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From: Vickie Patton <vpatton@edf.org>  
To: Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: FW: Additional IEA material  
Date: Tue Jan 03 2012 16:22:25 EST  
Attachments: executive\_summary.pdf  
WEO-2011\_Cozzi\_Lock-insideevent.ppt

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fyi

From: Hawkins, Dave [mailto:dhawkins@nrdc.org]  
Sent: Friday, December 16, 2011 5:58 AM  
To: Liz Perera; John.Coequyt@sierraclub.org; Doniger, David; mendelsonj@nwf.org; Mark MacLeod; Vickie Patton; joanne.spalding@sierraclub.org; Marchant Wentworth; Lexi Shultz; Rachel Cleetus  
Subject: FW: Additional IEA material

Here is the second of two emails I sent to Dom Mancini at OMB. I also sent him the Executive Summary from the IEA Report (attached)

David

From: Hawkins, Dave  
Sent: Friday, December 16, 2011 7:41 AM  
To: 'dmancini@omb.eop.gov'  
Subject: Additional IEA material

Dominic,

Attached please find a slide set from IEA presented at last week's Climate meeting in Durban.

Slide 5 illustrates an example of the added costs to society if countries invest more in high-emitting coal capacity in the near-term. The text below from the full IEA report explains the scenario.

To summarize, continuing investment in coal power plants lacking CCS through 2015 (compared to acting now to end additional investments in such facilities) avoids about \$150 billion in global investments that would be made in the no delay scenario. But to compensate for the emissions added by such short-sighted investment will require an additional \$650 billion in global expenditures after 2020.

While this example is a global one, the same phenomenon will apply in the US: for any path the US adopts to limit cumulative emissions to a level consistent with preserving 450 ppm as an option, continuing to invest in high carbon power sources even for a few more years will result in substantially higher added costs later.

I'd be pleased to discuss this further.

David Hawkins

IEA, WEO 2011 (p. 235):

The cost of lock-in

If action is delayed until 2015, emissions from the power sector will overshoot the trajectory of the 450 Scenario in the early years of the projection period. These additional emissions must be offset by reductions later in the period. The additional abatement could, theoretically, occur in the power sector or elsewhere. Our analysis shows that in most countries the power sector still offers the cheapest abatement. We therefore assume that the additional reductions will be made in this sector. Postponing the compensating abatement until later than 2035 means that emissions would have to become negative, i.e. widespread use of biomass generation with CCS would be needed. As this technology is not proven at commercial scale, and therefore cannot be counted upon, we assume that the majority of the additional power sector abatement takes place, over the Outlook period, by other means. Given a delay in action to 2015, containing cumulative emissions from the power sector to a level compatible with stabilisation of the atmospheric concentration of greenhouse gases at 450 ppm CO<sub>2</sub>-eq over the Outlook period would require the following actions, from the cheapest to the most expensive:

! Retrofitting plants with CCS, when this is more economic than early retirement. In this case, the associated capital cost is the cost of retrofit (and there may be some additional operating costs).

! Shut down of plants that are beyond their economic lifetime, but still safe and profitable to operate, i.e. plants for which the initial investment has been repaid. This will reduce revenues compared to the New Policies Scenario.

! Retirement of plants before the end of their economic lifetime, i.e. before the upfront

investment has been fully recovered. In this case there will be a lost sunk cost, as well as a loss of revenues.

! Additional investment in low-carbon generation.

Delay in action results in some financial savings in the early years of the projection period, relative to the 450 Scenario. While there is increased investment in fossil fuel-based generation, particularly in cheaper, inefficient plants, there would be a reduction in investment in highly efficient and low-carbon plants. Over the decade 2011 to 2020, we estimate that the net effect would be to avoid \$150 billion of investment, relative to the 450 Scenario. After 2020, the additional abatement to compensate for higher emissions earlier in the period means that more low-carbon plants and equipment need to be installed, relative to the 450 Scenario, with a net effect of adding \$650 billion to investment over the period 2021 to 2035 (Figure 6.16). In other words, for every \$1 of avoided investment between 2011 and 2020, either through reduced low-carbon investment or adoption of cheaper fossil-fuel investment options, an additional \$4.3 would need to be spent between 2021 and 2035 to compensate.

From: Hawkins, Dave  
Sent: Thursday, December 15, 2011 4:00 PM  
To: dmancini@omb.eop.gov  
Subject: IEA WEO analysis

Dominic,

Thank you for meeting with us today. As promised, here is the Executive Summary of the International Energy Agency's World Energy Outlook for 2011. The calculation that I mentioned is described on page 2 of the Executive Summary.

David Hawkins

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Owner: Vickie Patton <vpatton@edf.org>  
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International  
Energy Agency

# WORLD ENERGY OUTLOOK

**EXECUTIVE SUMMARY**

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## INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its primary mandate was – and is – two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its 28 member countries and beyond. The IEA carries out a comprehensive programme of energy co-operation among its member countries, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency's aims include the following objectives:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
  - Improve transparency of international markets through collection and analysis of energy data.
    - Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
    - Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

IEA member countries:

Australia  
Austria  
Belgium  
Canada  
Czech Republic  
Denmark  
Finland  
France  
Germany  
Greece  
Hungary  
Ireland  
Italy  
Japan  
Korea (Republic of)  
Luxembourg  
Netherlands  
New Zealand  
Norway  
Poland  
Portugal  
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The European Commission also participates in the work of the IEA

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## EXECUTIVE SUMMARY

### **“If we don’t change direction soon, we’ll end up where we’re heading”**

**There are few signs that the urgently needed change in direction in global energy trends is underway.** Although the recovery in the world economy since 2009 has been uneven, and future economic prospects remain uncertain, global primary energy demand rebounded by a remarkable 5% in 2010, pushing CO<sub>2</sub> emissions to a new high. Subsidies that encourage wasteful consumption of fossil fuels jumped to over \$400 billion. The number of people without access to electricity remained unacceptably high at 1.3 billion, around 20% of the world’s population. Despite the priority in many countries to increase energy efficiency, global energy intensity worsened for the second straight year. Against this unpromising background, events such as those at the Fukushima Daiichi nuclear power plant and the turmoil in parts of the Middle East and North Africa (MENA) have cast doubts on the reliability of energy supply, while concerns about sovereign financial integrity have shifted the focus of government attention away from energy policy and limited their means of policy intervention, boding ill for agreed global climate change objectives.

**This *Outlook* assesses the threats and opportunities facing the global energy system based on a rigorous quantitative analysis of energy and climate trends.** The analysis includes three global scenarios and multiple case studies. The central scenario for this *Outlook* is the New Policies Scenario, in which recent government policy commitments are assumed to be implemented in a cautious manner – even if they are not yet backed up by firm measures. Comparison with the results of the Current Policies Scenario, which assumes no new policies are added to those in place as of mid-2011, illustrates the value of these commitments and plans. From another angle, comparison is also instructive with the 450 Scenario, which works back from the international goal of limiting the long-term increase in the global mean temperature to two degrees Celsius (2°C) above pre-industrial levels, in order to trace a plausible pathway to that goal. **The wide difference in outcomes between these three scenarios underlines the critical role of governments to define the objectives and implement the policies necessary to shape our energy future.**

### **Short-term uncertainty does little to alter the longer-term picture**

**Despite uncertainty over the prospects for short-term economic growth, demand for energy in the New Policies Scenario grows strongly, increasing by one-third from 2010 to 2035.** The assumptions of a global population that increases by 1.7 billion people and 3.5% annual average growth in the global economy generate ever-higher demand for energy services and mobility. A lower rate of global GDP growth in the short-term than assumed in this *Outlook* would make only a marginal difference to longer-term trends.

**The dynamics of energy markets are increasingly determined by countries outside the OECD.** Non-OECD countries account for 90% of population growth, 70% of the increase in economic output and 90% of energy demand growth over the period from 2010 to 2035.

China consolidates its position as the world's largest energy consumer: in 2035 it consumes nearly 70% more energy than the United States, the second-largest consumer, even though, by then, per-capita energy consumption in China is still less than half the level in the United States. The rates of growth in energy consumption in India, Indonesia, Brazil and the Middle East are even faster than in China.

**Global investment in energy supply infrastructure of \$38 trillion (in year-2010 dollars) is required over the period 2011 to 2035.** Almost two-thirds of the total investment is in countries outside of the OECD. Oil and gas collectively account for almost \$20 trillion, as both the need for upstream investment and the associated cost rise in the medium and long term. The power sector claims most of the remainder, with over 40% of this being for transmission and distribution networks.

**The age of fossil fuels is far from over, but their dominance declines.** Demand for all fuels rises, but the share of fossil fuels in global primary energy consumption falls slightly from 81% in 2010 to 75% in 2035; natural gas is the only fossil fuel to increase its share in the global mix over the period to 2035. In the power sector, renewable energy technologies, led by hydropower and wind, account for half of the new capacity installed to meet growing demand.

## Steps in the right direction, but the door to 2°C is closing

**We cannot afford to delay further action to tackle climate change** if the long-term target of limiting the global average temperature increase to 2°C, as analysed in the 450 Scenario, is to be achieved at reasonable cost. In the New Policies Scenario, the world is on a trajectory that results in a level of emissions consistent with a long-term average temperature increase of more than 3.5°C. Without these new policies, we are on an even more dangerous track, for a temperature increase of 6°C or more.

**Four-fifths of the total energy-related CO<sub>2</sub> emissions permissible by 2035 in the 450 Scenario are already "locked-in" by our existing capital stock** (power plants, buildings, factories, etc.). If stringent new action is not forthcoming by 2017, the energy-related infrastructure then in place will generate all the CO<sub>2</sub> emissions allowed in the 450 Scenario up to 2035, leaving no room for additional power plants, factories and other infrastructure unless they are zero-carbon, which would be extremely costly. Delaying action is a false economy: for every \$1 of investment avoided in the power sector before 2020 an additional \$4.3 would need to be spent after 2020 to compensate for the increased emissions.

**New energy efficiency measures make a difference, but much more is required.** Energy efficiency improves in the New Policies Scenario at a rate twice as high as that seen over the last two-and-a-half decades, stimulated by tighter standards across all sectors and a partial phase-out of subsidies to fossil fuels. In the 450 Scenario, we need to achieve an even higher pace of change, with efficiency improvements accounting for half of the additional reduction in emissions. The most important contribution to reaching energy security and climate goals comes from the energy that we do not consume.

## Rising transport demand and upstream costs reconfirm the end of cheap oil

**Short-term pressures on oil markets may be eased by slower economic growth and by the expected return of Libyan oil to the market, but trends on both the oil demand and supply sides maintain pressure on prices.** We assume that the average IEA crude oil import price remains high, approaching \$120/barrel (in year-2010 dollars) in 2035 (over \$210/barrel in nominal terms) in the New Policies Scenario although, in practice, price volatility is likely to remain.

**All of the net increase in oil demand comes from the transport sector in emerging economies, as economic growth pushes up demand for personal mobility and freight.** Oil demand (excluding biofuels) rises from 87 million barrels per day (mb/d) in 2010 to 99 mb/d in 2035. The total number of passenger cars doubles to almost 1.7 billion in 2035. Sales in non-OECD markets exceed those in the OECD by 2020, with the centre of gravity of car manufacturing shifting to non-OECD countries before 2015. The rise in oil use comes despite some impressive gains in fuel economy in many regions, notably for passenger vehicles in Europe and for heavy freight in the United States. Alternative vehicle technologies emerge that use oil much more efficiently or not at all, such as electric vehicles, but it takes time for them to become commercially viable and penetrate markets. With limited potential for substitution for oil as a transportation fuel, the concentration of oil demand in the transport sector makes demand less responsive to changes in the oil price (especially where oil products are subsidised).

**The cost of bringing oil to market rises as oil companies are forced to turn to more difficult and costly sources to replace lost capacity and meet rising demand.** Production of conventional crude oil – the largest single component of oil supply – remains at current levels before declining slightly to around 68 mb/d by 2035. To compensate for declining crude oil production at existing fields, 47 mb/d of gross capacity additions are required, twice the current total oil production of all OPEC countries in the Middle East. A growing share of output comes from natural gas liquids (over 18 mb/d in 2035) and unconventional sources (10 mb/d). The largest increase in oil production comes from Iraq, followed by Saudi Arabia, Brazil, Kazakhstan and Canada. Biofuels supply triples to the equivalent of more than 4 mb/d, bolstered by \$1.4 trillion in subsidies over the projection period.

**Oil imports to the United States, currently the world's biggest importer, drop as efficiency gains reduce demand and new supplies such as light tight oil are developed, but increasing reliance on oil imports elsewhere heightens concerns about the cost of imports and supply security.** Four-fifths of oil consumed in non-OECD Asia comes from imports in 2035, compared with just over half in 2010. Globally, reliance grows on a relatively small number of producers, mainly in the MENA region, with oil shipped along vulnerable supply routes. In aggregate, the increase in production from this region is over 90% of the required growth in world oil output, pushing the share of OPEC in global production above 50% in 2035.

**A shortfall in upstream investment in the MENA region could have far-reaching consequences for global energy markets.** Such a shortfall could result from a variety of

factors, including higher perceived investment risks, deliberate government policies to develop production capacity more slowly or constraints on upstream domestic capital flows because priority is given to spending on other public programmes. If, between 2011 and 2015, investment in the MENA region runs one-third lower than the \$100 billion per year required in the New Policies Scenario, consumers could face a substantial near-term rise in the oil price to \$150/barrel (in year-2010 dollars).

## Golden prospects for natural gas

**There is much less uncertainty over the outlook for natural gas: factors both on the supply and demand sides point to a bright future, even a golden age, for natural gas.** Our *Outlook* reinforces the main conclusions of a *WEO* special report released in June 2011: gas consumption rises in all three scenarios, underlining how gas does well under a wide range of future policy directions. In the New Policies Scenario, demand for gas all but reaches that for coal, with 80% of the additional demand coming from non-OECD countries. Policies promoting fuel diversification support a major expansion of gas use in China; this is met through higher domestic production and through an increasing share of LNG trade and Eurasian pipeline imports. Global trade doubles and more than one-third of the increase goes to China. Russia remains the largest gas producer in 2035 and makes the largest contribution to global supply growth, followed by China, Qatar, the United States and Australia.

**Unconventional gas now accounts for half of the estimated natural gas resource base and it is more widely dispersed than conventional resources, a fact that has positive implications for gas security.** The share of unconventional gas rises to one-fifth of total gas production by 2035, although the pace of this development varies considerably by region. The growth in output will also depend on the gas industry dealing successfully with the environmental challenges: a golden age of gas will require golden standards for production. Natural gas is the cleanest of the fossil fuels, but increased use of gas in itself (without carbon capture and storage) will not be enough to put us on a carbon emissions path consistent with limiting the rise in average global temperatures to 2°C.

## Renewables are pushed towards centre stage

**The share of non-hydro renewables in power generation increases from 3% in 2009 to 15% in 2035, underpinned by annual subsidies to renewables that rise almost five-times to \$180 billion.** China and the European Union drive this expansion, providing nearly half of the growth. Even though the subsidy cost per unit of output is expected to decline, most renewable-energy sources need continued support throughout the projection period in order to compete in electricity markets. While this will be costly, it is expected to bring lasting benefits in terms of energy security and environmental protection. Accommodating more electricity from renewable sources, sometimes in remote locations, will require additional investment in transmission networks amounting to 10% of total transmission investment: in the European Union, 25% of the investment in transmission networks is needed for this purpose. The contribution of hydropower to global power generation remains at around 15%, with China, India and Brazil accounting for almost half of the 680 gigawatts of new capacity.

## Treading water or full steam ahead for coal?

**Coal has met almost half of the increase in global energy demand over the last decade. Whether this trend alters and how quickly is among the most important questions for the future of the global energy economy.** Maintaining current policies would see coal use rise by a further 65% by 2035, overtaking oil as the largest fuel in the global energy mix. In the New Policies Scenario, global coal use rises for the next ten years, but then levels off to finish 25% above the levels of 2009. Realisation of the 450 Scenario requires coal consumption to peak well before 2020 and then decline. The range of projections for coal demand in 2035 across the three scenarios is nearly as large as total world coal demand in 2009. The implications of policy and technology choices for the global climate are huge.

**China's consumption of coal is almost half of global demand and its Five-Year Plan for 2011 to 2015, which aims to reduce the energy and carbon intensity of the economy, will be a determining factor for world coal markets.** China's emergence as a net coal importer in 2009 led to rising prices and new investment in exporting countries, including Australia, Indonesia, Russia and Mongolia. In the New Policies Scenario, the main market for traded coal continues to shift from the Atlantic to the Pacific, but the scale and direction of international trade flows are highly uncertain, particularly after 2020. It would take only a relatively small shift in domestic demand or supply for China to become a net-exporter again, competing for markets against the countries that are now investing to supply its needs. India's coal use doubles in the New Policies Scenario, so that India displaces the United States as the world's second-largest coal consumer and becomes the largest coal importer in the 2020s.

**Widespread deployment of more efficient coal-fired power plants and carbon capture and storage (CCS) technology could boost the long-term prospects for coal, but there are still considerable hurdles.** If the average efficiency of all coal-fired power plants were to be five percentage points higher than in the New Policies Scenario in 2035, such an accelerated move away from the least efficient combustion technologies would lower CO<sub>2</sub> emissions from the power sector by 8% and reduce local air pollution. Opting for more efficient technology for new coal power plants would require relatively small additional investments, but improving efficiency levels at existing plants would come at a much higher cost. In the New Policies Scenario, CCS plays a role only towards the end of the projection period. Nonetheless, CCS is a key abatement option in the 450 Scenario, accounting for almost one-fifth of the additional reductions in emissions that are required. If CCS is not widely deployed in the 2020s, an extraordinary burden would rest on other low-carbon technologies to deliver lower emissions in line with global climate objectives.

## Second thoughts on nuclear would have far-reaching consequences

**Events at Fukushima Daiichi have raised questions about the future role of nuclear power, although it has not changed policies in countries such as China, India, Russia and Korea that are driving its expansion.** In the New Policies Scenario, nuclear output rises by more than 70% over the period to 2035, only slightly less than projected last year. However, we

also examine the possible implications of a more substantial shift away from nuclear power in a Low Nuclear Case, which assumes that no new OECD reactors are built, that non-OECD countries build only half of the additions projected in our New Policies Scenario and that the operating lifespan of existing nuclear plants is shortened. While creating opportunities for renewables, such a low-nuclear future would also boost demand for fossil fuels: the increase in global coal demand is equal to twice the level of Australia's current steam coal exports and the rise in gas demand is equivalent to two-thirds of Russia's current natural gas exports. The net result would be to put additional upward pressure on energy prices, raise additional concerns about energy security and make it harder and more expensive to combat climate change. The consequences would be particularly severe for those countries with limited indigenous energy resources which have been planning to rely relatively heavily on nuclear power. It would also make it considerably more challenging for emerging economies to satisfy their rapidly growing demand for electricity.

### **The world needs Russian energy, while Russia needs to use less**

**Russia's large energy resources underpin its continuing role as a cornerstone of the global energy economy over the coming decades.** High prospective demand and international prices for fossil fuels might appear to guarantee a positive outlook for Russia, but the challenges facing Russia are, in many ways, no less impressive than the size of its resources. Russia's core oil and gas fields in Western Siberia will decline and a new generation of higher-cost fields need to be developed, both in the traditional production areas of Western Siberia and in the new frontiers of Eastern Siberia and the Arctic. A responsive Russian fiscal regime will be needed to provide sufficient incentives for investment. Oil production plateaus around 10.5 mb/d before starting a slight decline to 9.7 mb/d in 2035; gas production increases by 35% to 860 billion cubic metres (bcm) in 2035, with the Yamal peninsula becoming the new anchor of Russian supply.

**As the geography of Russian oil and gas production changes, so does the geography of export.** The majority of Russia's exports continue to go westwards to traditional markets in Europe, but a shift towards Asian markets gathers momentum. Russia gains greater diversity of export revenues as a result: the share of China in Russia's total fossil-fuel export earnings rises from 2% in 2010 to 20% in 2035, while the share of the European Union falls from 61% to 48%.

**Russia aims to create a more efficient economy, less dependent on oil and gas, but needs to pick up the pace of change.** If Russia increased its energy efficiency in each sector to the levels of comparable OECD countries, it could save almost one-third of its annual primary energy use, an amount similar to the energy used in one year by the United Kingdom. Potential savings of natural gas alone, at 180 bcm, are close to Russia's net exports in 2010. New energy efficiency policies and continued price reforms for gas and electricity bring some improvements but, in our analysis, do not unlock more than a part of Russia's efficiency potential. Faster implementation of efficiency improvements and energy market reforms would accelerate the modernisation of the Russian economy and thereby loosen its dependency on movements in international commodity prices.

## Achieving energy for all will not cost the earth

**We estimate that, in 2009, around \$9 billion was invested globally to provide first access to modern energy, but more than five-times this amount, \$48 billion, needs to be invested each year if universal access is to be achieved by 2030.** Providing energy access for all by 2030 is a key goal announced by the UN Secretary-General. Today, 1.3 billion people do not have electricity and 2.7 billion people still rely on the traditional use of biomass for cooking. The investment required is equivalent to around 3% of total energy investment to 2030. Without this increase, the global picture in 2030 is projected to change little from today and in sub-Saharan Africa it gets worse. Some existing policies designed to help the poorest miss their mark. Only 8% of the subsidies to fossil-fuel consumption in 2010 reached the poorest 20% of the population.

**International concern about the issue of energy access is growing. The United Nations has declared 2012 to be the “International Year of Sustainable Energy for All” and the Rio+20 Summit represents an important opportunity for action.** More finance, from many sources and in many forms, is needed to provide modern energy for all, with solutions matched to the particular challenges, risks and returns of each category of project. Private sector investment needs to grow the most, but this will not happen unless national governments adopt strong governance and regulatory frameworks and invest in capacity building. The public sector, including donors, needs to use its tools to leverage greater private sector investment where the commercial case would otherwise be marginal. Universal access by 2030 would increase global demand for fossil fuels and related CO<sub>2</sub> emissions by less than 1%, a trivial amount in relation to the contribution made to human development and welfare.



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# WORLD ENERGY OUTLOOK 2011

*World Energy Outlook 2011* brings together the latest data, policy developments, and the experience of another year to provide robust analysis and insight into global energy markets, today and for the next 25 years. This edition of the IEA's flagship WEO publication gives the latest energy demand and supply projections for different future scenarios, broken down by country, fuel and sector. It also gives special focus to such topical energy sector issues as:

- **Russia's energy prospects** and their implications for global markets.
- The role of **coal in driving economic growth** in an emissions-constrained world.
- The implications of a possible **delay in oil and gas sector investment** in the Middle East and North Africa.
- How **high-carbon infrastructure "lock-in"** is making the 2°C climate change goal more challenging and expensive to meet.
- The scale of **fossil fuel subsidies** and **support for renewable energy** and their impact on energy, economic and environmental trends.
- A "**Low Nuclear Case**" to investigate what a rapid slowdown in the use of nuclear power would mean for the global energy landscape.
- The scale and type of investment needed to provide **modern energy to the billions of the world's poor** that do not have it.

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# WORLD ENERGY OUTLOOK

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## World Energy Outlook 2011

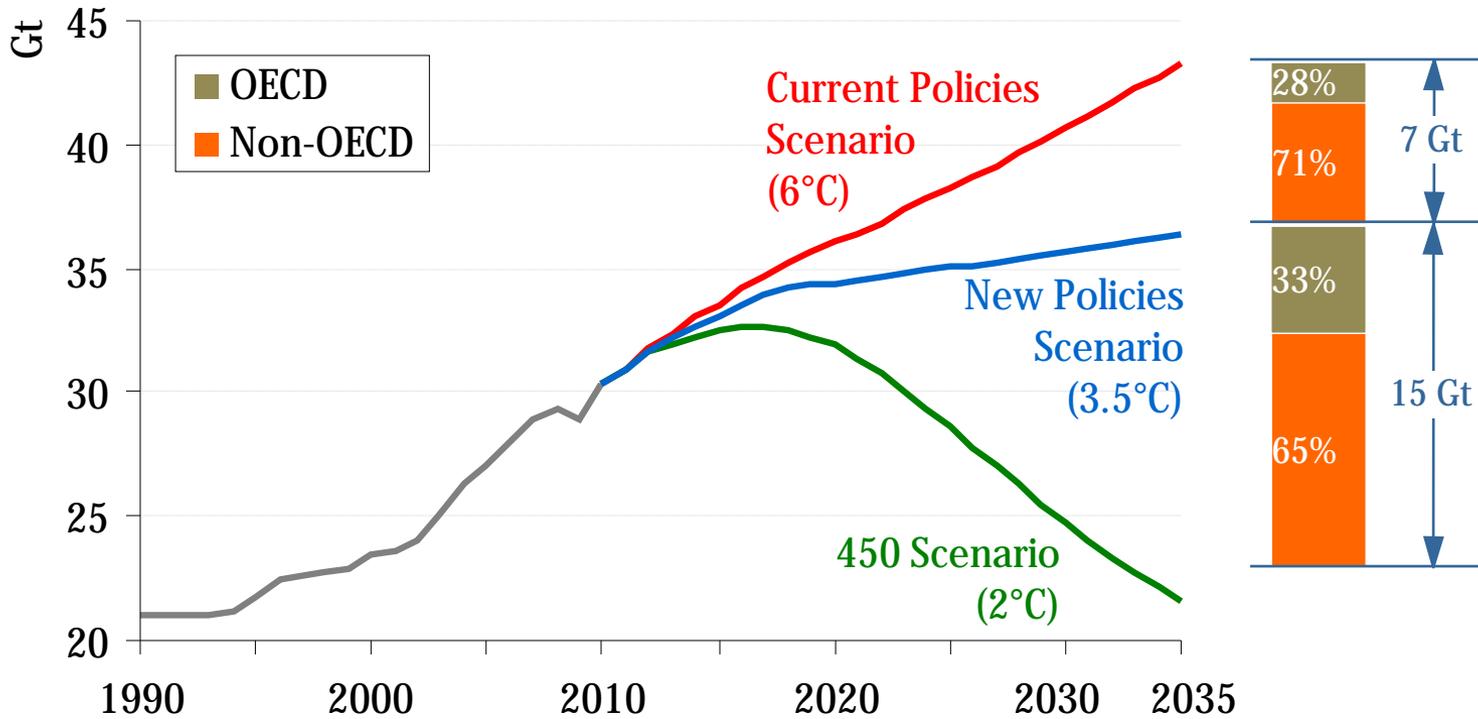
**Laura Cozzi**  
**Deputy Head, Office of the Chief Economist**  
**Durban, COP17, 5 December 2011**

Welcome and good morning/afternoon/evening...

During the next 25/30 minutes I will be presenting the key findings of the WEO-2011.

# Energy policies will determine long-term temperature increase

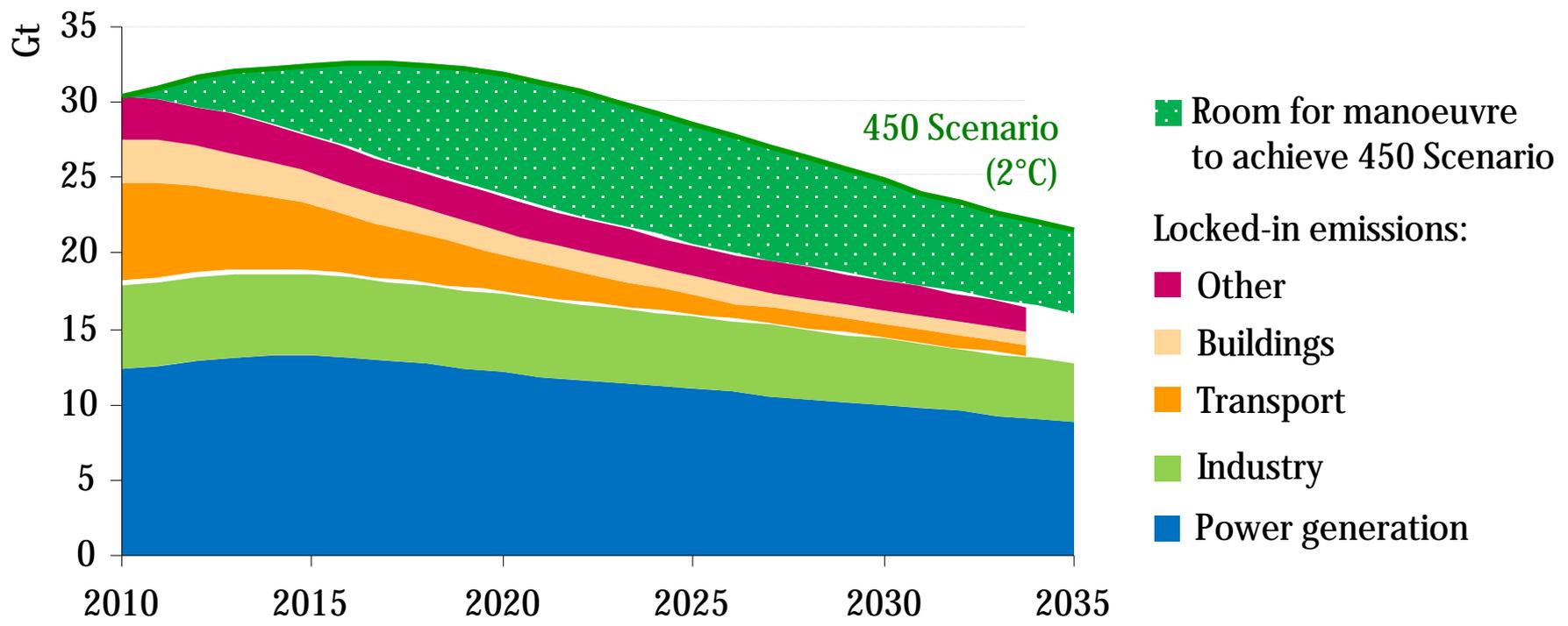
**World energy-related CO<sub>2</sub> emissions by scenario**



**Without further energy and climate policy action, we are committing to a trajectory leading to up to 6 degrees long-term temperature increase**

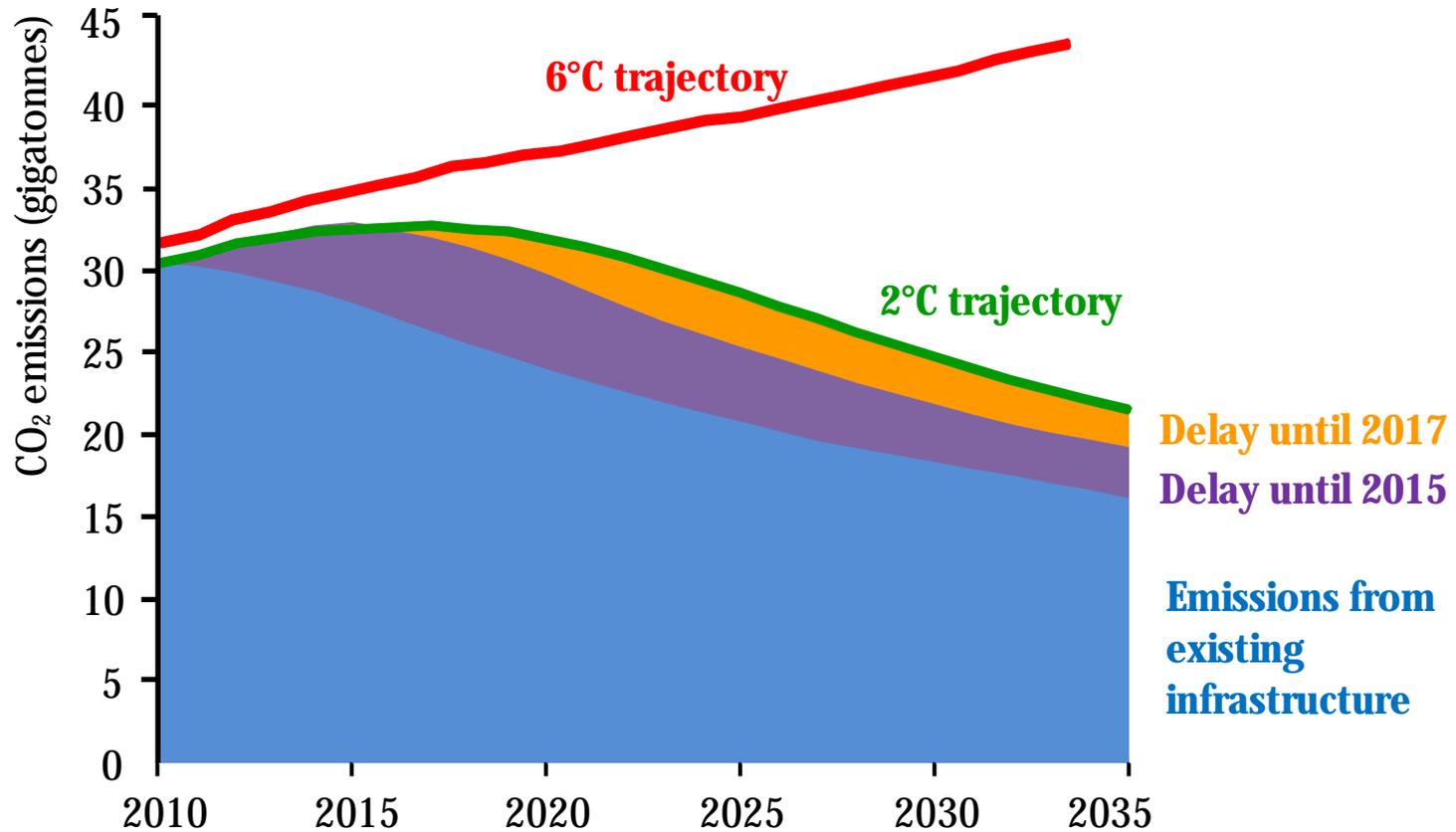
# Lock-in of current infrastructure

**World energy-related CO2 emissions from locked-in infrastructure in 2010 & room to manoeuvre to achieve the 450 Scenario**



**Infrastructure currently in place or being built accounts for 80% of permissible emissions under a 450 Scenario, significantly limiting the room of manoeuvre**

# The door to 2°C is closing, but will we be “locked-in” ?



Without further action, by 2017 all CO<sub>2</sub> emissions permitted in the 450 Scenario will be “locked-in” by existing power plants, factories, buildings, etc

## **ANIMATION**

CO<sub>2</sub> emissions in the New Policies Scenario put us on track for a dangerous level of climate change, inducing a temperature increase of more than 3.5°C. Without these new policies, current trends put us on an even more worrying track, for a temperature rise of 6°C

WEO-2011 also presents a 450 Scenario that sets out what it would take to reach the international goal of limiting the long-term increase to 2°C

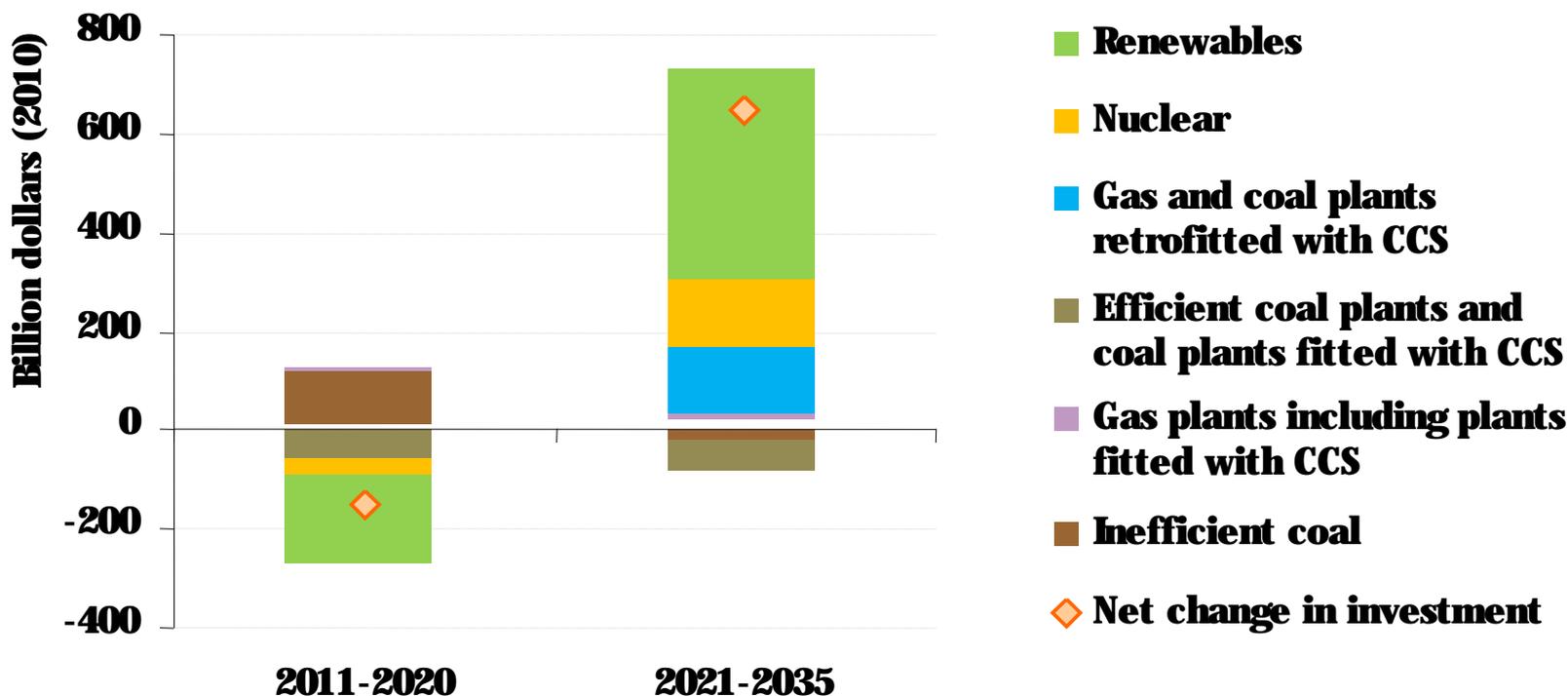
This year, we are here to warn that the door to achieve 2°C, is quickly closing.

– 80% of the total CO<sub>2</sub> emissions permissible by 2035 are already “locked-in” by our existing capital stock (power plants, buildings and factories).

– Without serious new efforts by 2015, the energy-related infrastructure in place will generate more than 90% of the allowed emissions by 2035.

# Delaying action is a false economy

**Change in investment in power generation in the Delayed 450 Case, relative to the 450 Scenario**



*For every \$1 of avoided investment in the power sector before 2020, an additional \$4.3 would need to be spent after 2020*

# What implications for energy policy?

**Power sector – which set of policies can trigger early retirement of as much as 45% of global fossil-fuel capacity?**

**Industry – how to incentivize investment in more efficient productions and CCS in developing countries?**

**Leave the fossils under ground?**

- **Emissions budget to 2050 for 2 degrees = 1176 Gt**
- **Potential emissions from burning remaining reserves = 2423 Gt**

As the presentation has just highlighted, there are few signs that the urgently needed shift in global energy trends is underway or forthcoming. Quite simply, if we don't change direction soon, we'll end up where we're heading – which is towards an unsustainable energy future

We have heard that global energy demand is set continue its increase with rising prosperity and population.

Oil supply will become more geographically concentrated, intensifying economic and energy security risks.

Natural gas is set to play an even more prominent role in the global energy mix, coal continues to support development in emerging economies.

---

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Bcc:  
Subject: ICYMI -- NYT: Drilling Critics Face a Divide Over the Goal of Their Fight  
Date: Tue Jan 10 2012 07:59:13 EST  
Attachments:

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Drilling Critics Face a Divide Over the Goal of Their Fight

By PETER APPLEBOME

With a deadline looming this week for the public to weigh in on gas drilling in New York State, the antifracking movement itself has become divided over what its goal should be: securing the nation's toughest regulations, or winning an outright ban?

The question is pitting brand-name organizations like the Sierra Club, the Natural Resources Defense Council and the Nature Conservancy, which are working nationwide for stringent rules, against an ever-growing universe of grass-roots groups demanding a prohibition on the kind of intensive shale gas drilling being proposed in the state. And it is reflecting the tightrope being walked by Gov. Andrew M. Cuomo between an economically potent industry and many landowners eager for drilling on one side, and on the other a movement that has become one of the most powerful environmental and citizens campaigns in state history.

Whatever the result, the split among the industry critics reflects how the opposition has exponentially hardened since fracking emerged as a statewide issue in 2008.

"When we started out, what we wanted was more information on what this means for New York," said Wes Gillingham, program director for Catskill Mountainkeeper, one of the first groups to focus on the issue. "No one had any thought about calling for a ban. But the more you find out about gas drilling and how it's been practiced by the industry today, the more you realize it can't be done safely. It would just be a disaster for New York State."

Mr. Gillingham said he had worked closely and effectively with national groups. Still, he said: "For the average person on the ground over the Marcellus Shale who is living with this issue, the fact that the national groups are not saying, 'Not here, no way,' is shocking to them."

Wednesday is the deadline for comments about the state's proposed drilling regulations and

environmental impact statement to guide gas development in New York. So far, the State Department of Environmental Conservation has received 20,800 comments, far more than any other issue in its history. Officials say they do not know of any other issue that received 1,000 comments.

Drilling could start up after the state adopts new regulations, perhaps this spring. After previously indicating his agency expected drilling to resume at some point this year, Joseph Martens, commissioner of the conservation department, said in October that it was not clear whether any drilling would proceed this year.

Representatives of national groups, like Kate Sinding of the Natural Resources Defense Council and Roger Downs of the Sierra Club, are widely regarded as key players who asked the right questions and provided the technical expertise that helped produce what has, in effect, been an almost four-year moratorium on new gas drilling in New York State. At issue is a process called high-volume hydraulic fracturing, or hydrofracking, which involves injecting millions of gallons of chemically treated water underground to break up shale formations and release natural gas.

Questions about the safety of the process have helped move some environmentalists from an enthusiastic embrace of gas to a much more measured one that still sees it as an essential part of the available energy mix.

"I guess I would say that, in fairness, the N.R.D.C.'s position has evolved — in New York and more broadly as well," Ms. Sinding said. "So we're very concerned not only with having the best regulations in place, but with the extent to which drilling is going to be allowed to happen at all in the state.

"But we haven't called for a ban because we continue to believe that, in all likelihood, some amount of drilling is going to happen, and it's important to be present at the table so we have regulations that ensure that whatever is done will be done as safely as possible."

Many of those involved said it was unlikely that Governor Cuomo would turn his back on the gas industry and ban drilling in the rich Marcellus and Utica shale deposits covering much of the economically depressed southern and western reaches of the state. But a push for local and statewide bans has become an increasing focus of the opposition.

Drilling critics have far outnumbered supporters during the public comment period, but the conservation department has also heard from the gas industry and landowners who hoped to lease their property for drilling. Many of them say New York has already delayed for too long, and is paying a price.

"I think the governor's office recognizes that this has gotten much beyond the science and has become an emotional issue or a cause célèbre for certain elements," said Dennis Holbrook, executive vice president of Norse Energy in Buffalo, who has been active in the industry in the state for 35 years. "It's time to move the process forward."

National environmental groups have a complicated history with natural gas. Several, particularly the Sierra Club, have seen it as a bridge fuel toward renewable sources that was cleaner than coal and oil, and a preferred alternative to common mining practices. The relationship between the gas industry and some environmentalists has frayed as the potential impacts of gas drilling, particularly the effects on drinking water supplies, have become apparent in the Western States and in Pennsylvania. Now some former advocates of gas see it not just as an alternative to oil and coal, but also as something crowding out renewable resources like wind and solar power.

But many fracking critics still see the old ties at work.

Claire Sandberg was one of the two founders of Frack Action, which started up in 2010 largely because some antifracking activists worried that established environmentalists seemed resigned to living with gas drilling.

"I think the national groups got themselves in a real bind," she said. "They entered into a marriage of convenience with natural gas because it was too daunting to try to take on coal and gas at the same time. Now they find themselves with a mutiny on their hands."

"It's time for the environmental movement to grow a spine," she added.

Many close to the process say that the fight will become far more complicated than simply deciding whether to ban or to regulate. Options in between could include a ban until further studies are done; rules so tough they amount to a de facto prohibition; bans in parts of the state, like those close to water supplies; regulations that would keep out all but the most responsible companies; and allowing drilling to resume with a pilot program in an area with a history of drilling.

Some involved with the issue say that despite differences, diverse fracking opponents have found ways to work together, and that they will almost certainly need the technical knowledge and the procedural savvy of longtime environmentalists, as well as the passion of the grass-roots groups.

"You have a lot of bricks being thrown at the national organizations, but I don't really think there's as much difference as some people want to see," said Bruce Ferguson, a founding member of Catskill Citizens for Safe Energy, which supports a ban. "No one wants to see fracking go forward under the current regime or the way it's being done in Pennsylvania. Everyone agrees on that."

--

Melissa D. DeRosa  
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Subject: Court Vacates EPA Stay Of Combustion Air Rules But Few Effects Seen  
Date: Thu Jan 12 2012 07:15:55 EST  
Attachments:

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Daily News 'INSIDEEPA.COM'

Court Vacates EPA Stay Of Combustion Air Rules But Few Effects Seen

Posted: January 10, 2012

A federal district court has vacated and remanded EPA's indefinite stay of its controversial boiler and incinerator air rules after finding the agency failed to adequately justify the delay -- a mixed ruling for activists as it means the delayed rules are again in effect though EPA is slated to amend them in April 2012, well before they take effect as early as 2014.

Although the court found EPA's stay of the combustion rule package was unlawful in this case, the ruling suggests EPA could issue such a stay in the future if it follows the right procedures.

In a Jan. 9 opinion, Judge Paul Friedman of the U.S. District Court for the District of Columbia ruled that the agency's self-imposed stay of the air rules is unlawful because the agency did not meet a previously established four-part test for a stay that it was bound to use. Friedman also said that the agency erred in failing to base its stay on pending legal challenges to those rules, as required under section 705 of the Administrative Procedure Act (APA).

The ruling means that EPA's boiler air toxics rule and a related emissions rule for commercial and industrial solid waste incinerators (CISWI) are once again in effect, sources say, though existing facilities do not have to comply with the rules until 2014 or 2015 at the earliest. Sources say the ruling will have little short-term effect given the 2014-2015 compliance date, and EPA has announced plans to revise and delay those deadlines to 2015 or 2016.

In a Jan. 10 statement, Earthjustice said the court rejected EPA's "attempt to suspend health protections against the toxic pollution from industrial boilers. . . . The health protections will save thousands of lives every year by reducing the major amounts of toxic air pollution such as mercury, lead, arsenic, and chromium that these plants emit."

But the American Forest & Paper Association (AF&PA) -- suing over the merits of the rules in the U.S. Court of Appeals for the District of Columbia Circuit -- issued a statement Jan. 10 saying the ruling reinforces the need to pass legislation delaying the rules in order to give EPA time to "fully analyze and prepare a new rule."

But prospects for a legislative fix are unclear at best, as several senators that previously supported the bill say they welcome the agency's December proposal to overhaul key provisions of the two rules.

EPA issued the final boiler and CISWI rules in February 2011, alongside an announcement it would reconsider several aspects of the rules to address industry concerns that the rules are unachievable.

In May the agency then issued a stay that halted the rules' implementation pending the outcome of either the lawsuit, or the reconsideration, depending on which occurs first. EPA proposed revised versions of the combustion rules in December, and has told the district court in briefs that it intends to issue final versions by April 2012.

Sierra Club and Earthjustice sued over the stay in the district court, saying EPA lacked authority under APA to issue the stay, and also arguing that the Clean Air Act does not allow stays pending reconsideration longer than three months. A Sierra Club source says, "I think we're happy with the decision," because it says the agency cannot issue indefinite stays of rules pending reconsideration.

EPA did not respond to a request for comment by press time.

#### Precedent For Stays

Ruling in the suit, *Sierra Club v. EPA*, Friedman said EPA's stay was arbitrary and capricious, and did not satisfy its or the court's own four-part test for stays. The agency is "bound by its own precedents to apply the four-part test for stays and injunctions unless it provides a reasoned decision for its change of position, which it has not done," according to Friedman. The judge said that EPA's use of APA section 705 authority for the stay also means that it was required to "justify the stay must be based on the underlying litigation in the court of appeals," but it did not.

Friedman said that stays initiated by the court or initiated by EPA are governed by the same criteria, which weighs the likelihood of plaintiffs succeeding in their suit, the prospects for the plaintiff or others to be irreparably harmed and the public interest in granting a stay. Ruling to vacate the stay, Friedman said EPA "neither employed nor mentioned" these criteria in its stay notice, and that the agency "has failed to advance any persuasive reason why it should be treated differently from a court when staying agency actions pending judicial review."

The court also finds that, "Even if EPA were not required as a matter of law to employ the four-part preliminary injunction test in granting a stay under Section 705 of the APA, EPA previously has done so in its review of requests to stay its rules," including its May 2011 Federal Register notice to deny in part and grant in part industry requests to reconsider air toxics and criteria pollutant rules for the Portland cement industry.

Given that the agency had previously weighed these various factors in determining whether or not to stay a rule, it was required to provide justification for why it departed from this precedent, the court says, which it failed to do. The court adds that "EPA therefore has failed . . . to come to grips with its prior precedents."

The court further finds that EPA -- when using APA section 705 authority to stay a rule pending judicial review when it finds that "justice so requires" -- is required to base the stay on pending legal challenges to the affected rule, but notes EPA did not cite the pending appeals court suits over the combustion rules when it stayed them.

Friedman said EPA's stay "makes no effort to ground the stay on the existence or consequences of the pending litigation in that court. In fact, the reasons that EPA provided in the delay notice for staying the effectiveness of the boiler rule and the CISWI rule have nothing to do with the judicial review of the boiler rule and the CISWI rule. The purpose and effect of the delay notice plainly are to stay the rules pending reconsideration, not litigation."

Friedman said EPA "must have articulated, at a minimum, a rational connection between its stay and the underlying litigation in the court of appeals." While EPA in briefs argued that the reasons provided in the stay notice "establish litigation risk" and thus justify the stay, the court notes that EPA says in the notice that it believes that the boiler and CISWI rules "reflect reasonable approaches consistent with the requirements of the Clean Air Act."

## Path For Future Stays

Although the court vacated EPA's stay, Friedman appears to have laid out a path for the agency to issue future stays of rules. Friedman rejected Sierra Club's claim that EPA lacked the authority to issue the notice under APA Section 705. Activists argued that EPA is limited by the Clean Air Act to issue stays pending reconsideration of no more than three months, and that the DC Circuit had barred such stays outside of that authority in 1992's Natural Resources Defense Council (NRDC) v. Reilly. But Friedman finds that NRDC addresses a different question than the one in the boiler case, and thus the case does not control the Sierra Club litigation over the boiler rule stay.

Friedman also said the Clean Air Act is ambiguous on whether the three-month limit on stays while it reconsiders regulations "eliminates EPA's authority to stay rules pending judicial review under section 705 of the APA" and does not specifically say whether APA section 705 does not apply to the relevant provisions of the air law.

Assessing Congress' intent, Friedman finds that APA section 705's omission from the list of exclusions in the Clean Air Act to be "significant," noting that the relevant section of the air law applies to both the court and EPA and "one cannot find a principled analysis by which to preserve the courts' authority to grant stays pending judicial review under section 705 while simultaneously concluding that the agency has been deprived of such authority."

Friedman said "the canon of statutory construction *expressio unius est exclusio alterius*" -- namely, that the express mention of one thing means the exclusion of others -- would offer that "when Congress enacts specific limitations in a general statute it is presumed to allow other circumstances not included in those limitations[.]"

Therefore, according to the ruling, "Congress did not intend to prohibit EPA or the federal courts from staying the effective date of emission standards pending judicial review under Section 705 of the APA."

Friedman also rejected activists' claims that EPA erred by failing to take notice and comment on its stay. Friedman said the stay "does not constitute a substantive rulemaking . . . and therefore is not subject to notice and comment requirements."

The court notes that "the central question . . . [is] whether the stay of the boiler rule and the CISWI rule constitutes substantive rulemaking" and that Sierra Club does not disagree with "EPA's characterization of the delay notice as 'a temporary procedural device . . . that maintains the status quo with respect to boilers and CISWI units.'" -- Bobby McMahan (bmcMahon@iwpnews.com)

Yours.....

Joel R Kupferman

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---

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Bcc:  
Subject: Tuesday Call  
Date: Mon Jan 23 2012 12:45:58 EST  
Attachments:

---

Sean and Mike,

Please tell your group we can use the same call in numbers for the call at 2:00 Eastern time tomorrow.

Call-in 866-410-9426

Code 2023537792

Perry

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Subject: Call w/Administrator Jackson - Thurs at 11:30 ET  
Date: Mon Jan 23 2012 15:26:32 EST  
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We understand the call with Administrator Jackson is scheduled for this Thursday at 11:30am ET.

This e-mail and any attachments may contain confidential and privileged information. If you are not the intended recipient, please notify the sender immediately by return e-mail, delete this e-mail and destroy any copies. Any dissemination or use of this information by a person other than the intended recipient is unauthorized and may be illegal.

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Cc: Kit Kennedy <kkennedy@nrdc.org>  
Bcc:  
Subject: Yale Environmental Protection Clinic Update  
Date: Wed Jan 25 2012 03:47:04 EST  
Attachments:

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Dear All,

I just wanted to give you a brief update on the status of our project selection process in the Yale Environmental Protection Clinic and to inform you of important first steps if your project is chosen.

Yesterday, the Clinic had its first joint-class meeting, where we discussed all of the project proposals with the students. The students must submit their rankings of their top project choices by this evening. We hope to finalize teams and let you know if your project has been selected by Friday at the very latest.

As Kit Kennedy mentioned in her original solicitation email, however, we have a quick turn-around between finalizing project teams and our first project team conference call with the sponsors of the chosen projects, which will take place on Monday, January 30. As such, we wanted to let you know that if your project is selected, we plan to schedule a call with you on Monday, January 30 between 12:00pm and 2:00pm. To the extent that you can try to leave this block of time available for a phone call, we would greatly appreciate it as it will make the meeting scheduling process go much more smoothly. Apologies in advance for the short notice and thank you for working with us to ensure the semester gets off to a smooth start!

Best,

Hayley Jade Fink

Joint J.D./M.E.M. 2013

Environmental Protection Clinic Teaching Fellow

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Subject: Cancellation of GE Litigation Conference Call and Meeting  
Date: Wed Feb 08 2012 12:41:49 EST  
Attachments:

---

To all:

Please note: Both the GE Prep Conference Call scheduled for February 13th and the Litigation Strategy scheduled for February 15th have been cancelled.

Thank you.

Caron D. Palladino

Executive Assistant

Office of Counsel to the Governor

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\*\*\*\*\*

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---

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Bcc:  
Subject: EPA's Respondent Brief in NRDC v. EPA, No. 08-1250 & consolidated cases (D.C. Cir.)  
  
Date: Mon Feb 27 2012 15:46:29 EST  
Attachments: ENV\_DEFENSE-#585286-v1-PM\_2\_5\_NSR\_(DC\_Cir)\_\_\_As-  
docketed\_EPA\_Proof\_Brief\_(without\_statutory\_addendum).PDF  
ENV\_DEFENSE-#585287-v1-PM\_2\_5\_NSR\_(DC\_Cir)\_\_\_As-  
docketed\_Statutory\_Addendum\_to\_EPA\_Brief.PDF

---

Everyone,

Attached are courtesy copies of EPA's Proof Brief and Statutory Addendum, which were filed today electronically.

Regards,

Brian H. Lynk  
Environmental Defense Section  
U.S. Department of Justice  
(202) 514-6187

---

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docketed\_EPA\_Proof\_Brief\_(without\_statutory\_addendum).PDF  
Last Modified: Mon Feb 27 15:46:29 EST 2012

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**ORAL ARGUMENT NOT YET SCHEDULED**

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IN THE UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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No. 08-1250  
(and consolidated cases)

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**NATURAL RESOURCES DEFENSE COUNCIL, and  
SIERRA CLUB,**

**Petitioners,**

**v.**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,**

**Respondent.**

---

On Petition for Review of Final Rules of the  
United States Environmental Protection Agency

---

**BRIEF OF RESPONDENT UNITED STATES  
ENVIRONMENTAL PROTECTION AGENCY**

---

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Attorneys for Respondent EPA

February 27, 2012

**UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

_____	)	
NATURAL RESOURCES DEFENSE	)	
COUNCIL, and SIERRA CLUB,	)	
	)	
Petitioners,	)	
	)	No. 08-1250
v.	)	(and consolidated cases)
	)	
UNITED STATES ENVIRONMENTAL	)	
PROTECTION AGENCY,	)	
	)	
Respondent.	)	
_____	)	

**CERTIFICATE AS TO PARTIES, RULINGS AND RELATED CASES**

I, the undersigned counsel for Respondent United States Environmental Protection Agency, hereby certify pursuant to Rule 28(a)(1) of the Rules of the United States Court of Appeals for the District of Columbia Circuit, to the best of my knowledge, information and belief, the following:

A. Parties and Amici

(i) Parties, intervenors, and amici who appeared below.

The requirement in Circuit Rule 28(a)(1)(A) to identify parties, intervenors and amici who appeared in the district court below is inapplicable because the instant petition seeks direct review of agency rulemaking.

(ii) Parties, intervenors, and amici in this Court.

**Petitioners:**

1. In Case No. 08-1250: Natural Resources Defense Council (“NRDC”) and Sierra Club
2. In Case No. 09-1102: NRDC and Sierra Club
3. In Case No. 11-1430: American Lung Association, Medical Advocates for Healthy Air, NRDC and Sierra Club

**Respondent:** United States Environmental Protection Agency (“EPA”)

**Intervenors:**

- National Environmental Development Association’s Clean Air Project
- Utility Air Regulatory Group
- Fine Particle Litigation Group
- National Petrochemical & Refiners Association and American Petroleum Institute
- National Cattlemen’s Beef Association

**Amici:** None

B. Rulings Under Review

Petitioners seek review of two final rules promulgated by EPA under the Clean Air Act, both of which govern implementation of the fine particulate matter (“PM<sub>2.5</sub>”) national ambient air quality standard originally established in 1997. See

72 Fed. Reg. 20,586 (Apr. 25, 2007) (“Clean Air Fine Particle Implementation Rule”); 73 Fed. Reg. 28,321 (May 16, 2008) (“Implementation of the New Source Review (NSR) Program for [PM<sub>2.5</sub>]”). These rules are included in the Addendum of Pertinent Statutes and Regulations to EPA’s Brief.

C. Related Cases

Case No. 07-1227 (and consolidated cases) is related. Petitioners in these consolidated cases challenge the “Clean Air Fine Particle Implementation Rule,” 72 Fed. Reg. 20,586. On June 27, 2011, Petitioners in Case No. 08-1250 moved jointly with EPA, and without opposition by any other party, to consolidate with Case No. 08-1250 certain common issues presented in Case No. 07-1227 so that they could be litigated together with Case No. 08-1250. The Court granted that motion on November 8, 2011. In all other respects, Case No. 07-1227 remains held in abeyance pending EPA’s consideration of an administrative petition requesting reconsideration of the Implementation Rule.

Dated: February 27, 2012

/s/ Brian H. Lynk  
Brian H. Lynk

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**GLOSSARY**

<u>ATA I</u>	<u>American Trucking Ass'ns v. EPA</u> , 175 F.3d 1027, 1056-57 (D.C. Cir.)
<u>ATA II</u>	<u>American Trucking Ass'ns v. EPA</u> 195 F.3d F.3d 4 (D.C. Cir. 1999)
<u>ATA III</u>	<u>American Trucking Ass'ns v. EPA</u> , 283 F.3d 355, 365 (D.C. Cir. 2002)
CAA or Act	Clean Air Act
EPA	United States Environmental Protection Agency
NAAQS	National Ambient Air Quality Standard
NO <sub>x</sub>	Oxides of Nitrogen
NSR	New Source Review
PM	Particulate Matter
PM <sub>2.5</sub>	Airborne particles generally less than or equal to 2.5 micrometers in diameter
PM <sub>10</sub>	Airborne particles generally less than or equal to 10 micrometers in diameter
PSD	Prevention of Significant Deterioration
RACM	Reasonable Available Control Measures
RACT	Reasonably Available Control Technology
RFP	Reasonable Further Progress
RTC	Response to Comments

SIP	State Implementation Plan
SO <sub>2</sub>	Sulfur Dioxide
SOA	Secondary Organic Aerosol
TSP	Total Suspended Particles
VOC	Volatile Organic Compound

## **JURISDICTION**

This case concerns two final rules promulgated by the United States Environmental Protection Agency (“EPA”) under the Clean Air Act (“CAA” or “Act”) governing implementation of the fine particulate matter (“PM<sub>2.5</sub>”) national ambient air quality standard (“NAAQS”) originally established in 1997. See 72 Fed. Reg. 20,586 (Apr. 25, 2007) (“Clean Air Fine Particle Implementation Rule”); 73 Fed. Reg. 28,321 (May 16, 2008) (“Implementation of the New Source Review (NSR) Program for [PM<sub>2.5</sub>]”).

EPA does not contest any party’s standing. 42 U.S.C. § 7607(b)(1) creates subject-matter jurisdiction. All petitions were timely filed, except that objections to a determination EPA originally published prior to the instant rulemaking are untimely. Infra Argument I.A.

## **STATUTES AND REGULATIONS**

An attached addendum contains all relevant provisions.

## **STATEMENT OF ISSUES**

1. Does the Act require, or in the alternative did EPA reasonably interpret the Act to allow, implementation of the PM<sub>2.5</sub> NAAQS under subpart 1 rather than subpart 4 of Part D of Title I, since the text of subpart 4 expressly applies to the coarse particulate matter (“PM<sub>10</sub>”) NAAQS?

2. Did EPA reasonably exercise its authority under 42 U.S.C. § 7602(g) to “identify” certain precursors as “air pollutants” presumptively subject to PM<sub>2.5</sub> NAAQS implementation and New Source Review requirements, while determining that the available scientific data supported the opposite presumption for other precursors?

### **STATEMENT OF THE CASE**

#### **I. NATURE OF THE CASE**

Petitioners in this case challenge certain aspects of two EPA regulations governing implementation of the 1997 NAAQS for fine particulate matter or “PM<sub>2.5</sub>.” The Implementation Rule, promulgated in 2007, generally addresses how emissions control measures and other requirements under Title I, Part D of the Act apply through State Implementation Plans (“SIPs”) to areas designated “nonattainment” for the 1997 PM<sub>2.5</sub> NAAQS. 72 Fed. Reg. 20,586. The provisions of this rule are codified in 40 C.F.R. Part 51. The NSR Rule, promulgated in 2008, addresses how such areas are to comply with statutory “New Source Review” (“NSR”) permitting requirements. 73 Fed. Reg. 28,321. The provisions of this rule are codified in 40 C.F.R. Parts 51 and 52.

Petitioners challenge, as an initial matter, EPA’s determination in each of these final rules that nonattainment requirements for PM<sub>2.5</sub> are governed by subpart 1, rather than subpart 4, of Part D of Title I of the Act. Secondly, Petitioners

challenge EPA's decision to adopt a presumption that emissions of ammonia and volatile organic compounds do not require regulation for purposes of PM<sub>2.5</sub> nonattainment planning and NSR, except for those nonattainment areas as to which a State or EPA makes a technical demonstration that emissions of ammonia or volatile organic compounds significantly contribute to PM<sub>2.5</sub> concentrations in the nonattainment area.

## **II. GENERAL BACKGROUND REGARDING THE NAAQS PROVISIONS**

The CAA, enacted in 1970 and extensively amended in 1977 and 1990, establishes a comprehensive program for controlling and improving the nation's air quality through a combination of state and federal regulation. Under Title I, EPA identifies air pollutants anticipated to endanger the public health and welfare, and formulates NAAQS, which establish maximum permissible concentrations of those pollutants in the ambient air. 42 U.S.C. §§ 7408-09; 40 C.F.R. pt. 50. "Primary" NAAQS protect against adverse effects on public health, while "secondary" NAAQS protect the public welfare. 42 U.S.C. § 7409(a)-(b). To ensure that NAAQS will keep pace with advances in scientific knowledge, the statute provides for EPA to review the NAAQS at least once every five years and revise them as "appropriate in accordance with [42 U.S.C. § 7408 and 7409(b)]." 42 U.S.C. § 7409(d)(1).

Within two years of promulgating a new or revised NAAQS, EPA must “designate” areas of the country as either “attainment” (i.e., meeting that NAAQS), “nonattainment” (i.e., not meeting that NAAQS), or “unclassifiable.” Id. § 7407(d)(1)(A). The Act then calls on the States to establish State Implementation Plans (“SIPs”), which impose controls on sources of air pollution as necessary to attain the NAAQS. Id. § 7410; see Lead Indus. Ass’n v. EPA, 647 F.2d 1130, 1137 (D.C. Cir. 1980).

### **III. PARTICULATE MATTER POLLUTION AND THE PM NAAQS**

#### **A. “Fine” and “Coarse” Particulate Matter**

The term “particulate matter” embraces a broad class of discrete, but chemically and physically diverse, solid particles and liquid droplets in the ambient air. 70 Fed. Reg. 65,984, 65,992 (Nov. 1, 2005). Such particles may range from less than a micrometer to more than 30 micrometers in diameter. Id. There are two relevant and generally distinct types of particulate matter or “PM”: fine and coarse. Although the terms “fine” and “coarse” are sometimes used solely in relation to particle size, they also refer to a particle’s chemistry and mechanism of formation. Id.

Fine particles derive primarily from combustion by-products that volatilize and quickly condense or form gases (such as sulfur oxides, nitrogen oxides, volatile organic compounds and ammonia) that react and transform in the

atmosphere. Id. Coarse particles are emitted by some of the same industrial sources that emit fine particles, but (unlike fine particles) primarily are formed by mechanical processes such as crushing, grinding and abrasion, and by the suspension of dust. Id. Coarse particles include suspended soils and street dusts, combustion fly ash, agricultural soils and residues, and organic carbon from abrasion of tires and asphalt. Id.

The 1997 PM NAAQS uses “PM<sub>2.5</sub>” (referring to “[a]irborne particles generally less than or equal to 2.5 micrometers in diameter”) as the “indicator” for fine particles and “PM<sub>10</sub>” (i.e., airborne particles generally less than or equal to 10 micrometers in diameter) as the indicator for coarse particles. See, e.g., 72 Fed. Reg. at 20,587; infra at 8 n.1 (explaining “indicator”).

#### **B. Background Regarding “Secondary” Fine Particle Pollution and “Precursors”**

Fine particles that are either emitted directly into the air in a solid or liquid chemical form, or formed near their source by condensation processes, are referred to as “primary” particles. 70 Fed. Reg. at 65,992. Sources of primary particles include soot from diesel engines, a wide variety of organic compounds condensed from incomplete combustion or cooking operations, and compounds that condense from vapor formed during combustion or smelting. Id. “Secondary” particles are those resulting from chemical reactions of gas-phase “precursors” in the

atmosphere, which reactions either form new particles or condense onto other particles in the air. Id. Most of the sulfate and nitrate and a portion of the organic compounds in the atmosphere are formed by such chemical reactions. Id. Secondary PM formation depends on numerous factors including the concentrations of precursors; the concentrations of other gaseous reactive species such as ozone; atmospheric conditions including solar radiation, temperature, and relative humidity; and the interactions of precursors and pre-existing particles with cloud or fog droplets. Id.

The main precursor gases or chemicals associated with fine particle formation are sulfur dioxide (SO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), volatile organic compounds (VOCs) and ammonia. 72 Fed. Reg. at 20,589; see also 70 Fed. Reg. at 65,995-97. However, the relative contributions of these gases to PM<sub>2.5</sub> formation vary significantly among the different regions of the United States. See 70 Fed. Reg. at 65,992-94 and Tables 2-3. Thus, in the rulemakings under review here, EPA considered how States should address PM<sub>2.5</sub> precursors given that “the refinement of emissions inventories, the overall contribution of different fine particle precursors to PM<sub>2.5</sub> formation, and the efficacy of alternative potential control measures will vary by location.” 72 Fed. Reg. at 20,589; infra at V.B.

### C. Evolution of the PM NAAQS

Particulate matter was one of six pollutants covered by the original NAAQS promulgated in 1971. 36 Fed. Reg. 8186 (Apr. 30, 1971). The indicator in the first PM NAAQS was Total Suspended Particles (“TSP”), which was measured by a device that captured most particles smaller than 25-45 micrometers (“ $\mu\text{m}$ ”) in diameter.

In 1987, when EPA first revised the PM NAAQS, EPA refined the standards to focus on “inhalable” particles. EPA changed the PM indicator from TSP to  $\text{PM}_{10}$  based on evidence that the risk of adverse health effects associated with particles of  $10\mu\text{m}$  or less, which can penetrate into the trachea, bronchi and deep lungs, was “markedly greater” than that associated with larger particles. 52 Fed. Reg. 24,634, 24,639 (July 1, 1987).

EPA revised the PM NAAQS a second time in 1997. 62 Fed. Reg. 38,652 (July 18, 1997). In that review, EPA determined it was appropriate to set separate standards for fine particles and coarse particles, based on evidence that serious health effects were associated with short- and long-term exposure to fine particles in areas that met the existing  $\text{PM}_{10}$  standards. *Id.* at 38,665-68; see also American Trucking Ass’ns v. EPA, 283 F.3d 355, 365 (D.C. Cir. 2002) (“ATA III”).

Accordingly, EPA adopted two new health-based (primary) standards with a  $\text{PM}_{2.5}$  indicator – an annual and a 24-hour standard – as well as welfare-based

(secondary) standards identical to the primary standards. See 72 Fed. Reg. at 20,587 (describing the 1997 rulemaking). To address the separate health risks associated with exposure to coarse particles, EPA modified the form, but not the level, of the existing 24-hour PM<sub>10</sub> standard and retained the existing annual PM<sub>10</sub> standard.<sup>1/</sup>

In response to petitions for review of both the 1997 PM NAAQS and the 1997 ozone NAAQS, this Court upheld EPA's decision to create a NAAQS for fine particles, including the use of PM<sub>2.5</sub> as the indicator for fine particles, the form of the standard, and the levels EPA chose. ATA III, 283 F.3d at 368-75. In an earlier opinion, the Court also upheld EPA's decision to establish PM<sub>2.5</sub> secondary standards (to address adverse effects on visibility) that were identical to the primary standards. American Trucking Ass'ns v. EPA, 175 F.3d 1027, 1056-57 (D.C. Cir.) ("ATA I"), modified on reh'g, 195 F.3d 4 (D.C. Cir. 1999) ("ATA II"), rev'd in part on other grounds, Whitman v. American Trucking Ass'ns, 531 U.S. 457 (2001). Finally, the Court upheld EPA's decision to have separate standards

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<sup>1/</sup> There are four components to a NAAQS, all of which can affect the degree of health or welfare protection: (1) the indicator, e.g., PM<sub>2.5</sub>; (2) the averaging time, e.g., 24-hour; (3) the level – for example, the level of the 24-hour PM<sub>2.5</sub> standard established in 1997 is 35 micrograms per cubic meter (µg/m<sup>3</sup>); and (4) the form – for instance, EPA determines whether the 24-hour PM<sub>2.5</sub> standard established in 1997 is met by looking at the 3-year average of the 98<sup>th</sup> percentile of 24-hour PM<sub>2.5</sub> concentrations, whereas another standard (i.e., with a different form) might require a different averaging protocol.

for coarse particles, but held that EPA had failed to reasonably explain its use of the PM<sub>10</sub> indicator for that purpose, and hence vacated and remanded the PM<sub>10</sub> standards. ATA I, 175 F.3d at 1053-55, 1057.

EPA most recently revised the PM NAAQS in 2006. 71 Fed. Reg. 61,144 (Oct. 17, 2006). The 2006 NAAQS rule continues the use of separate PM<sub>2.5</sub> and PM<sub>10</sub> standards to address the respective health and welfare effects of fine and coarse particles. In American Farm Bureau Fed'n v. EPA, 559 F.3d 512, 531-39 (D.C. Cir. 2009), this Court denied all petitions for review with respect to the PM<sub>10</sub> NAAQS. The Court specifically held that EPA reasonably explained its use of PM<sub>10</sub> as the indicator for coarse particles. Id. at 535-36.

#### **IV. STATUTORY BACKGROUND REGARDING NAAQS IMPLEMENTATION**

##### **A. State Implementation Plans**

Congress “delegated to the States primary responsibility for implementing the NAAQS.” Louisiana Env'tl. Action Network (“LEAN”) v. EPA, 382 F.3d 575, 578-79 (5th Cir. 2004). For each area within its borders failing to meet a NAAQS, a State is required to submit to EPA a state implementation plan or “SIP” setting forth the required pollution control measures and other programs the State will use to timely attain the NAAQS in that area. 42 U.S.C. §§ 7410(a), 7502(b).

SIPs submissions are adopted by the State after reasonable public notice and a hearing. Id. § 7410(a)(1). EPA then reviews each submitted plan for compliance with the applicable provisions of the Act. Id. § 7410(k). If EPA approves the SIP submission in whole or in part, the approved provisions become federally enforceable. Id. §§ 7413, 7604. If EPA does not approve or finds the submission incomplete, the State may be subject to sanctions and, eventually, federally imposed clean air measures. Id. §§ 7410(c), 7509.

### **B. Requirements under Part D, Subpart 1**

The Act's 1990 amendments established a complex program for implementing existing and revised NAAQS in Part D, Subparts 1-5 of the Act. Under Subpart 1, EPA may – but is not required to – classify areas designated nonattainment for any new or revised NAAQS. Id. § 7502(a)(1)(A). For all nonattainment areas, EPA must establish attainment dates that “can be achieved as expeditiously as practicable,” but are no later than five years from the date the area is designated nonattainment, or up to ten years from designation if “appropriate” based on specified considerations. Id. § 7502(a)(2)(A). Subpart 1 specifies control measures and other programs that States must include in SIPs for all nonattainment areas, except as modified by requirements under other subparts. Id. § 7502(b)-(c).

**C. Nonattainment Area Requirements for “PM10” under Subpart 4**

Subpart 4 establishes a classification scheme and imposes more specific requirements for the adoption of pollution control measures by certain nonattainment areas. 42 U.S.C. §§ 7513-13b. Although the subpart is generically titled “Additional Provisions for Particulate Matter Nonattainment Areas,” the statutory text invariably makes particular reference to “PM-10” as the subject of each specified requirement. *See, e.g., id.* §§ 7513(c) (“Except as provided under subsection (d) [concerning extension of attainment dates], the attainment dates for *PM-10* nonattainment areas shall be as follows . . . .”) (emphasis added); 7513a(b)(3) (defining “major sources” and “major stationary sources” in “serious” nonattainment areas as those that emit, or have the potential to emit, “at least 70 tons per year of PM-10”); 7513a(e) (requirements for “PM-10 precursors”).

**D. New Source Review**

The Act requires new or modified stationary sources to obtain construction permits under what is collectively called the “New Source Review” program. As amended in 1990, Subpart 1 provides that permits to construct and operate a new or modified major stationary source in an area designated nonattainment for any NAAQS may be issued if, among other things, “sufficient offsetting emissions reductions have been obtained, such that total allowable emissions . . . will be sufficiently less than total emissions from existing sources . . . so as to represent

... reasonable further progress.” 42 U.S.C. § 7503(a)(1)(A). Subpart 1 imposes several other preconditions for issuing new source permits in areas designated nonattainment. *E.g.*, *id.* § 7503(a)(2)-(5). These “Nonattainment New Source Review” requirements are implemented through SIPs. *Id.* § 7502(c)(5).

The Act also establishes a preconstruction permitting program for “major emitting facilities” in areas designated attainment or unclassifiable. *Id.* § 7475. This part of the NSR program is known as “Prevention of Significant Deterioration” (“PSD”). 73 Fed. Reg. at 28,323.

Finally, the Act imposes a general duty on each State to include a program in its SIP regulating the modification and construction “of any stationary source ... as necessary to assure that [NAAQS] are achieved, including a permit program as required in parts C and D.” 42 U.S.C. § 7410(a)(2)(C); 73 Fed. Reg. at 28,323.

## **V. SUMMARY OF THE RULEMAKING**

EPA published a proposed rule governing implementation of the 1997 PM<sub>2.5</sub> NAAQS in 2005, following this Court’s final resolution of the legal challenges to that NAAQS in *ATA III*. 70 Fed. Reg. 65,984 (“Proposed Rule”). EPA subsequently took final action in two stages, initially promulgating a general implementation rule in 2007, and then a second final rule in 2008 to address NSR requirements. 72 Fed. Reg. 20,586 (“Implementation Rule”); 73 Fed. Reg. 28,321 (“NSR Rule”). These two rulemakings are summarized in pertinent part below.

## **A. Implementation Pursuant to Subpart 1 Rather Than Subpart 4**

### **1. 1997 NAAQS Preamble Statement**

EPA originally set forth its position on the applicability of subpart 1 for purposes of PM<sub>2.5</sub> NAAQS implementation in the preamble to the 1997 final rule that established the PM<sub>2.5</sub> NAAQS, after receiving public comments suggesting that Congress' enactment of subpart 4 had restricted EPA's authority to promulgate a separate standard for PM<sub>2.5</sub>. In that final rule preamble, EPA observed that "Congress clearly specified an approach to the implementation of the PM<sub>10</sub> standard in the provisions of subpart 4 of Part D of Title I of the Act," and concluded that "the clear and express linkage of that approach to the PM<sub>10</sub> standard indicates that a different PM standard [such as the one for PM<sub>2.5</sub>] should be implemented under the general principles of subpart 1 of Part D of Title 1 of the Act." 62 Fed. Reg. at 38,695. In a separate passage of the preamble discussing the final rule's impact on small entities, EPA was equally direct in stating its determination that subpart 1, not subpart 4, would govern SIP requirements for PM<sub>2.5</sub>: "The SIP requirements of subpart 4 of Part D of Title I of the Act apply to SIPs for areas designated as not attaining NAAQS for PM<sub>10</sub>. Those requirements will not apply to SIPs to implement the PM<sub>2.5</sub> NAAQS." *Id.* at 38,704 n.96.

## 2. ATA litigation

In the ensuing litigation concerning the 1997 ozone and PM NAAQS, this Court and the Supreme Court reviewed challenges to EPA's determination in the preamble to the ozone NAAQS final rule that subpart 1 rather than subpart 2 would govern implementation of the revised ozone NAAQS. See 62 Fed. Reg. 38,856, 38,885 (July 18, 1997) (ozone NAAQS final rule preamble); ATA I, 175 F.3d at 1048-50; Whitman, 531 U.S. at 477-86. However, *no* challenge was raised to EPA's conclusion in the PM NAAQS preamble that *subpart 4's* requirements were inapplicable to implementation of the PM<sub>2.5</sub> NAAQS.

## 3. The Implementation Rule and NSR Rule

In the 2005 Proposed Rule, EPA reiterated its conclusion that subpart 1 exclusively governs PM<sub>2.5</sub> NAAQS implementation: "Part D includes a general subpart 1 which applies to all NAAQS for which a specific subpart does not exist. Because the PM standards were not established until 1997, the nonattainment plan provisions found in section 172 of subpart 1 apply." 70 Fed. Reg. at 66,002; see also id. at 66,037 ("EPA does not interpret subpart 4 of [P]art D of the Act . . . to apply to PM<sub>2.5</sub>."). EPA did not specifically request public comments on whether the Act could be construed to make PM<sub>2.5</sub> NAAQS implementation subject to subpart 4, nor did EPA otherwise suggest that it was reevaluating the question it had resolved in 1997.

Accordingly, consistent with its previously-stated view, EPA explained how States would address the various requirements of subpart 1 (in addition to the general SIP requirements in 42 U.S.C. § 7410), such as the provisions in CAA section 172(c) concerning reasonably available control technology (“RACT”), reasonable available control measures (“RACM”), reasonable further progress (“RFP”), contingency measures, emission inventory requirements, and NSR. 42 U.S.C. § 7502(c); see, e.g., 70 Fed. Reg. at 66,002-04, 66,010-21, 66,036-38.

Both the final Implementation Rule and NSR Rule, like the proposal, implemented the PM<sub>2.5</sub> NAAQS under subpart 1 rather than subpart 4. See, e.g., 72 Fed. Reg. at 20,598-99; 73 Fed. Reg. at 28,331-32. As noted above, EPA had not specifically sought comments on this issue. Nonetheless, EPA received a number of comments expressing concern about the legal validity of EPA’s approach (as well as other comments supporting EPA’s approach). EPA therefore responded by explaining in detail its conclusion that the Act, as construed in Whitman, not only does not “mandate” that EPA implement the PM<sub>2.5</sub> NAAQS under subpart 4, but in fact expressly limits the applicability of that subpart to the PM<sub>10</sub> NAAQS. See 72 Fed. Reg. at 20,598-99 (2007 final rule preamble); 2007 Response to Comments

(“RTC”)<sup>2/</sup> at 9-14 (JA xx); 73 Fed. Reg. at 28,331-32 (2008 final rule preamble); 2008 RTC<sup>3/</sup> at 24-27, 29-30 (JA xx).

## **B. Regulation of Precursors**

The Act authorizes EPA to regulate criteria pollutant precursors. In 42 U.S.C. § 7602(g), the Act defines the term “air pollutant” to include “any precursors to the formation of any air pollutant, to the extent the Administrator has identified such precursor or precursors for the particular purpose for which the term ‘air pollutant’ is used.” Id. As EPA explained in its Proposed Rule preamble, “the second clause of [this] sentence indicates that the Administrator has discretion to identify which pollutants should be classified as precursors for particular regulatory purposes.” 70 Fed. Reg. at 65,998. Hence, as part of this rulemaking, EPA considered whether each of the following should be regulated as precursors for purposes of PM<sub>2.5</sub> NAAQS attainment planning and NSR requirements: sulfur dioxide, ammonia, NO<sub>x</sub> and VOCs. See generally 70 Fed. Reg. at 65,998-66,000; 72 Fed. Reg. at 20,590-95; 73 Fed. Reg. at 28,325-31; 2007 RTC at 25-78 (JA xx); 2008 RTC at 7-21 (JA xx).

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<sup>2/</sup> EPA, “Responses to Significant Comments on the 2005 Proposed Rule to Implement the Fine Particle [NAAQS],” Dkt. No. OAR-2003-0062-0251 (Mar. 29, 2007) (JA xx).

<sup>3/</sup> EPA, “Implementation of the New Source Review (NSR) Program for [PM<sub>2.5</sub>]: Response to Comments,” Dkt. No. OAR-2003-0062-0278 (Mar. 2008) (JA xx).

EPA's Proposed Rule provided: (a) that SIPs in all PM<sub>2.5</sub> nonattainment areas would be required to address sulfur dioxide as a PM<sub>2.5</sub> attainment plan precursor; (b) that all such SIPs also would be required to address NO<sub>x</sub> as a PM<sub>2.5</sub> attainment plan precursor "unless the State and EPA make[] a finding that NO<sub>x</sub> emissions from sources in the State do not significantly contribute to the PM<sub>2.5</sub> problem in a given area or to other downwind air quality concerns"; and (c) that such SIPs would *not* be required to address ammonia or VOCs as PM<sub>2.5</sub> attainment plan precursors "unless the State or EPA makes a technical demonstration that ammonia emissions from sources in the State significantly contribute to the PM<sub>2.5</sub> problem in a given nonattainment area or to other downwind air quality concerns." 70 Fed. Reg. at 66,999-66,000.

EPA requested comments "on all aspects" of its proposed policies for addressing precursor emissions, and requested that such comments be accompanied by detailed technical supporting information. Id. EPA also noted that "[a]ny State or EPA technical demonstration to modify the presumptive policy approach for ammonia, NO<sub>x</sub> or VOC should be developed well in advance of the SIP submittal date." Id. at 66,000. "In addition, the development of such a technical demonstration should include consultation with appropriate State, local, and EPA technical representatives representing air quality and transportation agencies." Id.

Both the final Implementation Rule and NSR Rule maintained the same policies that EPA had proposed. Thus, the rules require States to address sulfur dioxide as a PM<sub>2.5</sub> attainment plan and NSR precursor in all areas, and to address NO<sub>x</sub> as such a precursor unless there is “a finding that NO<sub>x</sub> emissions from sources in the State do not significantly contribute to PM<sub>2.5</sub> concentrations in the relevant nonattainment area.” 72 Fed. Reg. at 20,594-95; accord 73 Fed. Reg. at 28,327-28. Conversely, both rules provide that States are *not* required to address ammonia or VOCs as a PM<sub>2.5</sub> attainment plan or NSR precursor unless a technical demonstration by the State or EPA shows that ammonia or VOC emissions “significantly contribute to PM<sub>2.5</sub> concentrations in a given nonattainment area.” 72 Fed. Reg. at 20,591-93; 73 Fed. Reg. at 28,329-31.

EPA’s final rules eliminated the language from the proposal that had referred to “other downwind air quality concerns” as a consideration in determining whether to reverse presumptions, in order to “clarify that identification of attainment plan precursors involves evaluation of the impact on PM<sub>2.5</sub> levels in a nonattainment area of precursor emissions from sources within the state(s) where the nonattainment area is located.” 72 Fed. Reg. at 20,591. This change from the Proposed Rule was appropriate because “[o]ther parts of the Act, notably [42 U.S.C. §§ 7410(a)(2)(D) and 7426], focus on interstate transport of pollutants.” 72 Fed. Reg. at 20,591; accord 73 Fed. Reg. at 28,328.

EPA discussed what data and analysis should be included in a technical demonstration to support reversing a PM<sub>2.5</sub> precursor presumption. 72 Fed. Reg. at 20,591-92, 20,596-97. Additionally, EPA made clear that, “if in the State’s SIP planning and adoption process a commenter provides additional information suggesting an alternative policy for regulating a particular precursor, the State will need to respond to this information in its rulemaking action.” Id. at 20,591.

## **VI. LITIGATION BACKGROUND AND ADMINISTRATIVE RECONSIDERATION PROCEEDINGS**

Petitioners the American Lung Association, Medical Advocates for Healthy Air, Natural Resources Defense Council and Sierra Club challenged the Implementation Rule in Case No. 07-1233, which was consolidated under Case No. 07-1227.<sup>4</sup> Later, Petitioners Natural Resources Defense Council and Sierra Club challenged the NSR Rule in Case No. 08-1250. The Petitioners also submitted administrative petitions to EPA requesting reconsideration of both rules. Accordingly, both judicial cases were held in abeyance for several years while EPA considered the petitions for reconsideration.

EPA Administrator Lisa P. Jackson issued a letter granting reconsideration as to four specific provisions or aspects of the NSR Rule on April 24, 2009. See

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<sup>4</sup> Other parties also filed petitions challenging the Implementation Rule, which remain held in abeyance pending administrative reconsideration. Here, “Petitioners” refers only to the four parties listed above.

74 Fed. Reg. 48,153, 48,154 (Sept. 22, 2009). EPA subsequently took several actions to address issues on which it had granted reconsideration. In May 2011, EPA promulgated a final rule entitled “Implementation of the [NSR] Program for [PM<sub>2.5</sub>]; Final Rule to Repeal Grandfather Provision,” which repealed a provision of the federal PM<sub>2.5</sub> PSD permit program that Petitioners had challenged, and confirmed that application of an Agency policy that was also challenged by Petitioners (the “1997 PM<sub>10</sub> Surrogate Policy”) had ended on May 16, 2011. 76 Fed. Reg. 28,646, 28,648, 28,659 (May 18, 2011). In July 2011, Assistant Administrator Gina McCarthy issued a guidance document entitled “Revised Policy to Address Reconsideration of Interpollutant Trading Provisions for [PM<sub>2.5</sub>],” which offered guidance to States wishing to develop area-specific pollutant trading ratios and explained EPA’s reconsideration of certain ratios that the NSR Rule previously had provided would be presumptively approvable if adopted in SIP submissions.<sup>51</sup>

Administrator Jackson also issued a letter granting reconsideration as to three issues pertaining to the Implementation Rule on April 25, 2011. EPA’s evaluation of the petition for reconsideration relating to the Implementation Rule is ongoing.

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<sup>51</sup> This guidance document may be found at <http://epa.gov/nsr/guidance.html>.

On June 27, 2011, Petitioners and EPA jointly moved to lift the stay of litigation in the NSR Rule case, enter a schedule for briefing with respect to any NSR Rule-related issues that were not resolved or mooted in the course of reconsideration, and consolidate with the NSR Rule case certain common issues raised by Petitioners' challenges to the Implementation Rule. The parties requested that the remainder of the Implementation Rule case continue to be held in abeyance pending administrative reconsideration. The Court granted this motion on November 8, 2011.

### **STANDARD OF REVIEW**

The Court must determine whether EPA's action was arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law. 42 U.S.C. § 7607(d)(9)(A). EPA's findings must be upheld if the Agency "examine[d] the relevant data and articulate[d] a satisfactory explanation for its action including a rational connection between the facts found and the choice made." Milk Indus. Found. v. Glickman, 132 F.3d 1467, 1476 (D.C. Cir. 1998) (internal quotation omitted); Small Refiner Lead Phase-Down Task Force v. EPA, 705 F.2d 506, 521 (D.C. Cir. 1983) (action must "conform to certain minimal standards of rationality") (internal quotation omitted). The Court "is guided by the deference traditionally given to agency expertise, particularly when dealing with a statutory

scheme as unwieldy and science-driven as the [CAA].” Appalachian Power Co. v. EPA, 135 F.3d 791, 801-02 (D.C. Cir. 1998); see also ATA III, 283 F.3d at 374.

In reviewing EPA’s statutory interpretation, the Court must inquire whether Congress “has directly spoken to the precise question at issue” and, if so, must give effect to Congress’ “unambiguously expressed intent.” Chevron, U.S.A., Inc. v. NRDC, 467 U.S. 837, 842-43 (1984). If the statute is silent or ambiguous, the Court considers “whether the agency’s answer is based on a permissible construction.” Id. at 843. Where “Congress has explicitly left a gap” to be filled, EPA’s regulation is “given controlling weight unless . . . arbitrary, capricious, or manifestly contrary to the statute.” Id. at 843-44. If the delegation is “implicit,” the Court “may not substitute its own construction . . . for [EPA’s] reasonable interpretation.” Id. at 844. EPA need not articulate “the best” interpretation, only a reasonable one. Smiley v. Citibank, 517 U.S. 735, 744-45 (1996).

### **SUMMARY OF ARGUMENT**

Both the Implementation Rule and NSR Rule specify NAAQS implementation requirements for PM<sub>2.5</sub> nonattainment areas pursuant to subpart 1 of Title I, Part D of the Act. This is consistent with EPA’s conclusion in 1997 that the Act makes subpart 4 applicable to implementation of the PM<sub>10</sub> NAAQS, but not the PM<sub>2.5</sub> NAAQS. Petitioners’ challenge to this interpretation has long since become untimely, as it should have been raised in response to the 1997 PM

NAAQS rule and the associated preamble statement in which EPA first published that interpretation. Challenges to EPA's similar conclusion concerning the 8-hour ozone NAAQS (*i.e.*, that implementation of that NAAQS should proceed under subpart 1 rather than subpart 2 of Title I, Part D), were not only timely raised in 1997 but were litigated to the merits before the Supreme Court in Whitman - the *same* case in which various challenges to the 1997 PM<sub>2.5</sub> and PM<sub>10</sub> NAAQS were litigated. Any dispute over whether subpart 4 should govern PM<sub>2.5</sub> NAAQS implementation was no less ripe for judicial review in 1997. Therefore, the instant petition is untimely with respect to this issue.

If the Court reaches the merits, it should defer to EPA's reasonable interpretation of the statute. The text of subpart 4 expressly refers to the "PM-10" NAAQS as being subject to its provisions. Importantly, Congress was aware when it wrote these provisions that the "PM-10" NAAQS was *not* the only potential NAAQS for particulate matter. Had Congress intended subpart 4's provisions to apply globally to any and all separate standards EPA might establish in the future for particulate matter, it could easily have substituted the all-encompassing phrase "particulate matter" for "PM-10," which would have been consistent with the type of language it used in the other subparts (*e.g.*, the provisions of subpart 2 refer generally to "ozone" nonattainment areas as being subject to their requirements). EPA's interpretation that subpart 4 applies only to the PM<sub>10</sub> NAAQS is thus

consistent with how Congress wrote the statute, and it is further supported by the legislative history of the 1990 Amendments. Finally, to the extent the Court finds any ambiguity in the text, EPA's interpretation is at least a "permissible" reading of the statute. Therefore, it must be upheld.

Petitioners also challenge EPA's decision in the Implementation and NSR Rules to adopt a rebuttable presumption that emissions of ammonia and volatile organic compounds ("VOCs") need not be regulated as PM<sub>2.5</sub> precursors for purposes of PM<sub>2.5</sub> nonattainment planning and NSR. They do not dispute, however, that 42 U.S.C. § 7602(g) gave EPA the discretion to adopt such a presumption. Contrary to Petitioners' argument, EPA identified a reasonable basis for its decision, explaining that there was significant uncertainty concerning the contribution of ammonia and VOC emissions to PM<sub>2.5</sub> concentrations in many nonattainment areas, as well as the potential that ammonia emissions reductions in certain areas could lead to adverse health impacts. EPA also explained how either the State or EPA could reverse the presumption with a technical demonstration that ammonia or VOC emissions "significantly contribute" to PM<sub>2.5</sub> concentrations in a particular nonattainment area. EPA's scientific judgment in this matter merits heightened deference, and the Rules' treatment of ammonia and VOCs should be upheld as a reasonable exercise of EPA's discretion under 42 U.S.C. § 7602(g).

For these reasons and those stated below, the Court should deny the petition for review. Moreover, if the Court grants the petition, it should deny Petitioners' extraordinary request that the Court impose a one-year deadline on EPA's remand proceedings.

## ARGUMENT

### **I. SUBPART 4 EXPRESSLY APPLIES TO THE $PM_{10}$ NAAQS AND DOES NOT SPECIFY NAAQS IMPLEMENTATION REQUIREMENTS FOR $PM_{2.5}$ .**

#### **A. Petitioners' Challenge Is Untimely.**

EPA originally announced its decision to implement the  $PM_{2.5}$  NAAQS under subpart 1 rather than subpart 4 in 1997, in the preamble to the final rule establishing that NAAQS. Supra at 13. In ATA I and Whitman, respectively, both this Court and the Supreme Court reached the merits of petitioners' challenges to analogous statements in the preamble to the 1997 *ozone* NAAQS final rule announcing EPA's decision to implement that NAAQS under subpart 1 rather than subpart 2. Supra at 14. Furthermore, the Supreme Court considered and expressly rejected EPA's arguments that those preamble statements did not constitute final agency action and that the subpart 1/subpart 2 issue was not yet ripe for review. Whitman, 531 U.S. at 477-80. But none of the parties in that litigation challenged EPA's decision to implement the separate  $PM_{2.5}$  standard under subpart 1, including *after* the Whitman opinion was issued and the case was remanded to this

Court for (among other things) further judicial review of the PM<sub>2.5</sub> NAAQS. See generally ATA III, 283 F.3d 355.<sup>67</sup> Petitioners did not seek review of this issue until commencing the present action challenging the Implementation Rule (and subsequently the NSR Rule), which means they are a decade too late. See 42 U.S.C. § 7607(b)(1) (petition for judicial review of final action of the Administrator must be filed within 60 days after publication in Federal Register).

EPA expressly stated in its 2007 Response to Comments that comments on the subpart 1/subpart 4 issue were untimely, noting “that the commenters should have raised their concerns with implementation of the PM<sub>2.5</sub> NAAQS under Subpart 1, rather than Subpart 4, at the time EPA issued the NAAQS in 1997.” 2007 RTC at 12 (JA xx). EPA observed that the Whitman Court’s analysis concerning the 1997 ozone NAAQS rule preamble statements was equally applicable to the statements in the PM<sub>2.5</sub> NAAQS rule preamble, and further noted: “EPA’s conclusion that the implementation of the PM<sub>2.5</sub> standard is governed by the provisions of subpart 1 of Part D, not subpart 4, is consistent with the analysis and views expressed by the Agency over nine years ago in final rulemaking when it first promulgated the PM<sub>2.5</sub> NAAQS.” Id.

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<sup>67</sup> By then at the very latest, if not earlier, any interested party would have been on notice regarding the ripeness of the subpart 1/subpart 4 issue based on the Whitman holding.

This Court has long held that “[w]hen an agency invites debate on some aspects of a broad subject, . . . it does not automatically reopen all related aspects including those already decided.” National Ass’n of Reversionary Prop. Owners v. Surface Transp. Bd., 158 F.3d 135, 142 (D.C. Cir. 1998). Instead, the statutory time limit for review may only be reopened with respect to issues that the Agency “either explicitly or implicitly reconsider[s]” in a subsequent rulemaking. West Virginia v. EPA, 362 F.3d 861, 872 (D.C. Cir. 2004). Here, nothing in EPA’s 2005 Proposed Rule preamble suggested that the Agency was reevaluating whether subpart 4 applies to the PM<sub>2.5</sub> NAAQS. See 70 Fed. Reg. at 66,002, 66,036-37. Rather, EPA merely *re-stated* its prior conclusion that only subpart 1 applies, and later gave more explanation in response to unsolicited comments. Supra at 14-16.

Such mere restatement of prior conclusions does not re-open an issue. As this Court repeatedly has stated,

if a party were allowed to “goad an agency into a reply, and then sue on the grounds that the agency . . . re-opened the issue,” American Iron & Steel Inst. v. EPA, 886 F.2d 390, 398 (D.C. Cir. 1989), the agency’s thorough answer would put it at risk of “reopening,” while a taciturn response would put it at risk of being faulted for acting without reasoned decisionmaking.

American Road & Transp. Builders Ass’n v. EPA, 588 F.3d 1109, 1114 (D.C. Cir. 2009) (citation omitted). Since EPA did not *reevaluate* the issue of subpart 4 applicability, the reopener doctrine does not apply. Accord NRDC v. EPA, 571

F.3d 1245, 1264-66, 1269-70 (D.C. Cir. 2009) (petition for review of “Phase 2 Implementation Rule” for the 1997 ozone NAAQS was untimely to the extent it challenged certain NSR-related regulatory policies that were originally established in earlier rulemakings and were not reconsidered).

Although “[u]nder some circumstances an issue may be ‘deemed to have been constructively reopened even though it was not actually reopened’ in a literal sense,” those circumstances are not present here. NRDC, 571 F.3d at 1266 (quoting Kennecott Utah Copper Corp. v. DOI, 88 F.3d 1191, 1214 (D.C. Cir. 1996)). “A constructive reopening occurs if the revision of accompanying regulations significantly alters the stakes of judicial review as the result of a change that could [not have] been reasonably anticipated.” NRDC, 571 F.3d at 1266 (internal quotation omitted). In Kennecott, for example, the Court found that certain existing regulations “may not have been worth challenging” originally, but were constructively reopened when the revision of related regulations “gave them a new significance.” 88 F.3d at 1227. But here, unlike Kennecott, the precise question Petitioners seek to present now – whether subpart 4 or subpart 1 governs implementation of the PM<sub>2.5</sub> NAAQS – clearly was ripe for review in 1997 (or, at the very latest, in 2001 following Whitman). Moreover, there is no reason to think the “significance” of the issue was any less evident at that time, since the parallel

question of whether subpart 2 governs implementation of the 1997 ozone NAAQS was litigated to the merits before the Supreme Court.

Finally, Petitioners may argue that they should be allowed to pursue their challenge despite its untimeliness because they are contending that EPA's NAAQS implementation approach is unlawful. But such a claim may be raised outside of a statutory limitations period only "by filing a petition for amendment or rescission of the agency's regulations, and challenging the denial of that petition."

Environmental Defense v. EPA, 467 F.3d 1329, 1333 (D.C. Cir. 2006); see also Motor Equip. Mfrs. Ass'n v. Nichols, 142 F.3d 449, 460 (D.C. Cir. 1998) (60-day filing period under 42 U.S.C. § 7607(b)(1) is jurisdictional and may not be enlarged by the courts); NRDC, 571 F.3d at 1265 (same).

Accordingly, the instant petition should be dismissed as untimely with respect to the issues presented in Argument I of Petitioners' brief (pp. 17-29). If the Court nonetheless reaches the merits, it should deny the petition for the additional reasons stated below.

**B. Because the Plain Text of Subpart 4 Makes Clear That It Applies Only to the PM<sub>10</sub> NAAQS, EPA's Interpretation Should Be Upheld under *Chevron* Step One.**

As noted above, subpart 1 sets forth provisions regarding classifications and attainment dates that apply to all nonattainment areas except those "for which [requirements] are specifically provided for under other provisions of this part."

42 U.S.C. § 7502(a)(1)(C), (2)(D). Subpart 1 also contains NAAQS implementation requirements that apply generally to all nonattainment areas, except where modified by subpart 2, 3, 4 or 5. E.g., id. § 7502(c)(1)-(9).

Subpart 4 is titled “Additional Provisions for Particulate Matter Nonattainment Areas,” but the operative provisions of subpart 4 make no reference to “particulate matter” and do not actually prescribe requirements for *all* particulate matter nonattainment areas. Instead, the text expressly and repeatedly refers to “PM-10” and “PM-10 nonattainment areas.” Supra at 11 (citing examples). As EPA noted in its Response to Comments, “[t]he statute explicitly refers to ‘PM-10’ in the operative provisions across the board, from initial classifications . . . to attainment dates . . . to nonattainment plan requirements . . . to milestone requirements . . . to the consequences of failure to attain . . . .” 2007 RTC at 10 (JA xx); 42 U.S.C. §§ 7513(a), (c), 7513a(a)-(d). “Indeed, there are more than thirty separate references to ‘PM-10’ throughout the three statutory sections that comprise Subpart 4.” 2007 RTC at 10 (JA xx). Moreover, “[i]n the relatively few subsections that do not explicitly include the term ‘PM-10,’ it is undeniable from the context that they implicitly refer to PM-10, whether by internal cross-reference

or by juxtaposition with adjoining provisions.” Id.; see, e.g., 42 U.S.C.

§ 7513a(c)(1)-(2).<sup>7</sup>

“PM-10” is defined in section 302(t) of the Act to mean “particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers,” 42 U.S.C. § 7602(t). Petitioners suggest that because particles meeting EPA’s regulatory definition of “PM<sub>2.5</sub>” necessarily have a diameter less than or equal to 10 micrometers, subpart 4’s references to “PM-10” should be deemed to apply to the PM<sub>2.5</sub> NAAQS. See Pet. Br. at 17-18. However, subpart 4 does not merely refer to “PM-10,” but rather contains requirements that expressly are based upon the form of the PM<sub>10</sub> NAAQS.<sup>8</sup> Specifically, subpart 4 allows attainment date extensions for “moderate” PM<sub>10</sub> nonattainment areas only if (among other conditions) “no more than one exceedance of the 24-hour [NAAQS] level for PM-10 has occurred in the area in the year preceding the Extension Year, and the annual mean concentration of PM-10 in the area for such year is less than or equal to the standard level.” 42 U.S.C. § 7513(d)(2). These criteria precisely track the form of

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<sup>7</sup> The title of subpart 4 thus carries no weight in construing the subpart’s applicability. See Whitman, 531 U.S. at 483 (where statutory text is clear, it “eliminates the interpretive role of the title, which may only shed light on some unambiguous word or phrase in the statute itself”) (internal quotation and alteration omitted).

<sup>8</sup> As explained above, form is one of four key elements of a NAAQS, and is the air quality statistic used as a basis for determining compliance with a standard. Supra at 8 n.1.

the 1987 24-hour and annual PM<sub>10</sub> standards. See 2007 RTC at 10-11 and n.1 (JA xx). Thus, subpart 4 is properly read as imposing implementation requirements on a specific set of standards – the PM<sub>10</sub> standards. See 2007 RTC at 11 (JA xx) (“Given the wording of provisions of Subpart 4, EPA does not believe that Congress intended the provisions to apply to any and all NAAQS for particulate matter that EPA might have in the future, particularly those that might reflect different size particles or have a different form.”)

Moreover, in the rulemaking that culminated in the 1987 PM<sub>10</sub> NAAQS, EPA had considered whether to establish a separate NAAQS for fine particles, using PM<sub>2.5</sub> as the indicator. See 52 Fed. Reg. at 24,639 (observing that the fine and coarse fractions “tend to have different origins and composition,” but explaining that EPA had declined to follow several commenters’ suggestion to adopt a separate PM<sub>2.5</sub> standard). Although EPA decided not to establish a PM<sub>2.5</sub> standard in 1987, it retained the discretion to do so in the course of future NAAQS reviews if necessary to protect public health and welfare with an adequate margin of safety. It must be presumed that Congress was aware of this possibility, just as it was aware that prior to 1987, the particulate matter NAAQS had a TSP indicator rather than a PM<sub>10</sub> indicator. Supra at 7 (explaining “TSP”).<sup>92</sup>

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<sup>92</sup> Cf. Community Futures Trading Comm’n v. Schor, 478 U.S. 833, 845-46 (1986) (Congress is presumed to be aware of agency positions or interpretations set forth in regulation).

Notably, the Act's 1990 amendments required continued implementation of that TSP standard: "Any designation for particulate matter (measured in terms of [TSP]) that the Administrator promulgated pursuant to this subsection (as in effect immediately before November 15, 1990) shall remain in effect . . . until the Administrator determines that such designation is no longer necessary . . . ." 42 U.S.C. § 7407(d)(4)(B). As EPA observed in its Response to Comments, "[h]ad Congress intended Subpart 4 to cover all possible particulate matter standards, past or future, actual or potential, it would not have needed to provide for this separate treatment for TSP." 2007 RTC at 11 (JA xx).

Furthermore, "[h]ad Congress meant to require EPA to implement any future particulate matter standard under subpart 4 it could have easily used the general term 'particulate matter,' rather than the specific term 'PM-10,' in the provisions of the subpart, rather than only in the title . . . ."). 2007 RTC at 13 (JA xx). Instead, subpart 4 makes repeated reference to "PM-10" and even more specifically to the form of the PM<sub>10</sub> NAAQS, as shown above. Among all of the subparts that impose NAAQS implementation requirements additional to those in subpart 1, subpart 4 is the *only* one in which the text of the operative provisions consistently refers to a specific NAAQS such as PM-10 instead of generally to an ambient air pollutant. Compare 42 U.S.C. §§ 7513-13b (subpart 4 requirements for "PM-10"), with id. §§ 7511-11f (subpart 2 provisions are expressed as NAAQS implementation

requirements for “ozone”), 7512-12a (subpart 3 provisions are expressed as requirements for “carbon monoxide”), and 7514-14a (subpart 5 provisions are expressed as requirements for “sulfur oxides, nitrogen dioxide, or lead”). Congress could have drafted subpart 4 in a manner identical to all of the other subparts by using the term “particulate matter” in the text of subpart 4's operative provisions. It chose instead to refer specifically to “PM-10,” and that choice must be regarded as meaningful; “[i]t is generally presumed that Congress acts intentionally and purposely when it includes particular language in one section of a statute but omits it in another.” South Coast Air Quality Mgmt. Dist. v. EPA, 472 F.3d 882, 894 (D.C. Cir. 2006) (internal quotation omitted); see, e.g., City of Chicago v. Environmental Def. Fund, 511 U.S. 328, 337-38 (1994).

**C. Whitman's Analysis of Subpart 2 Is Inapplicable Because the Text of Subpart 4 Materially Differs From That of Subpart 2.**

Subpart 4 differs from subpart 2 in several key respects. Therefore, EPA's reading of subpart 4 is not foreclosed by Whitman's holding that implementation of the 1997 ozone NAAQS is governed at least in part by subpart 2. See Pet. Br. at 26-29.

In 1997, EPA determined that the existing ozone standards – which were based on a “design value” (i.e., method for determining compliance) that measured ozone concentrations over a 1-hour sampling period, and set an annual compliance

level of 0.12 parts per million – were not adequate to protect public health based on evidence linking prolonged ozone exposures (six to eight hours) to adverse health effects. Accordingly, EPA promulgated a more protective, revised standard based on an 8-hour design value and an annual compliance level of 0.08 parts per million. 62 Fed. Reg. at 38,859. The pre-existing and revised standards were commonly referred to as the “1-hour” and “8-hour” ozone NAAQS, respectively. EPA planned to implement the 8-hour standard exclusively under subpart 1. *Id.* at 38,884-85.

Because the Act states that subpart 1's provisions on nonattainment area classifications and attainment dates “shall not apply with respect to nonattainment areas for which [classifications and attainment dates] are specifically provided under” other subparts, 42 U.S.C. § 7502(a)(1)(C), (2)(D), in *Whitman* the Court examined whether subpart 2 “provides for” the classification of ozone nonattainment areas. 531 U.S. at 481-82. Central to the Court’s analysis was Table 1 in 42 U.S.C. § 7511(a)(1), which “defines five categories of ozone nonattainment areas and prescribes attainment deadlines for each.” *Whitman*, 531 U.S. at 482. The Court concluded that subpart 2 “funnels all [ozone] nonattainment areas into the table for classification” by “declaring that ‘[e]ach area designated nonattainment for ozone . . . shall be classified at the time of such designation, under table 1, by operation of law,’” and by providing specific

calendar deadlines for attainment for each classification listed in the table.

Whitman, 531 U.S. at 482 (quoting 42 U.S.C. § 7511(a)(1)).

Although the title of 42 U.S.C. § 7511(a)(1) is “Classification and attainment dates for 1989 nonattainment areas,” the text makes clear that Table 1 applies not only to areas that were in nonattainment in 1989, but also to areas that later become designated as nonattainment for ozone. See 42 U.S.C. § 7511(b)(1) (“Any area that is designated attainment or unclassifiable for ozone . . . and that is subsequently redesignated to nonattainment for ozone . . . shall, at the time of the designation, be classified by operation of law in accordance with table 1 . . . .”). Accordingly, the Court found that subpart 2 governs implementation of the 1997 revised ozone standard at least in part, although “some provisions of Subpart 2 [were] ill fitted to implementation of the revised standard” and thus implied “some limited applicability of Subpart 1” as well. Whitman, 531 U.S. at 483, 484.

For several reasons, the analysis in Whitman does not compel a similar conclusion here. First, the text of subpart 2 refers in general terms to “ozone” nonattainment areas as being subject to its requirements. In contrast, as shown above, virtually every provision of subpart 4 makes explicit reference to the “PM-10” NAAQS or “PM-10” nonattainment areas. Thus, the text of subpart 2 on its face applies to *any* “ozone” standard, whereas the text of subpart 4 applies specifically to the PM<sub>10</sub> NAAQS. Accord 2007 RTC at 10 (JA xx).

Second, subpart 4 contains no provision that comprehensively prescribes classifications and attainment dates for all particulate matter nonattainment areas in the way that 42 U.S.C. § 7511 and Table 1 do for ozone nonattainment areas. Rather, the classification and attainment date requirements in 42 U.S.C. § 7513 apply specifically to areas “designated nonattainment for PM-10,” and the statute explicitly directs EPA to continue implementing a *different* particulate matter NAAQS – the TSP standard – separately from the PM<sub>10</sub> NAAQS implementation scheme. See 42 U.S.C. § 7407(d)(4)(B). Thus, unlike subpart 2, it is apparent from the text of subpart 4 that “Congress did not intend Subpart 4 to cover all possible standards for particulate matter.” 2007 RTC at 11 (JA xx).

Finally, the Whitman Court was principally concerned that by replacing the 1-hour ozone NAAQS with an 8-hour ozone NAAQS and implementing the latter standards exclusively under subpart 1, EPA’s approach would have rendered subpart 2 entirely meaningless. See 62 Fed. Reg. at 38,894 (describing conditions under which 1-hour ozone NAAQS eventually would be revoked); 69 Fed. Reg. 23,951, 23,954 (Apr. 30, 2004) (modified revocation approach); Whitman, 531 U.S. at 484 (“Whatever effect may be accorded the gaps in Subpart 2 as implying some limited applicability of Subpart 1, they cannot be thought to render Subpart 2’s carefully designed restrictions . . . utterly nugatory once a new standard has been promulgated.”). “In contrast, EPA promulgated the PM<sub>2.5</sub> NAAQS as an

*additional* standard that did not replace the PM<sub>10</sub> NAAQS.” 2008 RTC at 27 (JA xx) (emphasis added). Thus, unlike Whitman, reading the operative provisions of subpart 4 to apply specifically and only to the PM<sub>10</sub> NAAQS does not render subpart 4 a nullity, because EPA continues to maintain separate PM<sub>10</sub> standards which are implemented in accordance with subpart 4's requirements. See 2007 RTC at 12 (JA xx) (“EPA has decided to retain the 24-hour PM-10 NAAQS, thus preserving a PM-10 NAAQS and an implementation regime for that NAAQS governed by subpart 4.”) (citing 71 Fed. Reg. at 61,202); see also 75 Fed. Reg. 39,366, 39,369 (July 8, 2010) (partially disapproving SIP submission for the Imperial Valley PM<sub>10</sub> nonattainment area due to non-compliance with the “best available control measures” requirement of 42 U.S.C. § 7513a(b)(1)(B)). In short, EPA’s approach fulfills the Act’s directives on implementation of the PM<sub>10</sub> NAAQS as well as its command that any NAAQS not otherwise specifically provided for – such as the PM<sub>2.5</sub> NAAQS – must comply with subpart 1.

**D. Even If the Court Finds the Statutory Text Ambiguous, Legislative History Supports EPA’s Reading.**

If the Court finds the statute to be clear in providing that subpart 4 specifically applies to the PM<sub>10</sub> NAAQS, there is no need to resort to legislative history to divine Congress’ intent. See, e.g., Donnelly v. FAA, 411 F.3d 267, 272 (D.C. Cir. 2005) (“[W]e need not resort to legislative history where the statute

itself is clear.”); Halverson v. Slater, 129 F.3d 180, 187 and n.10 (D.C. Cir. 1997) (“[O]rdinarily we have no need to refer to legislative history at Chevron step one . . . .”); Engine Mfrs. Ass’n v. EPA, 88 F.3d 1075, 1088 (D.C. Cir. 1996) (“The plain meaning of legislation should be conclusive, except in the rare cases in which the literal application of a statute will produce a result demonstrably at odds with the intentions of its drafters.”) (internal quotation and alteration omitted).

However, even if the Court finds the statute to be ambiguous, the legislative history corroborates EPA’s interpretation that Congress intended in subpart 4 to alter the implementation schedule and nonattainment area requirements specifically for the PM<sub>10</sub> NAAQS. The statement of Representative Murtha quoted in Petitioners’ Brief (at 18-19) confirms this understanding: “The Title I PM-10 provisions of H.R. 3030 somewhat reschedule the attainment dates that would otherwise apply *under the PM-10 standards as promulgated by EPA.*” A Legislative History of the Clean Air Act Amendments of 1990 (“Legislative History”) at 2996 (Comm. Print 1993) (JA xx) (emphasis added).

Petitioners are correct in observing that, in 1990, EPA had not yet promulgated a separate PM<sub>2.5</sub> NAAQS, and that the 1987 PM<sub>10</sub> NAAQS had been designed to protect against the health and welfare risks (as understood based on the science available at the time) of both fine and coarse particles. Pet. Br. at 17-25. But as shown above, Congress was well aware that PM<sub>10</sub> was not the only NAAQS

indicator used for particulate matter, since the TSP standard was also in effect. And Congress presumably understood that other particulate matter NAAQS using new indicators (such as the separate  $PM_{2.5}$  NAAQS EPA had considered but decided not to establish in 1987) might be promulgated in the future. Despite this knowledge, Congress elected to impose implementation requirements specifically for “PM-10” rather than using the obvious alternative phrase – *i.e.*, “particulate matter” – that would have encompassed any possible NAAQS indicator EPA might use in the future. Thus, it takes a substantial and unsupported leap of logic to conclude that, by imposing requirements for implementation of “the PM-10 standards as promulgated by EPA,” Congress also intended to direct how a potential future “ $PM_{2.5}$ ” NAAQS would be implemented.

Petitioners cite nothing in the legislative history that gives credence to their position. Primarily, they assert that because there is at least some overlap between the health risks and emission sources associated with  $PM_{2.5}$  and  $PM_{10}$  pollution, Congress would have wanted a  $PM_{2.5}$  NAAQS to be implemented in the same manner it expressly mandated for the  $PM_{10}$  NAAQS. See Pet. Br. at 21-25. The problem with this line of reasoning, however, is that one could just as easily argue that the *ozone* NAAQS should be subject to subpart 4's requirements because  $NO_x$  is a relevant precursor pollutant for both particulate matter and ozone. Compare, *e.g.*, 42 U.S.C. § 7511a(b)(1)(A) (subpart 2 provision requiring  $NO_x$  and VOC

emission reductions in order to demonstrate “reasonable further progress” towards attainment of the ozone NAAQS in moderate ozone nonattainment areas), with Legislative History at 2501 (identifying “nitrates” and other secondary particles as a source of PM<sub>10</sub> pollution). Therefore, this is not a reliable basis for determining Congress’ intent regarding the applicability of subpart 4.<sup>10/</sup>

**E. EPA’s Reading of the Act Is, at Minimum, a “Permissible” Interpretation Entitled to Deference under *Chevron* Step Two.**

As EPA explained throughout the course of the rulemaking, and for the reasons discussed above in Arguments I.B and C, EPA believes the statute is clear and unambiguous in requiring that PM<sub>10</sub> NAAQS implementation be governed by subpart 4 and that PM<sub>2.5</sub> NAAQS implementation be governed by subpart 1. See 70 Fed. Reg. at 66,037 (“We do not believe the Act gives us the discretion to promulgate a lower major source threshold for pollutants such as PM<sub>2.5</sub> that are only subject to Subpart 1 of part D of the Act.”); 72 Fed. Reg. at 20,599 (“EPA . . . agrees with comments stating that subpart 4 on its face applies only to the PM<sub>10</sub> standard.”); 73 Fed. Reg. at 28,332 (“Subpart 4 was added to the Act by Congress specifically to address the PM<sub>10</sub> NAAQS.”). If, however, the Court concludes that

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<sup>10/</sup> Although EPA emphasized the differences between PM<sub>2.5</sub> and PM<sub>10</sub> pollution in response to comments asserting that PM<sub>2.5</sub> was merely a “subset” of PM<sub>10</sub>, see 2007 RTC at 13-14 (JA xx), that was not EPA’s primary rationale for concluding that subpart 4 applies only to PM<sub>10</sub>. Rather, EPA based its interpretation on the statutory text. See 2007 RTC at 9-12 (JA xx); supra Arguments I.B and C.

the statute is ambiguous, it should defer to EPA's interpretation of the statute pursuant to Chevron step two. Even if the Court disagrees that EPA's reading is the *only* plausible way to interpret the text of subpart 4, at the very least it is a "permissible" interpretation for the reasons explained in Arguments I.B and C. Additionally, it is supported by legislative history as shown in Argument I.D.

This is *not* a case where EPA advances an interpretation grounded in policy preferences that are at odds with Congress' clearly expressed intent. See Engine Mfrs., 88 F.3d at 1089 (agency may not avoid "Congressional intent clearly expressed in the text simply by asserting that its preferred approach would be better policy"). For example, in South Coast, where the Court reviewed EPA's rule addressing (among other things) how subpart 1 and 2 would interact for purposes of implementing the 8-hour ozone NAAQS, the Court described "[t]he main thrust of EPA's interpretation" as an argument that subpart 1 "is best because it maximizes EPA's ability to tailor a SIP to the situation of that state." 472 F.3d at 894. The Court rejected that rationale because it found that EPA had failed to "explain how its interpretation fits with the 1990 Amendments." Id. Here, by contrast, EPA's interpretation is based directly on the language Congress elected to use in drafting subpart 4, which differs materially from the key subpart 2 provisions that drove the courts' analyses in Whitman and South Coast. In this case, EPA's interpretation is entirely consistent with both the text and structure of

the statute, and it therefore constitutes, at a minimum, a “permissible construction” to which the Court should defer. Chevron, 467 U.S. at 843.<sup>117</sup>

**II. EPA REASONABLY DETERMINED THAT AMMONIA AND VOLATILE ORGANIC COMPOUNDS SHOULD NOT BE PRESUMPTIVELY SUBJECT TO CONTROL REQUIREMENTS IN ALL PM<sub>2.5</sub> NONATTAINMENT AREAS.**

Petitioners also claim that EPA acted arbitrarily and capriciously in adopting a rebuttable presumption that PM<sub>2.5</sub> nonattainment area SIPs need not include controls on ammonia and VOC emissions. Pet. Br. at 30-33. Contrary to Petitioners’ contention, EPA reasonably exercised its discretion under 42 U.S.C. § 7602(g) to “identif[y]” which emissions should, or should not, be considered “precursors” for purposes of PM<sub>2.5</sub> attainment planning and NSR. Moreover, EPA articulated a reasonable explanation for treating ammonia and VOC emissions differently than sulfur dioxide (“SO<sub>2</sub>”) emissions, for which States are required to evaluate emissions controls in all PM<sub>2.5</sub> nonattainment areas, and emissions of oxides of nitrogen (“NO<sub>x</sub>”), for which States presumptively must evaluate controls.

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<sup>117</sup> Petitioners’ contention (Pet. Br. at 29) that subpart 4 should be construed to apply to the PM 2.5 NAAQS because it would lead to stricter control requirements is, in the context of this case, precisely the type of construction that the Court found inadequate in South Coast. That is, it emphasizes a policy rationale to support an interpretation for which there is no support in the statutory text.

**A. EPA Indisputably Has Discretion under 42 U.S.C. § 7602(g) to Determine Which Emissions Should Be Identified As “Precursors” for Specific Regulatory Purposes Such As NAAQS Implementation Pursuant to Subpart 1.**

The Act’s provision defining the term “air pollutant” gives EPA discretionary authority to determine which emissions constitute “precursors” for particular regulatory purposes. See 42 U.S.C. § 7602(g). This provision states as follows:

The term “air pollutant” means any air pollutant agent or combination of such agents, including any physical, chemical, biological, radioactive (including source material, spent nuclear material, and byproduct material) substance or matter which is emitted into or otherwise enters the ambient air. *Such term includes any precursors to the formation of any air pollutant, to the extent the Administrator has identified such precursor or precursors for the particular purpose for which the term “air pollutant” is used.*

Id. (emphasis added).

As EPA explained during the rulemaking, the second sentence of this definition “explicitly authorizes the Administrator to identify and regulate precursors as air pollutants under other parts of the CAA,” and the second clause of that second sentence “indicates that the Administrator has discretion to identify which pollutants should be classified as precursors for particular regulatory purposes.” 70 Fed. Reg. at 65,998; accord 72 Fed. Reg. at 20,590, and 73 Fed. Reg. at 28,325-26. Hence, even if a particular substance is known to contribute to the formation of a criteria air pollutant – and thus constitutes a “precursor” from a

scientific perspective – 42 U.S.C. § 7602(g) contemplates that the substance might not be “*identif[ied]* . . . as an air pollutant for *all* regulatory purposes, where it can be demonstrated that various Clean Air Act programs address different aspects of the air pollutant problem.” 70 Fed. Reg. at 65,998 (emphasis added). Similarly, section 7602(g) indicates that EPA is not required to “treat all precursors of a particular pollutant the same under any one program when there is a basis to distinguish between such precursors.” 70 Fed. Reg. at 65,998; accord 70 Fed. Reg. 24,280 (May 6, 2005) (transportation conformity rulemaking adopted different approaches for some PM<sub>2.5</sub> precursors based on the degree to which the various precursors emitted by transportation-related sources contributed to the PM<sub>2.5</sub> air quality problem); cf. Association of Irrigated Residents v. EPA, 423 F.3d 989, 996-97 (9th Cir. 2005) (upholding EPA’s approval of PM<sub>10</sub> SIP that included controls on NO<sub>x</sub> but not ammonia, based on EPA’s finding that ammonia did not contribute significantly to PM<sub>10</sub> concentrations in the nonattainment area).<sup>12/</sup>

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<sup>12/</sup> 42 U.S.C. § 7513a(e), which was at issue in Association of Irrigated Residents, provides that control requirements “applicable under plans in effect under this part . . . shall also apply to major stationary sources of PM-10 precursors, except where the Administrator determines that such sources do not contribute significantly to PM-10 levels which exceed the standard in the area.” Id.; see Association of Irrigated Residents, 423 F.3d at 996. However, for the reasons stated in Argument I, this provision (like other subpart 4 provisions) does not apply to PM<sub>2.5</sub> NAAQS implementation. Petitioners acknowledge that 42 U.S.C. § 7602(g) does not impose a mandatory presumption in favor of regulating ammonia and VOC as PM<sub>2.5</sub> attainment plan and NSR precursors. See Pet. Br. at 30.

Petitioners do not challenge EPA's interpretation of section 7602(g). Instead, they argue that EPA's decision to adopt rebuttable presumptions against control requirements for ammonia and VOCs was arbitrary and capricious. Pet. Br. at 30-33. The record shows otherwise, as discussed further below.

**B. EPA Reasonably Determined That Ammonia and VOC Emissions Should Be Subject to PM<sub>2.5</sub> Nonattainment Planning and NSR Requirements Only Where Those Emissions Are Demonstrated to Significantly Contribute to PM<sub>2.5</sub> Concentrations.**

EPA's final rules establish: (1) a requirement that States address SO<sub>2</sub> for purposes of PM<sub>2.5</sub> attainment planning and NSR in all areas; (2) a presumption that States must also address NO<sub>x</sub> for these purposes, which may be reversed by a technical demonstration showing that NO<sub>x</sub> emissions do not significantly contribute to PM<sub>2.5</sub> concentrations in a particular area; and (3) a presumption that States need not initially address ammonia and VOCs for these purposes, which again may be reversed by a technical demonstration indicating that consideration of ammonia or VOCs as a PM<sub>2.5</sub> attainment plan and NSR precursor would be appropriate for a particular area. EPA intended the presumptions, "which should be valid for the majority of areas, to reduce the overall burden on States of documenting which pollutants are attainment plan precursors." 2007 RTC at 61 (JA xx).

## 1. EPA's policies for SO<sub>2</sub> and NO<sub>x</sub>

In the Implementation Rule, EPA determined that States would be required to address SO<sub>2</sub> as a PM<sub>2.5</sub> attainment plan precursor and evaluate SO<sub>2</sub> for possible control measures in all areas. 72 Fed. Reg. at 20,595. EPA later adopted a similar policy in the NSR Rule. 73 Fed. Reg. at 28,327. EPA explained that this policy was appropriate because SO<sub>2</sub> “is a significant contributor (e.g., ranging from 9 percent to 40 percent) to PM<sub>2.5</sub> concentrations in nonattainment areas and to other air quality problems in all regions of the country.” 72 Fed. Reg. at 20,595; see also 70 Fed. Reg. at 65,993, Table 2 (PM<sub>2.5</sub> chemical composition data by region). Even after accounting for the regional reductions in sulfur dioxide emissions that EPA was then projecting would occur in the eastern United States as a result of implementing the Clean Air Interstate Rule (“CAIR”), 70 Fed. Reg. 25,162 (May 12, 2005), “sulfate [was] still projected to be a key contributor to PM<sub>2.5</sub> concentrations in the future.” 72 Fed. Reg. at 20,595. Moreover, EPA noted that SO<sub>2</sub> emissions “lead to sulfate formation on both regional and local scales,” which necessitates consideration of area-specific controls on local sulfur dioxide sources in addition to regional measures such as CAIR. Id. Therefore, for purposes of PM<sub>2.5</sub> NAAQS attainment planning, “each State will need to consider whether controls on local SO<sub>2</sub> sources would be cost-effective and would be needed to attain expeditiously.” Id.; see 73 Fed. Reg. at 28,327 (parallel approach for NSR).

In discussing its policy for NO<sub>x</sub> emissions, EPA noted that “[t]he sources of NO<sub>x</sub> are numerous and widespread,” and that “nitrate concentrations vary significantly across the country.” 72 Fed. Reg. at 20,594. EPA also noted that nitrate formation in the atmosphere – a process that involves a reaction between nitric acid and other species such as ammonia (thereby creating ammonium nitrate) – is “dependent upon the relative degree of nearby SO<sub>2</sub> emissions because ammonia reacts preferentially with SO<sub>2</sub> over NO<sub>x</sub>.” *Id.*; see also 70 Fed. Reg. at 65,997 (“The NARSTO Fine Particle Assessment<sup>13/</sup> indicates that sulfates form preferentially over nitrates . . .”). EPA expected NO<sub>x</sub> emission reductions to reduce PM<sub>2.5</sub> concentrations in “most” areas. 72 Fed. Reg. at 20,594. However, it was possible that “in a limited number of areas, NO<sub>x</sub> control would result in increased PM<sub>2.5</sub> mass by disrupting the ozone cycle and leading to increased oxidation of SO<sub>2</sub> to form sulfate particles, which are heavier than nitrate particles.” *Id.* Therefore, rather than *universally* requiring that States address NO<sub>x</sub> in all PM<sub>2.5</sub> nonattainment areas as it had done for SO<sub>2</sub>, EPA used a presumptive approach under which States must address NO<sub>x</sub> as a PM<sub>2.5</sub> attainment plan precursor “unless the State and EPA make a finding that NO<sub>x</sub> emissions from sources in the State do

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<sup>13/</sup> North American Research Strategy for Tropospheric Ozone and Particulate Matter (“NARSTO”), “Particulate Matter Assessment for Policy Makers: A NARSTO Assessment” (2004), Dkt. No. EPA-HQ-OAR-2003-0062-0263 (JA xx).

not significantly contribute to PM<sub>2.5</sub> concentrations in the relevant nonattainment area.” Id.; accord 73 Fed. Reg. at 28,328.

**2. EPA reasonably addressed ammonia differently than SO<sub>2</sub> and NO<sub>x</sub> by adopting a rebuttable presumption that ammonia is not a PM<sub>2.5</sub> attainment plan and NSR precursor.**

In contrast to SO<sub>2</sub> and NO<sub>x</sub>, EPA found that a different policy was appropriate for ammonia due to certain aspects of the complex and still not fully understood relationship between ammonia emissions and air quality. Among other things, EPA noted the potential of adverse environmental and health impacts in some areas if ammonia emissions were reduced. As EPA explained, “[a]mmonia serves an important role in neutralizing acids in clouds, precipitation and particles. In particular, ammonia neutralizes sulfuric acid and nitric acid, the two key contributors to [acid rain].” 70 Fed. Reg. at 65,997. Where concentrations of sulfate (with which ammonia reacts preferentially over nitrates, as noted above) are high, “decreasing ammonia emissions . . . can reduce PM<sub>2.5</sub> mass concentrations, but may also increase particle and precipitation acidity.” Id. at 65,997 and n.38 (citing NARSTO Fine Particle Assessment at S-31 (Table S.4) (JA xx)). “An increase in particle acidity is suspected to be linked with human health effects and with an increase in the formation of secondary organic compounds” in the atmosphere. 72 Fed. Reg. at 20,591; accord 70 Fed. Reg. at 65,997; id. at 65,996

and n.30 (citing study by Jang, et al.). “Moreover, the relationship between ammonia and [the] sulfate-nitrate equilibrium may also impact [secondary organic aerosol (“SOA”)] formation, although this link is not well understood.” 70 Fed. Reg. at 65,997.

In addition to these potentially adverse effects of ammonia emissions reductions under certain atmospheric conditions, EPA also noted that there was substantial uncertainty in the available information concerning ammonia. EPA observed that the “[e]mission inventories for ammonia are considered to be among the most uncertain of any species related to PM,” and that “[t]he control techniques for ammonia and the analytical tools to quantify the impact of reducing ammonia emissions on atmospheric aerosol formation are both evolving sciences.” Id.

Given all of these factors, EPA explained in the Proposed Rule preamble that “it seems prudent to continue research on ammonia control technologies and the ammonia-sulfate-nitrate-SOA equilibrium before one undertakes broad national programs to reduce ammonia emissions.” Id.; see also id. at 65,997/3 (“At this time . . . reducing SO<sub>2</sub> and NO<sub>x</sub> will allow us to move with greater certainty towards achieving our nation’s air quality goals.”). The available data and analysis indicated that “there may be considerable ambiguity concerning the results of reducing ammonia emissions and in some cases, there may be undesired consequences of ammonia reductions.” Id. at 65,997. At the same time, EPA

recognized that “as States and EPA develop a greater understanding over the coming years about the potential air quality effects of reducing ammonia emissions in specific nonattainment areas, it may be appropriate for ammonia reduction strategies to be included in future SIPs.” Id. For these reasons, a policy requiring States to address ammonia in their PM<sub>2.5</sub> attainment planning area only where a technical demonstration supported such a requirement appeared to be the best fit, as it “showed consideration for the uncertainties about ammonia emissions inventories and about the potential efficacy of ammonia control measures by providing for a case-by-case approach.” 72 Fed. Reg. at 20,591.

The final Implementation and NSR Rules maintained the approach EPA had proposed. EPA retained this approach because of “continued uncertainties regarding ammonia emission inventories and the effects of ammonia emission reductions.” Id. at 20,592. Additionally, EPA observed that “data necessary to understand the atmospheric composition and balance of ammonia and nitric acid in an area are not widely available across PM<sub>2.5</sub> nonattainment areas, making it difficult to predict the results of potential ammonia emission reductions.” Id. EPA further explained that “[a]mmonia reductions may be effective and appropriate for reducing PM<sub>2.5</sub> concentrations in selected locations, but in other locations such reductions may lead to minimal reductions in PM<sub>2.5</sub> concentrations and increased atmospheric acidity.” Id. For these reasons, EPA remained of the view that

ammonia should be subject to the case-by-case policy approach it had proposed, which would “ensure[] that ammonia will be addressed in areas in which reductions will be beneficial, while avoiding potential disbenefits in other areas.” 2007 RTC at 47 (JA xx); accord 73 Fed. Reg. at 28,330-31.

Given the state of the scientific understanding of ammonia’s interaction with other chemicals in the processes described above, and the potential that ammonia emissions reductions in some areas might be ineffective in reducing PM<sub>2.5</sub> concentrations or even result in adverse health effects due to increased acidification, it was reasonable for EPA to adopt a case-by-case approach for ammonia rather than presumptively or categorically to require States to regulate ammonia emissions in all areas. Accordingly, the Court should defer to EPA’s technical evaluation of the science and uphold this aspect of the final Implementation and NSR Rules. See NRDC, 571 F.3d at 1253-55 (upholding provision of 8-hr ozone NAAQS implementation rule that presumes the validity of “reasonably available control technology” (“RACT”) determinations developed under the 1-hr ozone NAAQS, while allowing for case-by-case consideration of any information indicating that the prior RACT determination should be updated); National Wildlife Fed’n v. EPA, 286 F.3d 554, 566-67 (D.C. Cir. 2002) (upholding decision not to establish nationwide standards under the Clean Water Act for discharges of color pollution, where EPA found that “the potential for significant

aesthetic or aquatic impacts from color discharges is driven by highly site-specific conditions” and was thus better addressed in individual permits where necessary).

**3. EPA also provided a reasonable explanation for adopting a rebuttable presumption that VOCs are not a PM<sub>2.5</sub> attainment plan and NSR precursor.**

As EPA explained in the preamble to the Implementation Rule, “[t]he primary rationale for not including VOC as a PM<sub>2.5</sub> attainment plan precursor in every nonattainment area is the uncertainty regarding the contribution of anthropogenic VOCs to the formation of the organic carbon portion of fine particles.” 72 Fed. Reg. at 20,593. “The organic component of ambient particles is a complex mixture of hundreds or even thousands of organic compounds [that] are either emitted directly from sources (i.e. primary organic aerosol) or can be formed by reactions in the ambient air (i.e. secondary organic aerosol, or SOA).” *Id.* at 20,592. These compounds include low molecular weight VOCs – which participate in the formation of secondary organic aerosol, sulfates and nitrates – and intermediate weight VOCs, which “often exhibit a range of volatilities and can exist in both the gas and aerosol phase at ambient conditions.” *Id.* at 20,592-93.

EPA further explained that, “[d]espite significant advances in understanding the origins and properties of [secondary organic aerosol], it remains probably the least understood component of PM<sub>2.5</sub>.” *Id.* at 20,593. Scientific research thus far “ha[s] been able to quantify the concentrations of hundreds of organic compounds

representing only 10-20 percent of the total organic aerosol mass.” Id.; cf. id. at 20,593/2 (noting that most research to date has been performed only in California). EPA thus “recognized that further research and technical tools are needed to better characterize emissions inventories for specific VOC compounds, and to determine the extent of the contribution of specific VOC compounds to organic PM mass.”

Id.

These factors supported the case-by-case approach EPA adopted for VOCs in the Implementation Rule, under which States are not required to address VOCs in their attainment plans and evaluate potential control measures for such pollutants “unless the State or EPA makes a technical demonstration that emissions of VOCs from sources in the State significantly contribute to PM<sub>2.5</sub> concentrations in a given nonattainment area.” Id.; accord 73 Fed. Reg. at 28,328-29 (adopting same policy in NSR rule). As EPA explained in the NSR Rule preamble, “[w]here the effect of a pollutant’s emissions on ambient PM<sub>2.5</sub> concentrations is subject to this degree of uncertainty, we do not have justification to establish a nationally-applicable presumption that the pollutant is . . . subject to [PM<sub>2.5</sub> NSR] requirements.” 73 Fed. Reg. at 28,329; see also id. at 28,329/3 (“[W]e do not find it appropriate to utilize the same approach for NO<sub>x</sub> because the scientific data and modeling analyses provide more certainty that NO<sub>x</sub> emissions are a significant contributor to ambient PM<sub>2.5</sub> concentrations.”). Because EPA articulated a

reasonable explanation, supported by information in the record, for applying the initial, rebuttable “presumed-out” approach to VOCs in the context of PM<sub>2.5</sub> attainment planning and NSR, this part of the Implementation and NSR Rules also should be upheld. See supra Argument II.B.2 (citing cases).

**C. EPA’s Rules Do Not Improperly Delegate the Decision to Regulate Ammonia or VOCs Solely to Each State’s Discretion.**

Petitioners’ primary objection to EPA’s treatment of ammonia and VOCs stems from the inaccurate premise that “the regulation of precursors [is] entirely dependent on the State’s willingness to make a significant contribution demonstration.” Pet. Br. at 32. In fact, EPA clearly stated that “[w]hile the rule establishes a presumption that ammonia and VOC[s] need not be regulated, States are required to address information brought to their attention during the planning and rule adoption process” that precedes the submission of their SIPs to EPA for approval. 2007 RTC at 33 (JA xx). Information brought to the State’s attention by interested members of the public or otherwise submitted or developed during that process may rebut the presumption and support regulation of ammonia or VOC emissions in a particular PM<sub>2.5</sub> nonattainment area. See id. at 51 (JA xx) (Explaining that “[w]hile this policy does not require States to regulate ammonia in the first instance, it does require relevant information to be considered in the public

record during the SIP process, and requires States to use the weight of best available information to determine whether ammonia should be controlled.”).

Moreover, EPA explicitly provided that it would review the validity of the presumptions for a given nonattainment area during its own rulemaking process when evaluating whether to approve a SIP submission. As the Agency explained, “EPA retains the ability to reverse a presumption in any area,” 2007 RTC at 33 (JA xx), and has its own obligation to respond to comments during the SIP submission approval process that may indicate regulation of ammonia or VOC emissions in a particular nonattainment area. See 72 Fed. Reg. at 20,597. EPA thus made clear that “both EPA *and* the state or local agency have the obligation to ensure regulation of precursors which have been demonstrated to have significant contribution, including consideration of public comments.” 2007 RTC at 43 (JA xx) (emphasis added); see also 72 Fed. Reg. at 20,596 (any technical demonstration by the State must be approved by EPA).

This Court previously has recognized that the public comment opportunities associated with SIP development and adoption at the state level and subsequent SIP approval by EPA provide a safeguard to ensure that the attainment planning process will include consideration of all pertinent information on a case-by-case basis. NRDC, 571 F.3d at 1254-55. There, the Court upheld EPA’s decision in the “Phase 2” implementation rule for the 1997 8-hour ozone NAAQS to allow States

to presumptively rely on pre-existing 1-hour ozone RACT determinations except where new information showed that an old RACT determination was no longer valid. Id. Though the petitioners in that case argued that EPA should have revised the existing nationally-applicable RACT guidance as part of the 8-hour NAAQS implementation rule, this Court concluded that it was reasonable under the circumstances to forego revising the guidance and rely instead on a case-by-case approach to update the RACT analysis where appropriate. Id. The Court observed that “if additional information is presented during notice-and-comment rulemaking, both the state and EPA are required to consider that information as part of the rulemaking,” id. at 1254, and that “persons disagreeing with a particular RACT certification can seek judicial review of a particular SIP approval.” Id. at 1255. The same is true here with regard to any comments or supporting data submitted during the SIP development and SIP approval processes that may indicate the presumption against regulating ammonia and VOCs is not valid for a particular PM<sub>2.5</sub> nonattainment area.

Petitioners also claim that States may not regulate ammonia or VOCs regardless of whether available information rebuts the validity of the presumption for a particular nonattainment area, because of “various state laws that limit the ability of state officials to take environmental regulatory action beyond the bare minimum mandated by federal law.” Pet. Br. at 33. However, EPA clearly stated

that “[w]here a finding is made by either a state *or* EPA [that ammonia or VOCs significantly contributes to PM<sub>2.5</sub> concentrations in a particular nonattainment area], ammonia or VOCs must then be regulated as appropriate.” 2007 RTC at 51 (JA xx). “Since consideration of relevant data is required[,] EPA does not believe that a finding of significance would be more stringent than required by federal regulation,” and thus it would apply in any State for which such a finding is made, “even those with limitations on their authority” as described by Petitioners. *Id.* “If the state or EPA makes a technical demonstration showing that VOC or ammonia significantly contribute, then this federal rule *requires* that the State assess whether there are controls for VOC or ammonia that constitute RACT or RACM, and whether there are reasonable measures to address intrastate transport” that would facilitate NAAQS attainment as expeditiously as practicable. *Id.* at 41-42 (JA xx) (emphasis in original)<sup>14</sup>; cf. *NRDC*, 571 F.3d at 1253 (“When control technology is necessary to advance attainment, it is ‘reasonably available’” within the meaning of the RACT requirement in 42 U.S.C. § 7502(c)(1) as construed by EPA).

Nor do the final rules permit States to avoid the potential necessity for regulating ammonia and VOCs in certain PM<sub>2.5</sub> nonattainment areas merely by opting not to conduct technical demonstrations. EPA made clear that “[i]f

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<sup>14</sup> “RACM” refers to the requirement under 42 U.S.C. § 7502(c)(1) that SIPs must “provide for the implementation of all reasonably available control measures [*i.e.*, “RACM”] as expeditiously as practicable . . . .”

information brought forward by commenters or the State in the SIP development process shows that the presumption in this rule for ammonia, VOC or NO<sub>x</sub> is not technically justified for a particular nonattainment area,” submittal of a technical demonstration is not optional. 72 Fed. Reg. at 20,597; accord 2007 RTC at 78 (JA xx).

In summary, 42 U.S.C. § 7602(g) authorizes EPA to establish a presumption either for or against identifying a substance as a “precursor” for a particular regulatory purpose. Here, EPA reasonably explained why the presumptions it adopted for ammonia and VOCs were appropriate starting points for its nationwide PM<sub>2.5</sub> NAAQS implementation approach, as well as how those presumptions could be reversed for individual areas through the use of technical demonstrations. Furthermore, EPA expressly provided procedural safeguards to ensure that interested parties can actively participate in the decisions concerning which precursors must be addressed in a given PM<sub>2.5</sub> nonattainment area. Accordingly, the Court should uphold the Implementation and NSR Rules.

### **III. IMPOSITION OF A DEADLINE ON REMAND WOULD BE INCONSISTENT WITH PRECEDENT AND IS UNNECESSARY.**

Petitioners ask that, if their petition is granted, the Court not only remand the Implementation and NSR Rules to EPA, but also impose a one-year deadline for such further administrative proceedings as may be necessary to respond to the

Court's mandate, retain jurisdiction over the case, and require regular status reports from EPA. Pet. Br. at 33-36. In recent decisions, this Court repeatedly has declined such requests, correctly observing that, were EPA to delay unreasonably in responding to the Court's mandate, the appropriate remedy would be to petition the Court for a writ of mandamus. See, e.g., NRDC v. EPA, 489 F.3d 1364, 1375 (D.C. Cir. 2007) ("We decline to set a two year limit on EPA's proceedings on remand as the NRDC requests; mandamus affords a remedy for undue delay."); North Carolina v. EPA, 550 F.3d 1176, 1178 (D.C. Cir. 2008) (per curiam) (declining to set deadline for proceedings in response to remand of CAIR rule, and noting availability of mandamus relief if appropriate); cf. Portland Cement Ass'n v. EPA, 665 F.3d 177, 194 (D.C. Cir. 2011) (petitioners could file a citizen suit under 42 U.S.C. § 7604 in the event of unreasonable delay). Thus, even if the Court grants the instant petition, it should decline Petitioners' extraordinary request for a one-year deadline on remand, consistent with the above-cited decisions.

### **CONCLUSION**

For the foregoing reasons, the Court should deny the petition for review.

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**CERTIFICATE OF COMPLIANCE**

I, the undersigned counsel for Respondent, hereby certify that the foregoing Brief complies with the applicable word limit under Federal Rule of Appellate Procedure 32(a)(7)(B) and this Court's orders, because this Brief contains approximately 13,986 words as calculated by Corel Wordperfect software, excluding the parts of the Brief exempted by Federal Rule of Appellate Procedure 32(a)(7)(B)(iii).

Dated: February 27, 2012

/s/ Brian H. Lynk  
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**CERTIFICATE OF SERVICE**

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## C

**Effective: January 23, 2004**

United States Code Annotated [Currentness](#)

Title 42. The Public Health and Welfare

Chapter 85. Air Pollution Prevention and Control ([Refs & Annos](#))

▢ [Subchapter I. Programs and Activities](#)

▢ [Part A. Air Quality and Emissions Limitations \(Refs & Annos\)](#)

→→ **§ 7407. Air quality control regions**

(a) Responsibility of each State for air quality; submission of implementation plan

Each State shall have the primary responsibility for assuring air quality within the entire geographic area comprising such State by submitting an implementation plan for such State which will specify the manner in which national primary and secondary ambient air quality standards will be achieved and maintained within each air quality control region in such State.

(b) Designated regions

For purposes of developing and carrying out implementation plans under [section 7410](#) of this title--

(1) an air quality control region designated under this section before December 31, 1970, or a region designated after such date under subsection (c) of this section, shall be an air quality control region; and

(2) the portion of such State which is not part of any such designated region shall be an air quality control region, but such portion may be subdivided by the State into two or more air quality control regions with the approval of the Administrator.

(c) Authority of Administrator to designate regions; notification of Governors of affected States

The Administrator shall, within 90 days after December 31, 1970, after consultation with appropriate State and local authorities, designate as an air quality control region any interstate area or major intrastate area which he deems necessary or appropriate for the attainment and maintenance of ambient air quality standards. The Administrator shall immediately notify the Governors of the affected States of any designation made under this subsection.

(d) Designations

(1) Designations generally

(A) Submission by Governors of initial designations following promulgation of new or revised standards

By such date as the Administrator may reasonably require, but not later than 1 year after promulgation of a new or revised national ambient air quality standard for any pollutant under [section 7409](#) of this title, the Governor of each State shall (and at any other time the Governor of a State deems appropriate the Governor may) submit to the Administrator a list of all areas (or portions thereof) in the State, designating as--

- (i) nonattainment, any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant,
- (ii) attainment, any area (other than an area identified in clause (i)) that meets the national primary or secondary ambient air quality standard for the pollutant, or
- (iii) unclassifiable, any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

The Administrator may not require the Governor to submit the required list sooner than 120 days after promulgating a new or revised national ambient air quality standard.

(B) Promulgation by EPA of designations

(i) Upon promulgation or revision of a national ambient air quality standard, the Administrator shall promulgate the designations of all areas (or portions thereof) submitted under subparagraph (A) as expeditiously as practicable, but in no case later than 2 years from the date of promulgation of the new or revised national ambient air quality standard. Such period may be extended for up to one year in the event the Administrator has insufficient information to promulgate the designations.

(ii) In making the promulgations required under clause (i), the Administrator may make such modifications as the Administrator deems necessary to the designations of the areas (or portions thereof) submitted under subparagraph (A) (including to the boundaries of such areas or portions thereof). Whenever the Administrator intends to make a modification, the Administrator shall notify the State and provide such State with an opportunity to demonstrate why any proposed modification is inappropriate. The Administrator shall give such notification no later than 120 days before the date the Administrator promulgates the designation, including any modification thereto. If the Governor fails to submit the list in whole or in part, as required under subparagraph (A), the Administrator shall promulgate the designation that the Administrator deems appropriate for any area (or portion thereof) not designated by the State.

(iii) If the Governor of any State, on the Governor's own motion, under subparagraph (A), submits a list of areas (or portions thereof) in the State designated as nonattainment, attainment, or unclassifiable, the Administrator shall act on such designations in accordance with the procedures under paragraph (3) (relating to redesignation).

(iv) A designation for an area (or portion thereof) made pursuant to this subsection shall remain in effect until the area (or portion thereof) is redesignated pursuant to paragraph (3) or (4).

(C) Designations by operation of law

(i) Any area designated with respect to any air pollutant under the provisions of paragraph (1)(A), (B), or (C) of this subsection (as in effect immediately before November 15, 1990) is designated, by operation of law, as a nonattainment area for such pollutant within the meaning of subparagraph (A)(i).

(ii) Any area designated with respect to any air pollutant under the provisions of paragraph (1)(E) (as in effect immediately before November 15, 1990) is designated by operation of law, as an attainment area for such pollutant within the meaning of subparagraph (A)(ii).

(iii) Any area designated with respect to any air pollutant under the provisions of paragraph (1)(D) (as in effect immediately before November 15, 1990) is designated, by operation of law, as an unclassifiable area for such pollutant within the meaning of subparagraph (A)(iii).

(2) Publication of designations and redesignations

(A) The Administrator shall publish a notice in the Federal Register promulgating any designation under paragraph (1) or (5), or announcing any designation under paragraph (4), or promulgating any redesignation under paragraph (3).

(B) Promulgation or announcement of a designation under paragraph (1), (4) or (5) shall not be subject to the provisions of [sections 553 through 557 of Title 5](#) (relating to notice and comment), except nothing herein shall be construed as precluding such public notice and comment whenever possible.

(3) Redesignation

(A) Subject to the requirements of subparagraph (E), and on the basis of air quality data, planning and control considerations, or any other air quality-related considerations the Administrator deems appropriate, the Administrator may at any time notify the Governor of any State that available information indicates that the designation of any area or portion of an area within the State or interstate area should be revised. In issuing such notification, which shall be public, to the Governor, the Administrator shall provide such information as the Administrator may have available explaining the basis for the notice.

(B) No later than 120 days after receiving a notification under subparagraph (A), the Governor shall submit to the Administrator such redesignation, if any, of the appropriate area (or areas) or portion thereof within the State or interstate area, as the Governor considers appropriate.

(C) No later than 120 days after the date described in subparagraph (B) (or paragraph (1)(B)(iii)), the Administrator shall promulgate the redesignation, if any, of the area or portion thereof, submitted by the Governor in

accordance with subparagraph (B), making such modifications as the Administrator may deem necessary, in the same manner and under the same procedure as is applicable under clause (ii) of paragraph (1)(B), except that the phrase “60 days” shall be substituted for the phrase “120 days” in that clause. If the Governor does not submit, in accordance with subparagraph (B), a redesignation for an area (or portion thereof) identified by the Administrator under subparagraph (A), the Administrator shall promulgate such redesignation, if any, that the Administrator deems appropriate.

**(D)** The Governor of any State may, on the Governor's own motion, submit to the Administrator a revised designation of any area or portion thereof within the State. Within 18 months of receipt of a complete State redesignation submittal, the Administrator shall approve or deny such redesignation. The submission of a redesignation by a Governor shall not affect the effectiveness or enforceability of the applicable implementation plan for the State.

**(E)** The Administrator may not promulgate a redesignation of a nonattainment area (or portion thereof) to attainment unless--

**(i)** the Administrator determines that the area has attained the national ambient air quality standard;

**(ii)** the Administrator has fully approved the applicable implementation plan for the area under [section 7410\(k\)](#) of this title;

**(iii)** the Administrator determines that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable implementation plan and applicable Federal air pollutant control regulations and other permanent and enforceable reductions;

**(iv)** the Administrator has fully approved a maintenance plan for the area as meeting the requirements of [section 7505a](#) of this title; and

**(v)** the State containing such area has met all requirements applicable to the area under [section 7410](#) of this title and part D of this subchapter.

**(F)** The Administrator shall not promulgate any redesignation of any area (or portion thereof) from nonattainment to unclassifiable.

(4) Nonattainment designations for ozone, carbon monoxide and particulate matter (PM-10)

(A) Ozone and carbon monoxide

**(i)** Within 120 days after November 15, 1990, each Governor of each State shall submit to the Administrator a list that designates, affirms or reaffirms the designation of, or redesignates (as the case may be), all areas (or portions thereof) of the Governor's State as attainment, nonattainment, or unclassifiable with respect to

the national ambient air quality standards for ozone and carbon monoxide.

(ii) No later than 120 days after the date the Governor is required to submit the list of areas (or portions thereof) required under clause (i) of this subparagraph, the Administrator shall promulgate such designations, making such modifications as the Administrator may deem necessary, in the same manner, and under the same procedure, as is applicable under clause (ii) of paragraph (1)(B), except that the phrase “60 days” shall be substituted for the phrase “120 days” in that clause. If the Governor does not submit, in accordance with clause (i) of this subparagraph, a designation for an area (or portion thereof), the Administrator shall promulgate the designation that the Administrator deems appropriate.

(iii) No nonattainment area may be redesignated as an attainment area under this subparagraph.

(iv) Notwithstanding paragraph (1)(C)(ii) of this subsection, if an ozone or carbon monoxide nonattainment area located within a metropolitan statistical area or consolidated metropolitan statistical area (as established by the Bureau of the Census) is classified under part D of this subchapter as a Serious, Severe, or Extreme Area, the boundaries of such area are hereby revised (on the date 45 days after such classification) by operation of law to include the entire metropolitan statistical area or consolidated metropolitan statistical area, as the case may be, unless within such 45-day period the Governor (in consultation with State and local air pollution control agencies) notifies the Administrator that additional time is necessary to evaluate the application of clause (v). Whenever a Governor has submitted such a notice to the Administrator, such boundary revision shall occur on the later of the date 8 months after such classification or 14 months after November 15, 1990, unless the Governor makes the finding referred to in clause (v), and the Administrator concurs in such finding, within such period. Except as otherwise provided in this paragraph, a boundary revision under this clause or clause (v) shall apply for purposes of any State implementation plan revision required to be submitted after November 15, 1990.

(v) Whenever the Governor of a State has submitted a notice under clause (iv), the Governor, in consultation with State and local air pollution control agencies, shall undertake a study to evaluate whether the entire metropolitan statistical area or consolidated metropolitan statistical area should be included within the nonattainment area. Whenever a Governor finds and demonstrates to the satisfaction of the Administrator, and the Administrator concurs in such finding, that with respect to a portion of a metropolitan statistical area or consolidated metropolitan statistical area, sources in the portion do not contribute significantly to violation of the national ambient air quality standard, the Administrator shall approve the Governor's request to exclude such portion from the nonattainment area. In making such finding, the Governor and the Administrator shall consider factors such as population density, traffic congestion, commercial development, industrial development, meteorological conditions, and pollution transport.

(B) PM-10 designations

By operation of law, until redesignation by the Administrator pursuant to paragraph (3)--

(i) each area identified in [52 Federal Register 29383 \(Aug. 7, 1987\)](#) as a Group I area (except to the extent

that such identification was modified by the Administrator before November 15, 1990) is designated non-attainment for PM-10;

(ii) any area containing a site for which air quality monitoring data show a violation of the national ambient air quality standard for PM-10 before January 1, 1989 (as determined under [part 50, appendix K of title 40 of the Code of Federal Regulations](#)) is hereby designated nonattainment for PM-10; and

(iii) each area not described in clause (i) or (ii) is hereby designated unclassifiable for PM-10.

Any designation for particulate matter (measured in terms of total suspended particulates) that the Administrator promulgated pursuant to this subsection (as in effect immediately before November 15, 1990) shall remain in effect for purposes of implementing the maximum allowable increases in concentrations of particulate matter (measured in terms of total suspended particulates) pursuant to [section 7473\(b\)](#) of this title, until the Administrator determines that such designation is no longer necessary for that purpose.

#### (5) Designations for lead

The Administrator may, in the Administrator's discretion at any time the Administrator deems appropriate, require a State to designate areas (or portions thereof) with respect to the national ambient air quality standard for lead in effect as of November 15, 1990, in accordance with the procedures under subparagraphs (A) and (B) of paragraph (1), except that in applying subparagraph (B)(i) of paragraph (1) the phrase "2 years from the date of promulgation of the new or revised national ambient air quality standard" shall be replaced by the phrase "1 year from the date the Administrator notifies the State of the requirement to designate areas with respect to the standard for lead".

#### (6) Designations

##### (A) Submission

Notwithstanding any other provision of law, not later than February 15, 2004, the Governor of each State shall submit designations referred to in paragraph (1) for the July 1997 PM<sub>2.5</sub> national ambient air quality standards for each area within the State, based on air quality monitoring data collected in accordance with any applicable Federal reference methods for the relevant areas.

##### (B) Promulgation

Notwithstanding any other provision of law, not later than December 31, 2004, the Administrator shall, consistent with paragraph (1), promulgate the designations referred to in subparagraph (A) for each area of each State for the July 1997 PM<sub>2.5</sub> national ambient air quality standards.

#### (7) Implementation plan for regional haze

## (A) In general

Notwithstanding any other provision of law, not later than 3 years after the date on which the Administrator promulgates the designations referred to in paragraph (6)(B) for a State, the State shall submit, for the entire State, the State implementation plan revisions to meet the requirements promulgated by the Administrator under [section 7492\(e\)\(1\)](#) of this title (referred to in this paragraph as “regional haze requirements”).

## (B) No preclusion of other provisions

Nothing in this paragraph precludes the implementation of the agreements and recommendations stemming from the Grand Canyon Visibility Transport Commission Report dated June 1996, including the submission of State implementation plan revisions by the States of Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, or Wyoming by December 31, 2003, for implementation of regional haze requirements applicable to those States.

## (e) Redesignation of air quality control regions

(1) Except as otherwise provided in paragraph (2), the Governor of each State is authorized, with the approval of the Administrator, to redesignate from time to time the air quality control regions within such State for purposes of efficient and effective air quality management. Upon such redesignation, the list under subsection (d) of this section shall be modified accordingly.

(2) In the case of an air quality control region in a State, or part of such region, which the Administrator finds may significantly affect air pollution concentrations in another State, the Governor of the State in which such region, or part of a region, is located may redesignate from time to time the boundaries of so much of such air quality control region as is located within such State only with the approval of the Administrator and with the consent of all Governors of all States which the Administrator determines may be significantly affected.

(3) No compliance date extension granted under [section 7413\(d\)\(5\)](#) of this title (relating to coal conversion) shall cease to be effective by reason of the regional limitation provided in [section 7413\(d\)\(5\)](#) of this title if the violation of such limitation is due solely to a redesignation of a region under this subsection.

## CREDIT(S)

(July 14, 1955, c. 360, Title I, § 107, as added Dec. 31, 1970, Pub.L. 91-604, § 4(a), 84 Stat. 1678; amended Aug. 7, 1977, [Pub.L. 95-95, Title I, § 103](#), 91 Stat. 687; Nov. 15, 1990, [Pub.L. 101-549, Title I, § 101\(a\)](#), 104 Stat. 2399; Jan. 23, 2004, [Pub.L. 108-199](#), Div. G, Title IV, § 425(a), 118 Stat. 417.)

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Title 42. The Public Health and Welfare

Chapter 85. Air Pollution Prevention and Control ([Refs & Annos](#))

▾ [Subchapter I. Programs and Activities](#)

▾ [Part A. Air Quality and Emissions Limitations \(Refs & Annos\)](#)

→→ **§ 7408. Air quality criteria and control techniques**

- (a) Air pollutant list; publication and revision by Administrator; issuance of air quality criteria for air pollutants
- (1) For the purpose of establishing national primary and secondary ambient air quality standards, the Administrator shall within 30 days after December 31, 1970, publish, and shall from time to time thereafter revise, a list which includes each air pollutant--
- (A) emissions of which, in his judgment, cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare;
- (B) the presence of which in the ambient air results from numerous or diverse mobile or stationary sources; and
- (C) for which air quality criteria had not been issued before December 31, 1970, but for which he plans to issue air quality criteria under this section.
- (2) The Administrator shall issue air quality criteria for an air pollutant within 12 months after he has included such pollutant in a list under paragraph (1). Air quality criteria for an air pollutant shall accurately reflect the latest scientific knowledge useful in indicating the kind and extent of all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air, in varying quantities. The criteria for an air pollutant, to the extent practicable, shall include information on--
- (A) those variable factors (including atmospheric conditions) which of themselves or in combination with other factors may alter the effects on public health or welfare of such air pollutant;
- (B) the types of air pollutants which, when present in the atmosphere, may interact with such pollutant to produce an adverse effect on public health or welfare; and
- (C) any known or anticipated adverse effects on welfare.

(b) Issuance by Administrator of information on air pollution control techniques; standing consulting committees for air pollutants; establishment; membership

(1) Simultaneously with the issuance of criteria under subsection (a) of this section, the Administrator shall, after consultation with appropriate advisory committees and Federal departments and agencies, issue to the States and appropriate air pollution control agencies information on air pollution control techniques, which information shall include data relating to the cost of installation and operation, energy requirements, emission reduction benefits, and environmental impact of the emission control technology. Such information shall include such data as are available on available technology and alternative methods of prevention and control of air pollution. Such information shall also include data on alternative fuels, processes, and operating methods which will result in elimination or significant reduction of emissions.

(2) In order to assist in the development of information on pollution control techniques, the Administrator may establish a standing consulting committee for each air pollutant included in a list published pursuant to subsection (a)(1) of this section, which shall be comprised of technically qualified individuals representative of State and local governments, industry, and the academic community. Each such committee shall submit, as appropriate, to the Administrator information related to that required by paragraph (1).

(c) Review, modification, and reissuance of criteria or information

The Administrator shall from time to time review, and, as appropriate, modify, and reissue any criteria or information on control techniques issued pursuant to this section. Not later than six months after August 7, 1977, the Administrator shall revise and reissue criteria relating to concentrations of NO<sub>2</sub> over such period (not more than three hours) as he deems appropriate. Such criteria shall include a discussion of nitric and nitrous acids, nitrites, nitrates, nitrosamines, and other carcinogenic and potentially carcinogenic derivatives of oxides of nitrogen.

(d) Publication in Federal Register; availability of copies for general public

The issuance of air quality criteria and information on air pollution control techniques shall be announced in the Federal Register and copies shall be made available to the general public.

(e) Transportation planning and guidelines

The Administrator shall, after consultation with the Secretary of Transportation, and after providing public notice and opportunity for comment, and with State and local officials, within nine months after November 15, 1990, and periodically thereafter as necessary to maintain a continuous transportation-air quality planning process, update the June 1978 Transportation-Air Quality Planning Guidelines and publish guidance on the development and implementation of transportation and other measures necessary to demonstrate and maintain attainment of national ambient air quality standards. Such guidelines shall include information on--

(1) methods to identify and evaluate alternative planning and control activities;

- (2) methods of reviewing plans on a regular basis as conditions change or new information is presented;
- (3) identification of funds and other resources necessary to implement the plan, including interagency agreements on providing such funds and resources;
- (4) methods to assure participation by the public in all phases of the planning process; and
- (5) such other methods as the Administrator determines necessary to carry out a continuous planning process.
- (f) Information regarding processes, procedures, and methods to reduce or control pollutants in transportation; reduction of mobile source related pollutants; reduction of impact on public health
- (1) The Administrator shall publish and make available to appropriate Federal, State, and local environmental and transportation agencies not later than one year after November 15, 1990, and from time to time thereafter--
- (A) information prepared, as appropriate, in consultation with the Secretary of Transportation, and after providing public notice and opportunity for comment, regarding the formulation and emission reduction potential of transportation control measures related to criteria pollutants and their precursors, including, but not limited to--
- (i) programs for improved public transit;
- (ii) restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;
- (iii) employer-based transportation management plans, including incentives;
- (iv) trip-reduction ordinances;
- (v) traffic flow improvement programs that achieve emission reductions;
- (vi) fringe and transportation corridor parking facilities serving multiple occupancy vehicle programs or transit service;
- (vii) programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use;
- (viii) programs for the provision of all forms of high-occupancy, shared-ride services;

(ix) programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;

(x) programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;

(xi) programs to control extended idling of vehicles;

(xii) programs to reduce motor vehicle emissions, consistent with subchapter II of this chapter, which are caused by extreme cold start conditions;

(xiii) employer-sponsored programs to permit flexible work schedules;

(xiv) programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;

(xv) programs for new construction and major reconstructions of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest. For purposes of this clause, the Administrator shall also consult with the Secretary of the Interior; and

(xvi) program to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks.

(B) information on additional methods or strategies that will contribute to the reduction of mobile source related pollutants during periods in which any primary ambient air quality standard will be exceeded and during episodes for which an air pollution alert, warning, or emergency has been declared;

(C) information on other measures which may be employed to reduce the impact on public health or protect the health of sensitive or susceptible individuals or groups; and

(D) information on the extent to which any process, procedure, or method to reduce or control such air pollutant may cause an increase in the emissions or formation of any other pollutant.

(2) In publishing such information the Administrator shall also include an assessment of--

(A) the relative effectiveness of such processes, procedures, and methods;

(B) the potential effect of such processes, procedures, and methods on transportation systems and the provision of transportation services; and

(C) the environmental, energy, and economic impact of such processes, procedures, and methods.

(g) Assessment of risks to ecosystems

The Administrator may assess the risks to ecosystems from exposure to criteria air pollutants (as identified by the Administrator in the Administrator's sole discretion).

(h) RACT/BACT/LAER clearinghouse

The Administrator shall make information regarding emission control technology available to the States and to the general public through a central database. Such information shall include all control technology information received pursuant to State plan provisions requiring permits for sources, including operating permits for existing sources.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 108, as added Dec. 31, 1970, Pub.L. 91-604, § 4(a), 84 Stat. 1678; amended Aug. 7, 1977, [Pub.L. 95-95, Title I, §§ 104](#), 105, Title IV, § 401(a), 91 Stat. 689, 790; Nov. 15, 1990, [Pub.L. 101-549, Title I, §§ 108\(a\)](#) to (c), (o), 111, 104 Stat. 2465, 2466, 2469, 2470; Nov. 10, 1998, [Pub.L. 105-362, Title XV, § 1501\(b\)](#), 112 Stat. 3294.)

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▢ [Subchapter I. Programs and Activities](#)

▢ [Part A. Air Quality and Emissions Limitations \(Refs & Annos\)](#)

→→ **§ 7409. National primary and secondary ambient air quality standards**

(a) Promulgation

(1) The Administrator--

(A) within 30 days after December 31, 1970, shall publish proposed regulations prescribing a national primary ambient air quality standard and a national secondary ambient air quality standard for each air pollutant for which air quality criteria have been issued prior to such date; and

(B) after a reasonable time for interested persons to submit written comments thereon (but no later than 90 days after the initial publication of such proposed standards) shall by regulation promulgate such proposed national primary and secondary ambient air quality standards with such modifications as he deems appropriate.

(2) With respect to any air pollutant for which air quality criteria are issued after December 31, 1970, the Administrator shall publish, simultaneously with the issuance of such criteria and information, proposed national primary and secondary ambient air quality standards for any such pollutant. The procedure provided for in paragraph (1)(B) of this subsection shall apply to the promulgation of such standards.

(b) Protection of public health and welfare

(1) National primary ambient air quality standards, prescribed under subsection (a) of this section shall be ambient air quality standards the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health. Such primary standards may be revised in the same manner as promulgated.

(2) Any national secondary ambient air quality standard prescribed under subsection (a) of this section shall specify a level of air quality the attainment and maintenance of which in the judgment of the Administrator, based on such criteria, is requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air. Such secondary standards may be revised in the same manner as promulgated.

## (c) National primary ambient air quality standard for nitrogen dioxide

The Administrator shall, not later than one year after August 7, 1977, promulgate a national primary ambient air quality standard for NO<sub>2</sub> concentrations over a period of not more than 3 hours unless, based on the criteria issued under [section 7408\(c\)](#) of this title, he finds that there is no significant evidence that such a standard for such a period is requisite to protect public health.

## (d) Review and revision of criteria and standards; independent scientific review committee; appointment; advisory functions

(1) Not later than December 31, 1980, and at five-year intervals thereafter, the Administrator shall complete a thorough review of the criteria published under [section 7408](#) of this title and the national ambient air quality standards promulgated under this section and shall make such revisions in such criteria and standards and promulgate such new standards as may be appropriate in accordance with [section 7408](#) of this title and subsection (b) of this section. The Administrator may review and revise criteria or promulgate new standards earlier or more frequently than required under this paragraph.

(2)(A) The Administrator shall appoint an independent scientific review committee composed of seven members including at least one member of the National Academy of Sciences, one physician, and one person representing State air pollution control agencies.

(B) Not later than January 1, 1980, and at five-year intervals thereafter, the committee referred to in subparagraph (A) shall complete a review of the criteria published under [section 7408](#) of this title and the national primary and secondary ambient air quality standards promulgated under this section and shall recommend to the Administrator any new national ambient air quality standards and revisions of existing criteria and standards as may be appropriate under [section 7408](#) of this title and subsection (b) of this section.

(C) Such committee shall also (i) advise the Administrator of areas in which additional knowledge is required to appraise the adequacy and basis of existing, new, or revised national ambient air quality standards, (ii) describe the research efforts necessary to provide the required information, (iii) advise the Administrator on the relative contribution to air pollution concentrations of natural as well as anthropogenic activity, and (iv) advise the Administrator of any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of such national ambient air quality standards.

## CREDIT(S)

(July 14, 1955, c. 360, Title I, § 109, as added Dec. 31, 1970, Pub.L. 91-604, § 4(a), 84 Stat. 1679; amended Aug. 7, 1977, [Pub.L. 95-95, Title I, § 106](#), 91 Stat. 691.)

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▢ [Part A](#). Air Quality and Emissions Limitations ([Refs & Annos](#))

→→ **§ 7410. State implementation plans for national primary and secondary ambient air quality standards**

(a) Adoption of plan by State; submission to Administrator; content of plan; revision; new sources; indirect source review program; supplemental or intermittent control systems

(1) Each State shall, after reasonable notice and public hearings, adopt and submit to the Administrator, within 3 years (or such shorter period as the Administrator may prescribe) after the promulgation of a national primary ambient air quality standard (or any revision thereof) under [section 7409](#) of this title for any air pollutant, a plan which provides for implementation, maintenance, and enforcement of such primary standard in each air quality control region (or portion thereof) within such State. In addition, such State shall adopt and submit to the Administrator (either as a part of a plan submitted under the preceding sentence or separately) within 3 years (or such shorter period as the Administrator may prescribe) after the promulgation of a national ambient air quality secondary standard (or revision thereof), a plan which provides for implementation, maintenance, and enforcement of such secondary standard in each air quality control region (or portion thereof) within such State. Unless a separate public hearing is provided, each State shall consider its plan implementing such secondary standard at the hearing required by the first sentence of this paragraph.

(2) Each implementation plan submitted by a State under this chapter shall be adopted by the State after reasonable notice and public hearing. Each such plan shall--

(A) include enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements of this chapter;

(B) provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to--

(i) monitor, compile, and analyze data on ambient air quality, and

(ii) upon request, make such data available to the Administrator;

(C) include a program to provide for the enforcement of the measures described in subparagraph (A), and regulation of the modification and construction of any stationary source within the areas covered by the plan as necessary to assure that national ambient air quality standards are achieved, including a permit program as required in parts C and D of this subchapter;

(D) contain adequate provisions--

(i) prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will--

(I) contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard, or

(II) interfere with measures required to be included in the applicable implementation plan for any other State under part C of this subchapter to prevent significant deterioration of air quality or to protect visibility,

(ii) insuring compliance with the applicable requirements of [sections 7426](#) and [7415](#) of this title (relating to interstate and international pollution abatement);

(E) provide (i) necessary assurances that the State (or, except where the Administrator deems inappropriate, the general purpose local government or governments, or a regional agency designated by the State or general purpose local governments for such purpose) will have adequate personnel, funding, and authority under State (and, as appropriate, local) law to carry out such implementation plan (and is not prohibited by any provision of Federal or State law from carrying out such implementation plan or portion thereof), (ii) requirements that the State comply with the requirements respecting State boards under [section 7428](#) of this title, and (iii) necessary assurances that, where the State has relied on a local or regional government, agency, or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of such plan provision;

(F) require, as may be prescribed by the Administrator--

(i) the installation, maintenance, and replacement of equipment, and the implementation of other necessary steps, by owners or operators of stationary sources to monitor emissions from such sources,

(ii) periodic reports on the nature and amounts of emissions and emissions-related data from such sources, and

(iii) correlation of such reports by the State agency with any emission limitations or standards established pursuant to this chapter, which reports shall be available at reasonable times for public inspection;

(G) provide for authority comparable to that in [section 7603](#) of this title and adequate contingency plans to implement such authority;

(H) provide for revision of such plan--

(i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of attaining such standard, and

(ii) except as provided in paragraph (3)(C), whenever the Administrator finds on the basis of information available to the Administrator that the plan is substantially inadequate to attain the national ambient air quality standard which it implements or to otherwise comply with any additional requirements established under this chapter;

(I) in the case of a plan or plan revision for an area designated as a nonattainment area, meet the applicable requirements of part D of this subchapter (relating to nonattainment areas);

(J) meet the applicable requirements of [section 7421](#) of this title (relating to consultation), [section 7427](#) of this title (relating to public notification), and part C of this subchapter (relating to prevention of significant deterioration of air quality and visibility protection);

(K) provide for--

(i) the performance of such air quality modeling as the Administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any air pollutant for which the Administrator has established a national ambient air quality standard, and

(ii) the submission, upon request, of data related to such air quality modeling to the Administrator;

(L) require the owner or operator of each major stationary source to pay to the permitting authority, as a condition of any permit required under this chapter, a fee sufficient to cover--

(i) the reasonable costs of reviewing and acting upon any application for such a permit, and

(ii) if the owner or operator receives a permit for such source, the reasonable costs of implementing and enforcing the terms and conditions of any such permit (not including any court costs or other costs associated

with any enforcement action),

until such fee requirement is superseded with respect to such sources by the Administrator's approval of a fee program under subchapter V of this chapter; and

(M) provide for consultation and participation by local political subdivisions affected by the plan.

(3)(A) Repealed. Pub.L. 101-549, Title I, § 101(d)(1), Nov. 15, 1990, 104 Stat. 2409

(B) As soon as practicable, the Administrator shall, consistent with the purposes of this chapter and the Energy Supply and Environmental Coordination Act of 1974 [15 U.S.C.A. § 791 et seq.], review each State's applicable implementation plans and report to the State on whether such plans can be revised in relation to fuel burning stationary sources (or persons supplying fuel to such sources) without interfering with the attainment and maintenance of any national ambient air quality standard within the period permitted in this section. If the Administrator determines that any such plan can be revised, he shall notify the State that a plan revision may be submitted by the State. Any plan revision which is submitted by the State shall, after public notice and opportunity for public hearing, be approved by the Administrator if the revision relates only to fuel burning stationary sources (or persons supplying fuel to such sources), and the plan as revised complies with paragraph (2) of this subsection. The Administrator shall approve or disapprove any revision no later than three months after its submission.

(C) Neither the State, in the case of a plan (or portion thereof) approved under this subsection, nor the Administrator, in the case of a plan (or portion thereof) promulgated under subsection (c) of this section, shall be required to revise an applicable implementation plan because one or more exemptions under section 7418 of this title (relating to Federal facilities), enforcement orders under section 7413(d) of this title, suspensions under subsection (f) or (g) of this section (relating to temporary energy or economic authority), orders under section 7419 of this title (relating to primary nonferrous smelters), or extensions of compliance in decrees entered under section 7413(e) of this title (relating to iron- and steel-producing operations) have been granted, if such plan would have met the requirements of this section if no such exemptions, orders, or extensions had been granted.

(4) Repealed. Pub.L. 101-549, Title I, § 101(d)(2), Nov. 15, 1990, 104 Stat. 2409

(5)(A)(i) Any State may include in a State implementation plan, but the Administrator may not require as a condition of approval of such plan under this section, any indirect source review program. The Administrator may approve and enforce, as part of an applicable implementation plan, an indirect source review program which the State chooses to adopt and submit as part of its plan.

(ii) Except as provided in subparagraph (B), no plan promulgated by the Administrator shall include any indirect source review program for any air quality control region, or portion thereof.

(iii) Any State may revise an applicable implementation plan approved under this subsection to suspend or re-

voke any such program included in such plan, provided that such plan meets the requirements of this section.

**(B)** The Administrator shall have the authority to promulgate, implement and enforce regulations under subsection (c) of this section respecting indirect source review programs which apply only to federally assisted highways, airports, and other major federally assisted indirect sources and federally owned or operated indirect sources.

**(C)** For purposes of this paragraph, the term “indirect source” means a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution. Such term includes parking lots, parking garages, and other facilities subject to any measure for management of parking supply (within the meaning of subsection (c)(2)(D)(ii) of this section), including regulation of existing off-street parking but such term does not include new or existing on-street parking. Direct emissions sources or facilities at, within, or associated with, any indirect source shall not be deemed indirect sources for the purpose of this paragraph.

**(D)** For purposes of this paragraph the term “indirect source review program” means the facility-by-facility review of indirect sources of air pollution, including such measures as are necessary to assure, or assist in assuring, that a new or modified indirect source will not attract mobile sources of air pollution, the emissions from which would cause or contribute to air pollution concentrations--

(i) exceeding any national primary ambient air quality standard for a mobile source-related air pollutant after the primary standard attainment date, or

(ii) preventing maintenance of any such standard after such date.

**(E)** For purposes of this paragraph and paragraph (2)(B), the term “transportation control measure” does not include any measure which is an “indirect source review program”.

**(6)** No State plan shall be treated as meeting the requirements of this section unless such plan provides that in the case of any source which uses a supplemental, or intermittent control system for purposes of meeting the requirements of an order under [section 7413\(d\)](#) of this title or [section 7419](#) of this title (relating to primary nonferrous smelter orders), the owner or operator of such source may not temporarily reduce the pay of any employee by reason of the use of such supplemental or intermittent or other dispersion dependent control system.

(b) Extension of period for submission of plans

The Administrator may, wherever he determines necessary, extend the period for submission of any plan or portion thereof which implements a national secondary ambient air quality standard for a period not to exceed 18 months from the date otherwise required for submission of such plan.

(c) Preparation and publication by Administrator of proposed regulations setting forth implementation plan;

transportation regulations study and report; parking surcharge; suspension authority; plan implementation

(1) The Administrator shall promulgate a Federal implementation plan at any time within 2 years after the Administrator--

(A) finds that a State has failed to make a required submission or finds that the plan or plan revision submitted by the State does not satisfy the minimum criteria established under subsection (k)(1)(A) of this section, or

(B) disapproves a State implementation plan submission in whole or in part,

unless the State corrects the deficiency, and the Administrator approves the plan or plan revision, before the Administrator promulgates such Federal implementation plan.

(2)(A) Repealed. [Pub.L. 101-549, Title I, § 101\(d\)\(3\)\(A\)](#), Nov. 15, 1990, 104 Stat. 2409

(B) No parking surcharge regulation may be required by the Administrator under paragraph (1) of this subsection as a part of an applicable implementation plan. All parking surcharge regulations previously required by the Administrator shall be void upon June 22, 1974. This subparagraph shall not prevent the Administrator from approving parking surcharges if they are adopted and submitted by a State as part of an applicable implementation plan. The Administrator may not condition approval of any implementation plan submitted by a State on such plan's including a parking surcharge regulation.

(C) Repealed. [Pub.L. 101-549, Title I, § 101\(d\)\(3\)\(B\)](#), Nov. 15, 1990, 104 Stat. 2409

(D) For purposes of this paragraph--

(i) The term "parking surcharge regulation" means a regulation imposing or requiring the imposition of any tax, surcharge, fee, or other charge on parking spaces, or any other area used for the temporary storage of motor vehicles.

(ii) The term "management of parking supply" shall include any requirement providing that any new facility containing a given number of parking spaces shall receive a permit or other prior approval, issuance of which is to be conditioned on air quality considerations.

(iii) The term "preferential bus/carpool lane" shall include any requirement for the setting aside of one or more lanes of a street or highway on a permanent or temporary basis for the exclusive use of buses or carpools, or both.

(E) No standard, plan, or requirement, relating to management of parking supply or preferential bus/carpool lanes shall be promulgated after June 22, 1974, by the Administrator pursuant to this section, unless such pro-

mulgation has been subjected to at least one public hearing which has been held in the area affected and for which reasonable notice has been given in such area. If substantial changes are made following public hearings, one or more additional hearings shall be held in such area after such notice.

(3) Upon application of the chief executive officer of any general purpose unit of local government, if the Administrator determines that such unit has adequate authority under State or local law, the Administrator may delegate to such unit the authority to implement and enforce within the jurisdiction of such unit any part of a plan promulgated under this subsection. Nothing in this paragraph shall prevent the Administrator from implementing or enforcing any applicable provision of a plan promulgated under this subsection.

(4) Repealed. Pub.L. 101-549, Title I, § 101(d)(3)(C), Nov. 15, 1990, 104 Stat. 2409

(5)(A) Any measure in an applicable implementation plan which requires a toll or other charge for the use of a bridge located entirely within one city shall be eliminated from such plan by the Administrator upon application by the Governor of the State, which application shall include a certification by the Governor that he will revise such plan in accordance with subparagraph (B).

(B) In the case of any applicable implementation plan with respect to which a measure has been eliminated under subparagraph (A), such plan shall, not later than one year after August 7, 1977, be revised to include comprehensive measures to:

(i) establish, expand, or improve public transportation measures to meet basic transportation needs, as expeditiously as is practicable; and

(ii) implement transportation control measures necessary to attain and maintain national ambient air quality standards,

and such revised plan shall, for the purpose of implementing such comprehensive public transportation measures, include requirements to use (insofar as is necessary) Federal grants, State or local funds, or any combination of such grants and funds as may be consistent with the terms of the legislation providing such grants and funds. Such measures shall, as a substitute for the tolls or charges eliminated under subparagraph (A), provide for emissions reductions equivalent to the reductions which may reasonably be expected to be achieved through the use of the tolls or charges eliminated.

(C) Any revision of an implementation plan for purposes of meeting the requirements of subparagraph (B) shall be submitted in coordination with any plan revision required under part D of this subchapter.

(d), (e) Repealed. Pub.L. 101-549, Title I, § 101(d)(4), (5), Nov. 15, 1990, 104 Stat. 2409

(f) National or regional energy emergencies; determination by President

(1) Upon application by the owner or operator of a fuel burning stationary source, and after notice and opportunity for public hearing, the Governor of the State in which such source is located may petition the President to determine that a national or regional energy emergency exists of such severity that--

(A) a temporary suspension of any part of the applicable implementation plan or of any requirement under [section 7651j](#) of this title (concerning excess emissions penalties or offsets) may be necessary, and

(B) other means of responding to the energy emergency may be inadequate.

Such determination shall not be delegable by the President to any other person. If the President determines that a national or regional energy emergency of such severity exists, a temporary emergency suspension of any part of an applicable implementation plan or of any requirement under [section 7651j](#) of this title (concerning excess emissions penalties or offsets) adopted by the State may be issued by the Governor of any State covered by the President's determination under the condition specified in paragraph (2) and may take effect immediately.

(2) A temporary emergency suspension under this subsection shall be issued to a source only if the Governor of such State finds that--

(A) there exists in the vicinity of such source a temporary energy emergency involving high levels of unemployment or loss of necessary energy supplies for residential dwellings; and

(B) such unemployment or loss can be totally or partially alleviated by such emergency suspension.

Not more than one such suspension may be issued for any source on the basis of the same set of circumstances or on the basis of the same emergency.

(3) A temporary emergency suspension issued by a Governor under this subsection shall remain in effect for a maximum of four months or such lesser period as may be specified in a disapproval order of the Administrator, if any. The Administrator may disapprove such suspension if he determines that it does not meet the requirements of paragraph (2).

(4) This subsection shall not apply in the case of a plan provision or requirement promulgated by the Administrator under subsection (c) of this section, but in any such case the President may grant a temporary emergency suspension for a four month period of any such provision or requirement if he makes the determinations and findings specified in paragraphs (1) and (2).

(5) The Governor may include in any temporary emergency suspension issued under this subsection a provision delaying for a period identical to the period of such suspension any compliance schedule (or increment of progress) to which such source is subject under [section 1857c-10](#) of this title, as in effect before August 7, 1977, or [section 7413\(d\)](#) of this title, upon a finding that such source is unable to comply with such schedule (or incre-

ment) solely because of the conditions on the basis of which a suspension was issued under this subsection.

(g) Governor's authority to issue temporary emergency suspensions

(1) In the case of any State which has adopted and submitted to the Administrator a proposed plan revision which the State determines--

(A) meets the requirements of this section, and

(B) is necessary (i) to prevent the closing for one year or more of any source of air pollution, and (ii) to prevent substantial increases in unemployment which would result from such closing, and

which the Administrator has not approved or disapproved under this section within 12 months of submission of the proposed plan revision, the Governor may issue a temporary emergency suspension of the part of the applicable implementation plan for such State which is proposed to be revised with respect to such source. The determination under subparagraph (B) may not be made with respect to a source which would close without regard to whether or not the proposed plan revision is approved.

(2) A temporary emergency suspension issued by a Governor under this subsection shall remain in effect for a maximum of four months or such lesser period as may be specified in a disapproval order of the Administrator. The Administrator may disapprove such suspension if he determines that it does not meet the requirements of this subsection.

(3) The Governor may include in any temporary emergency suspension issued under this subsection a provision delaying for a period identical to the period of such suspension any compliance schedule (or increment of progress) to which such source is subject under [section 1857c-10](#) of this title as in effect before August 7, 1977, or under [section 7413\(d\)](#) of this title upon a finding that such source is unable to comply with such schedule (or increment) solely because of the conditions on the basis of which a suspension was issued under this subsection.

(h) Publication of comprehensive document for each State setting forth requirements of applicable implementation plan

(1) Not later than 5 years after November 15, 1990, and every 3 years thereafter, the Administrator shall assemble and publish a comprehensive document for each State setting forth all requirements of the applicable implementation plan for such State and shall publish notice in the Federal Register of the availability of such documents.

(2) The Administrator may promulgate such regulations as may be reasonably necessary to carry out the purpose of this subsection.

(i) Modification of requirements prohibited

Except for a primary nonferrous smelter order under [section 7419](#) of this title, a suspension under subsection (f) or (g) of this section (relating to emergency suspensions), an exemption under [section 7418](#) of this title (relating to certain Federal facilities), an order under [section 7413\(d\)](#) of this title (relating to compliance orders), a plan promulgation under subsection (c) of this section, or a plan revision under subsection (a)(3) of this section, no order, suspension, plan revision, or other action modifying any requirement of an applicable implementation plan may be taken with respect to any stationary source by the State or by the Administrator.

(j) Technological systems of continuous emission reduction on new or modified stationary sources; compliance with performance standards

As a condition for issuance of any permit required under this subchapter, the owner or operator of each new or modified stationary source which is required to obtain such a permit must show to the satisfaction of the permitting authority that the technological system of continuous emission reduction which is to be used will enable such source to comply with the standards of performance which are to apply to such source and that the construction or modification and operation of such source will be in compliance with all other requirements of this chapter.

(k) Environmental Protection Agency action on plan submissions

(1) Completeness of plan submissions

(A) Completeness criteria

Within 9 months after November 15, 1990, the Administrator shall promulgate minimum criteria that any plan submission must meet before the Administrator is required to act on such submission under this subsection. The criteria shall be limited to the information necessary to enable the Administrator to determine whether the plan submission complies with the provisions of this chapter.

(B) Completeness finding

Within 60 days of the Administrator's receipt of a plan or plan revision, but no later than 6 months after the date, if any, by which a State is required to submit the plan or revision, the Administrator shall determine whether the minimum criteria established pursuant to subparagraph (A) have been met. Any plan or plan revision that a State submits to the Administrator, and that has not been determined by the Administrator (by the date 6 months after receipt of the submission) to have failed to meet the minimum criteria established pursuant to subparagraph (A), shall on that date be deemed by operation of law to meet such minimum criteria.

(C) Effect of finding of incompleteness

Where the Administrator determines that a plan submission (or part thereof) does not meet the minimum criteria established pursuant to subparagraph (A), the State shall be treated as not having made the submission (or, in the Administrator's discretion, part thereof).

(2) Deadline for action

Within 12 months of a determination by the Administrator (or a determination deemed by operation of law) under paragraph (1) that a State has submitted a plan or plan revision (or, in the Administrator's discretion, part thereof) that meets the minimum criteria established pursuant to paragraph (1), if applicable (or, if those criteria are not applicable, within 12 months of submission of the plan or revision), the Administrator shall act on the submission in accordance with paragraph (3).

(3) Full and partial approval and disapproval

In the case of any submittal on which the Administrator is required to act under paragraph (2), the Administrator shall approve such submittal as a whole if it meets all of the applicable requirements of this chapter. If a portion of the plan revision meets all the applicable requirements of this chapter, the Administrator may approve the plan revision in part and disapprove the plan revision in part. The plan revision shall not be treated as meeting the requirements of this chapter until the Administrator approves the entire plan revision as complying with the applicable requirements of this chapter.

(4) Conditional approval

The Administrator may approve a plan revision based on a commitment of the State to adopt specific enforceable measures by a date certain, but not later than 1 year after the date of approval of the plan revision. Any such conditional approval shall be treated as a disapproval if the State fails to comply with such commitment.

(5) Calls for plan revisions

Whenever the Administrator finds that the applicable implementation plan for any area is substantially inadequate to attain or maintain the relevant national ambient air quality standard, to mitigate adequately the interstate pollutant transport described in [section 7506a](#) of this title or [section 7511c](#) of this title, or to otherwise comply with any requirement of this chapter, the Administrator shall require the State to revise the plan as necessary to correct such inadequacies. The Administrator shall notify the State of the inadequacies, and may establish reasonable deadlines (not to exceed 18 months after the date of such notice) for the submission of such plan revisions. Such findings and notice shall be public. Any finding under this paragraph shall, to the extent the Administrator deems appropriate, subject the State to the requirements of this chapter to which the State was subject when it developed and submitted the plan for which such finding was made, except that the Administrator may adjust any dates applicable under such requirements as appropriate (except that the Administrator may not adjust any attainment date prescribed under part D of this subchapter, unless such date has elapsed).

(6) Corrections

Whenever the Administrator determines that the Administrator's action approving, disapproving, or promulgating any plan or plan revision (or part thereof), area designation, redesignation, classification, or reclassification was in error, the Administrator may in the same manner as the approval, disapproval, or promulgation revise such action as appropriate without requiring any further submission from the State. Such determination

and the basis thereof shall be provided to the State and public.

(l) Plan revisions

Each revision to an implementation plan submitted by a State under this chapter shall be adopted by such State after reasonable notice and public hearing. The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (as defined in [section 7501](#) of this title), or any other applicable requirement of this chapter.

(m) Sanctions

The Administrator may apply any of the sanctions listed in [section 7509\(b\)](#) of this title at any time (or at any time after) the Administrator makes a finding, disapproval, or determination under paragraphs (1) through (4), respectively, of [section 7509\(a\)](#) of this title in relation to any plan or plan item (as that term is defined by the Administrator) required under this chapter, with respect to any portion of the State the Administrator determines reasonable and appropriate, for the purpose of ensuring that the requirements of this chapter relating to such plan or plan item are met. The Administrator shall, by rule, establish criteria for exercising his authority under the previous sentence with respect to any deficiency referred to in [section 7509\(a\)](#) of this title to ensure that, during the 24-month period following the finding, disapproval, or determination referred to in [section 7509\(a\)](#) of this title, such sanctions are not applied on a statewide basis where one or more political subdivisions covered by the applicable implementation plan are principally responsible for such deficiency.

(n) Savings clauses

(1) Existing plan provisions

Any provision of any applicable implementation plan that was approved or promulgated by the Administrator pursuant to this section as in effect before November 15, 1990, shall remain in effect as part of such applicable implementation plan, except to the extent that a revision to such provision is approved or promulgated by the Administrator pursuant to this chapter.

(2) Attainment dates

For any area not designated nonattainment, any plan or plan revision submitted or required to be submitted by a State--

**(A)** in response to the promulgation or revision of a national primary ambient air quality standard in effect on November 15, 1990, or

**(B)** in response to a finding of substantial inadequacy under subsection (a)(2) of this section (as in effect immediately before November 15, 1990),

shall provide for attainment of the national primary ambient air quality standards within 3 years of Novem-

ber 15, 1990, or within 5 years of issuance of such finding of substantial inadequacy, whichever is later.

(3) Retention of construction moratorium in certain areas

In the case of an area to which, immediately before November 15, 1990, the prohibition on construction or modification of major stationary sources prescribed in subsection (a)(2)(I) of this section (as in effect immediately before November 15, 1990) applied by virtue of a finding of the Administrator that the State containing such area had not submitted an implementation plan meeting the requirements of [section 7502\(b\)\(6\)](#) of this title (relating to establishment of a permit program) (as in effect immediately before November 15, 1990) or [7502\(a\)\(1\)](#) of this title (to the extent such requirements relate to provision for attainment of the primary national ambient air quality standard for sulfur oxides by December 31, 1982) as in effect immediately before November 15, 1990, no major stationary source of the relevant air pollutant or pollutants shall be constructed or modified in such area until the Administrator finds that the plan for such area meets the applicable requirements of [section 7502\(c\)\(5\)](#) of this title (relating to permit programs) or subpart 5 of part D of this subchapter (relating to attainment of the primary national ambient air quality standard for sulfur dioxide), respectively.

(o) Indian tribes

If an Indian tribe submits an implementation plan to the Administrator pursuant to [section 7601\(d\)](#) of this title, the plan shall be reviewed in accordance with the provisions for review set forth in this section for State plans, except as otherwise provided by regulation promulgated pursuant to [section 7601\(d\)\(2\)](#) of this title. When such plan becomes effective in accordance with the regulations promulgated under [section 7601\(d\)](#) of this title, the plan shall become applicable to all areas (except as expressly provided otherwise in the plan) located within the exterior boundaries of the reservation, notwithstanding the issuance of any patent and including rights-of-way running through the reservation.

(p) Reports

Any State shall submit, according to such schedule as the Administrator may prescribe, such reports as the Administrator may require relating to emission reductions, vehicle miles traveled, congestion levels, and any other information the Administrator may deem necessary to assess the development effectiveness, need for revision, or implementation of any plan or plan revision required under this chapter.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 110, as added Dec. 31, 1970, Pub.L. 91-604, § 4(a), 84 Stat. 1680; amended June 22, 1974, [Pub.L. 93-319, § 4, 88 Stat. 256](#); S.Res. 4, Feb. 4, 1977; Aug. 7, 1977, [Pub.L. 95-95, Title I, §§ 107, 108, 91 Stat. 691, 693](#); Nov. 16, 1977, [Pub.L. 95-190, § 14\(a\)\(1\)-\(6\)](#), 91 Stat. 1399; July 17, 1981, [Pub.L. 97-23, § 3, 95 Stat. 142](#); Nov. 15, 1990, [Pub.L. 101-549, Title I, §§ 101\(b\)-\(d\), 102\(h\), 107\(c\), 108\(d\)](#), Title IV, § 412, 104 Stat. 2404-2408, 2422, 2464, 2466, 2634.)

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**Effective:[See Text Amendments]**

United States Code Annotated [Currentness](#)

Title 42. The Public Health and Welfare

Chapter 85. Air Pollution Prevention and Control ([Refs & Annos](#))

▢ [Subchapter I. Programs and Activities](#)

▢ [Part A. Air Quality and Emissions Limitations \(Refs & Annos\)](#)

→→ **§ 7413. Federal enforcement**

(a) In general

(1) Order to comply with SIP

Whenever, on the basis of any information available to the Administrator, the Administrator finds that any person has violated or is in violation of any requirement or prohibition of an applicable implementation plan or permit, the Administrator shall notify the person and the State in which the plan applies of such finding. At any time after the expiration of 30 days following the date on which such notice of a violation is issued, the Administrator may, without regard to the period of violation (subject to section 2462 of Title 28)--

(A) issue an order requiring such person to comply with the requirements or prohibitions of such plan or permit,

(B) issue an administrative penalty order in accordance with subsection (d) of this section, or

(C) bring a civil action in accordance with subsection (b) of this section.

(2) State failure to enforce SIP or permit program

Whenever, on the basis of information available to the Administrator, the Administrator finds that violations of an applicable implementation plan or an approved permit program under subchapter V of this chapter are so widespread that such violations appear to result from a failure of the State in which the plan or permit program applies to enforce the plan or permit program effectively, the Administrator shall so notify the State. In the case of a permit program, the notice shall be made in accordance with subchapter V of this chapter. If the Administrator finds such failure extends beyond the 30th day after such notice (90 days in the case of such permit program), the Administrator shall give public notice of such finding. During the period beginning with such public notice and ending when such State satisfies the Administrator that it will enforce such plan or permit program (hereafter referred to in this section as “period of federally assumed enforcement”), the Administrator may enforce any requirement or prohibition of such plan or permit program with respect to any person by--

(A) issuing an order requiring such person to comply with such requirement or prohibition,

(B) issuing an administrative penalty order in accordance with subsection (d) of this section, or

(C) bringing a civil action in accordance with subsection (b) of this section.

(3) EPA enforcement of other requirements

Except for a requirement or prohibition enforceable under the preceding provisions of this subsection, whenever, on the basis of any information available to the Administrator, the Administrator finds that any person has violated, or is in violation of, any other requirement or prohibition of this subchapter, [section 7603](#) of this title, subchapter IV-A, subchapter V, or subchapter VI of this chapter, including, but not limited to, a requirement or prohibition of any rule, plan, order, waiver, or permit promulgated, issued, or approved under those provisions or subchapters, or for the payment of any fee owed to the United States under this chapter (other than subchapter II of this chapter), the Administrator may--

(A) issue an administrative penalty order in accordance with subsection (d) of this section,

(B) issue an order requiring such person to comply with such requirement or prohibition,

(C) bring a civil action in accordance with subsection (b) of this section or [section 7605](#) of this title, or

(D) request the Attorney General to commence a criminal action in accordance with subsection (c) of this section.

(4) Requirements for orders

An order issued under this subsection (other than an order relating to a violation of [section 7412](#) of this title) shall not take effect until the person to whom it is issued has had an opportunity to confer with the Administrator concerning the alleged violation. A copy of any order issued under this subsection shall be sent to the State air pollution control agency of any State in which the violation occurs. Any order issued under this subsection shall state with reasonable specificity the nature of the violation and specify a time for compliance which the Administrator determines is reasonable, taking into account the seriousness of the violation and any good faith efforts to comply with applicable requirements. In any case in which an order under this subsection (or notice to a violator under paragraph (1)) is issued to a corporation, a copy of such order (or notice) shall be issued to appropriate corporate officers. An order issued under this subsection shall require the person to whom it was issued to comply with the requirement as expeditiously as practicable, but in no event longer than one year after the date the order was issued, and shall be nonrenewable. No order issued under this subsection shall prevent the State or the Administrator from assessing any penalties nor otherwise affect or limit the State's or the United States authority to enforce under other provisions of this chapter, nor affect any person's obligations to comply with any section of this chapter or with a term or condition of any permit or ap-

plicable implementation plan promulgated or approved under this chapter.

(5) Failure to comply with new source requirements

Whenever, on the basis of any available information, the Administrator finds that a State is not acting in compliance with any requirement or prohibition of the chapter relating to the construction of new sources or the modification of existing sources, the Administrator may--

(A) issue an order prohibiting the construction or modification of any major stationary source in any area to which such requirement applies; [\[FN1\]](#)

(B) issue an administrative penalty order in accordance with subsection (d) of this section, or

(C) bring a civil action under subsection (b) of this section.

Nothing in this subsection shall preclude the United States from commencing a criminal action under subsection (c) of this section at any time for any such violation.

(b) Civil judicial enforcement

The Administrator shall, as appropriate, in the case of any person that is the owner or operator of an affected source, a major emitting facility, or a major stationary source, and may, in the case of any other person, commence a civil action for a permanent or temporary injunction, or to assess and recover a civil penalty of not more than \$25,000 per day for each violation, or both, in any of the following instances:

(1) Whenever such person has violated, or is in violation of, any requirement or prohibition of an applicable implementation plan or permit. Such an action shall be commenced (A) during any period of federally assumed enforcement, or (B) more than 30 days following the date of the Administrator's notification under subsection (a)(1) of this section that such person has violated, or is in violation of, such requirement or prohibition.

(2) Whenever such person has violated, or is in violation of, any other requirement or prohibition of this subchapter, [section 7603](#) of this title, subchapter IV-A, subchapter V, or subchapter VI of this chapter, including, but not limited to, a requirement or prohibition of any rule, order, waiver or permit promulgated, issued, or approved under this chapter, or for the payment of any fee owed the United States under this chapter (other than subchapter II of this chapter).

(3) Whenever such person attempts to construct or modify a major stationary source in any area with respect to which a finding under subsection (a)(5) of this section has been made.

Any action under this subsection may be brought in the district court of the United States for the district in which the violation is alleged to have occurred, or is occurring, or in which the defendant resides, or where the defendant's principal place of business is located, and such court shall have jurisdiction to restrain such violation, to require compliance, to assess such civil penalty, to collect any fees owed the United States under this chapter (other than subchapter II of this chapter) and any noncompliance assessment and nonpayment penalty owed under [section 7420](#) of this title, and to award any other appropriate relief. Notice of the commencement of such action shall be given to the appropriate State air pollution control agency. In the case of any action brought by the Administrator under this subsection, the court may award costs of litigation (including reasonable attorney and expert witness fees) to the party or parties against whom such action was brought if the court finds that such action was unreasonable.

(c) Criminal penalties

(1) Any person who knowingly violates any requirement or prohibition of an applicable implementation plan (during any period of federally assumed enforcement or more than 30 days after having been notified under subsection (a)(1) of this section by the Administrator that such person is violating such requirement or prohibition), any order under subsection (a) of this section, requirement or prohibition of [section 7411\(e\)](#) of this title (relating to new source performance standards), [section 7412](#) of this title, [section 7414](#) of this title (relating to inspections, etc.), [section 7429](#) of this title (relating to solid waste combustion), [section 7475\(a\)](#) of this title (relating to preconstruction requirements), an order under [section 7477](#) of this title (relating to preconstruction requirements), an order under [section 7603](#) of this title (relating to emergency orders), [section 7661a\(a\)](#) or [7661b\(c\)](#) of this title (relating to permits), or any requirement or prohibition of subchapter IV-A of this chapter (relating to acid deposition control), or subchapter VI of this chapter (relating to stratospheric ozone control), including a requirement of any rule, order, waiver, or permit promulgated or approved under such sections or subchapters, and including any requirement for the payment of any fee owed the United States under this chapter (other than subchapter II of this chapter) shall, upon conviction, be punished by a fine pursuant to Title 18, or by imprisonment for not to exceed 5 years, or both. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment.

(2) Any person who knowingly--

(A) makes any false material statement, representation, or certification in, or omits material information from, or knowingly alters, conceals, or fails to file or maintain any notice, application, record, report, plan, or other document required pursuant to this chapter to be either filed or maintained (whether with respect to the requirements imposed by the Administrator or by a State);

(B) fails to notify or report as required under this chapter; or

(C) falsifies, tampers with, renders inaccurate, or fails to install any monitoring device or method required to be maintained or followed under this chapter [\[FN2\]](#)

shall, upon conviction, be punished by a fine pursuant to Title 18, or by imprisonment for not more than 2 years, or both. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment.

(3) Any person who knowingly fails to pay any fee owed the United States under this subchapter, subchapter III, IV-A, V, or VI of this chapter shall, upon conviction, be punished by a fine pursuant to Title 18, or by imprisonment for not more than 1 year, or both. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment.

(4) Any person who negligently releases into the ambient air any hazardous air pollutant listed pursuant to [section 7412](#) of this title or any extremely hazardous substance listed pursuant to [section 11002\(a\)\(2\)](#) of this title that is not listed in [section 7412](#) of this title, and who at the time negligently places another person in imminent danger of death or serious bodily injury shall, upon conviction, be punished by a fine under Title 18, or by imprisonment for not more than 1 year, or both. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment.

(5)(A) Any person who knowingly releases into the ambient air any hazardous air pollutant listed pursuant to [section 7412](#) of this title or any extremely hazardous substance listed pursuant to [section 11002\(a\)\(2\)](#) of this title that is not listed in [section 7412](#) of this title, and who knows at the time that he thereby places another person in imminent danger of death or serious bodily injury shall, upon conviction, be punished by a fine under Title 18, or by imprisonment of not more than 15 years, or both. Any person committing such violation which is an organization shall, upon conviction under this paragraph, be subject to a fine of not more than \$1,000,000 for each violation. If a conviction of any person under this paragraph is for a violation committed after a first conviction of such person under this paragraph, the maximum punishment shall be doubled with respect to both the fine and imprisonment. For any air pollutant for which the Administrator has set an emissions standard or for any source for which a permit has been issued under subchapter V of this chapter, a release of such pollutant in accordance with that standard or permit shall not constitute a violation of this paragraph or paragraph (4).

(B) In determining whether a defendant who is an individual knew that the violation placed another person in imminent danger of death or serious bodily injury--

(i) the defendant is responsible only for actual awareness or actual belief possessed; and

(ii) knowledge possessed by a person other than the defendant, but not by the defendant, may not be attributed to the defendant;

except that in proving a defendant's possession of actual knowledge, circumstantial evidence may be used, including evidence that the defendant took affirmative steps to be shielded from relevant information.

(C) It is an affirmative defense to a prosecution that the conduct charged was freely consented to by the person endangered and that the danger and conduct charged were reasonably foreseeable hazards of--

(i) an occupation, a business, or a profession; or

(ii) medical treatment or medical or scientific experimentation conducted by professionally approved methods and such other person had been made aware of the risks involved prior to giving consent.

The defendant may establish an affirmative defense under this subparagraph by a preponderance of the evidence.

(D) All general defenses, affirmative defenses, and bars to prosecution that may apply with respect to other Federal criminal offenses may apply under subparagraph (A) of this paragraph and shall be determined by the courts of the United States according to the principles of common law as they may be interpreted in the light of reason and experience. Concepts of justification and excuse applicable under this section may be developed in the light of reason and experience.

(E) The term "organization" means a legal entity, other than a government, established or organized for any purpose, and such term includes a corporation, company, association, firm, partnership, joint stock company, foundation, institution, trust, society, union, or any other association of persons.

(F) The term "serious bodily injury" means bodily injury which involves a substantial risk of death, unconsciousness, extreme physical pain, protracted and obvious disfigurement or protracted loss or impairment of the function of a bodily member, organ, or mental faculty.

(6) For the purpose of this subsection, the term "person" includes, in addition to the entities referred to in [section 7602\(e\)](#) of this title, any responsible corporate officer.

(d) Administrative assessment of civil penalties

(1) The Administrator may issue an administrative order against any person assessing a civil administrative penalty of up to \$25,000, per day of violation, whenever, on the basis of any available information, the Administrator finds that such person--

(A) has violated or is violating any requirement or prohibition of an applicable implementation plan (such order shall be issued (i) during any period of federally assumed enforcement, or (ii) more than thirty days following the date of the Administrator's notification under subsection (a)(1) of this section of a finding that such person has violated or is violating such requirement or prohibition); or

(B) has violated or is violating any other requirement or prohibition of this subchapter or subchapter III, IV-A, V, or VI of this chapter, including, but not limited to, a requirement or prohibition of any rule, order, waiver,

permit, or plan promulgated, issued, or approved under this chapter, or for the payment of any fee owed the United States under this chapter (other than subchapter II of this chapter); or

(C) attempts to construct or modify a major stationary source in any area with respect to which a finding under subsection (a)(5) of this section has been made.

The Administrator's authority under this paragraph shall be limited to matters where the total penalty sought does not exceed \$200,000 and the first alleged date of violation occurred no more than 12 months prior to the initiation of the administrative action, except where the Administrator and the Attorney General jointly determine that a matter involving a larger penalty amount or longer period of violation is appropriate for administrative penalty action. Any such determination by the Administrator and the Attorney General shall not be subject to judicial review.

(2)(A) An administrative penalty assessed under paragraph (1) shall be assessed by the Administrator by an order made after opportunity for a hearing on the record in accordance with [sections 554 and 556 of Title 5](#). The Administrator shall issue reasonable rules for discovery and other procedures for hearings under this paragraph. Before issuing such an order, the Administrator shall give written notice to the person to be assessed an administrative penalty of the Administrator's proposal to issue such order and provide such person an opportunity to request such a hearing on the order, within 30 days of the date the notice is received by such person.

(B) The Administrator may compromise, modify, or remit, with or without conditions, any administrative penalty which may be imposed under this subsection.

(3) The Administrator may implement, after consultation with the Attorney General and the States, a field citation program through regulations establishing appropriate minor violations for which field citations assessing civil penalties not to exceed \$5,000 per day of violation may be issued by officers or employees designated by the Administrator. Any person to whom a field citation is assessed may, within a reasonable time as prescribed by the Administrator through regulation, elect to pay the penalty assessment or to request a hearing on the field citation. If a request for a hearing is not made within the time specified in the regulation, the penalty assessment in the field citation shall be final. Such hearing shall not be subject to [section 554 or 556 of Title 5](#), but shall provide a reasonable opportunity to be heard and to present evidence. Payment of a civil penalty required by a field citation shall not be a defense to further enforcement by the United States or a State to correct a violation, or to assess the statutory maximum penalty pursuant to other authorities in the chapter, if the violation continues.

(4) Any person against whom a civil penalty is assessed under paragraph (3) of this subsection or to whom an administrative penalty order is issued under paragraph (1) of this subsection may seek review of such assessment in the United States District Court for the District of Columbia or for the district in which the violation is alleged to have occurred, in which such person resides, or where such person's principal place of business is located, by filing in such court within 30 days following the date the administrative penalty order becomes final under paragraph (2), the assessment becomes final under paragraph (3), or a final decision following a hearing under paragraph (3) is rendered, and by simultaneously sending a copy of the filing by certified mail to the Administrator

and the Attorney General. Within 30 days thereafter, the Administrator shall file in such court a certified copy, or certified index, as appropriate, of the record on which the administrative penalty order or assessment was issued. Such court shall not set aside or remand such order or assessment unless there is not substantial evidence in the record, taken as a whole, to support the finding of a violation or unless the order or penalty assessment constitutes an abuse of discretion. Such order or penalty assessment shall not be subject to review by any court except as provided in this paragraph. In any such proceedings, the United States may seek to recover civil penalties ordered or assessed under this section.

(5) If any person fails to pay an assessment of a civil penalty or fails to comply with an administrative penalty order--

(A) after the order or assessment has become final, or

(B) after a court in an action brought under paragraph (4) has entered a final judgment in favor of the Administrator,

the Administrator shall request the Attorney General to bring a civil action in an appropriate district court to enforce the order or to recover the amount ordered or assessed (plus interest at rates established pursuant to [section 6621\(a\)\(2\) of Title 26](#) from the date of the final order or decision or the date of the final judgment, as the case may be). In such an action, the validity, amount, and appropriateness of such order or assessment shall not be subject to review. Any person who fails to pay on a timely basis a civil penalty ordered or assessed under this section shall be required to pay, in addition to such penalty and interest, the United States enforcement expenses, including but not limited to attorneys fees and costs incurred by the United States for collection proceedings and a quarterly nonpayment penalty for each quarter during which such failure to pay persists. Such nonpayment penalty shall be 10 percent of the aggregate amount of such person's outstanding penalties and nonpayment penalties accrued as of the beginning of such quarter.

(e) Penalty assessment criteria

(1) In determining the amount of any penalty to be assessed under this section or [section 7604\(a\)](#) of this title, the Administrator or the court, as appropriate, shall take into consideration (in addition to such other factors as justice may require) the size of the business, the economic impact of the penalty on the business, the violator's full compliance history and good faith efforts to comply, the duration of the violation as established by any credible evidence (including evidence other than the applicable test method), payment by the violator of penalties previously assessed for the same violation, the economic benefit of noncompliance, and the seriousness of the violation. The court shall not assess penalties for noncompliance with administrative subpoenas under [section 7607\(a\)](#) of this title, or actions under [section 7414](#) of this title, where the violator had sufficient cause to violate or fail or refuse to comply with such subpoena or action.

(2) A penalty may be assessed for each day of violation. For purposes of determining the number of days of violation for which a penalty may be assessed under subsection (b) or (d)(1) of this section, or [section 7604\(a\)](#) of this title, or an assessment may be made under [section 7420](#) of this title, where the Administrator or an air pollu-

tion control agency has notified the source of the violation, and the plaintiff makes a prima facie showing that the conduct or events giving rise to the violation are likely to have continued or recurred past the date of notice, the days of violation shall be presumed to include the date of such notice and each and every day thereafter until the violator establishes that continuous compliance has been achieved, except to the extent that the violator can prove by a preponderance of the evidence that there were intervening days during which no violation occurred or that the violation was not continuing in nature.

(f) Awards

The Administrator may pay an award, not to exceed \$10,000, to any person who furnishes information or services which lead to a criminal conviction or a judicial or administrative civil penalty for any violation of this subchapter or subchapter III, IV-A, V, or VI of this chapter enforced under this section. Such payment is subject to available appropriations for such purposes as provided in annual appropriation Acts. Any officer, or employee of the United States or any State or local government who furnishes information or renders service in the performance of an official duty is ineligible for payment under this subsection. The Administrator may, by regulation, prescribe additional criteria for eligibility for such an award.

(g) Settlements; public participation

At least 30 days before a consent order or settlement agreement of any kind under this chapter to which the United States is a party (other than enforcement actions under this section, [section 7420](#) of this title, or subchapter II of this chapter, whether or not involving civil or criminal penalties, or judgments subject to Department of Justice policy on public participation) is final or filed with a court, the Administrator shall provide a reasonable opportunity by notice in the Federal Register to persons who are not named as parties or intervenors to the action or matter to comment in writing. The Administrator or the Attorney General, as appropriate, shall promptly consider any such written comments and may withdraw or withhold his consent to the proposed order or agreement if the comments disclose facts or considerations which indicate that such consent is inappropriate, improper, inadequate, or inconsistent with the requirements of this chapter. Nothing in this subsection shall apply to civil or criminal penalties under this chapter.

(h) Operator

For purposes of the provisions of this section and [section 7420](#) of this title, the term “operator”, as used in such provisions, shall include any person who is senior management personnel or a corporate officer. Except in the case of knowing and willful violations, such term shall not include any person who is a stationary engineer or technician responsible for the operation, maintenance, repair, or monitoring of equipment and facilities and who often has supervisory and training duties but who is not senior management personnel or a corporate officer. Except in the case of knowing and willful violations, for purposes of subsection (c)(4) of this section, the term “a person” shall not include an employee who is carrying out his normal activities and who is not a part of senior management personnel or a corporate officer. Except in the case of knowing and willful violations, for purposes of paragraphs (1), (2), (3), and (5) of subsection (c) of this section the term “a person” shall not include an employee who is carrying out his normal activities and who is acting under orders from the employer.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 113, as added Dec. 31, 1970, Pub.L. 91-604, § 4(a), 84 Stat. 1686; amended Nov. 18, 1971, Pub.L. 92-157, Title III, § 302(b), (c), 85 Stat. 464; June 22, 1974, [Pub.L. 93-319](#), § 6(a)(1) to (3), 88 Stat. 259; Aug. 7, 1977, [Pub.L. 95-95, Title I, §§ 111](#), 112(a), 91 Stat. 704, 705; Nov. 16, 1977, [Pub.L. 95-190](#), § 14(a)(10) to (21), (b)(1), 91 Stat. 1400, 1404; July 17, 1981, [Pub.L. 97-23, § 2, 95 Stat. 139](#); Nov. 15, 1990, [Pub.L. 101-549, Title VII, § 701](#), 104 Stat. 2672.)

[\[FN1\]](#) So in original. The semicolon probably should be a comma.

[\[FN2\]](#) So in original. Probably should be followed by a comma.

Current through P.L. 112-89 (excluding P.L. 112-55, 112-74, 112-78, and 112-81) approved 1-3-12

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United States Code Annotated [Currentness](#)

Title 42. The Public Health and Welfare

Chapter 85. Air Pollution Prevention and Control ([Refs & Annos](#))

Subchapter I. Programs and Activities

▢ [Part C](#). Prevention of Significant Deterioration of Air Quality

▢ [Subpart I](#). Clean Air ([Refs & Annos](#))

→→ **§ 7475. Preconstruction requirements**

(a) Major emitting facilities on which construction is commenced

No major emitting facility on which construction is commenced after August 7, 1977, may be constructed in any area to which this part applies unless--

(1) a permit has been issued for such proposed facility in accordance with this part setting forth emission limitations for such facility which conform to the requirements of this part;

(2) the proposed permit has been subject to a review in accordance with this section, the required analysis has been conducted in accordance with regulations promulgated by the Administrator, and a public hearing has been held with opportunity for interested persons including representatives of the Administrator to appear and submit written or oral presentations on the air quality impact of such source, alternatives thereto, control technology requirements, and other appropriate considerations;

(3) the owner or operator of such facility demonstrates, as required pursuant to [section 7410\(j\)](#) of this title, that emissions from construction or operation of such facility will not cause, or contribute to, air pollution in excess of any (A) maximum allowable increase or maximum allowable concentration for any pollutant in any area to which this part applies more than one time per year, (B) national ambient air quality standard in any air quality control region, or (C) any other applicable emission standard or standard of performance under this chapter;

(4) the proposed facility is subject to the best available control technology for each pollutant subject to regulation under this chapter emitted from, or which results from, such facility;

(5) the provisions of subsection (d) of this section with respect to protection of class I areas have been complied with for such facility;

(6) there has been an analysis of any air quality impacts projected for the area as a result of growth associated with such facility;

(7) the person who owns or operates, or proposes to own or operate, a major emitting facility for which a permit is required under this part agrees to conduct such monitoring as may be necessary to determine the effect which emissions from any such facility may have, or is having, on air quality in any area which may be affected by emissions from such

source; and

(8) in the case of a source which proposes to construct in a class III area, emissions from which would cause or contribute to exceeding the maximum allowable increments applicable in a class II area and where no standard under [section 7411](#) of this title has been promulgated subsequent to August 7, 1977, for such source category, the Administrator has approved the determination of best available technology as set forth in the permit.

(b) Exception

The demonstration pertaining to maximum allowable increases required under subsection (a)(3) of this section shall not apply to maximum allowable increases for class II areas in the case of an expansion or modification of a major emitting facility which is in existence on August 7, 1977, whose allowable emissions of air pollutants, after compliance with subsection (a)(4) of this section, will be less than fifty tons per year and for which the owner or operator of such facility demonstrates that emissions of particulate matter and sulfur oxides will not cause or contribute to ambient air quality levels in excess of the national secondary ambient air quality standard for either of such pollutants.

(c) Permit applications

Any completed permit application under [section 7410](#) of this title for a major emitting facility in any area to which this part applies shall be granted or denied not later than one year after the date of filing of such completed application.

(d) Action taken on permit applications; notice; adverse impact on air quality related values; variance; emission limitations

(1) Each State shall transmit to the Administrator a copy of each permit application relating to a major emitting facility received by such State and provide notice to the Administrator of every action related to the consideration of such permit.

(2)(A) The Administrator shall provide notice of the permit application to the Federal Land Manager and the Federal official charged with direct responsibility for management of any lands within a class I area which may be affected by emissions from the proposed facility.

(B) The Federal Land Manager and the Federal official charged with direct responsibility for management of such lands shall have an affirmative responsibility to protect the air quality related values (including visibility) of any such lands within a class I area and to consider, in consultation with the Administrator, whether a proposed major emitting facility will have an adverse impact on such values.

(C)(i) In any case where the Federal official charged with direct responsibility for management of any lands within a class I area or the Federal Land Manager of such lands, or the Administrator, or the Governor of an adjacent State containing such a class I area files a notice alleging that emissions from a proposed major emitting facility may cause or contribute to a change in the air quality in such area and identifying the potential adverse impact of such change, a permit shall not be issued unless the owner or operator of such facility demonstrates that emissions of particulate matter and sulfur dioxide will not cause or contribute to concentrations which exceed the maximum allowable increases for a class I area.

**(ii)** In any case where the Federal Land Manager demonstrates to the satisfaction of the State that the emissions from such facility will have an adverse impact on the air quality-related values (including visibility) of such lands, notwithstanding the fact that the change in air quality resulting from emissions from such facility will not cause or contribute to concentrations which exceed the maximum allowable increases for a class I area, a permit shall not be issued.

**(iii)** In any case where the owner or operator of such facility demonstrates to the satisfaction of the Federal Land Manager, and the Federal Land Manager so certifies, that the emissions from such facility will have no adverse impact on the air quality-related values of such lands (including visibility), notwithstanding the fact that the change in air quality resulting from emissions from such facility will cause or contribute to concentrations which exceed the maximum allowable increases for class I areas, the State may issue a permit.

**(iv)** In the case of a permit issued pursuant to clause (iii), such facility shall comply with such emission limitations under such permit as may be necessary to assure that emissions of sulfur oxides and particulates from such facility will not cause or contribute to concentrations of such pollutant which exceed the following maximum allowable increases over the baseline concentration for such pollutants:

	Maximum allowable increase (in micrograms per cubic meter)
<b>Particulate matter:</b>	
Annual geometric mean	19
Twenty-four-hour maximum	37
<b>Sulfur dioxide:</b>	
Annual arithmetic mean	20
Twenty-four-hour maximum	91
Three-hour maximum	32

5

**(D)(i)** In any case where the owner or operator of a proposed major emitting facility who has been denied a certification under subparagraph (C)(iii) demonstrates to the satisfaction of the Governor, after notice and public hearing, and the Governor finds, that the facility cannot be constructed by reason of any maximum allowable increase for sulfur dioxide for periods of twenty-four hours or less applicable to any class I area and, in the case of Federal mandatory class I areas, that a variance under this clause will not adversely affect the air quality related values of the area (including visibility), the Governor, after consideration of the Federal Land Manager's recommendation (if any) and subject to his concurrence, may grant a variance from such maximum allowable increase. If such variance is granted, a permit may be issued to such source pursuant to the requirements of this subparagraph.

**(ii)** In any case in which the Governor recommends a variance under this subparagraph in which the Federal Land Manager does not concur, the recommendations of the Governor and the Federal Land Manager shall be transmitted to the President. The President may approve the Governor's recommendation if he finds that such variance is in the national interest. No Presidential finding shall be reviewable in any court. The variance shall take effect if the President approves the Governor's recommendations. The President shall approve or disapprove such recommendation within ninety days after his receipt of the recommendations of the Governor and the Federal Land Manager.

(iii) In the case of a permit issued pursuant to this subparagraph, such facility shall comply with such emission limitations under such permit as may be necessary to assure that emissions of sulfur oxides from such facility will not (during any day on which the otherwise applicable maximum allowable increases are exceeded) cause or contribute to concentrations which exceed the following maximum allowable increases for such areas over the baseline concentration for such pollutant and to assure that such emissions will not cause or contribute to concentrations which exceed the otherwise applicable maximum allowable increases for periods of exposure of 24 hours or less on more than 18 days during any annual period:

MAXIMUM ALLOWABLE INCREASE		
[In micrograms per cubic meter]		
	Low terrain areas	High terrain areas
24-hr maximum	36	62
3-hr maximum	13	221
	0	

(iv) For purposes of clause (iii), the term “high terrain area” means with respect to any facility, any area having an elevation of 900 feet or more above the base of the stack of such facility, and the term “low terrain area” means any area other than a high terrain area.

(e) Analysis; continuous air quality monitoring data; regulations; model adjustments

(1) The review provided for in subsection (a) of this section shall be preceded by an analysis in accordance with regulations of the Administrator, promulgated under this subsection, which may be conducted by the State (or any general purpose unit of local government) or by the major emitting facility applying for such permit, of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under this chapter which will be emitted from such facility.

(2) Effective one year after August 7, 1977, the analysis required by this subsection shall include continuous air quality monitoring data gathered for purposes of determining whether emissions from such facility will exceed the maximum allowable increases or the maximum allowable concentration permitted under this part. Such data shall be gathered over a period of one calendar year preceding the date of application for a permit under this part unless the State, in accordance with regulations promulgated by the Administrator, determines that a complete and adequate analysis for such purposes may be accomplished in a shorter period. The results of such analysis shall be available at the time of the public hearing on the application for such permit.

(3) The Administrator shall within six months after August 7, 1977, promulgate regulations respecting the analysis required under this subsection which regulations--

(A) shall not require the use of any automatic or uniform buffer zone or zones,

(B) shall require an analysis of the ambient air quality, climate and meteorology, terrain, soils and vegetation, and vis-

ibility at the site of the proposed major emitting facility and in the area potentially affected by the emissions from such facility for each pollutant regulated under this chapter which will be emitted from, or which results from the construction or operation of, such facility, the size and nature of the proposed facility, the degree of continuous emission reduction which could be achieved by such facility, and such other factors as may be relevant in determining the effect of emissions from a proposed facility on any air quality control region,

(C) shall require the results of such analysis shall be available at the time of the public hearing on the application for such permit, and

(D) shall specify with reasonable particularity each air quality model or models to be used under specified sets of conditions for purposes of this part.

Any model or models designated under such regulations may be adjusted upon a determination, after notice and opportunity for public hearing, by the Administrator that such adjustment is necessary to take into account unique terrain or meteorological characteristics of an area potentially affected by emissions from a source applying for a permit required under this part.

#### CREDIT(S)

(July 14, 1955, c. 360, Title I, § 165, as added Aug. 7, 1977, [Pub.L. 95-95, Title I, § 127\(a\)](#), 91 Stat. 735; amended Nov. 16, 1977, [Pub.L. 95-190, § 14\(a\)\(44\)-\(51\)](#), 91 Stat. 1402.)

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Title 42. The Public Health and Welfare

Chapter 85. Air Pollution Prevention and Control ([Refs & Annos](#))

Subchapter I. Programs and Activities

▣ [Part D](#). Plan Requirements for Nonattainment Areas▣ [Subpart 1](#). Nonattainment Areas in General ([Refs & Annos](#))→ → **§ 7502. Nonattainment plan provisions in general**

(a) Classifications and attainment dates

(1) Classifications

(A) On or after the date the Administrator promulgates the designation of an area as a nonattainment area pursuant to [section 7407\(d\)](#) of this title with respect to any national ambient air quality standard (or any revised standard, including a revision of any standard in effect on November 15, 1990), the Administrator may classify the area for the purpose of applying an attainment date pursuant to paragraph (2), and for other purposes. In determining the appropriate classification, if any, for a nonattainment area, the Administrator may consider such factors as the severity of nonattainment in such area and the availability and feasibility of the pollution control measures that the Administrator believes may be necessary to provide for attainment of such standard in such area.

(B) The Administrator shall publish a notice in the Federal Register announcing each classification under subparagraph (A), except the Administrator shall provide an opportunity for at least 30 days for written comment. Such classification shall not be subject to the provisions of [sections 553 through 557 of Title 5](#) (concerning notice and comment) and shall not be subject to judicial review until the Administrator takes final action under [subsection \(k\)](#) or [\(l\) of section 7410](#) of this title (concerning action on plan submissions) or [section 7509](#) of this title (concerning sanctions) with respect to any plan submissions required by virtue of such classification.

(C) This paragraph shall not apply with respect to nonattainment areas for which classifications are specifically provided under other provisions of this part.

(2) Attainment dates for nonattainment areas

(A) The attainment date for an area designated nonattainment with respect to a national primary ambient air quality standard shall be the date by which attainment can be achieved as expeditiously as practicable, but no later than 5 years from the date such area was designated nonattainment under [section 7407\(d\)](#) of this title, except that the Administrator may extend the attainment date to the extent the Administrator determines appropriate.

ropriate, for a period no greater than 10 years from the date of designation as nonattainment, considering the severity of nonattainment and the availability and feasibility of pollution control measures.

**(B)** The attainment date for an area designated nonattainment with respect to a secondary national ambient air quality standard shall be the date by which attainment can be achieved as expeditiously as practicable after the date such area was designated nonattainment under [section 7407\(d\)](#) of this title.

**(C)** Upon application by any State, the Administrator may extend for 1 additional year (hereinafter referred to as the "Extension Year") the attainment date determined by the Administrator under subparagraph (A) or (B) if--

**(i)** the State has complied with all requirements and commitments pertaining to the area in the applicable implementation plan, and

**(ii)** in accordance with guidance published by the Administrator, no more than a minimal number of exceedances of the relevant national ambient air quality standard has occurred in the area in the year preceding the Extension Year.

No more than 2 one-year extensions may be issued under this subparagraph for a single nonattainment area.

**(D)** This paragraph shall not apply with respect to nonattainment areas for which attainment dates are specifically provided under other provisions of this part.

**(b) Schedule for plan submissions**

At the time the Administrator promulgates the designation of an area as nonattainment with respect to a national ambient air quality standard under [section 7407\(d\)](#) of this title, the Administrator shall establish a schedule according to which the State containing such area shall submit a plan or plan revision (including the plan items) meeting the applicable requirements of subsection (c) of this section and [section 7410\(a\)\(2\)](#) of this title. Such schedule shall at a minimum, include a date or dates, extending no later than 3 years from the date of the nonattainment designation, for the submission of a plan or plan revision (including the plan items) meeting the applicable requirements of subsection (c) of this section and [section 7410\(a\)\(2\)](#) of this title.

**(c) Nonattainment plan provisions**

The plan provisions (including plan items) required to be submitted under this part shall comply with each of the following:

**(1) In general**

Such plan provisions shall provide for the implementation of all reasonably available control measures as ex-

peditionally as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment of the national primary ambient air quality standards.

(2) RFP

Such plan provisions shall require reasonable further progress.

(3) Inventory

Such plan provisions shall include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area, including such periodic revisions as the Administrator may determine necessary to assure that the requirements of this part are met.

(4) Identification and quantification

Such plan provisions shall expressly identify and quantify the emissions, if any, of any such pollutant or pollutants which will be allowed, in accordance with [section 7503\(a\)\(1\)\(B\)](#) of this title, from the construction and operation of major new or modified stationary sources in each such area. The plan shall demonstrate to the satisfaction of the Administrator that the emissions quantified for this purpose will be consistent with the achievement of reasonable further progress and will not interfere with attainment of the applicable national ambient air quality standard by the applicable attainment date.

(5) Permits for new and modified major stationary sources

Such plan provisions shall require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, in accordance with [section 7503](#) of this title.

(6) Other measures

Such plan provisions shall include enforceable emission limitations, and such other control measures, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part.

(7) Compliance with section 7410(a)(2)

Such plan provisions shall also meet the applicable provisions of [section 7410\(a\)\(2\)](#) of this title.

(8) Equivalent techniques

Upon application by any State, the Administrator may allow the use of equivalent modeling, emission inventory, and planning procedures, unless the Administrator determines that the proposed techniques are, in the ag-

gregate, less effective than the methods specified by the Administrator.

(9) Contingency measures

Such plan shall provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date applicable under this part. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator.

(d) Plan revisions required in response to finding of plan inadequacy

Any plan revision for a nonattainment area which is required to be submitted in response to a finding by the Administrator pursuant to [section 7410\(k\)\(5\)](#) of this title (relating to calls for plan revisions) must correct the plan deficiency (or deficiencies) specified by the Administrator and meet all other applicable plan requirements of [section 7410](#) of this title and this part. The Administrator may reasonably adjust the dates otherwise applicable under such requirements to such revision (except for attainment dates that have not yet elapsed), to the extent necessary to achieve a consistent application of such requirements. In order to facilitate submittal by the States of adequate and approvable plans consistent with the applicable requirements of this chapter, the Administrator shall, as appropriate and from time to time, issue written guidelines, interpretations, and information to the States which shall be available to the public, taking into consideration any such guidelines, interpretations, or information provided before November 15, 1990.

(e) Future modification of standard

If the Administrator relaxes a national primary ambient air quality standard after November 15, 1990, the Administrator shall, within 12 months after the relaxation, promulgate requirements applicable to all areas which have not attained that standard as of the date of such relaxation. Such requirements shall provide for controls which are not less stringent than the controls applicable to areas designated nonattainment before such relaxation.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 172, as added Aug. 7, 1977, [Pub.L. 95-95, Title I, § 129\(b\)](#), 91 Stat. 746; amended Nov. 16, 1977, [Pub.L. 95-190, § 14\(a\)\(55\), \(56\)](#), 91 Stat. 1402; Nov. 15, 1990, [Pub.L. 101-549, Title I, § 102\(b\)](#), 104 Stat. 2412.)

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**Effective:[See Text Amendments]**

United States Code Annotated [Currentness](#)

Title 42. The Public Health and Welfare

Chapter 85. Air Pollution Prevention and Control ([Refs & Annos](#))

Subchapter I. Programs and Activities

▣ [Part D](#). Plan Requirements for Nonattainment Areas

▣ [Subpart 1](#). Nonattainment Areas in General ([Refs & Annos](#))

→→ **§ 7503. Permit requirements**

(a) In general

The permit program required by [section 7502\(b\)\(6\)](#) of this title shall provide that permits to construct and operate may be issued if--

(1) in accordance with regulations issued by the Administrator for the determination of baseline emissions in a manner consistent with the assumptions underlying the applicable implementation plan approved under [section 7410](#) of this title and this part, the permitting agency determines that--

(A) by the time the source is to commence operation, sufficient offsetting emissions reductions have been obtained, such that total allowable emissions from existing sources in the region, from new or modified sources which are not major emitting facilities, and from the proposed source will be sufficiently less than total emissions from existing sources (as determined in accordance with the regulations under this paragraph) prior to the application for such permit to construct or modify so as to represent (when considered together with the plan provisions required under [section 7502](#) of this title) reasonable further progress (as defined in [section 7501](#) of this title); or

(B) in the case of a new or modified major stationary source which is located in a zone (within the nonattainment area) identified by the Administrator, in consultation with the Secretary of Housing and Urban Development, as a zone to which economic development should be targeted, that emissions of such pollutant resulting from the proposed new or modified major stationary source will not cause or contribute to emissions levels which exceed the allowance permitted for such pollutant for such area from new or modified major stationary sources under [section 7502\(c\)](#) of this title;

(2) the proposed source is required to comply with the lowest achievable emission rate;

(3) the owner or operator of the proposed new or modified source has demonstrated that all major stationary sources owned or operated by such person (or by any entity controlling, controlled by, or under common con-

trol with such person) in such State are subject to emission limitations and are in compliance, or on a schedule for compliance, with all applicable emission limitations and standards under this chapter; and [FN1]

(4) the Administrator has not determined that the applicable implementation plan is not being adequately implemented for the nonattainment area in which the proposed source is to be constructed or modified in accordance with the requirements of this part; and

(5) an analysis of alternative sites, sizes, production processes, and environmental control techniques for such proposed source demonstrates that benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification.

Any emission reductions required as a precondition of the issuance of a permit under paragraph (1) shall be federally enforceable before such permit may be issued.

(b) Prohibition on use of old growth allowances

Any growth allowance included in an applicable implementation plan to meet the requirements of [section 7502\(b\)\(5\)](#) of this title (as in effect immediately before November 15, 1990) shall not be valid for use in any area that received or receives a notice under [section 7410\(a\)\(2\)\(H\)\(ii\)](#) of this title (as in effect immediately before November 15, 1990) or under [section 7410\(k\)\(1\)](#) of this title that its applicable implementation plan containing such allowance is substantially inadequate.

(c) Offsets

(1) The owner or operator of a new or modified major stationary source may comply with any offset requirement in effect under this part for increased emissions of any air pollutant only by obtaining emission reductions of such air pollutant from the same source or other sources in the same nonattainment area, except that the State may allow the owner or operator of a source to obtain such emission reductions in another nonattainment area if (A) the other area has an equal or higher nonattainment classification than the area in which the source is located and (B) emissions from such other area contribute to a violation of the national ambient air quality standard in the nonattainment area in which the source is located. Such emission reductions shall be, by the time a new or modified source commences operation, in effect and enforceable and shall assure that the total tonnage of increased emissions of the air pollutant from the new or modified source shall be offset by an equal or greater reduction, as applicable, in the actual emissions of such air pollutant from the same or other sources in the area.

(2) Emission reductions otherwise required by this chapter shall not be creditable as emissions reductions for purposes of any such offset requirement. Incidental emission reductions which are not otherwise required by this chapter shall be creditable as emission reductions for such purposes if such emission reductions meet the requirements of paragraph (1).

(d) Control technology information

The State shall provide that control technology information from permits issued under this section will be promptly submitted to the Administrator for purposes of making such information available through the RACT/BACT/LAER clearinghouse to other States and to the general public.

(e) Rocket engines or motors

The permitting authority of a State shall allow a source to offset by alternative or innovative means emission increases from rocket engine and motor firing, and cleaning related to such firing, at an existing or modified major source that tests rocket engines or motors under the following conditions:

(1) Any modification proposed is solely for the purpose of expanding the testing of rocket engines or motors at an existing source that is permitted to test such engines on November 15, 1990.

(2) The source demonstrates to the satisfaction of the permitting authority of the State that it has used all reasonable means to obtain and utilize offsets, as determined on an annual basis, for the emissions increases beyond allowable levels, that all available offsets are being used, and that sufficient offsets are not available to the source.

(3) The source has obtained a written finding from the Department of Defense, Department of Transportation, National Aeronautics and Space Administration or other appropriate Federal agency, that the testing of rocket motors or engines at the facility is required for a program essential to the national security.

(4) The source will comply with an alternative measure, imposed by the permitting authority, designed to offset any emission increases beyond permitted levels not directly offset by the source. In lieu of imposing any alternative offset measures, the permitting authority may impose an emissions fee to be paid to such authority of a State which shall be an amount no greater than 1.5 times the average cost of stationary source control measures adopted in that area during the previous 3 years. The permitting authority shall utilize the fees in a manner that maximizes the emissions reductions in that area.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 173, as added Aug. 7, 1977, [Pub.L. 95-95, Title I, § 129\(b\)](#), 91 Stat. 748; amended Nov. 16, 1977, [Pub.L. 95-190, § 14\(a\)\(57\), \(58\)](#), 91 Stat. 1403; Nov. 15, 1990, [Pub.L. 101-549, Title I, § 102\(c\)](#), 104 Stat. 2415.)

[FN1] So in original. The word “and” probably should not appear.

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Title 42. The Public Health and Welfare

Chapter 85. Air Pollution Prevention and Control ([Refs & Annos](#))

Subchapter I. Programs and Activities

▣ [Part D](#). Plan Requirements for Nonattainment Areas▣ [Subpart 1](#). Nonattainment Areas in General ([Refs & Annos](#))→ → **§ 7509. Sanctions and consequences of failure to attain**

(a) State failure

For any implementation plan or plan revision required under this part (or required in response to a finding of substantial inadequacy as described in [section 7410\(k\)\(5\)](#) of this title), if the Administrator--

(1) finds that a State has failed, for an area designated nonattainment under [section 7407\(d\)](#) of this title, to submit a plan, or to submit 1 or more of the elements (as determined by the Administrator) required by the provisions of this chapter applicable to such an area, or has failed to make a submission for such an area that satisfies the minimum criteria established in relation to any such element under [section 7410\(k\)](#) of this title,

(2) disapproves a submission under [section 7410\(k\)](#) of this title, for an area designated nonattainment under [section 7407](#) of this title, based on the submission's failure to meet one or more of the elements required by the provisions of this chapter applicable to such an area,

(3)(A) determines that a State has failed to make any submission as may be required under this chapter, other than one described under paragraph (1) or (2), including an adequate maintenance plan, or has failed to make any submission, as may be required under this chapter, other than one described under paragraph (1) or (2), that satisfies the minimum criteria established in relation to such submission under [section 7410\(k\)\(1\)\(A\)](#) of this title, or

(B) disapproves in whole or in part a submission described under subparagraph (A), or

(4) finds that any requirement of an approved plan (or approved part of a plan) is not being implemented,

unless such deficiency has been corrected within 18 months after the finding, disapproval, or determination referred to in paragraphs (1), (2), (3), and (4), one of the sanctions referred to in subsection (b) of this section shall apply, as selected by the Administrator, until the Administrator determines that the State has come into compli-

ance, except that if the Administrator finds a lack of good faith, sanctions under both paragraph (1) and paragraph (2) of subsection (b) of this section shall apply until the Administrator determines that the State has come into compliance. If the Administrator has selected one of such sanctions and the deficiency has not been corrected within 6 months thereafter, sanctions under both paragraph (1) and paragraph (2) of subsection (b) of this section shall apply until the Administrator determines that the State has come into compliance. In addition to any other sanction applicable as provided in this section, the Administrator may withhold all or part of the grants for support of air pollution planning and control programs that the Administrator may award under [section 7405](#) of this title.

(b) Sanctions

The sanctions available to the Administrator as provided in subsection (a) of this section are as follows:

(1) Highway sanctions

(A) The Administrator may impose a prohibition, applicable to a nonattainment area, on the approval by the Secretary of Transportation of any projects or the awarding by the Secretary of any grants, under Title 23 other than projects or grants for safety where the Secretary determines, based on accident or other appropriate data submitted by the State, that the principal purpose of the project is an improvement in safety to resolve a demonstrated safety problem and likely will result in a significant reduction in, or avoidance of, accidents. Such prohibition shall become effective upon the selection by the Administrator of this sanction.

(B) In addition to safety, projects or grants that may be approved by the Secretary, notwithstanding the prohibition in subparagraph (A), are the following--

(i) capital programs for public transit;

(ii) construction or restriction of certain roads or lanes solely for the use of passenger buses or high occupancy vehicles;

(iii) planning for requirements for employers to reduce employee work-trip-related vehicle emissions;

(iv) highway ramp metering, traffic signalization, and related programs that improve traffic flow and achieve a net emission reduction;

(v) fringe and transportation corridor parking facilities serving multiple occupancy vehicle programs or transit operations;

(vi) programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use, through road use charges, tolls, parking surcharges, or other pricing mechanisms, vehicle restricted zones or periods, or vehicle registration programs;

(vii) programs for breakdown and accident scene management, nonrecurring congestion, and vehicle information systems, to reduce congestion and emissions; and

(viii) such other transportation-related programs as the Administrator, in consultation with the Secretary of Transportation, finds would improve air quality and would not encourage single occupancy vehicle capacity.

In considering such measures, the State should seek to ensure adequate access to downtown, other commercial, and residential areas, and avoid increasing or relocating emissions and congestion rather than reducing them.

(2) Offsets

In applying the emissions offset requirements of [section 7503](#) of this title to new or modified sources or emissions units for which a permit is required under this part, the ratio of emission reductions to increased emissions shall be at least 2 to 1.

(c) Notice of failure to attain

(1) As expeditiously as practicable after the applicable attainment date for any nonattainment area, but not later than 6 months after such date, the Administrator shall determine, based on the area's air quality as of the attainment date, whether the area attained the standard by that date.

(2) Upon making the determination under paragraph (1), the Administrator shall publish a notice in the Federal Register containing such determination and identifying each area that the Administrator has determined to have failed to attain. The Administrator may revise or supplement such determination at any time based on more complete information or analysis concerning the area's air quality as of the attainment date.

(d) Consequences for failure to attain

(1) Within 1 year after the Administrator publishes the notice under subsection (c)(2) of this section (relating to notice of failure to attain), each State containing a nonattainment area shall submit a revision to the applicable implementation plan meeting the requirements of paragraph (2) of this subsection.

(2) The revision required under paragraph (1) shall meet the requirements of [section 7410](#) of this title and [section 7502](#) of this title. In addition, the revision shall include such additional measures as the Administrator may reasonably prescribe, including all measures that can be feasibly implemented in the area in light of technological achievability, costs, and any nonair quality and other air quality-related health and environmental impacts.

(3) The attainment date applicable to the revision required under paragraph (1) shall be the same as provided in the provisions of [section 7502\(a\)\(2\)](#) of this title, except that in applying such provisions the phrase "from the date of the notice under section 7509(c)(2) of this title" shall be substituted for the phrase "from the date such

area was designated nonattainment under [section 7407\(d\)](#) of this title” and for the phrase “from the date of designation as nonattainment”.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 179, as added Nov. 15, 1990, [Pub.L. 101-549, Title I, § 102\(g\)](#), 104 Stat. 2420.)

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▢ [Subpart 2](#). Additional Provisions for Ozone Nonattainment Areas ([Refs & Annos](#))

→→ **§ 7511. Classifications and attainment dates**

(a) Classification and attainment dates for 1989 nonattainment areas

(1) Each area designated nonattainment for ozone pursuant to [section 7407\(d\)](#) of this title shall be classified at the time of such designation, under table 1, by operation of law, as a Marginal Area, a Moderate Area, a Serious Area, a Severe Area, or an Extreme Area based on the design value for the area. The design value shall be calculated according to the interpretation methodology issued by the Administrator most recently before November 15, 1990. For each area classified under this subsection, the primary standard attainment date for ozone shall be as expeditiously as practicable but not later than the date provided in table 1.

TABLE 1		
Area class	Design value <sup>[FN*]</sup>	Primary standard attainment date <sup>[FN**]</sup>
Marginal	0.121 up to 0.138	3 years after November 15, 1990
Moderate	0.138 up to 0.160	6 years after November 15, 1990
Serious	0.160 up to 0.180	9 years after November 15, 1990
Severe	0.180 up to 0.280	15 years after November 15, 1990
Extreme	0.280 and above	20 years after November 15, 1990

<sup>[FN\*]</sup> The design value is measured in parts per million (ppm).

<sup>[FN\*\*]</sup> The primary standard attainment date is measured from November 15, 1990.

(2) Notwithstanding table 1, in the case of a severe area with a 1988 ozone design value between 0.190 and 0.280 ppm,

the attainment date shall be 17 years (in lieu of 15 years) after November 15, 1990.

(3) At the time of publication of the notice under [section 7407\(d\)\(4\)](#) of this title (relating to area designations) for each ozone nonattainment area, the Administrator shall publish a notice announcing the classification of such ozone nonattainment area. The provisions of [section 7502\(a\)\(1\)\(B\)](#) of this title (relating to lack of notice and comment and judicial review) shall apply to such classification.

(4) If an area classified under paragraph (1) (Table 1) would have been classified in another category if the design value in the area were 5 percent greater or 5 percent less than the level on which such classification was based, the Administrator may, in the Administrator's discretion, within 90 days after the initial classification, by the procedure required under paragraph (3), adjust the classification to place the area in such other category. In making such adjustment, the Administrator may consider the number of exceedances of the national primary ambient air quality standard for ozone in the area, the level of pollution transport between the area and other affected areas, including both intrastate and interstate transport, and the mix of sources and air pollutants in the area.

(5) Upon application by any State, the Administrator may extend for 1 additional year (hereinafter referred to as the "Extension Year") the date specified in table 1 of paragraph (1) of this subsection if--

(A) the State has complied with all requirements and commitments pertaining to the area in the applicable implementation plan, and

(B) no more than 1 exceedance of the national ambient air quality standard level for ozone has occurred in the area in the year preceding the Extension Year.

No more than 2 one-year extensions may be issued under this paragraph for a single nonattainment area.

(b) New designations and reclassifications

(1) New designations to nonattainment

Any area that is designated attainment or unclassifiable for ozone under [section 7407\(d\)\(4\)](#) of this title, and that is subsequently redesignated to nonattainment for ozone under [section 7407\(d\)\(3\)](#) of this title, shall, at the time of the redesignation, be classified by operation of law in accordance with table 1 under subsection (a) of this section. Upon its classification, the area shall be subject to the same requirements under [section 7410](#) of this title, subpart 1 of this part, and this subpart that would have applied had the area been so classified at the time of the notice under subsection (a)(3) of this section, except that any absolute, fixed date applicable in connection with any such requirement is extended by operation of law by a period equal to the length of time between November 15, 1990, and the date the area is classified under this paragraph.

(2) Reclassification upon failure to attain

(A) Within 6 months following the applicable attainment date (including any extension thereof) for an ozone nonattain-

ment area, the Administrator shall determine, based on the area's design value (as of the attainment date), whether the area attained the standard by that date. Except for any Severe or Extreme area, any area that the Administrator finds has not attained the standard by that date shall be reclassified by operation of law in accordance with table 1 of subsection (a) of this section to the higher of--

(i) the next higher classification for the area, or

(ii) the classification applicable to the area's design value as determined at the time of the notice required under subparagraph (B).

No area shall be reclassified as Extreme under clause (ii).

(B) The Administrator shall publish a notice in the Federal Register, no later than 6 months following the attainment date, identifying each area that the Administrator has determined under subparagraph (A) as having failed to attain and identifying the reclassification, if any, described under subparagraph (A).

(3) Voluntary reclassification

The Administrator shall grant the request of any State to reclassify a nonattainment area in that State in accordance with table 1 of subsection (a) of this section to a higher classification. The Administrator shall publish a notice in the Federal Register of any such request and of action by the Administrator granting the request.

(4) Failure of Severe Areas to attain standard

(A) If any Severe Area fails to achieve the national primary ambient air quality standard for ozone by the applicable attainment date (including any extension thereof), the fee provisions under [section 7511d](#) of this title shall apply within the area, the percent reduction requirements of [section 7511a\(c\)\(2\)\(B\)](#) and (C) of this title (relating to reasonable further progress demonstration and NO<sub>x</sub> control) shall continue to apply to the area, and the State shall demonstrate that such percent reduction has been achieved in each 3-year interval after such failure until the standard is attained. Any failure to make such a demonstration shall be subject to the sanctions provided under this part.

(B) In addition to the requirements of subparagraph (A), if the ozone design value for a Severe Area referred to in subparagraph (A) is above 0.140 ppm for the year of the applicable attainment date, or if the area has failed to achieve its most recent milestone under [section 7511a\(g\)](#) of this title, the new source review requirements applicable under this subpart in Extreme Areas shall apply in the area and the term [FN1] "major source" and "major stationary source" shall have the same meaning as in Extreme Areas.

(C) In addition to the requirements of subparagraph (A) for those areas referred to in subparagraph (A) and not covered by subparagraph (B), the provisions referred to in subparagraph (B) shall apply after 3 years from the applicable attainment date unless the area has attained the standard by the end of such 3-year period.

(D) If, after November 15, 1990, the Administrator modifies the method of determining compliance with the national primary ambient air quality standard, a design value or other indicator comparable to 0.140 in terms of its relationship to the standard shall be used in lieu of 0.140 for purposes of applying the provisions of subparagraphs (B) and (C).

(c) References to terms

(1) Any reference in this subpart to a “Marginal Area”, a “Moderate Area”, a “Serious Area”, a “Severe Area”, or an “Extreme Area” shall be considered a reference to a Marginal Area, a Moderate Area, a Serious Area, a Severe Area, or an Extreme Area as respectively classified under this section.

(2) Any reference in this subpart to “next higher classification” or comparable terms shall be considered a reference to the classification related to the next higher set of design values in table 1.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 181, as added Nov. 15, 1990, [Pub.L. 101-549, Title I, § 103](#), 104 Stat. 2423.)

[FN1] So in original. Probably should be “terms”.

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Subchapter I. Programs and Activities

▣ [Part D](#). Plan Requirements for Nonattainment Areas▣ [Subpart 2](#). Additional Provisions for Ozone Nonattainment Areas ([Refs & Annos](#))→→ **§ 7511a. Plan submissions and requirements**

## (a) Marginal Areas

Each State in which all or part of a Marginal Area is located shall, with respect to the Marginal Area (or portion thereof, to the extent specified in this subsection), submit to the Administrator the State implementation plan revisions (including the plan items) described under this subsection except to the extent the State has made such submissions as of November 15, 1990.

## (1) Inventory

Within 2 years after November 15, 1990, the State shall submit a comprehensive, accurate, current inventory of actual emissions from all sources, as described in [section 7502\(c\)\(3\)](#) of this title, in accordance with guidance provided by the Administrator.

## (2) Corrections to the State implementation plan

Within the periods prescribed in this paragraph, the State shall submit a revision to the State implementation plan that meets the following requirements--

## (A) Reasonably available control technology corrections

For any Marginal Area (or, within the Administrator's discretion, portion thereof) the State shall submit, within 6 months of the date of classification under [section 7511\(a\)](#) of this title, a revision that includes such provisions to correct requirements in (or add requirements to) the plan concerning reasonably available control technology as were required under [section 7502\(b\)](#) of this title (as in effect immediately before November 15, 1990), as interpreted in guidance issued by the Administrator under [section 7408](#) of this title before November 15, 1990.

## (B) Savings clause for vehicle inspection and maintenance

(i) For any Marginal Area (or, within the Administrator's discretion, portion thereof), the plan for which already includes, or was required by [section 7502\(b\)\(11\)\(B\)](#) of this title (as in effect immediately before November 15, 1990) to have included, a specific schedule for implementation of a vehicle emission control inspection and maintenance program, the State shall submit, immediately after November 15, 1990, a revision that includes any provisions necessary to provide for a vehicle inspection and maintenance program of no less stringency than that of either the program defined in House Report Numbered 95-294, 95th Congress, 1st Session, 281-291 (1977) as interpreted in guidance of the Administrator issued pursuant to [section 7502\(b\)\(11\)\(B\)](#) of this title (as in effect immediately before November 15, 1990) or the program already included in the plan, whichever is more stringent.

(ii) Within 12 months after November 15, 1990, the Administrator shall review, revise, update, and republish in the Federal Register the guidance for the States for motor vehicle inspection and maintenance programs required by this chapter, taking into consideration the Administrator's investigations and audits of such program. The guidance shall, at a minimum, cover the frequency of inspections, the types of vehicles to be inspected (which shall include leased vehicles that are registered in the nonattainment area), vehicle maintenance by owners and operators, audits by the State, the test method and measures, including whether centralized or decentralized, inspection methods and procedures, quality of inspection, components covered, assurance that a vehicle subject to a recall notice from a manufacturer has complied with that notice, and effective implementation and enforcement, including ensuring that any retesting of a vehicle after a failure shall include proof of corrective action and providing for denial of vehicle registration in the case of tampering or misfueling. The guidance which shall be incorporated in the applicable State implementation plans by the States shall provide the States with continued reasonable flexibility to fashion effective, reasonable, and fair programs for the affected consumer. No later than 2 years after the Administrator promulgates regulations under [section 7521\(m\)\(3\)](#) of this title (relating to emission control diagnostics), the State shall submit a revision to such program to meet any requirements that the Administrator may prescribe under that section.

(C) Permit programs

Within 2 years after November 15, 1990, the State shall submit a revision that includes each of the following:

(i) Provisions to require permits, in accordance with [sections 7502\(c\)\(5\)](#) and [7503](#) of this title, for the construction and operation of each new or modified major stationary source (with respect to ozone) to be located in the area.

(ii) Provisions to correct requirements in (or add requirements to) the plan concerning permit programs as were required under [section 7502\(b\)\(6\)](#) of this title (as in effect immediately before November 15, 1990), as interpreted in regulations of the Administrator promulgated as of November 15, 1990.

(3) Periodic inventory

(A) General requirement

No later than the end of each 3-year period after submission of the inventory under paragraph (1) until the area is redesignated to attainment, the State shall submit a revised inventory meeting the requirements of subsection (a)(1) of this section.

(B) Emissions statements

(i) Within 2 years after November 15, 1990, the State shall submit a revision to the State implementation plan to require that the owner or operator of each stationary source of oxides of nitrogen or volatile organic compounds provide the State with a statement, in such form as the Administrator may prescribe (or accept an equivalent alternative developed by the State), for classes or categories of sources, showing the actual emissions of oxides of nitrogen and volatile organic compounds from that source. The first such statement shall be submitted within 3 years after November 15, 1990. Subsequent statements shall be submitted at least every year thereafter. The statement shall contain a certification that the information contained in the statement is accurate to the best knowledge of the individual certifying the statement.

(ii) The State may waive the application of clause (i) to any class or category of stationary sources which emit less than 25 tons per year of volatile organic compounds or oxides of nitrogen if the State, in its submissions under subparagraphs [FN1] (1) or (3)(A), provides an inventory of emissions from such class or category of sources, based on the use of the emission factors established by the Administrator or other methods acceptable to the Administrator.

(4) General offset requirement

For purposes of satisfying the emission offset requirements of this part, the ratio of total emission reductions of volatile organic compounds to total increased emissions of such air pollutant shall be at least 1.1 to 1.

The Administrator may, in the Administrator's discretion, require States to submit a schedule for submitting any of the revisions or other items required under this subsection. The requirements of this subsection shall apply in lieu of any requirement that the State submit a demonstration that the applicable implementation plan provides for attainment of the ozone standard by the applicable attainment date in any Marginal Area. Section 7502(c)(9) of this title (relating to contingency measures) shall not apply to Marginal Areas.

(b) Moderate Areas

Each State in which all or part of a Moderate Area is located shall, with respect to the Moderate Area, make the submissions described under subsection (a) of this section (relating to Marginal Areas), and shall also submit the revisions to the applicable implementation plan described under this subsection.

(1) Plan provisions for reasonable further progress

(A) General rule

(i) By no later than 3 years after November 15, 1990, the State shall submit a revision to the applicable im-

plementation plan to provide for volatile organic compound emission reductions, within 6 years after November 15, 1990, of at least 15 percent from baseline emissions, accounting for any growth in emissions after 1990. Such plan shall provide for such specific annual reductions in emissions of volatile organic compounds and oxides of nitrogen as necessary to attain the national primary ambient air quality standard for ozone by the attainment date applicable under this chapter. This subparagraph shall not apply in the case of oxides of nitrogen for those areas for which the Administrator determines (when the Administrator approves the plan or plan revision) that additional reductions of oxides of nitrogen would not contribute to attainment.

(ii) A percentage less than 15 percent may be used for purposes of clause (i) in the case of any State which demonstrates to the satisfaction of the Administrator that--

(I) new source review provisions are applicable in the nonattainment areas in the same manner and to the same extent as required under subsection (e) of this section in the case of Extreme Areas (with the exception that, in applying such provisions, the terms "major source" and "major stationary source" shall include (in addition to the sources described in [section 7602](#) of this title) any stationary source or group of sources located within a contiguous area and under common control that emits, or has the potential to emit, at least 5 tons per year of volatile organic compounds);

(II) reasonably available control technology is required for all existing major sources (as defined in subclause (I)); and

(III) the plan reflecting a lesser percentage than 15 percent includes all measures that can feasibly be implemented in the area, in light of technological achievability.

To qualify for a lesser percentage under this clause, a State must demonstrate to the satisfaction of the Administrator that the plan for the area includes the measures that are achieved in practice by sources in the same source category in nonattainment areas of the next higher category.

(B) Baseline emissions

For purposes of subparagraph (A), the term "baseline emissions" means the total amount of actual VOC or NO<sub>x</sub> emissions from all anthropogenic sources in the area during the calendar year 1990, excluding emissions that would be eliminated under the regulations described in clauses (i) and (ii) of subparagraph (D).

(C) General rule for creditability of reductions

Except as provided under subparagraph (D), emissions reductions are creditable toward the 15 percent required under subparagraph (A) to the extent they have actually occurred, as of 6 years after November 15, 1990, from the implementation of measures required under the applicable implementation plan, rules promulgated by the Administrator, or a permit under subchapter V of this chapter.

(D) Limits on creditability of reductions

Emission reductions from the following measures are not creditable toward the 15 percent reductions required under subparagraph (A):

- (i) Any measure relating to motor vehicle exhaust or evaporative emissions promulgated by the Administrator by January 1, 1990.
- (ii) Regulations concerning Reid Vapor Pressure promulgated by the Administrator by November 15, 1990, or required to be promulgated under [section 7545\(h\)](#) of this title.
- (iii) Measures required under subsection (a)(2)(A) of this section (concerning corrections to implementation plans prescribed under guidance by the Administrator).
- (iv) Measures required under subsection (a)(2)(B) of this section to be submitted immediately after November 15, 1990 (concerning corrections to motor vehicle inspection and maintenance programs).

(2) Reasonably available control technology

The State shall submit a revision to the applicable implementation plan to include provisions to require the implementation of reasonably available control technology under [section 7502\(c\)\(1\)](#) of this title with respect to each of the following:

- (A) Each category of VOC sources in the area covered by a CTG document issued by the Administrator between November 15, 1990, and the date of attainment.
- (B) All VOC sources in the area covered by any CTG issued before November 15, 1990.
- (C) All other major stationary sources of VOCs that are located in the area.

Each revision described in subparagraph (A) shall be submitted within the period set forth by the Administrator in issuing the relevant CTG document. The revisions with respect to sources described in subparagraphs (B) and (C) shall be submitted by 2 years after November 15, 1990, and shall provide for the implementation of the required measures as expeditiously as practicable but no later than May 31, 1995.

(3) Gasoline vapor recovery

(A) General rule

Not later than 2 years after November 15, 1990, the State shall submit a revision to the applicable implementation plan to require all owners or operators of gasoline dispensing systems to install and operate, by

the date prescribed under subparagraph (B), a system for gasoline vapor recovery of emissions from the fueling of motor vehicles. The Administrator shall issue guidance as appropriate as to the effectiveness of such system. This subparagraph shall apply only to facilities which sell more than 10,000 gallons of gasoline per month (50,000 gallons per month in the case of an independent small business marketer of gasoline as defined in [section 7625-1 \[FN2\]](#) of this title).

(B) Effective date

The date required under subparagraph (A) shall be--

- (i) 6 months after the adoption date, in the case of gasoline dispensing facilities for which construction commenced after November 15, 1990;
- (ii) one year after the adoption date, in the case of gasoline dispensing facilities which dispense at least 100,000 gallons of gasoline per month, based on average monthly sales for the 2-year period before the adoption date; or
- (iii) 2 years after the adoption date, in the case of all other gasoline dispensing facilities.

Any gasoline dispensing facility described under both clause (i) and clause (ii) shall meet the requirements of clause (i).

(C) Reference to terms

For purposes of this paragraph, any reference to the term "adoption date" shall be considered a reference to the date of adoption by the State of requirements for the installation and operation of a system for gasoline vapor recovery of emissions from the fueling of motor vehicles.

(4) Motor vehicle inspection and maintenance

For all Moderate Areas, the State shall submit, immediately after November 15, 1990, a revision to the applicable implementation plan that includes provisions necessary to provide for a vehicle inspection and maintenance program as described in subsection (a)(2)(B) of this section (without regard to whether or not the area was required by [section 7502\(b\)\(11\)\(B\)](#) of this title (as in effect immediately before November 15, 1990) to have included a specific schedule for implementation of such a program).

(5) General offset requirement

For purposes of satisfying the emission offset requirements of this part, the ratio of total emission reductions of volatile organic compounds to total increase emissions of such air pollutant shall be at least 1.15 to 1.

(c) Serious Areas

Except as otherwise specified in paragraph (4), each State in which all or part of a Serious Area is located shall, with respect to the Serious Area (or portion thereof, to the extent specified in this subsection), make the submissions described under subsection (b) of this section (relating to Moderate Areas), and shall also submit the revisions to the applicable implementation plan (including the plan items) described under this subsection. For any Serious Area, the terms “major source” and “major stationary source” include (in addition to the sources described in [section 7602](#) of this title) any stationary source or group of sources located within a contiguous area and under common control that emits, or has the potential to emit, at least 50 tons per year of volatile organic compounds.

(1) Enhanced monitoring

In order to obtain more comprehensive and representative data on ozone air pollution, not later than 18 months after November 15, 1990, the Administrator shall promulgate rules, after notice and public comment, for enhanced monitoring of ozone, oxides of nitrogen, and volatile organic compounds. The rules shall, among other things, cover the location and maintenance of monitors. Immediately following the promulgation of rules by the Administrator relating to enhanced monitoring, the State shall commence such actions as may be necessary to adopt and implement a program based on such rules, to improve monitoring for ambient concentrations of ozone, oxides of nitrogen and volatile organic compounds and to improve monitoring of emissions of oxides of nitrogen and volatile organic compounds. Each State implementation plan for the area shall contain measures to improve the ambient monitoring of such air pollutants.

(2) Attainment and reasonable further progress demonstrations

Within 4 years after November 15, 1990, the State shall submit a revision to the applicable implementation plan that includes each of the following:

(A) Attainment demonstration

A demonstration that the plan, as revised, will provide for attainment of the ozone national ambient air quality standard by the applicable attainment date. This attainment demonstration must be based on photochemical grid modeling or any other analytical method determined by the Administrator, in the Administrator's discretion, to be at least as effective.

(B) Reasonable further progress demonstration

A demonstration that the plan, as revised, will result in VOC emissions reductions from the baseline emissions described in subsection (b)(1)(B) of this section equal to the following amount averaged over each consecutive 3-year period beginning 6 years after November 15, 1990, until the attainment date:

- (i) at least 3 percent of baseline emissions each year; or

(ii) an amount less than 3 percent of such baseline emissions each year, if the State demonstrates to the satisfaction of the Administrator that the plan reflecting such lesser amount includes all measures that can feasibly be implemented in the area, in light of technological achievability.

To lessen the 3 percent requirement under clause (ii), a State must demonstrate to the satisfaction of the Administrator that the plan for the area includes the measures that are achieved in practice by sources in the same source category in nonattainment areas of the next higher classification. Any determination to lessen the 3 percent requirement shall be reviewed at each milestone under subsection (g) of this section and revised to reflect such new measures (if any) achieved in practice by sources in the same category in any State, allowing a reasonable time to implement such measures. The emission reductions described in this subparagraph shall be calculated in accordance with subsection (b)(1)(C) and (D) of this section (concerning creditability of reductions). The reductions creditable for the period beginning 6 years after November 15, 1990, shall include reductions that occurred before such period, computed in accordance with subsection (b)(1) of this section, that exceed the 15-percent amount of reductions required under subsection (b)(1)(A) of this section.

(C) NO<sub>x</sub> control

The revision may contain, in lieu of the demonstration required under subparagraph (B), a demonstration to the satisfaction of the Administrator that the applicable implementation plan, as revised, provides for reductions of emissions of VOC's and oxides of nitrogen (calculated according to the creditability provisions of subsection (b)(1)(C) and (D) of this section), that would result in a reduction in ozone concentrations at least equivalent to that which would result from the amount of VOC emission reductions required under subparagraph (B). Within 1 year after November 15, 1990, the Administrator shall issue guidance concerning the conditions under which NO<sub>x</sub> control may be substituted for VOC control or may be combined with VOC control in order to maximize the reduction in ozone air pollution. In accord with such guidance, a lesser percentage of VOCs may be accepted as an adequate demonstration for purposes of this subsection.

(3) Enhanced vehicle inspection and maintenance program

(A) Requirement for submission

Within 2 years after November 15, 1990, the State shall submit a revision to the applicable implementation plan to provide for an enhanced program to reduce hydrocarbon emissions and NO<sub>x</sub> emissions from in-use motor vehicles registered in each urbanized area (in the nonattainment area), as defined by the Bureau of the Census, with a 1980 population of 200,000 or more.

(B) Effective date of State programs; guidance

The State program required under subparagraph (A) shall take effect no later than 2 years from November 15, 1990, and shall comply in all respects with guidance published in the Federal Register (and from time to time revised) by the Administrator for enhanced vehicle inspection and maintenance programs. Such guidance shall include--

(i) a performance standard achievable by a program combining emission testing, including on-road emission testing, with inspection to detect tampering with emission control devices and misfueling for all light-duty vehicles and all light-duty trucks subject to standards under [section 7521](#) of this title; and

(ii) program administration features necessary to reasonably assure that adequate management resources, tools, and practices are in place to attain and maintain the performance standard.

Compliance with the performance standard under clause (i) shall be determined using a method to be established by the Administrator.

(C) State program

The State program required under subparagraph (A) shall include, at a minimum, each of the following elements--

(i) Computerized emission analyzers, including on-road testing devices.

(ii) No waivers for vehicles and parts covered by the emission control performance warranty as provided for in [section 7541\(b\)](#) of this title unless a warranty remedy has been denied in writing, or for tampering-related repairs.

(iii) In view of the air quality purpose of the program, if, for any vehicle, waivers are permitted for emissions-related repairs not covered by warranty, an expenditure to qualify for the waiver of an amount of \$450 or more for such repairs (adjusted annually as determined by the Administrator on the basis of the Consumer Price Index in the same manner as provided in subchapter V of this chapter).

(iv) Enforcement through denial of vehicle registration (except for any program in operation before November 15, 1990, whose enforcement mechanism is demonstrated to the Administrator to be more effective than the applicable vehicle registration program in assuring that noncomplying vehicles are not operated on public roads).

(v) Annual emission testing and necessary adjustment, repair, and maintenance, unless the State demonstrates to the satisfaction of the Administrator that a biennial inspection, in combination with other features of the program which exceed the requirements of this chapter, will result in emission reductions which equal or exceed the reductions which can be obtained through such annual inspections.

(vi) Operation of the program on a centralized basis, unless the State demonstrates to the satisfaction of the Administrator that a decentralized program will be equally effective. An electronically connected testing system, a licensing system, or other measures (or any combination thereof) may be considered, in accordance with criteria established by the Administrator, as equally effective for such purposes.

(vii) Inspection of emission control diagnostic systems and the maintenance or repair of malfunctions or system deterioration identified by or affecting such diagnostics systems.

Each State shall biennially prepare a report to the Administrator which assesses the emission reductions achieved by the program required under this paragraph based on data collected during inspection and repair of vehicles. The methods used to assess the emission reductions shall be those established by the Administrator.

(4) Clean-fuel vehicle programs

(A) Except to the extent that substitute provisions have been approved by the Administrator under subparagraph (B), the State shall submit to the Administrator, within 42 months of November 15, 1990, a revision to the applicable implementation plan for each area described under part C of subchapter II of this chapter to include such measures as may be necessary to ensure the effectiveness of the applicable provisions of the clean-fuel vehicle program prescribed under part C of subchapter II of this chapter, including all measures necessary to make the use of clean alternative fuels in clean-fuel vehicles (as defined in part C of subchapter II of this chapter) economic from the standpoint of vehicle owners. Such a revision shall also be submitted for each area that opts into the clean fuel-vehicle program as provided in part C of subchapter II of this chapter.

(B) The Administrator shall approve, as a substitute for all or a portion of the clean-fuel vehicle program prescribed under part C of subchapter II of this chapter, any revision to the relevant applicable implementation plan that in the Administrator's judgment will achieve long-term reductions in ozone-producing and toxic air emissions equal to those achieved under part C of subchapter II of this chapter, or the percentage thereof attributable to the portion of the clean-fuel vehicle program for which the revision is to substitute. The Administrator may approve such revision only if it consists exclusively of provisions other than those required under this chapter for the area. Any State seeking approval of such revision must submit the revision to the Administrator within 24 months of November 15, 1990. The Administrator shall approve or disapprove any such revision within 30 months of November 15, 1990. The Administrator shall publish the revision submitted by a State in the Federal Register upon receipt. Such notice shall constitute a notice of proposed rulemaking on whether or not to approve such revision and shall be deemed to comply with the requirements concerning notices of proposed rulemaking contained in [sections 553 through 557 of Title 5](#) (related to notice and comment). Where the Administrator approves such revision for any area, the State need not submit the revision required by subparagraph (A) for the area with respect to the portions of the Federal clean-fuel vehicle program for which the Administrator has approved the revision as a substitute.

(C) If the Administrator determines, under [section 7509](#) of this title, that the State has failed to submit any portion of the program required under subparagraph (A), then, in addition to any sanctions available under [section 7509](#) of this title, the State may not receive credit, in any demonstration of attainment or reasonable further progress for the area, for any emission reductions from implementation of the corresponding aspects of the Federal clean-fuel vehicle requirements established in part C of subchapter II of this chapter.

(5) Transportation control

(A) [FN3] Beginning 6 years after November 15, 1990, and each third year thereafter, the State shall submit a demonstration as to whether current aggregate vehicle mileage, aggregate vehicle emissions, congestion levels, and other relevant parameters are consistent with those used for the area's demonstration of attainment. Where such parameters and emissions levels exceed the levels projected for purposes of the area's attainment demonstration, the State shall within 18 months develop and submit a revision of the applicable implementation plan that includes a transportation control measures program consisting of measures from, but not limited to, [section 7408\(f\)](#) of this title that will reduce emissions to levels that are consistent with emission levels projected in such demonstration. In considering such measures, the State should ensure adequate access to downtown, other commercial, and residential areas and should avoid measures that increase or relocate emissions and congestion rather than reduce them. Such revision shall be developed in accordance with guidance issued by the Administrator pursuant to [section 7408\(e\)](#) of this title and with the requirements of [section 7504\(b\)](#) of this title and shall include implementation and funding schedules that achieve expeditious emissions reductions in accordance with implementation plan projections.

(6) De minimis rule

The new source review provisions under this part shall ensure that increased emissions of volatile organic compounds resulting from any physical change in, or change in the method of operation of, a stationary source located in the area shall not be considered de minimis for purposes of determining the applicability of the permit requirements established by this chapter unless the increase in net emissions of such air pollutant from such source does not exceed 25 tons when aggregated with all other net increases in emissions from the source over any period of 5 consecutive calendar years which includes the calendar year in which such increase occurred.

(7) Special rule for modifications of sources emitting less than 100 tons

In the case of any major stationary source of volatile organic compounds located in the area (other than a source which emits or has the potential to emit 100 tons or more of volatile organic compounds per year), whenever any change (as described in [section 7411\(a\)\(4\)](#) of this title) at that source results in any increase (other than a de minimis increase) in emissions of volatile organic compounds from any discrete operation, unit, or other pollutant emitting activity at the source, such increase shall be considered a modification for purposes of [section 7502\(c\)\(5\)](#) of this title and [section 7503\(a\)](#) of this title, except that such increase shall not be considered a modification for such purposes if the owner or operator of the source elects to offset the increase by a greater reduction in emissions of volatile organic compounds concerned from other operations, units, or activities within the source at an internal offset ratio of at least 1.3 to 1. If the owner or operator does not make such election, such change shall be considered a modification for such purposes, but in applying [section 7503\(a\)\(2\)](#) of this title in the case of any such modification, the best available control technology (BACT), as defined in [section 7479](#) of this title, shall be substituted for the lowest achievable emission rate (LAER). The Administrator shall establish and publish policies and procedures for implementing the provisions of this paragraph.

(8) Special rule for modifications of sources emitting 100 tons or more

In the case of any major stationary source of volatile organic compounds located in the area which emits or

has the potential to emit 100 tons or more of volatile organic compounds per year, whenever any change (as described in [section 7411\(a\)\(4\)](#) of this title) at that source results in any increase (other than a de minimis increase) in emissions of volatile organic compounds from any discrete operation, unit, or other pollutant emitting activity at the source, such increase shall be considered a modification for purposes of [section 7502\(c\)\(5\)](#) of this title and [section 7503\(a\)](#) of this title, except that if the owner or operator of the source elects to offset the increase by a greater reduction in emissions of volatile organic compounds from other operations, units, or activities within the source at an internal offset ratio of at least 1.3 to 1, the requirements of [section 7503\(a\)\(2\)](#) of this title (concerning the lowest achievable emission rate (LAER)) shall not apply.

(9) Contingency provisions

In addition to the contingency provisions required under [section 7502\(c\)\(9\)](#) of this title, the plan revision shall provide for the implementation of specific measures to be undertaken if the area fails to meet any applicable milestone. Such measures shall be included in the plan revision as contingency measures to take effect without further action by the State or the Administrator upon a failure by the State to meet the applicable milestone.

(10) General offset requirement

For purposes of satisfying the emission offset requirements of this part, the ratio of total emission reductions of volatile organic compounds to total increase emissions of such air pollutant shall be at least 1.2 to 1.

Any reference to “attainment date” in subsection (b) of this section, which is incorporated by reference into this subsection, shall refer to the attainment date for serious areas.

(d) Severe Areas

Each State in which all or part of a Severe Area is located shall, with respect to the Severe Area, make the submissions described under subsection (c) of this section (relating to Serious Areas), and shall also submit the revisions to the applicable implementation plan (including the plan items) described under this subsection. For any Severe Area, the terms “major source” and “major stationary source” include (in addition to the sources described in [section 7602](#) of this title) any stationary source or group of sources located within a contiguous area and under common control that emits, or has the potential to emit, at least 25 tons per year of volatile organic compounds.

(1) Vehicle miles traveled

(A) Within 2 years after November 15, 1990, the State shall submit a revision that identifies and adopts specific enforceable transportation control strategies and transportation control measures to offset any growth in emissions from growth in vehicle miles traveled or numbers of vehicle trips in such area and to attain reduction in motor vehicle emissions as necessary, in combination with other emission reduction requirements of this subpart, to comply with the requirements of subsection [\[FN4\]](#) (b)(2)(B) and (c)(2)(B) of this section (pertaining to periodic emissions reduction requirements). The State shall consider measures specified in [section 7408\(f\)](#) of this title, and choose from among and implement such measures as necessary to demonstrate

attainment with the national ambient air quality standards; in considering such measures, the State should ensure adequate access to downtown, other commercial, and residential areas and should avoid measures that increase or relocate emissions and congestion rather than reduce them.

(B) The State may also, in its discretion, submit a revision at any time requiring employers in such area to implement programs to reduce work-related vehicle trips and miles travelled by employees. Such revision shall be developed in accordance with guidance issued by the Administrator pursuant to [section 7408\(f\)](#) of this title and may require that employers in such area increase average passenger occupancy per vehicle in commuting trips between home and the workplace during peak travel periods. The guidance of the Administrator may specify average vehicle occupancy rates which vary for locations within a nonattainment area (suburban, center city, business district) or among nonattainment areas reflecting existing occupancy rates and the availability of high occupancy modes. Any State required to submit a revision under this subparagraph (as in effect before December 23, 1995) containing provisions requiring employers to reduce work-related vehicle trips and miles travelled by employees may, in accordance with State law, remove such provisions from the implementation plan, or withdraw its submission, if the State notifies the Administrator, in writing, that the State has undertaken, or will undertake, one or more alternative methods that will achieve emission reductions equivalent to those to be achieved by the removed or withdrawn provisions.

(2) Offset requirement

For purposes of satisfying the offset requirements pursuant to this part, the ratio of total emission reductions of VOCs to total increased emissions of such air pollutant shall be at least 1.3 to 1, except that if the State plan requires all existing major sources in the nonattainment area to use best available control technology (as defined in [section 7479\(3\)](#) of this title) for the control of volatile organic compounds, the ratio shall be at least 1.2 to 1.

(3) Enforcement under section 7511d

By December 31, 2000, the State shall submit a plan revision which includes the provisions required under [section 7511d](#) of this title.

Any reference to the term “attainment date” in subsection (b) or (c) of this section, which is incorporated by reference into this subsection (d), shall refer to the attainment date for Severe Areas.

(e) Extreme Areas

Each State in which all or part of an Extreme Area is located shall, with respect to the Extreme Area, make the submissions described under subsection (d) of this section (relating to Severe Areas), and shall also submit the revisions to the applicable implementation plan (including the plan items) described under this subsection. The provisions of clause (ii) of subsection (c)(2)(B) of this section (relating to reductions of less than 3 percent), the provisions of paragraphs [FN5] (6), (7) and (8) of subsection (c) of this section (relating to de minimus rule and modification of sources), and the provisions of clause (ii) of subsection (b)(1)(A) of this section (relating to reductions of less than 15 percent) shall not apply in the case of an Extreme Area. For any Extreme Area, the

terms “major source” and “major stationary source” includes (in addition to the sources described in [section 7602](#) of this title) any stationary source or group of sources located within a contiguous area and under common control that emits, or has the potential to emit, at least 10 tons per year of volatile organic compounds.

(1) Offset requirement

For purposes of satisfying the offset requirements pursuant to this part, the ratio of total emission reductions of VOCs to total increased emissions of such air pollutant shall be at least 1.5 to 1, except that if the State plan requires all existing major sources in the nonattainment area to use best available control technology (as defined in [section 7479\(3\)](#) of this title) for the control of volatile organic compounds, the ratio shall be at least 1.2 to 1.

(2) Modifications

Any change (as described in [section 7411\(a\)\(4\)](#) of this title) at a major stationary source which results in any increase in emissions from any discrete operation, unit, or other pollutant emitting activity at the source shall be considered a modification for purposes of [section 7502\(c\)\(5\)](#) of this title and [section 7503\(a\)](#) of this title, except that for purposes of complying with the offset requirement pursuant to [section 7503\(a\)\(1\)](#) of this title, any such increase shall not be considered a modification if the owner or operator of the source elects to offset the increase by a greater reduction in emissions of the air pollutant concerned from other discrete operations, units, or activities within the source at an internal offset ratio of at least 1.3 to 1. The offset requirements of this part shall not be applicable in Extreme Areas to a modification of an existing source if such modification consists of installation of equipment required to comply with the applicable implementation plan, permit, or this chapter.

(3) Use of clean fuels or advanced control technology

For Extreme Areas, a plan revision shall be submitted within 3 years after November 15, 1990, to require, effective 8 years after November 15, 1990, that each new, modified, and existing electric utility and industrial and commercial boiler which emits more than 25 tons per year of oxides of nitrogen--

(A) burn as its primary fuel natural gas, methanol, or ethanol (or a comparably low polluting fuel), or

(B) use advanced control technology (such as catalytic control technology or other comparably effective control methods) for reduction of emissions of oxides of nitrogen.

For purposes of this subsection, the term “primary fuel” means the fuel which is used 90 percent or more of the operating time. This paragraph shall not apply during any natural gas supply emergency (as defined in title III of the Natural Gas Policy Act of 1978 [[15 U.S.C.A. § 3361 et seq.](#)] ).

(4) Traffic control measures during heavy traffic hours

For Extreme Areas, each implementation plan revision under this subsection may contain provisions establishing traffic control measures applicable during heavy traffic hours to reduce the use of high polluting vehicles or heavy-duty vehicles, notwithstanding any other provision of law.

(5) New technologies

The Administrator may, in accordance with [section 7410](#) of this title, approve provisions of an implementation plan for an Extreme Area which anticipate development of new control techniques or improvement of existing control technologies, and an attainment demonstration based on such provisions, if the State demonstrates to the satisfaction of the Administrator that--

(A) such provisions are not necessary to achieve the incremental emission reductions required during the first 10 years after November 15, 1990; and

(B) the State has submitted enforceable commitments to develop and adopt contingency measures to be implemented as set forth herein if the anticipated technologies do not achieve planned reductions.

Such contingency measures shall be submitted to the Administrator no later than 3 years before proposed implementation of the plan provisions and approved or disapproved by the Administrator in accordance with [section 7410](#) of this title. The contingency measures shall be adequate to produce emission reductions sufficient, in conjunction with other approved plan provisions, to achieve the periodic emission reductions required by subsection (b)(1) or (c)(2) of this section and attainment by the applicable dates. If the Administrator determines that an Extreme Area has failed to achieve an emission reduction requirement set forth in subsection (b)(1) or (c)(2) of this section, and that such failure is due in whole or part to an inability to fully implement provisions approved pursuant to this subsection, the Administrator shall require the State to implement the contingency measures to the extent necessary to assure compliance with subsections (b)(1) and (c)(2) of this section.

Any reference to the term "attainment date" in subsection (b), (c), or (d) of this section which is incorporated by reference into this subsection, shall refer to the attainment date for Extreme Areas.

(f) NO<sub>x</sub> requirements

(1) The plan provisions required under this subpart for major stationary sources of volatile organic compounds shall also apply to major stationary sources (as defined in [section 7602](#) of this title and subsections (c), (d), and (e) of this section) of oxides of nitrogen. This subsection shall not apply in the case of oxides of nitrogen for those sources for which the Administrator determines (when the Administrator approves a plan or plan revision) that net air quality benefits are greater in the absence of reductions of oxides of nitrogen from the sources concerned. This subsection shall also not apply in the case of oxides of nitrogen for--

(A) nonattainment areas not within an ozone transport region under [section 7511c](#) of this title, if the Administrator determines (when the Administrator approves a plan or plan revision) that additional reductions of ox-

ides of nitrogen would not contribute to attainment of the national ambient air quality standard for ozone in the area, or

**(B)** nonattainment areas within such an ozone transport region if the Administrator determines (when the Administrator approves a plan or plan revision) that additional reductions of oxides of nitrogen would not produce net ozone air quality benefits in such region.

The Administrator shall, in the Administrator's determinations, consider the study required under [section 7511f](#) of this title.

**(2)(A)** If the Administrator determines that excess reductions in emissions of NO<sub>x</sub> would be achieved under paragraph (1), the Administrator may limit the application of paragraph (1) to the extent necessary to avoid achieving such excess reductions.

**(B)** For purposes of this paragraph, excess reductions in emissions of NO<sub>x</sub> are emission reductions for which the Administrator determines that net air quality benefits are greater in the absence of such reductions. Alternatively, for purposes of this paragraph, excess reductions in emissions of NO<sub>x</sub> are, for--

**(i)** nonattainment areas not within an ozone transport region under [section 7511c](#) of this title, emission reductions that the Administrator determines would not contribute to attainment of the national ambient air quality standard for ozone in the area, or

**(ii)** nonattainment areas within such ozone transport region, emission reductions that the Administrator determines would not produce net ozone air quality benefits in such region.

**(3)** At any time after the final report under [section 7511f](#) of this title is submitted to Congress, a person may petition the Administrator for a determination under paragraph (1) or (2) with respect to any nonattainment area or any ozone transport region under [section 7511c](#) of this title. The Administrator shall grant or deny such petition within 6 months after its filing with the Administrator.

**(g) Milestones**

**(1) Reductions in emissions**

6 years after November 15, 1990, and at intervals of every 3 years thereafter, the State shall determine whether each nonattainment area (other than an area classified as Marginal or Moderate) has achieved a reduction in emissions during the preceding intervals equivalent to the total emission reductions required to be achieved by the end of such interval pursuant to subsection (b)(1) of this section and the corresponding requirements of subsections (c)(2)(B) and (C), (d), and (e) of this section. Such reduction shall be referred to in this section as an applicable milestone.

(2) Compliance demonstration

For each nonattainment area referred to in paragraph (1), not later than 90 days after the date on which an applicable milestone occurs (not including an attainment date on which a milestone occurs in cases where the standard has been attained), each State in which all or part of such area is located shall submit to the Administrator a demonstration that the milestone has been met. A demonstration under this paragraph shall be submitted in such form and manner, and shall contain such information and analysis, as the Administrator shall require, by rule. The Administrator shall determine whether or not a State's demonstration is adequate within 90 days after the Administrator's receipt of a demonstration which contains the information and analysis required by the Administrator.

(3) Serious and Severe Areas; State election

If a State fails to submit a demonstration under paragraph (2) for any Serious or Severe Area within the required period or if the Administrator determines that the area has not met any applicable milestone, the State shall elect, within 90 days after such failure or determination--

(A) to have the area reclassified to the next higher classification,

(B) to implement specific additional measures adequate, as determined by the Administrator, to meet the next milestone as provided in the applicable contingency plan, or

(C) to adopt an economic incentive program as described in paragraph (4).

If the State makes an election under subparagraph (B), the Administrator shall, within 90 days after the election, review such plan and shall, if the Administrator finds the contingency plan inadequate, require further measures necessary to meet such milestone. Once the State makes an election, it shall be deemed accepted by the Administrator as meeting the election requirement. If the State fails to make an election required under this paragraph within the required 90-day period or within 6 months thereafter, the area shall be reclassified to the next higher classification by operation of law at the expiration of such 6-month period. Within 12 months after the date required for the State to make an election, the State shall submit a revision of the applicable implementation plan for the area that meets the requirements of this paragraph. The Administrator shall review such plan revision and approve or disapprove the revision within 9 months after the date of its submission.

(4) Economic incentive program

(A) An economic incentive program under this paragraph shall be consistent with rules published by the Administrator and sufficient, in combination with other elements of the State plan, to achieve the next milestone. The State program may include a nondiscriminatory system, consistent with applicable law regarding interstate commerce, of State established emissions fees or a system of marketable permits, or a system of State fees on sale or manufacture of products the use of which contributes to ozone formation, or any combination of the foregoing or other similar measures. The program may also include incentives and requirements to re-

duce vehicle emissions and vehicle miles traveled in the area, including any of the transportation control measures identified in [section 7408\(f\)](#) of this title.

**(B)** Within 2 years after November 15, 1990, the Administrator shall publish rules for the programs to be adopted pursuant to subparagraph (A). Such rules shall include model plan provisions which may be adopted for reducing emissions from permitted stationary sources, area sources, and mobile sources. The guidelines shall require that any revenues generated by the plan provisions adopted pursuant to subparagraph (A) shall be used by the State for any of the following:

**(i)** Providing incentives for achieving emission reductions.

**(ii)** Providing assistance for the development of innovative technologies for the control of ozone air pollution and for the development of lower-polluting solvents and surface coatings. Such assistance shall not provide for the payment of more than 75 percent of either the costs of any project to develop such a technology or the costs of development of a lower-polluting solvent or surface coating.

**(iii)** Funding the administrative costs of State programs under this chapter. Not more than 50 percent of such revenues may be used for purposes of this clause.

**(5) Extreme Areas**

If a State fails to submit a demonstration under paragraph (2) for any Extreme Area within the required period, or if the Administrator determines that the area has not met any applicable milestone, the State shall, within 9 months after such failure or determination, submit a plan revision to implement an economic incentive program which meets the requirements of paragraph (4). The Administrator shall review such plan revision and approve or disapprove the revision within 9 months after the date of its submission.

**(h) Rural transport areas**

**(1)** Notwithstanding any other provision of [section 7511](#) of this title or this section, a State containing an ozone nonattainment area that does not include, and is not adjacent to, any part of a Metropolitan Statistical Area or, where one exists, a Consolidated Metropolitan Statistical Area (as defined by the United States Bureau of the Census), which area is treated by the Administrator, in the Administrator's discretion, as a rural transport area within the meaning of paragraph (2), shall be treated by operation of law as satisfying the requirements of this section if it makes the submissions required under subsection (a) of this section (relating to marginal areas).

**(2)** The Administrator may treat an ozone nonattainment area as a rural transport area if the Administrator finds that sources of VOC (and, where the Administrator determines relevant, NO<sub>x</sub>) emissions within the area do not make a significant contribution to the ozone concentrations measured in the area or in other areas.

**(i) Reclassified areas**

Each State containing an ozone nonattainment area reclassified under [section 7511\(b\)\(2\)](#) of this title shall meet such requirements of subsections (b) through (d) of this section as may be applicable to the area as reclassified, according to the schedules prescribed in connection with such requirements, except that the Administrator may adjust any applicable deadlines (other than attainment dates) to the extent such adjustment is necessary or appropriate to assure consistency among the required submissions.

(j) Multi-State ozone nonattainment areas

(1) Coordination among States

Each State in which there is located a portion of a single ozone nonattainment area which covers more than one State (hereinafter in this section referred to as a “multi-State ozone nonattainment area”) shall--

(A) take all reasonable steps to coordinate, substantively and procedurally, the revisions and implementation of State implementation plans applicable to the nonattainment area concerned; and

(B) use photochemical grid modeling or any other analytical method determined by the Administrator, in his discretion, to be at least as effective.

The Administrator may not approve any revision of a State implementation plan submitted under this part for a State in which part of a multi-State ozone nonattainment area is located if the plan revision for that State fails to comply with the requirements of this subsection.

(2) Failure to demonstrate attainment

If any State in which there is located a portion of a multi-State ozone nonattainment area fails to provide a demonstration of attainment of the national ambient air quality standard for ozone in that portion within the required period, the State may petition the Administrator to make a finding that the State would have been able to make such demonstration but for the failure of one or more other States in which other portions of the area are located to commit to the implementation of all measures required under this section (relating to plan submissions and requirements for ozone nonattainment areas). If the Administrator makes such finding, the provisions of [section 7509](#) of this title (relating to sanctions) shall not apply, by reason of the failure to make such demonstration, in the portion of the multi-State ozone nonattainment area within the State submitting such petition.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 182, as added Nov. 15, 1990, [Pub.L. 101-549, Title I, § 103](#), 104 Stat. 2426; amended Dec. 23, 1995, [Pub.L. 104-70, § 1](#), 109 Stat. 773.)

[FN1] So in original. Probably should be “subparagraph”.

[FN2] So in original. Probably should be [section “7625”](#).

[FN3] So in original. No subpar. (B) has been enacted.

[FN4] So in original. Probably should be “subsections”.

[FN5] So in original. Probably should be “paragraphs”.

Current through P.L. 112-89 (excluding P.L. 112-55, 112-74, 112-78, and 112-81) approved 1-3-12

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## C

**Effective:[See Text Amendments]**United States Code Annotated [Currentness](#)

Title 42. The Public Health and Welfare

Chapter 85. Air Pollution Prevention and Control ([Refs & Annos](#))

Subchapter I. Programs and Activities

▣ [Part D](#). Plan Requirements for Nonattainment Areas▣ [Subpart 4](#). Additional Provisions for Particulate Matter Nonattainment Areas→→ **§ 7513. Classifications and attainment dates**

## (a) Initial classifications

Every area designated nonattainment for PM-10 pursuant to [section 7407\(d\)](#) of this title shall be classified at the time of such designation, by operation of law, as a moderate PM-10 nonattainment area (also referred to in this subpart as a “Moderate Area”) at the time of such designation. At the time of publication of the notice under [section 7407\(d\)\(4\)](#) of this title (relating to area designations) for each PM-10 nonattainment area, the Administrator shall publish a notice announcing the classification of such area. The provisions of [section 7502\(a\)\(1\)\(B\)](#) of this title (relating to lack of notice-and-comment and judicial review) shall apply with respect to such classification.

## (b) Reclassification as Serious

## (1) Reclassification before attainment date

The Administrator may reclassify as a Serious PM-10 nonattainment area (identified in this subpart also as a “Serious Area”) any area that the Administrator determines cannot practicably attain the national ambient air quality standard for PM-10 by the attainment date (as prescribed in subsection (c) of this section) for Moderate Areas. The Administrator shall reclassify appropriate areas as Serious by the following dates:

**(A)** For areas designated nonattainment for PM-10 under [section 7407\(d\)\(4\)](#) of this title, the Administrator shall propose to reclassify appropriate areas by June 30, 1991, and take final action by December 31, 1991.

**(B)** For areas subsequently designated nonattainment, the Administrator shall reclassify appropriate areas within 18 months after the required date for the State's submission of a SIP for the Moderate Area.

## (2) Reclassification upon failure to attain

Within 6 months following the applicable attainment date for a PM-10 nonattainment area, the Administrator shall determine whether the area attained the standard by that date. If the Administrator finds that any Moderate Area is not in attainment after the applicable attainment date--

(A) the area shall be reclassified by operation of law as a Serious Area; and

(B) the Administrator shall publish a notice in the Federal Register no later than 6 months following the attainment date, identifying the area as having failed to attain and identifying the reclassification described under subparagraph (A).

(c) Attainment dates

Except as provided under subsection (d) of this section, the attainment dates for PM-10 nonattainment areas shall be as follows:

(1) Moderate Areas

For a Moderate Area, the attainment date shall be as expeditiously as practicable but no later than the end of the sixth calendar year after the area's designation as nonattainment, except that, for areas designated nonattainment for PM-10 under [section 7407\(d\)\(4\)](#) of this title, the attainment date shall not extend beyond December 31, 1994.

(2) Serious Areas

For a Serious Area, the attainment date shall be as expeditiously as practicable but no later than the end of the tenth calendar year beginning after the area's designation as nonattainment, except that, for areas designated nonattainment for PM-10 under [section 7407\(d\)\(4\)](#) of this title, the date shall not extend beyond December 31, 2001.

(d) Extension of attainment date for Moderate Areas

Upon application by any State, the Administrator may extend for 1 additional year (hereinafter referred to as the "Extension Year") the date specified in paragraph [\[FN1\]](#) (c)(1) if--

(1) the State has complied with all requirements and commitments pertaining to the area in the applicable implementation plan; and

(2) no more than one exceedance of the 24-hour national ambient air quality standard level for PM-10 has occurred in the area in the year preceding the Extension Year, and the annual mean concentration of PM-10 in the area for such year is less than or equal to the standard level.

No more than 2 one-year extensions may be issued under the subsection for a single nonattainment area.

(e) Extension of attainment date for Serious Areas

Upon application by any State, the Administrator may extend the attainment date for a Serious Area beyond the

date specified under subsection (c) of this section, if attainment by the date established under subsection (c) of this section would be impracticable, the State has complied with all requirements and commitments pertaining to that area in the implementation plan, and the State demonstrates to the satisfaction of the Administrator that the plan for that area includes the most stringent measures that are included in the implementation plan of any State or are achieved in practice in any State, and can feasibly be implemented in the area. At the time of such application, the State must submit a revision to the implementation plan that includes a demonstration of attainment by the most expeditious alternative date practicable. In determining whether to grant an extension, and the appropriate length of time for any such extension, the Administrator may consider the nature and extent of nonattainment, the types and numbers of sources or other emitting activities in the area (including the influence of uncontrollable natural sources and transboundary emissions from foreign countries), the population exposed to concentrations in excess of the standard, the presence and concentration of potentially toxic substances in the mix of particulate emissions in the area, and the technological and economic feasibility of various control measures. The Administrator may not approve an extension until the State submits an attainment demonstration for the area. The Administrator may grant at most one such extension for an area, of no more than 5 years.

(f) Waivers for certain areas

The Administrator may, on a case-by-case basis, waive any requirement applicable to any Serious Area under this subpart where the Administrator determines that anthropogenic sources of PM-10 do not contribute significantly to the violation of the PM-10 standard in the area. The Administrator may also waive a specific date for attainment of the standard where the Administrator determines that nonanthropogenic sources of PM-10 contribute significantly to the violation of the PM-10 standard in the area.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 188, as added Nov. 15, 1990, [Pub.L. 101-549, Title I, § 105\(a\)](#), 104 Stat. 2458.)

[\[FN1\]](#) So in original. Probably should be “subsection”.

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C

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Title 42. The Public Health and Welfare

Chapter 85. Air Pollution Prevention and Control ([Refs & Annos](#))

Subchapter I. Programs and Activities

▣ [Part D](#). Plan Requirements for Nonattainment Areas▣ [Subpart 4](#). Additional Provisions for Particulate Matter Nonattainment Areas→ → **§ 7513a. Plan provisions and schedules for plan submissions**

(a) Moderate Areas

(1) Plan provisions

Each State in which all or part of a Moderate Area is located shall submit, according to the applicable schedule under paragraph (2), an implementation plan that includes each of the following:

(A) For the purpose of meeting the requirements of [section 7502\(c\)\(5\)](#) of this title, a permit program providing that permits meeting the requirements of [section 7503](#) of this title are required for the construction and operation of new and modified major stationary sources of PM-10.

(B) Either (i) a demonstration (including air quality modeling) that the plan will provide for attainment by the applicable attainment date; or (ii) a demonstration that attainment by such date is impracticable.

(C) Provisions to assure that reasonably available control measures for the control of PM-10 shall be implemented no later than December 10, 1993, or 4 years after designation in the case of an area classified as moderate after November 15, 1990.

(2) Schedule for plan submissions

A State shall submit the plan required under subparagraph (1) no later than the following:

(A) Within 1 year of November 15, 1990, for areas designated nonattainment under [section 7407\(d\)\(4\)](#) of this title, except that the provision required under subparagraph (1)(A) shall be submitted no later than June 30, 1992.

(B) 18 months after the designation as nonattainment, for those areas designated nonattainment after the designations prescribed under [section 7407\(d\)\(4\)](#) of this title.

(b) Serious Areas

(1) Plan provisions

In addition to the provisions submitted to meet the requirements of paragraph [FN1] (a)(1) (relating to Moderate Areas), each State in which all or part of a Serious Area is located shall submit an implementation plan for such area that includes each of the following:

(A) A demonstration (including air quality modeling)--

(i) that the plan provides for attainment of the PM-10 national ambient air quality standard by the applicable attainment date, or

(ii) for any area for which the State is seeking, pursuant to [section 7513\(e\)](#) of this title, an extension of the attainment date beyond the date set forth in [section 7513\(c\)](#) of this title, that attainment by that date would be impracticable, and that the plan provides for attainment by the most expeditious alternative date practicable.

(B) Provisions to assure that the best available control measures for the control of PM-10 shall be implemented no later than 4 years after the date the area is classified (or reclassified) as a Serious Area.

(2) Schedule for plan submissions

A State shall submit the demonstration required for an area under paragraph (1)(A) no later than 4 years after reclassification of the area to Serious, except that for areas reclassified under [section 7513\(b\)\(2\)](#) of this title, the State shall submit the attainment demonstration within 18 months after reclassification to Serious. A State shall submit the provisions described under paragraph (1)(B) no later than 18 months after reclassification of the area as a Serious Area.

(3) Major sources

For any Serious Area, the terms “major source” and “major stationary source” include any stationary source or group of stationary sources located within a contiguous area and under common control that emits, or has the potential to emit, at least 70 tons per year of PM-10.

(c) Milestones

(1) Plan revisions demonstrating attainment submitted to the Administrator for approval under this subpart shall contain quantitative milestones which are to be achieved every 3 years until the area is redesignated attainment and which demonstrate reasonable further progress, as defined in [section 7501\(1\)](#) of this title, toward attainment by the applicable date.

(2) Not later than 90 days after the date on which a milestone applicable to the area occurs, each State in which all or part of such area is located shall submit to the Administrator a demonstration that all measures in the plan approved under this section have been implemented and that the milestone has been met. A demonstration under this subsection shall be submitted in such form and manner, and shall contain such information and analysis, as the Administrator shall require. The Administrator shall determine whether or not a State's demonstration under this subsection is adequate within 90 days after the Administrator's receipt of a demonstration which contains the information and analysis required by the Administrator.

(3) If a State fails to submit a demonstration under paragraph (2) with respect to a milestone within the required period or if the Administrator determines that the area has not met any applicable milestone, the Administrator shall require the State, within 9 months after such failure or determination to submit a plan revision that assures that the State will achieve the next milestone (or attain the national ambient air quality standard for PM-10, if there is no next milestone) by the applicable date.

(d) Failure to attain

In the case of a Serious PM-10 nonattainment area in which the PM-10 standard is not attained by the applicable attainment date, the State in which such area is located shall, after notice and opportunity for public comment, submit within 12 months after the applicable attainment date, plan revisions which provide for attainment of the PM-10 air quality standard and, from the date of such submission until attainment, for an annual reduction in PM-10 or PM-10 precursor emissions within the area of not less than 5 percent of the amount of such emissions as reported in the most recent inventory prepared for such area.

(e) PM-10 precursors

The control requirements applicable under plans in effect under this part for major stationary sources of PM-10 shall also apply to major stationary sources of PM-10 precursors, except where the Administrator determines that such sources do not contribute significantly to PM-10 levels which exceed the standard in the area. The Administrator shall issue guidelines regarding the application of the preceding sentence.

CREDIT(S)

(July 14, 1955, c. 360, Title I, § 189, as added Nov. 15, 1990, [Pub.L. 101-549, Title I, § 105\(a\)](#), 104 Stat. 2460.)

[FN1] So in original. Probably should be "subsection".

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Title 42. The Public Health and Welfare

▣ [Chapter 85. Air Pollution Prevention and Control \(Refs & Annos\)](#)

▣ [Subchapter III. General Provisions](#)

→→ **§ 7602. Definitions**

When used in this chapter--

(a) The term “Administrator” means the Administrator of the Environmental Protection Agency.

(b) The term “air pollution control agency” means any of the following:

(1) A single State agency designated by the Governor of that State as the official State air pollution control agency for purposes of this chapter.

(2) An agency established by two or more States and having substantial powers or duties pertaining to the prevention and control of air pollution.

(3) A city, county, or other local government health authority, or, in the case of any city, county, or other local government in which there is an agency other than the health authority charged with responsibility for enforcing ordinances or laws relating to the prevention and control of air pollution, such other agency.

(4) An agency of two or more municipalities located in the same State or in different States and having substantial powers or duties pertaining to the prevention and control of air pollution.

(5) An agency of an Indian tribe.

(c) The term “interstate air pollution control agency” means--

(1) an air pollution control agency established by two or more States, or

(2) an air pollution control agency of two or more municipalities located in different States.

**(d)** The term “State” means a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, and American Samoa and includes the Commonwealth of the Northern Mariana Islands.

**(e)** The term “person” includes an individual, corporation, partnership, association, State, municipality, political subdivision of a State, and any agency, department, or instrumentality of the United States and any officer, agent, or employee thereof.

**(f)** The term “municipality” means a city, town, borough, county, parish, district, or other public body created by or pursuant to State law.

**(g)** The term “air pollutant” means any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive (including source material, special nuclear material, and byproduct material) substance or matter which is emitted into or otherwise enters the ambient air. Such term includes any precursors to the formation of any air pollutant, to the extent the Administrator has identified such precursor or precursors for the particular purpose for which the term “air pollutant” is used.

**(h)** All language referring to effects on welfare includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants.

**(i)** The term “Federal land manager” means, with respect to any lands in the United States, the Secretary of the department with authority over such lands.

**(j)** Except as otherwise expressly provided, the terms “major stationary source” and “major emitting facility” mean any stationary facility or source of air pollutants which directly emits, or has the potential to emit, one hundred tons per year or more of any air pollutant (including any major emitting facility or source of fugitive emissions of any such pollutant, as determined by rule by the Administrator).

**(k)** The terms “emission limitation” and “emission standard” mean a requirement established by the State or the Administrator which limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction, and any design, equipment, work practice or operational standard promulgated under this chapter.. [\[FN1\]](#)

**(l)** The term “standard of performance” means a requirement of continuous emission reduction, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction.

**(m)** The term “means of emission limitation” means a system of continuous emission reduction (including the use of specific technology or fuels with specified pollution characteristics).

(n) The term “primary standard attainment date” means the date specified in the applicable implementation plan for the attainment of a national primary ambient air quality standard for any air pollutant.

(o) The term “delayed compliance order” means an order issued by the State or by the Administrator to an existing stationary source, postponing the date required under an applicable implementation plan for compliance by such source with any requirement of such plan.

(p) The term “schedule and timetable of compliance” means a schedule of required measures including an enforceable sequence of actions or operations leading to compliance with an emission limitation, other limitation, prohibition, or standard.

(q) For purposes of this chapter, the term “applicable implementation plan” means the portion (or portions) of the implementation plan, or most recent revision thereof, which has been approved under [section 7410](#) of this title, or promulgated under [section 7410\(c\)](#) of this title, or promulgated or approved pursuant to regulations promulgated under [section 7601\(d\)](#) of this title and which implements the relevant requirements of this chapter.

(r) **Indian tribe.**--The term “Indian tribe” means any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village, which is Federally recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

(s) **VOC.**--The term “VOC” means volatile organic compound, as defined by the Administrator.

(t) **PM-10.**--The term “PM-10” means particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers, as measured by such method as the Administrator may determine.

(u) **NAAQS and CTG.**--The term “NAAQS” means national ambient air quality standard. The term “CTG” means a Control Technique Guideline published by the Administrator under [section 7408](#) of this title.

(v) **NO<sub>x</sub>.**--The term “NO<sub>x</sub>” means oxides of nitrogen.

(w) **CO.**--The term “CO” means carbon monoxide.

(x) **Small source.**--The term “small source” means a source that emits less than 100 tons of regulated pollutants per year, or any class of persons that the Administrator determines, through regulation, generally lack technical ability or knowledge regarding control of air pollution.

(y) **Federal implementation plan.**--The term “Federal implementation plan” means a plan (or portion thereof) promulgated by the Administrator to fill all or a portion of a gap or otherwise correct all or a portion of an

inadequacy in a State implementation plan, and which includes enforceable emission limitations or other control measures, means or techniques (including economic incentives, such as marketable permits or auctions of emissions allowances), and provides for attainment of the relevant national ambient air quality standard.

**(z) Stationary source.**--The term "stationary source" means generally any source of an air pollutant except those emissions resulting directly from an internal combustion engine for transportation purposes or from a nonroad engine or nonroad vehicle as defined in [section 7550](#) of this title.

CREDIT(S)

(July 14, 1955, c. 360, Title III, § 302, formerly § 9, as added Dec. 17, 1963, Pub.L. 88-206, § 1, 77 Stat. 400, renumbered Oct. 20, 1965, Pub.L. 89-272, Title I, § 101(4), 79 Stat. 992; amended Nov. 21, 1967, Pub.L. 90-148, § 2, 81 Stat. 504; Dec. 31, 1970, Pub.L. 91-604, § 15(a)(1), (c)(1), 84 Stat. 1710, 1713; Aug. 7, 1977, [Pub.L. 95-95, Title II, § 218\(c\), Title III, § 301](#), 91 Stat. 761, 769; Nov. 16, 1977, [Pub.L. 95-190](#), § 14(a)(76), 91 Stat. 1404; Nov. 15, 1990, [Pub.L. 101-549, Title I, §§ 101\(d\)\(4\)](#), 107(a), (b), 108(j), 109(b), Title III, § 302(e), Title VII, § 709, 104 Stat. 2409, 2464, 2468, 2470, 2574, 2684.)

[\[FN1\]](#) So in original.

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**Effective:[See Text Amendments]**United States Code Annotated [Currentness](#)

Title 42. The Public Health and Welfare

- ▣ [Chapter 85](#). Air Pollution Prevention and Control ([Refs & Annos](#))

- ▣ [Subchapter III](#). General Provisions

- **§ 7604. Citizen suits**

(a) Authority to bring civil action; jurisdiction

Except as provided in subsection (b) of this section, any person may commence a civil action on his own behalf-

(1) against any person (including (i) the United States, and (ii) any other governmental instrumentality or agency to the extent permitted by the Eleventh Amendment to the Constitution) who is alleged to have violated (if there is evidence that the alleged violation has been repeated) or to be in violation of (A) an emission standard or limitation under this chapter or (B) an order issued by the Administrator or a State with respect to such a standard or limitation,

(2) against the Administrator where there is alleged a failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator, or

(3) against any person who proposes to construct or constructs any new or modified major emitting facility without a permit required under part C of subchapter I of this chapter (relating to significant deterioration of air quality) or part D of subchapter I of this chapter (relating to nonattainment) or who is alleged to have violated (if there is evidence that the alleged violation has been repeated) or to be in violation of any condition of such permit.

The district courts shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce such an emission standard or limitation, or such an order, or to order the Administrator to perform such act or duty, as the case may be, and to apply any appropriate civil penalties (except for actions under paragraph (2)). The district courts of the United States shall have jurisdiction to compel (consistent with paragraph (2) of this subsection) agency action unreasonably delayed, except that an action to compel agency action referred to in [section 7607\(b\)](#) of this title which is unreasonably delayed may only be filed in a United States District Court within the circuit in which such action would be reviewable under [section 7607\(b\)](#) of this title. In any such action for unreasonable delay, notice to the entities referred to in subsection (b)(1)(A) of this section shall be provided 180 days before commencing such action.

## (b) Notice

No action may be commenced--

**(1)** under subsection (a)(1) of this section--

**(A)** prior to 60 days after the plaintiff has given notice of the violation (i) to the Administrator, (ii) to the State in which the violation occurs, and (iii) to any alleged violator of the standard, limitation, or order, or

**(B)** if the Administrator or State has commenced and is diligently prosecuting a civil action in a court of the United States or a State to require compliance with the standard, limitation, or order, but in any such action in a court of the United States any person may intervene as a matter of right.

**(2)** under subsection (a)(2) of this section prior to 60 days after the plaintiff has given notice of such action to the Administrator,

except that such action may be brought immediately after such notification in the case of an action under this section respecting a violation of [section 7412\(i\)\(3\)\(A\)](#) or [\(f\)\(4\)](#) of this title or an order issued by the Administrator pursuant to [section 7413\(a\)](#) of this title. Notice under this subsection shall be given in such manner as the Administrator shall prescribe by regulation.

(c) Venue; intervention by Administrator; service of complaint; consent judgment

**(1)** Any action respecting a violation by a stationary source of an emission standard or limitation or an order respecting such standard or limitation may be brought only in the judicial district in which such source is located.

**(2)** In any action under this section, the Administrator, if not a party, may intervene as a matter of right at any time in the proceeding. A judgment in an action under this section to which the United States is not a party shall not, however, have any binding effect upon the United States.

**(3)** Whenever any action is brought under this section the plaintiff shall serve a copy of the complaint on the Attorney General of the United States and on the Administrator. No consent judgment shall be entered in an action brought under this section in which the United States is not a party prior to 45 days following the receipt of a copy of the proposed consent judgment by the Attorney General and the Administrator during which time the Government may submit its comments on the proposed consent judgment to the court and parties or may intervene as a matter of right.

(d) Award of costs; security

The court, in issuing any final order in any action brought pursuant to subsection (a) of this section, may award costs of litigation (including reasonable attorney and expert witness fees) to any party, whenever the court de-

termines such award is appropriate. The court may, if a temporary restraining order or preliminary injunction is sought, require the filing of a bond or equivalent security in accordance with the Federal Rules of Civil Procedure.

(e) Nonrestriction of other rights

Nothing in this section shall restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any emission standard or limitation or to seek any other relief (including relief against the Administrator or a State agency). Nothing in this section or in any other law of the United States shall be construed to prohibit, exclude, or restrict any State, local, or interstate authority from--

- (1) bringing any enforcement action or obtaining any judicial remedy or sanction in any State or local court, or
- (2) bringing any administrative enforcement action or obtaining any administrative remedy or sanction in any State or local administrative agency, department or instrumentality,

against the United States, any department, agency, or instrumentality thereof, or any officer, agent, or employee thereof under State or local law respecting control and abatement of air pollution. For provisions requiring compliance by the United States, departments, agencies, instrumentalities, officers, agents, and employees in the same manner as nongovernmental entities, see [section 7418](#) of this title.

(f) "Emission standard or limitation under this chapter" defined

For purposes of this section, the term "emission standard or limitation under this chapter" means--

- (1) a schedule or timetable of compliance, emission limitation, standard of performance or emission standard,
- (2) a control or prohibition respecting a motor vehicle fuel or fuel additive, or [\[FN1\]](#)
- (3) any condition or requirement of a permit under part C of subchapter I of this chapter (relating to significant deterioration of air quality) or part D of subchapter I of this chapter (relating to nonattainment), [\[FN2\]section 7419](#) of this title (relating to primary nonferrous smelter orders), any condition or requirement under an applicable implementation plan relating to transportation control measures, air quality maintenance plans, vehicle inspection and maintenance programs or vapor recovery requirements, [section 7545\(e\)](#) and [\(f\)](#) of this title (relating to fuels and fuel additives), [section 7491](#) of this title (relating to visibility protection), any condition or requirement under subchapter VI of this chapter (relating to ozone protection), or any requirement under [section 7411](#) or [7412](#) of this title (without regard to whether such requirement is expressed as an emission standard or otherwise); [\[FN3\]](#) or
- (4) any other standard, limitation, or schedule established under any permit issued pursuant to subchapter V of this chapter or under any applicable State implementation plan approved by the Administrator, any permit

term or condition, and any requirement to obtain a permit as a condition of operations. [FN4]

which is in effect under this chapter (including a requirement applicable by reason of [section 7418](#) of this title) or under an applicable implementation plan.

(g) Penalty fund

(1) Penalties received under subsection (a) of this section shall be deposited in a special fund in the United States Treasury for licensing and other services. Amounts in such fund are authorized to be appropriated and shall remain available until expended, for use by the Administrator to finance air compliance and enforcement activities. The Administrator shall annually report to the Congress about the sums deposited into the fund, the sources thereof, and the actual and proposed uses thereof.

(2) Notwithstanding paragraph (1) the court in any action under this subsection to apply civil penalties shall have discretion to order that such civil penalties, in lieu of being deposited in the fund referred to in paragraph (1), be used in beneficial mitigation projects which are consistent with this chapter and enhance the public health or the environment. The court shall obtain the view of the Administrator in exercising such discretion and selecting any such projects. The amount of any such payment in any such action shall not exceed \$100,000.

CREDIT(S)

(July 14, 1955, c. 360, Title III, § 304, as added Dec. 31, 1970, Pub.L. 91-604, § 12(a), 84 Stat. 1706; amended Aug. 7, 1977, [Pub.L. 95-95, Title III, § 303\(a\)-\(c\)](#), 91 Stat. 771, 772; Nov. 16, 1977, [Pub.L. 95-190, § 14\(a\)\(77\)](#), (78), 91 Stat. 1404; Nov. 15, 1990, [Pub.L. 101-549, Title III, § 302\(f\), Title VII, § 707\(a\)-\(g\)](#), 104 Stat. 2574, 2682, 2683.)

[FN1] So in original. The word “or” probably should not appear.

[FN2] So in original.

[FN3] So in original. The semicolon probably should be comma.

[FN4] So in original. The period probably should be a comma.

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## C

**Effective:[See Text Amendments]**United States Code Annotated [Currentness](#)

Title 42. The Public Health and Welfare

- ▣ [Chapter 85](#). Air Pollution Prevention and Control ([Refs & Annos](#))

- ▣ [Subchapter III](#). General Provisions

- → **§ 7607. Administrative proceedings and judicial review**

(a) Administrative subpoenas; confidentiality; witnesses

In connection with any determination under [section 7410\(f\)](#) of this title, or for purposes of obtaining information under [section 7521\(b\)\(4\)](#) or [7545\(c\)\(3\)](#) of this title, any investigation, monitoring, reporting requirement, entry, compliance inspection, or administrative enforcement proceeding under the [\[FN1\]](#) chapter (including but not limited to [section 7413](#), [section 7414](#), [section 7420](#), [section 7429](#), [section 7477](#), [section 7524](#), [section 7525](#), [section 7542](#), [section 7603](#), or [section 7606](#) of this title), [\[FN2\]](#) the Administrator may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and he may administer oaths. Except for emission data, upon a showing satisfactory to the Administrator by such owner or operator that such papers, books, documents, or information or particular part thereof, if made public, would divulge trade secrets or secret processes of such owner or operator, the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of [section 1905 of Title 18](#), except that such paper, book, document, or information may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out this chapter, to persons carrying out the National Academy of Sciences' study and investigation provided for in [section 7521\(c\)](#) of this title, or when relevant in any proceeding under this chapter. Witnesses summoned shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. In case of contumacy or refusal to obey a subpoena served upon any person under this subparagraph, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Administrator to appear and produce papers, books, and documents before the Administrator, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(b) Judicial review

(1) A petition for review of action of the Administrator in promulgating any national primary or secondary ambient air quality standard, any emission standard or requirement under [section 7412](#) of this title, any standard of performance or requirement under [section 7411](#) of this title, [\[FN2\]](#) any standard under [section 7521](#) of this title (other than a standard required to be prescribed under [section 7521\(b\)\(1\)](#) of this title), any determination under [section 7521\(b\)\(5\)](#) of this title, any control or prohibition under [section 7545](#) of this title, any standard under [section 7571](#) of this title, any rule issued under [section 7413](#), [7419](#), or under [section 7420](#) of this title, or any other nationally applicable regulations promulgated, or final action taken, by the Administrator under this

chapter may be filed only in the United States Court of Appeals for the District of Columbia. A petition for review of the Administrator's action in approving or promulgating any implementation plan under [section 7410](#) of this title or [section 7411\(d\)](#) of this title, any order under [section 7411\(j\)](#) of this title, under [section 7412](#) of this title,, [\[FN2\]](#) under [section 7419](#) of this title, or under [section 7420](#) of this title, or his action under [section 1857c-10\(c\)\(2\)\(A\)](#), (B), or (C) of this title (as in effect before August 7, 1977) or under regulations thereunder, or revising regulations for enhanced monitoring and compliance certification programs under [section 7414\(a\)\(3\)](#) of this title, or any other final action of the Administrator under this chapter (including any denial or disapproval by the Administrator under subchapter I of this chapter) which is locally or regionally applicable may be filed only in the United States Court of Appeals for the appropriate circuit. Notwithstanding the preceding sentence a petition for review of any action referred to in such sentence may be filed only in the United States Court of Appeals for the District of Columbia if such action is based on a determination of nationwide scope or effect and if in taking such action the Administrator finds and publishes that such action is based on such a determination. Any petition for review under this subsection shall be filed within sixty days from the date notice of such promulgation, approval, or action appears in the Federal Register, except that if such petition is based solely on grounds arising after such sixtieth day, then any petition for review under this subsection shall be filed within sixty days after such grounds arise. The filing of a petition for reconsideration by the Administrator of any otherwise final rule or action shall not affect the finality of such rule or action for purposes of judicial review nor extend the time within which a petition for judicial review of such rule or action under this section may be filed, and shall not postpone the effectiveness of such rule or action.

(2) Action of the Administrator with respect to which review could have been obtained under paragraph (1) shall not be subject to judicial review in civil or criminal proceedings for enforcement. Where a final decision by the Administrator defers performance of any nondiscretionary statutory action to a later time, any person may challenge the deferral pursuant to paragraph (1).

(c) Additional evidence

In any judicial proceeding in which review is sought of a determination under this chapter required to be made on the record after notice and opportunity for hearing, if any party applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Administrator, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Administrator, in such manner and upon such terms and conditions as to [\[FN3\]](#) the court may deem proper. The Administrator may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken and he shall file such modified or new findings, and his recommendation, if any, for the modification or setting aside of his original determination, with the return of such additional evidence.

(d) Rulemaking

(1) This subsection applies to--

(A) the promulgation or revision of any national ambient air quality standard under [section 7409](#) of this title,

(B) the promulgation or revision of an implementation plan by the Administrator under [section 7410\(c\)](#) of this title,

(C) the promulgation or revision of any standard of performance under [section 7411](#) of this title, or emission standard or limitation under [section 7412\(d\)](#) of this title, any standard under [section 7412\(f\)](#) of this title, or any regulation under [section 7412\(g\)\(1\)\(D\)](#) and (F) of this title, or any regulation under [section 7412\(m\)](#) or (n) of this title,

(D) the promulgation of any requirement for solid waste combustion under [section 7429](#) of this title,

(E) the promulgation or revision of any regulation pertaining to any fuel or fuel additive under [section 7545](#) of this title,

(F) the promulgation or revision of any aircraft emission standard under [section 7571](#) of this title,

(G) the promulgation or revision of any regulation under subchapter IV-A of this chapter (relating to control of acid deposition),

(H) promulgation or revision of regulations pertaining to primary nonferrous smelter orders under [section 7419](#) of this title (but not including the granting or denying of any such order),

(I) promulgation or revision of regulations under subchapter VI of this chapter (relating to stratosphere and ozone protection),

(J) promulgation or revision of regulations under part C of subchapter I of this chapter (relating to prevention of significant deterioration of air quality and protection of visibility),

(K) promulgation or revision of regulations under [section 7521](#) of this title and test procedures for new motor vehicles or engines under [section 7525](#) of this title, and the revision of a standard under [section 7521\(a\)\(3\)](#) of this title,

(L) promulgation or revision of regulations for noncompliance penalties under [section 7420](#) of this title,

(M) promulgation or revision of any regulations promulgated under [section 7541](#) of this title (relating to warranties and compliance by vehicles in actual use),

(N) action of the Administrator under [section 7426](#) of this title (relating to interstate pollution abatement),

- (O) the promulgation or revision of any regulation pertaining to consumer and commercial products under [section 7511b\(e\)](#) of this title,
- (P) the promulgation or revision of any regulation pertaining to field citations under [section 7413\(d\)\(3\)](#) of this title,
- (Q) the promulgation or revision of any regulation pertaining to urban buses or the clean-fuel vehicle, clean-fuel fleet, and clean fuel programs under part C of subchapter II of this chapter,
- (R) the promulgation or revision of any regulation pertaining to nonroad engines or nonroad vehicles under [section 7547](#) of this title,
- (S) the promulgation or revision of any regulation relating to motor vehicle compliance program fees under [section 7552](#) of this title,
- (T) the promulgation or revision of any regulation under subchapter IV-A of this chapter (relating to acid deposition),
- (U) the promulgation or revision of any regulation under [section 7511b\(f\)](#) of this title pertaining to marine vessels, and
- (V) such other actions as the Administrator may determine.

The provisions of [section 553](#) through [557](#) and [section 706 of Title 5](#) shall not, except as expressly provided in this subsection, apply to actions to which this subsection applies. This subsection shall not apply in the case of any rule or circumstance referred to in subparagraphs (A) or (B) of subsection 553(b) of Title 5.

(2) Not later than the date of proposal of any action to which this subsection applies, the Administrator shall establish a rulemaking docket for such action (hereinafter in this subsection referred to as a “rule”). Whenever a rule applies only within a particular State, a second (identical) docket shall be simultaneously established in the appropriate regional office of the Environmental Protection Agency.

(3) In the case of any rule to which this subsection applies, notice of proposed rulemaking shall be published in the Federal Register, as provided under [section 553\(b\) of Title 5](#), shall be accompanied by a statement of its basis and purpose and shall specify the period available for public comment (hereinafter referred to as the “comment period”). The notice of proposed rulemaking shall also state the docket number, the location or locations of the docket, and the times it will be open to public inspection. The statement of basis and purpose shall include a summary of--

- (A) the factual data on which the proposed rule is based;
- (B) the methodology used in obtaining the data and in analyzing the data; and
- (C) the major legal interpretations and policy considerations underlying the proposed rule.

The statement shall also set forth or summarize and provide a reference to any pertinent findings, recommendations, and comments by the Scientific Review Committee established under [section 7409\(d\)](#) of this title and the National Academy of Sciences, and, if the proposal differs in any important respect from any of these recommendations, an explanation of the reasons for such differences. All data, information, and documents referred to in this paragraph on which the proposed rule relies shall be included in the docket on the date of publication of the proposed rule.

(4)(A) The rulemaking docket required under paragraph (2) shall be open for inspection by the public at reasonable times specified in the notice of proposed rulemaking. Any person may copy documents contained in the docket. The Administrator shall provide copying facilities which may be used at the expense of the person seeking copies, but the Administrator may waive or reduce such expenses in such instances as the public interest requires. Any person may request copies by mail if the person pays the expenses, including personnel costs to do the copying.

(B)(i) Promptly upon receipt by the agency, all written comments and documentary information on the proposed rule received from any person for inclusion in the docket during the comment period shall be placed in the docket. The transcript of public hearings, if any, on the proposed rule shall also be included in the docket promptly upon receipt from the person who transcribed such hearings. All documents which become available after the proposed rule has been published and which the Administrator determines are of central relevance to the rulemaking shall be placed in the docket as soon as possible after their availability.

(ii) The drafts of proposed rules submitted by the Administrator to the Office of Management and Budget for any interagency review process prior to proposal of any such rule, all documents accompanying such drafts, and all written comments thereon by other agencies and all written responses to such written comments by the Administrator shall be placed in the docket no later than the date of proposal of the rule. The drafts of the final rule submitted for such review process prior to promulgation and all such written comments thereon, all documents accompanying such drafts, and written responses thereto shall be placed in the docket no later than the date of promulgation.

(5) In promulgating a rule to which this subsection applies (i) the Administrator shall allow any person to submit written comments, data, or documentary information; (ii) the Administrator shall give interested persons an opportunity for the oral presentation of data, views, or arguments, in addition to an opportunity to make written submissions; (iii) a transcript shall be kept of any oral presentation; and (iv) the Administrator shall keep the record of such proceeding open for thirty days after completion of the proceeding to provide an opportunity for submission of rebuttal and supplementary information.

**(6)(A)** The promulgated rule shall be accompanied by (i) a statement of basis and purpose like that referred to in paragraph (3) with respect to a proposed rule and (ii) an explanation of the reasons for any major changes in the promulgated rule from the proposed rule.

**(B)** The promulgated rule shall also be accompanied by a response to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the comment period.

**(C)** The promulgated rule may not be based (in part or whole) on any information or data which has not been placed in the docket as of the date of such promulgation.

**(7)(A)** The record for judicial review shall consist exclusively of the material referred to in paragraph (3), clause (i) of paragraph (4)(B), and subparagraphs (A) and (B) of paragraph (6).

**(B)** Only an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment (including any public hearing) may be raised during judicial review. If the person raising an objection can demonstrate to the Administrator that it was impracticable to raise such objection within such time or if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule, the Administrator shall convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed. If the Administrator refuses to convene such a proceeding, such person may seek review of such refusal in the United States court of appeals for the appropriate circuit (as provided in subsection (b) of this section). Such reconsideration shall not postpone the effectiveness of the rule. The effectiveness of the rule may be stayed during such reconsideration, however, by the Administrator or the court for a period not to exceed three months.

**(8)** The sole forum for challenging procedural determinations made by the Administrator under this subsection shall be in the United States court of appeals for the appropriate circuit (as provided in subsection (b) of this section) at the time of the substantive review of the rule. No interlocutory appeals shall be permitted with respect to such procedural determinations. In reviewing alleged procedural errors, the court may invalidate the rule only if the errors were so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made.

**(9)** In the case of review of any action of the Administrator to which this subsection applies, the court may reverse any such action found to be--

**(A)** arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

**(B)** contrary to constitutional right, power, privilege, or immunity;

**(C)** in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; or

(D) without observance of procedure required by law, if (i) such failure to observe such procedure is arbitrary or capricious, (ii) the requirement of paragraph (7)(B) has been met, and (iii) the condition of the last sentence of paragraph (8) is met.

(10) Each statutory deadline for promulgation of rules to which this subsection applies which requires promulgation less than six months after date of proposal may be extended to not more than six months after date of proposal by the Administrator upon a determination that such extension is necessary to afford the public, and the agency, adequate opportunity to carry out the purposes of this subsection.

(11) The requirements of this subsection shall take effect with respect to any rule the proposal of which occurs after ninety days after August 7, 1977.

(e) Other methods of judicial review not authorized

Nothing in this chapter shall be construed to authorize judicial review of regulations or orders of the Administrator under this chapter, except as provided in this section.

(f) Costs

In any judicial proceeding under this section, the court may award costs of litigation (including reasonable attorney and expert witness fees) whenever it determines that such award is appropriate.

(g) Stay, injunction, or similar relief in proceedings relating to noncompliance penalties

In any action respecting the promulgation of regulations under [section 7420](#) of this title or the administration or enforcement of [section 7420](#) of this title no court shall grant any stay, injunctive, or similar relief before final judgment by such court in such action.

(h) Public participation

It is the intent of Congress that, consistent with the policy of subchapter II of chapter 5 of Title 5, the Administrator in promulgating any regulation under this chapter, including a regulation subject to a deadline, shall ensure a reasonable period for public participation of at least 30 days, except as otherwise expressly provided in section [\[FN4\]](#) 7407(d), 7502(a), 7511(a) and (b), and 7512(a) and (b) of this title.

CREDIT(S)

(July 14, 1955, c. 360, Title III, § 307, as added Dec. 31, 1970, Pub.L. 91-604, § 12(a), 84 Stat. 1707; amended Nov. 18, 1971, Pub.L. 92-157, Title III, § 302(a), 85 Stat. 464; June 22, 1974, [Pub.L. 93-319, § 6\(c\), 88 Stat. 259](#); Aug. 7, 1977, [Pub.L. 95-95, Title III, §§ 303\(d\)](#), 305(a), (c), (f)-(h), 91 Stat. 772, 776, 777; Nov. 16, 1977, [Pub.L. 95-190, § 14\(a\)\(79\)](#), (80), 91 Stat. 1404; Nov. 15, 1990, [Pub.L. 101-549, Title I, §§ 108\(p\)](#), 110(5), Title III, § 302(g), (h), Title VII, §§ 702(c), 703, 706, 707(h), 710(b), 104 Stat. 2469, 2470, 2574, 2681-2684.)

[FN1] So in original. Probably should be “this”.

[FN2] So in original.

[FN3] So in original. The word “to” probably should not appear.

[FN4] So in original. Probably should be “sections”.

Current through P.L. 112-89 (excluding P.L. 112-55, 112-74, 112-78, and 112-81) approved 1-3-12

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**ENVIRONMENTAL PROTECTION AGENCY****40 CFR Part 51**

[EPA-HQ-OAR-2003-0062; FRL-8295-2]

RIN 2060-AK74

**Clean Air Fine Particle Implementation Rule****AGENCY:** Environmental Protection Agency (EPA).**ACTION:** Final rule.

**SUMMARY:** This final action provides rules and guidance on the Clean Air Act (CAA) requirements for State and Tribal plans to implement the 1997 fine particle (PM<sub>2.5</sub>) national ambient air quality standards (NAAQS). Fine particles and precursor pollutants are emitted by a wide range of sources, including power plants, cars, trucks, industrial sources, and other burning or combustion-related activities. Health effects that have been associated with exposure to PM<sub>2.5</sub> include premature death, aggravation of heart and lung disease, and asthma attacks. Those particularly sensitive to PM<sub>2.5</sub> exposure include older adults, people with heart and lung disease, and children.

Air quality designations became effective on April 5, 2005 for 39 areas (with a total population of 90 million) that were not attaining the 1997 PM<sub>2.5</sub> standards. By April 5, 2008, each State having a nonattainment area must submit to EPA an attainment demonstration and adopted regulations ensuring that the area will attain the standards as expeditiously as practicable, but no later than 2015. This rule and preamble describe the requirements that States and Tribes must meet in their implementation plans for attainment of the 1997 fine particle NAAQS. (Note that this rule does not include final PM<sub>2.5</sub> requirements for the new source review (NSR) program; the final NSR rule will be issued at a later date.)

**DATES:** This rule is effective on May 29, 2007.

**ADDRESSES:** The EPA has established a docket for this action under Docket ID EPA-HQ-OAR-2003-0062. All documents relevant to this action are listed in the Federal docket management system at [www.regulations.gov](http://www.regulations.gov). Although listed in the index, some information is not publicly available (e.g. Confidential Business Information or other information whose disclosure is restricted by statute). Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy

form. Publicly available docket materials are available either electronically through [www.regulations.gov](http://www.regulations.gov) or in hard copy format at the EPA Docket Center, EPA/DC, EPA West, Room 3334, 1301 Constitution Avenue, NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Office of Air and Radiation Docket and Information Center is (202) 566-1742. A variety of information and materials related to the fine particle NAAQS and implementation program are also available on EPA's Web site: <http://www.epa.gov/air/particles>.

**FOR FURTHER INFORMATION CONTACT:** For general information, contact Mr. Richard Damberg, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Mail Code C539-01, Research Triangle Park, NC 27711, phone number (919) 541-5592 or by e-mail at: [damberg.rich@epa.gov](mailto:damberg.rich@epa.gov).

**SUPPLEMENTARY INFORMATION:****General Information***A. Does this action apply to me?*

Entities potentially regulated by this action are State and local air quality agencies.

*B. Where can I get a copy of this document and other related information?*

In addition to being available in the docket, an electronic copy of this final rule will also be available on the World Wide Web. Following signature by the EPA Administrator, a copy of this final rule will be posted at <http://www.epa.gov/particles/actions.html>.

*C. How is the preamble organized?*

- I. Background
- II. Elements of the Clean Air Fine Particle Implementation Rule
  - A. Precursors and Pollutants Contributing to Fine Particle Formation
  - B. No Classification System
  - C. Due Dates and Basic Requirements for Attainment Demonstrations
  - D. Attainment Dates
  - E. Modeling and Attainment Demonstrations
  - F. Reasonably Available Control Technology and Reasonably Available Control Measures
  - G. Reasonable Further Progress
  - H. Contingency Measures
  - I. Transportation Conformity
  - J. General Conformity
  - K. Emission Inventory Requirements
  - L. Condensable Particulate Matter Test Methods and Related Data Issues
  - M. Improving Source Monitoring

- N. Guidance Specific to Tribes
- O. Enforcement and Compliance
- P. Emergency Episodes
- Q. Ambient Monitoring
- III. Statutory and Executive Order Reviews
  - A. Executive Order 12866: Regulatory Planning and Review
  - B. Paperwork Reduction Act
  - C. Regulatory Flexibility Act
  - D. Unfunded Mandates Reform Act
  - E. Executive Order 13132: Federalism
  - F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments
  - G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks
  - H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use
  - I. National Technology Transfer Advancement Act
  - J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations
  - K. Congressional Review Act
  - L. Petitions for Judicial Review
  - M. Judicial Review
- IV. Statutory Authority

**I. Background**

Fine particles in the atmosphere are comprised of a complex mixture of components. Common constituents include: sulfate (SO<sub>4</sub>); nitrate (NO<sub>3</sub>); ammonium; elemental carbon; a great variety of organic compounds; and inorganic material (including metals, dust, sea salt, and other trace elements) generally referred to as "crustal" material, although it may contain material from other sources. Airborne particles generally less than or equal to 2.5 micrometers in diameter are considered to be "fine particles" (also referred to as PM<sub>2.5</sub>). (A micrometer is one-millionth of a meter, and 2.5 micrometers is less than one-seventh the average width of a human hair.) "Primary" particles are emitted directly into the air as a solid or liquid particle (e.g., elemental carbon from diesel engines or fire activities, or condensable organic particles from gasoline engines). "Secondary" particles (e.g., sulfate and nitrate) form in the atmosphere as a result of various chemical reactions. (Section II of the proposed rule included detailed technical discussion on PM<sub>2.5</sub>, its precursors, formation processes, and emissions sources.)

The EPA established air quality standards for PM<sub>2.5</sub> based on evidence from numerous health studies demonstrating that serious health effects are associated with exposures to elevated levels of PM<sub>2.5</sub>. Epidemiological studies have shown statistically significant correlations between elevated PM<sub>2.5</sub> levels and premature mortality. Other important

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of Federal Regulations is amended as follows:

■ 1. The authority citation for part 51 continues to read as follows:

**Authority:** 23 U.S.C. 101; 42 U.S.C. 7401-7671q.

■ 2. A new Subpart Z is added to read as follows:

**Subpart Z—Provisions for Implementation of PM<sub>2.5</sub> National Ambient Air Quality Standards**

Sec.	
51.1000	Definitions.
51.1001	Applicability of part 51.
51.1002	Submittal of State implementation plan.
51.1003	[Reserved]
51.1004	Attainment dates.
51.1005	One-year extensions of the attainment date.
51.1006	Redesignation to nonattainment following initial designations for the PM <sub>2.5</sub> NAAQS.
51.1007	Attainment demonstration and modeling requirements.
51.1008	Emission inventory requirements for the PM <sub>2.5</sub> NAAQS.
51.1009	Reasonable further progress (RFP) requirements.
51.1010	Requirements for reasonably available control technology (RACT) and reasonably available control measures (RACM).
51.1011	Requirements for mid-course review.
51.1012	Requirements for contingency measures.

**§ 51.1000 Definitions.**

The following definitions apply for purposes of this subpart. Any term not defined herein shall have the meaning as defined in 40 CFR 51.100.

*Act* means the Clean Air Act as codified at 42 U.S.C. 7401-7671q. (2003).

*Attainment date* means the date by which an area, under an approved State implementation plan, is required to attain the PM<sub>2.5</sub> NAAQS (based on the average of three consecutive years of ambient air quality data).

*Baseline year inventory* for the RFP plan is the emissions inventory for the year also used as the base year for the attainment demonstration.

*Benchmark RFP plan* means the reasonable further progress plan that requires generally linear emission reductions in pollutants from the baseline emissions year through the milestone inventory year.

*Date of designation* means the effective date of the PM<sub>2.5</sub> area designation as promulgated by the Administrator.

*Direct PM<sub>2.5</sub> emissions* means solid particles emitted directly from an air emissions source or activity, or gaseous

emissions or liquid droplets from an air emissions source or activity which condense to form particulate matter at ambient temperatures. Direct PM<sub>2.5</sub> emissions include elemental carbon, directly emitted organic carbon, directly emitted sulfate, directly emitted nitrate, and other inorganic particles (including but not limited to crustal material, metals, and sea salt).

*Existing control measure* means any Federally enforceable national, State, or local control measure that has been approved in the SIP and that results in reductions in emissions of PM<sub>2.5</sub> or PM<sub>2.5</sub> precursors in a nonattainment area.

*Full implementation inventory* is the projected RFP emission inventory for the year preceding the attainment date, representing a level of emissions that demonstrates attainment.

*Milestone year inventory* is the projected RFP emission inventory for the applicable RFP milestone year (i.e. 2009 and, where applicable, 2012).

*PM<sub>2.5</sub> NAAQS* means the particulate matter national ambient air quality standards (annual and 24-hour) codified at 40 CFR 50.7.

*PM<sub>2.5</sub> design value* for a nonattainment area is the highest of the three-year average concentrations calculated for the monitors in the area, in accordance with 40 CFR part 50, appendix N.

*PM<sub>2.5</sub> attainment plan precursor* means SO<sub>2</sub> and those other PM<sub>2.5</sub> precursors emitted by sources in the State which the State must evaluate for emission reduction measures to be included in its PM<sub>2.5</sub> nonattainment area or maintenance area plan.

*PM<sub>2.5</sub> precursor* means those air pollutants other than PM<sub>2.5</sub> direct emissions that contribute to the formation of PM<sub>2.5</sub>. PM<sub>2.5</sub> precursors include SO<sub>2</sub>, NO<sub>x</sub>, volatile organic compounds, and ammonia.

*Reasonable further progress (RFP)* means the incremental emissions reductions toward attainment required under sections 172(c)(2) and 171(1).

*Subpart 1* means the general attainment plan requirements found in subpart 1 of part D of title I of the Act.

**§ 51.1001 Applicability of part 51.**

The provisions in subparts A through X of this part apply to areas for purposes of the PM<sub>2.5</sub> NAAQS to the extent they are not inconsistent with the provisions of this subpart.

**§ 51.1002 Submittal of State implementation plan.**

(a) For any area designated by EPA as nonattainment for the PM<sub>2.5</sub> NAAQS, the State must submit a State

implementation plan satisfying the requirements of section 172 of the Act and this subpart to EPA by the date prescribed by EPA which will be no later than 3 years from the date of designation.

(b) The State must submit a plan consistent with the requirements of section 110(a)(2) of the Act unless the State already has fulfilled this obligation for the purposes of implementing the PM<sub>2.5</sub> NAAQS.

(c) *Pollutants contributing to fine particle concentrations.* The State implementation plan must identify and evaluate sources of PM<sub>2.5</sub> direct emissions and PM<sub>2.5</sub> attainment plan precursors in accordance with §§ 51.1009 and 51.1010. After January 1, 2011, for purposes of establishing emissions limits under 51.1009 and 51.1010, States must establish such limits taking into consideration the condensable fraction of direct PM<sub>2.5</sub> emissions. Prior to this date, States are not prohibited from establishing source emission limits that include the condensable fraction of direct PM<sub>2.5</sub>.

(1) The State must address sulfur dioxide as a PM<sub>2.5</sub> attainment plan precursor and evaluate sources of SO<sub>2</sub> emissions in the State for control measures.

(2) The State must address NO<sub>x</sub> as a PM<sub>2.5</sub> attainment plan precursor and evaluate sources of NO<sub>x</sub> emissions in the State for control measures, unless the State and EPA provide an appropriate technical demonstration for a specific area showing that NO<sub>x</sub> emissions from sources in the State do not significantly contribute to PM<sub>2.5</sub> concentrations in the nonattainment area.

(3) The State is not required to address VOC as a PM<sub>2.5</sub> attainment plan precursor and evaluate sources of VOC emissions in the State for control measures, unless:

(i) the State provides an appropriate technical demonstration for a specific area showing that VOC emissions from sources in the State significantly contribute to PM<sub>2.5</sub> concentrations in the nonattainment area, and such demonstration is approved by EPA; or

(ii) The EPA provides such a technical demonstration.

(4) The State is not required to address ammonia as a PM<sub>2.5</sub> attainment plan precursor and evaluate sources of ammonia emissions from sources in the State for control measures, unless:

(i) The State provides an appropriate technical demonstration for a specific area showing that ammonia emissions from sources in the State significantly contribute to PM<sub>2.5</sub> concentrations in the

nonattainment area, and such demonstration is approved by EPA; or

(ii) The EPA provides such a technical demonstration.

(5) The State must submit a demonstration to reverse any presumption in this rule for a PM<sub>2.5</sub> precursor with respect to a particular nonattainment area, if the administrative record related to development of its SIP shows that the presumption is not technically justified for that area.

#### § 51.1003 [Reserved]

#### § 51.1004 Attainment dates.

(a) Consistent with section 172(a)(2)(A) of the Act, the attainment date for an area designated nonattainment for the PM<sub>2.5</sub> NAAQS will be the date by which attainment can be achieved as expeditiously as practicable, but no more than five years from the date of designation. The Administrator may extend the attainment date to the extent the Administrator determines appropriate, for a period no greater than 10 years from the date of designation, considering the severity of nonattainment and the availability and feasibility of pollution control measures.

(b) In the SIP submittal for each of its nonattainment areas, the State must submit an attainment demonstration justifying its proposed attainment date. For each nonattainment area, the Administrator will approve an attainment date at the same time the Administrator approves the attainment demonstration for the area, consistent with the attainment date timing provision of section 172(a)(2)(A) and paragraph (a) of this section.

(c) Upon a determination by EPA that an area designated nonattainment for the PM<sub>2.5</sub> NAAQS has attained the standard, the requirements for such area to submit attainment demonstrations and associated reasonably available control measures, reasonable further progress plans, contingency measures, and other planning SIPs related to attainment of the PM<sub>2.5</sub> NAAQS shall be suspended until such time as: the area is redesignated to attainment, at which time the requirements no longer apply; or EPA determines that the area has violated the PM<sub>2.5</sub> NAAQS, at which time the area is again required to submit such plans.

#### § 51.1005 One-year extensions of the attainment date.

(a) Pursuant to section 172(a)(2)(C)(ii) of the Act, a State with an area that fails to attain the PM<sub>2.5</sub> NAAQS by its attainment date may apply for an initial 1-year attainment date extension if the

State has complied with all requirements and commitments pertaining to the area in the applicable implementation plan, and:

(1) For an area that violates the annual PM<sub>2.5</sub> NAAQS as of its attainment date, the annual average concentration for the most recent year at each monitor is 15.0 µg/m<sup>3</sup> or less (calculated according to the data analysis requirements in 40 CFR part 50, appendix N).

(2) For an area that violates the 24-hour PM<sub>2.5</sub> NAAQS as of its attainment date, the 98th percentile concentration for the most recent year at each monitor is 65 µg/m<sup>3</sup> or less (calculated according to the data analysis requirements in 40 CFR part 50, appendix N).

(b) An area that fails to attain the PM<sub>2.5</sub> NAAQS after receiving a 1-year attainment date extension may apply for a second 1-year attainment date extension pursuant to section 172(a)(2)(C)(ii) if the State has complied with all requirements and commitments pertaining to the area in the applicable implementation plan, and:

(1) For an area that violates the annual PM<sub>2.5</sub> NAAQS as of its attainment date, the two-year average of annual average concentrations at each monitor, based on the first extension year and the previous year, is 15.0 µg/m<sup>3</sup> or less (calculated according to the data analysis requirements in 40 CFR part 50, appendix N).

(2) For an area that violates the 24-hour PM<sub>2.5</sub> NAAQS as of its attainment date, the two-year average of annual 98th percentile concentrations at each monitor, based on the first extension year and the previous year, is 65 µg/m<sup>3</sup> or less (calculated according to the data analysis requirements in 40 CFR part 50, appendix N).

#### § 51.1006 Redesignation to nonattainment following initial designations for the PM<sub>2.5</sub> NAAQS.

Any area that is initially designated "attainment/unclassifiable" for the PM<sub>2.5</sub> NAAQS may be subsequently redesignated to nonattainment if ambient air quality data in future years indicate that such a redesignation is appropriate. For any such area that is redesignated to nonattainment for the PM<sub>2.5</sub> NAAQS, any absolute, fixed date that is applicable in connection with the requirements of this part is extended by a period of time equal to the length of time between the effective date of the initial designation for the PM<sub>2.5</sub> NAAQS and the effective date of redesignation, except as otherwise provided in this subpart.

#### § 51.1007 Attainment demonstration and modeling requirements.

(a) For any area designated as nonattainment for the PM<sub>2.5</sub> NAAQS, the State must submit an attainment demonstration showing that the area will attain the annual and 24-hour standards as expeditiously as practicable. The demonstration must meet the requirements of § 51.112 and Appendix W of this part and must include inventory data, modeling results, and emission reduction analyses on which the State has based its projected attainment date. The attainment date justified by the demonstration must be consistent with the requirements of § 51.1004(a). The modeled strategies must be consistent with requirements in § 51.1009 for RFP and in § 51.1010 for RACT and RACM. The attainment demonstration and supporting air quality modeling should be consistent with EPA's PM<sub>2.5</sub> modeling guidance.

(b) *Required time frame for obtaining emissions reductions.* For each nonattainment area, the State implementation plan must provide for implementation of all control measures needed for attainment as expeditiously as practicable, but no later than the beginning of the year prior to the attainment date. Consistent with section 172(c)(1) of the Act, the plan must provide for implementation of all RACM and RACT as expeditiously as practicable. The plan also must include RFP milestones in accordance with § 51.1009, and control measures needed to meet these milestones, as necessary.

#### § 51.1008 Emission inventory requirements for the PM<sub>2.5</sub> NAAQS.

(a) For purposes of meeting the emission inventory requirements of section 172(c)(3) of the Act for nonattainment areas, the State shall, no later than three years after designation:

(1) Submit to EPA Statewide emission inventories for direct PM<sub>2.5</sub> emissions and emissions of PM<sub>2.5</sub> precursors. For purposes of defining the data elements for these inventories, the PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor-relevant data element requirements under subpart A of this part shall apply.

(2) Submit any additional emission inventory information needed to support an attainment demonstration and RFP plan ensuring expeditious attainment of the annual and 24-hour PM<sub>2.5</sub> standards.

(b) For inventories required for submission under paragraph (a) of this section, a baseline emission inventory is required for the attainment demonstration required under § 51.1007 and for meeting RFP requirements

under § 51.1009. As determined on the date of designation, the base year for this inventory shall be the most recent calendar year for which a complete inventory was required to be submitted to EPA pursuant to subpart A of this part. The baseline emission inventory for calendar year 2002 or other suitable year shall be used for attainment planning and RFP plans for areas initially designated nonattainment for the PM<sub>2.5</sub> NAAQS in 2004–2005.

**§ 51.1009 Reasonable further progress (RFP) requirements.**

(a) Consistent with section 172(c)(2) of the Act, State implementation plans for areas designated nonattainment for the PM<sub>2.5</sub> NAAQS must demonstrate reasonable further progress as provided in § 51.1009(b) through (h).

(b) If the State submits to EPA an attainment demonstration and State implementation plan for an area which demonstrates that it will attain the PM NAAQS within five years of the date of designation, the State is not required to submit a separate RFP plan. Compliance with the emission reduction measures in the attainment demonstration and State implementation plan will meet the requirements for achieving reasonable further progress for the area.

(c) For any area for which the State submits to EPA an approvable attainment demonstration and State implementation plan that demonstrates the area needs an attainment date of more than five years from the date of designation, the State also must submit an RFP plan. The RFP plan must describe the control measures that provide for meeting the reasonable further progress milestones for the area, the timing of implementation of those measures, and the expected reductions in emissions of direct PM<sub>2.5</sub> and PM<sub>2.5</sub> attainment plan precursors. The RFP plan is due to EPA within three years of the date of designation.

(1) For any State that submits to EPA an approvable attainment demonstration and State implementation plan justifying an attainment date of more than five and less than nine years from the date of designation, the RFP plan must include 2009 emissions milestones for direct PM<sub>2.5</sub> and PM<sub>2.5</sub> attainment plan precursors demonstrating that reasonable further progress will be achieved for the 2009 emissions year.

(2) For any area that submits to EPA an approvable attainment demonstration and State implementation plan justifying an attainment date of nine or ten years from the date of designation, the RFP plan must include 2009 and 2012 emissions milestones for direct PM<sub>2.5</sub> and PM<sub>2.5</sub> attainment plan

precursors demonstrating that reasonable further progress will be achieved for the 2009 and 2012 emissions years.

(d) The RFP plan must demonstrate that in each applicable milestone year, emissions will be at a level consistent with generally linear progress in reducing emissions between the base year and the attainment year.

(e) For a multi-State nonattainment area, the RFP plans for each State represented in the nonattainment area must demonstrate RFP on the basis of common multi-State inventories. The States within which the area is located must provide a coordinated RFP plan. Each State in a multi-State nonattainment area must ensure that the sources within its boundaries comply with enforceable emission levels and other requirements that in combination with the reductions planned in other state(s) will provide for attainment as expeditiously as practicable and demonstrate reasonable further progress.

(f) In the benchmark RFP plan, the State must identify direct PM<sub>2.5</sub> emissions and PM<sub>2.5</sub> attainment plan precursors regulated under the PM<sub>2.5</sub> attainment plan and specify target emission reduction levels to be achieved during the milestone years. In developing the benchmark RFP plan, the State must develop emission inventory information for the geographic area included in the plan and conduct the following calculations:

(1) For direct PM<sub>2.5</sub> emissions and each PM<sub>2.5</sub> attainment plan precursor addressed in the attainment strategy, the full implementation reduction is calculated by subtracting the full implementation inventory from the baseline year inventory.

(2) The “milestone date fraction” is the ratio of the number of years from the baseline year to the milestone inventory year divided by the number of years from the baseline year to the full implementation year.

(3) For direct PM<sub>2.5</sub> emissions and each PM<sub>2.5</sub> attainment plan precursor addressed in the attainment strategy, a benchmark emission reduction is calculated by multiplying the full implementation reduction by the milestone date fraction.

(4) The benchmark emission level in the milestone year is calculated for direct PM<sub>2.5</sub> emissions and each PM<sub>2.5</sub> attainment plan precursor by subtracting the benchmark emission reduction from the baseline year emission level. The benchmark RFP plan is defined as a plan that achieves benchmark emission levels for direct PM<sub>2.5</sub> emissions and each PM<sub>2.5</sub>

attainment plan precursor addressed in the attainment strategy for the area.

(5) In comparing inventories between baseline and future years for direct PM<sub>2.5</sub> emissions and each PM<sub>2.5</sub> attainment plan precursor, the inventories must be derived from the same geographic area. The plan must include emissions estimates for all types of emitting sources and activities in the geographic area from which the emission inventories for direct PM<sub>2.5</sub> emissions and each PM<sub>2.5</sub> attainment plan precursor addressed in the plan are derived.

(6) For purposes of establishing motor vehicle emissions budgets for transportation conformity purposes (as required in 40 CFR part 93) for a PM<sub>2.5</sub> nonattainment area, the State shall include in its RFP submittal an inventory of on-road mobile source emissions in the nonattainment area.

(g) The RFP plan due three years after designation must demonstrate that emissions for the milestone year are either:

(1) At levels that are roughly equivalent to the benchmark emission levels for direct PM<sub>2.5</sub> emissions and each PM<sub>2.5</sub> attainment plan precursor to be addressed in the plan; or

(2) At levels included in an alternative scenario that is projected to result in a generally equivalent improvement in air quality by the milestone year as would be achieved under the benchmark RFP plan.

(h) The equivalence of an alternative scenario to the corresponding benchmark plan must be determined by comparing the expected air quality changes of the two scenarios at the design value monitor location. This comparison must use the information developed for the attainment plan to assess the relationship between emissions reductions of the direct PM<sub>2.5</sub> emissions and each PM<sub>2.5</sub> attainment plan precursor addressed in the attainment strategy and the ambient air quality improvement for the associated ambient species.

**§ 51.1010 Requirements for reasonably available control technology (RACT) and reasonably available control measures (RACM).**

(a) For each PM<sub>2.5</sub> nonattainment area, the State shall submit with the attainment demonstration a SIP revision demonstrating that it has adopted all reasonably available control measures (including RACT for stationary sources) necessary to demonstrate attainment as expeditiously as practicable and to meet any RFP requirements. The SIP revision shall contain the list of the potential measures considered by the State, and

information and analysis sufficient to support the State's judgment that it has adopted all RACM, including RACT.

(b) In determining whether a particular emission reduction measure or set of measures must be adopted as RACM under section 172(c)(1) of the Act, the State must consider the cumulative impact of implementing the available measures. Potential measures that are reasonably available considering technical and economic feasibility must be adopted as RACM if, considered collectively, they would advance the attainment date by one year or more.

**§ 51.1011 Requirements for mid-course review.**

(a) Any State that submits to EPA an approvable attainment plan for a PM<sub>2.5</sub>

nonattainment area justifying an attainment date of nine or ten years from the date of designation also must submit to EPA a mid-course review six years from the date of designation.

(b) The mid-course review for an area must include:

(1) A review of emissions reductions and progress made in implementing control measures to reduce emissions of direct PM<sub>2.5</sub> and PM<sub>2.5</sub> attainment plan precursors contributing to PM<sub>2.5</sub> concentrations in the area;

(2) An analysis of changes in ambient air quality data for the area;

(3) Revised air quality modeling analysis to demonstrate attainment;

(4) Any new or revised control measures adopted by the State, as necessary to ensure attainment by the

attainment date in the approved SIP of the nonattainment area.

**§ 51.1012 Requirement for contingency measures.**

Consistent with section 172(c)(9) of the Act, the State must submit in each attainment plan specific contingency measures to be undertaken if the area fails to make reasonable further progress, or fails to attain the PM<sub>2.5</sub> NAAQS by its attainment date. The contingency measures must take effect without significant further action by the State or EPA.

[FR Doc. E7-6347 Filed 4-24-07; 8:45 am]

BILLING CODE 6560-50-P

No comments objecting to the proposal were received. Class E airspace areas extending from 700 feet or more above the surface of the earth are published in paragraphs 6005 of FAA Order 7400.96, signed August 14, 2007, and effective September 15, 2007, which is incorporated by reference in 14 CFR 71.1. The class airspace designation listed in this document will be published subsequently in the Order.

**The Rule**

The FAA is amending Title 14, Code of Federal Regulations (14 CFR) part 71 to modify Class E airspace at Waynesburg, PA, by providing additional controlled airspace for aircraft executing the RNAV (GPS) Runway 09/27 to the Green County Airport. This action also corrects the geographic position coordinates of the airport.

The FAA has determined that this regulation only involves an established body of technical regulations for which frequent and routine amendments are necessary to keep them operationally current. It, therefore, (1) is not a "significant regulatory action" under Executive Order 12866; (2) is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979); and (3) does not warrant preparation of a Regulatory Evaluation as the anticipated impact is so minimal. Since this is a routine matter that will only affect air traffic procedures and air navigation, it is certified that this rule, when promulgated, will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

The FAA's authority to issue rules regarding aviation safety is found in the Title 49 of the United States Code. Subtitle I, Section 106 describes the authority of the FAA administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the agency's authority.

This rulemaking is promulgated under the authority described in Subtitle VII, Part A, Subpart I, Section 40103. Under that section, the FAA is charged with prescribing regulations to assign the use of airspace necessary to ensure the safety of aircraft and the efficient use of airspace. This regulation is within the scope of that authority as it modifies Class E Airspace at Waynesburg, PA.

**List of Subjects in 14 CFR Part 71**

Airspace, Incorporation by reference, Navigation (air).

**Adoption of the Amendment**

In consideration of the foregoing, the Federal Aviation Administration amends 14 CFR part 71 as follows:

**PART 71—DESIGNATION OF CLASS A, CLASS B, CLASS C, CLASS D, AND CLASS E AIRSPACE AREAS; AIRWAYS; ROUTES; AND REPORTING POINTS**

1. The authority citation for part 71 continues to read as follows:

**Authority:** 49 U.S.C. 106(g); 40103, 40113, 40120; E.O. 10854, 24 FR 9565, 3 CFR, 1959–1963 Comp., p. 389.

**§ 71.1 [Amended]**

2. The incorporation by reference in 14 CFR 71.1 of Federal Aviation Administration Order 7400.9R, Airspace Designations and Reporting Points, signed August 15, 2007, and effective September 15, 2007, is amended as follows:

*Paragraph 6005 Class E Airspace Areas Extending Upward from 700 feet or More Above the Surface of the Earth.*

\* \* \* \* \*

**AEA PA E5 Waynesburg, PA [Revised]**  
 Green County Airport, PA  
 (Lat. 39°54'04" N., long. 80°07'51" W.)

That airspace extending upward from 700 feet above the surface of the Earth within an 8.3-mile radius of Green County Airport.

\* \* \* \* \*

Issued in College Park, Georgia, on April 21, 2008.

**Lynda G. Otting,**  
*Acting Manager, System Support Group,  
 Eastern Service Center, Air Traffic  
 Organization.*  
 [FR Doc. E8-10425 Filed 5-15-08; 8:45 am]  
**BILLING CODE 4910-13-M**

**DEPARTMENT OF HOMELAND SECURITY**

**Coast Guard**

**33 CFR Part 165**

[Docket No. USCG-2008-0366]

**Security Zone; Portland Rose Festival on Willamette River**

**AGENCY:** Coast Guard, DHS.  
**ACTION:** Notice of enforcement of regulation.

**SUMMARY:** The Coast Guard will enforce the Portland Rose Festival Security Zone on the Willamette River from 1 a.m. on June 4, 2008 until 10 a.m. June 10, 2008. This action is necessary for the security of public vessels on a portion

of the Willamette River during the fleet week of the Rose Festival. This security zone provides for the regulation of vessel traffic in the vicinity of the moored public vessels. During the enforcement period, entry into this zone is prohibited unless authorized by the Captain of the Port or his designee.

**DATES:** The regulations in 33 CFR 165.1312 will be enforced commencing from 1 a.m. on June 4, 2008 until 10 a.m. June 10, 2008.

**FOR FURTHER INFORMATION CONTACT:** MST1 Lucia Mack, Coast Guard Sector Portland, 6767 N. Basin Ave, Portland, OR 97217, telephone 503-240-9311.

**SUPPLEMENTARY INFORMATION:** The Coast Guard will enforce the Rose Festival Security Zone established by 33 CFR 165.1312 from 1 a.m. on June 4, 2008 until 10 a.m. June 10, 2008.

Under the provisions of 33 CFR 165.33 a vessel may not enter the regulated area, unless it receives permission from the Captain of the Port or his designee. The Coast Guard may be assisted by other Federal, State, or local law enforcement agencies in enforcing this regulation.

This notice is issued under authority of 33 CFR 165.1312 and 5 U.S.C. 552(a). In addition to this notice in the **Federal Register**, the Coast Guard will provide the maritime community with extensive advance notification of this enforcement period via the Local Notice to Mariners and marine information broadcasts.

Dated: May 6, 2008.

**F.G. Myer,**  
*Captain, U.S. Coast Guard, Captain of the Port, Portland.*

[FR Doc. E8-10921 Filed 5-15-08; 8:45 am]  
**BILLING CODE 4910-15-P**

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Parts 51 and 52**

[EPA-HQ-OAR-2003-0062; FRL-8566-1]  
**RIN 2060-AN86**

**Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers (PM<sub>2.5</sub>)**

**AGENCY:** Environmental Protection Agency (EPA).  
**ACTION:** Final rule.

**SUMMARY:** The EPA is finalizing regulations to implement the New Source Review (NSR) program for fine particulate matter (that is, particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers,

NSR portions of this action should also be subject to the provisions of section 307(d) to ensure consistency. All of the procedural requirements of section 307(d), e.g., docketing, hearing, and comment periods, have been complied with during the course of this rulemaking.

**VII. Statutory Authority**

The statutory authority for this action is provided by sections 101, 110, 165, 169, 172, 173, 301, and 302 of the Act as amended (42 U.S.C. 7401, 7410, 7475, 7479, 7502, 7503, 7601, and 7602). This rulemaking is also subject to section 307(d) of the Act (42 U.S.C. 7407(d)).

**List of Subjects**

*40 CFR Part 51*

Environmental protection, Administrative practices and procedures, Air pollution control, Intergovernmental relations.

*40 CFR Part 52*

Environmental protection, Administrative practices and procedures, Air pollution control, Intergovernmental relations.

Dated: May 8, 2008.

Stephen L. Johnson,  
 Administrator.

■ For the reasons stated in the preamble, title 40, chapter I of the Code of Federal Regulations is amended as follows.

**PART 51—[AMENDED]**

■ 1. The authority citation for part 51 continues to read as follows:

Authority: 23 U.S.C. 101; 42 U.S.C. 7401–7671q.

**Subpart I—[Amended]**

■ 2. Section 51.165 is amended as follows:

- a. By revising paragraph (a)(1)(x)(A);
- b. By removing the word “or” at the end of paragraph (a)(1)(xxxvii)(B);
- c. By revising paragraph (a)(1)(xxxvii)(C);
- d. By adding paragraph (a)(1)(xxxvii)(D);
- e. By redesignating paragraphs (a)(9)(i) through (iii) as paragraphs (a)(9)(ii) through (iv), respectively, and adding a new paragraph (a)(9)(i);
- f. By removing from newly redesignated paragraph (a)(9)(iii) the reference to “paragraph (a)(9)(i)” and adding in its place “paragraph (a)(9)(ii)”; and
- g. By adding paragraph (a)(11).

**§ 51.165 Permit requirements.**

(a) \* \* \*

(1) \* \* \*  
 (x)(A) *Significant* means, in reference to a net emissions increase or the potential of a source to emit any of the following pollutants, a rate of emissions that would equal or exceed any of the following rates:

**Pollutant Emission Rate**

- Carbon monoxide: 100 tons per year (tpy).
- Nitrogen oxides: 40 tpy
- Sulfur dioxide: 40 tpy
- Ozone: 40 tpy of volatile organic compounds or nitrogen oxides
- Lead: 0.6 tpy
- PM<sub>10</sub>: 15 tpy
- PM<sub>2.5</sub>: 10 tpy of direct PM<sub>2.5</sub> emissions; 40 tpy of sulfur dioxide emissions; 40 tpy of nitrogen oxide emissions unless demonstrated not to be a PM<sub>2.5</sub> precursor under paragraph (a)(1)(xxxvii) of this section

(xxxvii) \* \* \*  
 (C) Any pollutant that is identified under this paragraph (a)(1)(xxxvii)(C) as a constituent or precursor of a general pollutant listed under paragraph (a)(1)(xxxvii)(A) or (B) of this section, provided that such constituent or precursor pollutant may only be regulated under NSR as part of regulation of the general pollutant. Precursors identified by the Administrator for purposes of NSR are the following:

- (1) Volatile organic compounds and nitrogen oxides are precursors to ozone in all ozone nonattainment areas.
- (2) Sulfur dioxide is a precursor to PM<sub>2.5</sub> in all PM<sub>2.5</sub> nonattainment areas.
- (3) Nitrogen oxides are presumed to be precursors to PM<sub>2.5</sub> in all PM<sub>2.5</sub> nonattainment areas, unless the State demonstrates to the Administrator’s satisfaction or EPA demonstrates that emissions of nitrogen oxides from sources in a specific area are not a significant contributor to that area’s ambient PM<sub>2.5</sub> concentrations.
- (4) Volatile organic compounds and ammonia are presumed not to be precursors to PM<sub>2.5</sub> in any PM<sub>2.5</sub> nonattainment area, unless the State demonstrates to the Administrator’s satisfaction or EPA demonstrates that emissions of volatile organic compounds or ammonia from sources in a specific area are a significant contributor to that area’s ambient PM<sub>2.5</sub> concentrations; or

(D) PM<sub>2.5</sub> emissions and PM<sub>10</sub> emissions shall include gaseous emissions from a source or activity which condense to form particulate matter at ambient temperatures. On or after January 1, 2011 (or any earlier date established in the upcoming rulemaking

codifying test methods), such condensable particulate matter shall be accounted for in applicability determinations and in establishing emissions limitations for PM<sub>2.5</sub> and PM<sub>10</sub> in nonattainment major NSR permits. Compliance with emissions limitations for PM<sub>2.5</sub> and PM<sub>10</sub> issued prior to this date shall not be based on condensable particulate matter unless required by the terms and conditions of the permit or the applicable implementation plan. Applicability determinations made prior to this date without accounting for condensable particulate matter shall not be considered in violation of this section unless the applicable implementation plan required condensable particulate matter to be included.

\* \* \* \* \*

(9)(i) The plan shall require that in meeting the emissions offset requirements of paragraph (a)(3) of this section, the ratio of total actual emissions reductions to the emissions increase shall be at least 1:1 unless an alternative ratio is provided for the applicable nonattainment area in paragraphs (a)(9)(ii) through (a)(9)(iv) of this section.

\* \* \* \* \*

(11) The plan shall require that in meeting the emissions offset requirements of paragraph (a)(3) of this section, the emissions offsets obtained shall be for the same regulated NSR pollutant unless interprecursor offsetting is permitted for a particular pollutant as specified in this paragraph. The plan may allow the offset requirements in paragraph (a)(3) of this section for direct PM<sub>2.5</sub> emissions or emissions of precursors of PM<sub>2.5</sub> to be satisfied by offsetting reductions in direct PM<sub>2.5</sub> emissions or emissions of any PM<sub>2.5</sub> precursor identified under paragraph (a)(1)(xxxvii)(C) of this section if such offsets comply with the interprecursor trading hierarchy and ratio established in the approved plan for a particular nonattainment area.

\* \* \* \* \*

■ 3. Section 51.166 is amended as follows:

- a. By revising paragraphs (b)(23)(i) and (b)(49)(i);
- b. By removing the word “or” at the end of paragraph (b)(49)(iii);
- c. By adding and reserving paragraph (b)(49)(v);
- d. By adding paragraph (b)(49)(vi); and
- e. By revising paragraphs (i)(5)(ii) and (i)(5)(iii).

**§ 51.166 Prevention of significant deterioration of air quality.**

\* \* \* \* \*

(b) \* \* \*

(23)(i) *Significant* means, in reference to a net emissions increase or the potential of a source to emit any of the following pollutants, a rate of emissions that would equal or exceed any of the following rates:

**Pollutant and Emissions Rate**

- Carbon monoxide: 100 tons per year (tpy)
- Nitrogen oxides: 40 tpy
- Sulfur dioxide: 40 tpy
- Particulate matter: 25 tpy of particulate matter emissions. 15 tpy of PM<sub>10</sub> emissions
- PM<sub>2.5</sub>: 10 tpy of direct PM<sub>2.5</sub> emissions; 40 tpy of sulfur dioxide emissions; 40 tpy of nitrogen oxide emissions unless demonstrated not to be a PM<sub>2.5</sub> precursor under paragraph (b)(49) of this section
- Ozone: 40 tpy of volatile organic compounds or nitrogen oxides
- Lead: 0.6 tpy
- Fluorides: 3 tpy
- Sulfuric acid mist: 7 tpy
- Hydrogen sulfide (H<sub>2</sub>S): 10 tpy
- Total reduced sulfur (including H<sub>2</sub>S): 10 tpy
- Reduced sulfur compounds (including H<sub>2</sub>S): 10 tpy
- Municipal waste combustor organics (measured as total tetra-through octa-chlorinated dibenzo-p-dioxins and dibenzofurans): 3.2 × 10<sup>-6</sup> megagrams per year (3.5 × 10<sup>-6</sup> tons per year)
- Municipal waste combustor metals (measured as particulate matter): 14 megagrams per year (15 tons per year)
- Municipal waste combustor acid gases (measured as sulfur dioxide and hydrogen chloride): 36 megagrams per year (40 tons per year)
- Municipal solid waste landfill emissions (measured as nonmethane organic compounds): 45 megagrams per year (50 tons per year)

\* \* \* \* \*

(49) \* \* \*

(i) Any pollutant for which a national ambient air quality standard has been promulgated and any pollutant identified under this paragraph (b)(49)(i) as a constituent or precursor to such pollutant. Precursors identified by the Administrator for purposes of NSR are the following:

(a) Volatile organic compounds and nitrogen oxides are precursors to ozone in all attainment and unclassifiable areas.

(b) Sulfur dioxide is a precursor to PM<sub>2.5</sub> in all attainment and unclassifiable areas.

(c) Nitrogen oxides are presumed to be precursors to PM<sub>2.5</sub> in all attainment and unclassifiable areas, unless the State demonstrates to the Administrator's satisfaction or EPA demonstrates that emissions of nitrogen oxides from sources in a specific area are not a significant contributor to that area's ambient PM<sub>2.5</sub> concentrations.

(d) Volatile organic compounds are presumed not to be precursors to PM<sub>2.5</sub> in any attainment or unclassifiable area, unless the State demonstrates to the Administrator's satisfaction or EPA demonstrates that emissions of volatile organic compounds from sources in a specific area are a significant contributor to that area's ambient PM<sub>2.5</sub> concentrations.

\* \* \* \* \*

(v) [Reserved.]

(vi) Particulate matter (PM) emissions, PM<sub>2.5</sub> emissions, and PM<sub>10</sub> emissions shall include gaseous emissions from a source or activity which condense to form particulate matter at ambient temperatures. On or after January 1, 2011 (or any earlier date established in the upcoming rulemaking codifying test methods), such condensable particulate matter shall be accounted for in applicability determinations and in establishing emissions limitations for PM, PM<sub>2.5</sub> and PM<sub>10</sub> in PSD permits. Compliance with emissions limitations for PM, PM<sub>2.5</sub> and PM<sub>10</sub> issued prior to this date shall not be based on condensable particulate matter unless required by the terms and conditions of the permit or the applicable implementation plan. Applicability determinations made prior to this date without accounting for condensable particulate matter shall not be considered in violation of this section unless the applicable implementation plan required condensable particulate matter to be included.

\* \* \* \* \*

(i) \* \* \*

(5) \* \* \*

(ii) The concentrations of the pollutant in the area that the source or modification would affect are less than the concentrations listed in paragraph (i)(5)(i) of this section; or

(iii) The pollutant is not listed in paragraph (i)(5)(i) of this section.

\* \* \* \* \*

■ 4. Appendix S to Part 51 is amended as follows:

■ a. By revising paragraphs II.A.10(i) and II.A.31;

■ b. By revising paragraph IV.A, Condition 3;

■ c. By redesignating paragraphs IV.G.1 through IV.G.3 as paragraphs IV.G.2

through IV.G.4, respectively, and adding new paragraph IV.G.1;

■ d. By removing from newly redesignated paragraph IV.G.3 the reference to "paragraph IV.G.1" and adding in its place "paragraph IV.G.2"; and

■ e. By adding paragraph IV.G.5.

**Appendix S to Part 51—Emission Offset Interpretative Ruling**

\* \* \* \* \*

II. \* \* \*

A. \* \* \*

10. (i) *Significant* means, in reference to a net emissions increase or the potential of a source to emit any of the following pollutants, a rate of emissions that would equal or exceed any of the following rates:

**Pollutant and Emissions Rate**

- Carbon monoxide: 100 tons per year (tpy)
- Nitrogen oxides: 40 tpy
- Sulfur dioxide: 40 tpy
- Ozone: 40 tpy of volatile organic compounds or nitrogen oxides
- Lead: 0.6 tpy
- Particulate matter: 25 tpy of particulate matter emissions
- PM<sub>10</sub>: 15 tpy
- PM<sub>2.5</sub>: 10 tpy of direct PM<sub>2.5</sub> emissions; 40 tpy of sulfur dioxide emissions

\* \* \* \* \*

31. *Regulated NSR pollutant*, for purposes of this Ruling, means the following:

(i) Nitrogen oxides or any volatile organic compounds;

(ii) Any pollutant for which a national ambient air quality standard has been promulgated;

(iii) Any pollutant that is identified under this paragraph II.A.31(iii) as a constituent or precursor of a general pollutant listed under paragraph II.A.31(i) or (ii) of this Ruling, provided that such constituent or precursor pollutant may only be regulated under NSR as part of regulation of the general pollutant. Precursors identified by the Administrator for purposes of NSR are the following:

(a) Volatile organic compounds and nitrogen oxides are precursors to ozone in all ozone nonattainment areas.

(b) Sulfur dioxide is a precursor to PM<sub>2.5</sub> in all PM<sub>2.5</sub> nonattainment areas; or

(iv) Particulate matter (PM) emissions, PM<sub>2.5</sub> emissions and PM<sub>10</sub> emissions shall include gaseous emissions from a source or activity which condense to form particulate matter at ambient temperatures. On or after January 1, 2011 (or any earlier date established in the upcoming rulemaking codifying test methods), such condensable particulate matter shall be accounted for in applicability determinations and in establishing emissions limitations for PM, PM<sub>2.5</sub> and PM<sub>10</sub> in permits issued under this ruling. Compliance with emissions limitations for PM, PM<sub>2.5</sub> and PM<sub>10</sub> issued prior to this date shall not be based on condensable particulate matter unless required by the terms and conditions of the permit or the applicable implementation plan. Applicability determinations made prior to this date without accounting for condensable particulate matter shall not be

considered in violation of this section unless the applicable implementation plan required condensable particulate matter to be included.

\* \* \* \* \*

IV. \* \* \*  
 A. \* \* \*

**Condition 3.** Emission reductions (*offsets*) from existing sources<sup>5</sup> in the area of the proposed source (whether or not under the same ownership) are required such that there will be reasonable progress toward attainment of the applicable NAAQS.<sup>6</sup> Except as provided in paragraph IV.G.5 of this Ruling (addressing PM<sub>2.5</sub> and its precursors), only intrapollutant emission offsets will be acceptable (e.g., hydrocarbon increases may not be offset against SO<sub>2</sub> reductions).

<sup>5</sup> Subject to the provisions of paragraph IV.C of this Ruling.

<sup>6</sup> The discussion in this paragraph is a proposal, but represents EPA's interim policy until final rulemaking is completed.

\* \* \* \* \*

G. *Offset ratios.*

1. In meeting the emissions offset requirements of paragraph IV.A, Condition 3 of this Ruling, the ratio of total actual emissions reductions to the emissions increase shall be at least 1:1 unless an alternative ratio is provided for the applicable nonattainment area in paragraphs IV.G.2 through IV.G.4.

\* \* \* \* \*

5. *Interpollutant offsetting.* In meeting the emissions offset requirements of paragraph IV.A, Condition 3 of this Ruling, the emissions offsets obtained shall be for the same regulated NSR pollutant unless interpollutant offsetting is permitted for a particular pollutant as specified in this paragraph IV.G.5. The offset requirements of paragraph IV.A, Condition 3 of this Ruling for direct PM<sub>2.5</sub> emissions or emissions of precursors of PM<sub>2.5</sub> may be satisfied by offsetting reductions of direct PM<sub>2.5</sub> emissions or emissions of any PM<sub>2.5</sub> precursor identified under paragraph II.A.31 (iii) of this Ruling if such offsets comply with an interprecursor trading hierarchy and ratio approved by the Administrator.

\* \* \* \* \*

**PART 52—[AMENDED]**

■ 5. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

**Subpart A—[Amended]**

■ 6. Section 52.21 is amended as follows:

- a. By revising paragraphs (b)(23)(i) and (b)(50)(i);
- b. By removing the word “or” at the end of paragraph (b)(50)(iii);
- c. By adding and reserving paragraph (b)(50)(v);
- d. By adding paragraphs (b)(50)(vi) and (i)(1)(xi);
- e. By revising paragraph (i)(5)(ii); and
- f. By adding paragraph (i)(5)(iii).

**§ 52.21 Prevention of significant deterioration of air quality.**

\* \* \* \* \*

(b) \* \* \*

(23)(i) Significant means, in reference to a net emissions increase or the potential of a source to emit any of the following pollutants, a rate of emissions that would equal or exceed any of the following rates:

**Pollutant and Emissions Rate**

- Carbon monoxide: 100 tons per year (tpy)
- Nitrogen oxides: 40 tpy
- Sulfur dioxide: 40 tpy
- Particulate matter: 25 tpy of particulate matter emissions
- PM<sub>10</sub>: 15 tpy
- PM<sub>2.5</sub>: 10 tpy of direct PM<sub>2.5</sub> emissions; 40 tpy of sulfur dioxide emissions; 40 tpy of nitrogen oxide emissions unless demonstrated not to be a PM<sub>2.5</sub> precursor under paragraph (b)(50) of this section
- Ozone: 40 tpy of volatile organic compounds or nitrogen oxides
- Lead: 0.6 tpy
- Fluorides: 3 tpy
- Sulfuric acid mist: 7 tpy
- Hydrogen sulfide (H<sub>2</sub>S): 10 tpy
- Total reduced sulfur (including H<sub>2</sub>S): 10 tpy
- Reduced sulfur compounds (including H<sub>2</sub>S): 10 tpy
- Municipal waste combustor organics (measured as total tetra-through octa-chlorinated dibenzo-p-dioxins and dibenzofurans): 3.2 × 10<sup>6</sup> megagrams per year (3.5 × 10<sup>6</sup> tons per year)
- Municipal waste combustor metals (measured as particulate matter): 14 megagrams per year (15 tons per year)
- Municipal waste combustor acid gases (measured as sulfur dioxide and hydrogen chloride): 36 megagrams per year (40 tons per year)
- Municipal solid waste landfills emissions (measured as nonmethane organic compounds): 45 megagrams per year (50 tons per year)

\* \* \* \* \*

(50) \* \* \*

(i) Any pollutant for which a national ambient air quality standard has been promulgated and any pollutant identified under this paragraph (b)(50)(i) as a constituent or precursor for such pollutant. Precursors identified by the Administrator for purposes of NSR are the following:

- (a) Volatile organic compounds and nitrogen oxides are precursors to ozone in all attainment and unclassifiable areas.
- (b) Sulfur dioxide is a precursor to PM<sub>2.5</sub> in all attainment and unclassifiable areas.

(c) Nitrogen oxides are presumed to be precursors to PM<sub>2.5</sub> in all attainment and unclassifiable areas, unless the State demonstrates to the Administrator's satisfaction or EPA demonstrates that emissions of nitrogen oxides from sources in a specific area are not a significant contributor to that area's ambient PM<sub>2.5</sub> concentrations.

(d) Volatile organic compounds are presumed not to be precursors to PM<sub>2.5</sub> in any attainment or unclassifiable area, unless the State demonstrates to the Administrator's satisfaction or EPA demonstrates that emissions of volatile organic compounds from sources in a specific area are a significant contributor to that area's ambient PM<sub>2.5</sub> concentrations.

\* \* \* \* \*

(v) [Reserved.]

(vi) Particulate matter (PM) emissions, PM<sub>2.5</sub> emissions and PM<sub>10</sub> emissions shall include gaseous emissions from a source or activity which condense to form particulate matter at ambient temperatures. On or after January 1, 2011 (or any earlier date established in the upcoming rulemaking codifying test methods), such condensable particulate matter shall be accounted for in applicability determinations and in establishing emissions limitations for PM, PM<sub>2.5</sub> and PM<sub>10</sub> in PSD permits. Compliance with emissions limitations for PM, PM<sub>2.5</sub> and PM<sub>10</sub> issued prior to this date shall not be based on condensable particulate matter unless required by the terms and conditions of the permit or the applicable implementation plan. Applicability determinations made prior to this date without accounting for condensable particulate matter shall not be considered in violation of this section unless the applicable implementation plan required condensable particulate matter to be included.

\* \* \* \* \*

(i) \* \* \*

(1) \* \* \*

(xi) The source or modification was subject to 40 CFR 52.21, with respect to PM<sub>2.5</sub>, as in effect before July 15, 2008, and the owner or operator submitted an application for a permit under this section before that date consistent with EPA recommendations to use PM<sub>10</sub> as a surrogate for PM<sub>2.5</sub>, and the Administrator subsequently determines that the application as submitted was complete with respect to the PM<sub>2.5</sub> requirements then in effect, as interpreted in the EPA memorandum entitled “Interim Implementation of New Source Review Requirements for PM<sub>2.5</sub>” (October 23, 1997). Instead, the requirements of paragraphs (j) through

(r) of this section, as interpreted in the aforementioned memorandum, that were in effect before July 15, 2008 shall apply to such source or modification.

\* \* \* \* \*

(5) \* \* \*

(ii) The concentrations of the pollutant in the area that the source or modification would affect are less than the concentrations listed in paragraph (i)(5)(i) of this section; or

(iii) The pollutant is not listed in paragraph (i)(5)(i) of this section.

\* \* \* \* \*

[FR Doc. E8-10768 Filed 5-15-08; 8:45 am]  
 BILLING CODE 6560-50-P

**DEPARTMENT OF HOMELAND SECURITY**

**Federal Emergency Management Agency**

**44 CFR Part 67**

**Final Flood Elevation Determinations**

**AGENCY:** Federal Emergency Management Agency, DHS.

**ACTION:** Final rule.

**SUMMARY:** Base (1% annual chance) Flood Elevations (BFEs) and modified BFEs are made final for the communities listed below. The BFEs and modified BFEs are the basis for the floodplain management measures that each community is required either to adopt or to show evidence of being already in effect in order to qualify or remain qualified for participation in the National Flood Insurance Program (NFIP).

**DATES:** The date of issuance of the Flood Insurance Rate Map (FIRM) showing

BFEs and modified BFEs for each community. This date may be obtained by contacting the office where the maps are available for inspection as indicated on the table below.

**ADDRESSES:** The final BFEs for each community are available for inspection at the office of the Chief Executive Officer of each community. The respective addresses are listed in the table below.

**FOR FURTHER INFORMATION CONTACT:** William R. Blanton, Jr., Engineering Management Branch, Mitigation Directorate, Federal Emergency Management Agency, 500 C Street, SW., Washington, DC 20472, (202) 646-3151.

**SUPPLEMENTARY INFORMATION:** The Federal Emergency Management Agency (FEMA) makes the final determinations listed below for the modified BFEs for each community listed. These modified elevations have been published in newspapers of local circulation and ninety (90) days have elapsed since that publication. The Assistant Administrator of the Mitigation Directorate has resolved any appeals resulting from this notification.

This final rule is issued in accordance with section 110 of the Flood Disaster Protection Act of 1973, 42 U.S.C. 4104, and 44 CFR part 67. FEMA has developed criteria for floodplain management in floodprone areas in accordance with 44 CFR part 60.

Interested lessees and owners of real property are encouraged to review the proof Flood Insurance Study and FIRM available at the address cited below for each community. The BFEs and modified BFEs are made final in the communities listed below. Elevations at selected locations in each community are shown.

**National Environmental Policy Act.** This final rule is categorically excluded from the requirements of 44 CFR part 10, Environmental Consideration. An environmental impact assessment has not been prepared.

**Regulatory Flexibility Act.** As flood elevation determinations are not within the scope of the Regulatory Flexibility Act, 5 U.S.C. 601-612, a regulatory flexibility analysis is not required.

**Regulatory Classification.** This final rule is not a significant regulatory action under the criteria of section 3(f) of Executive Order 12866 of September 30, 1993, Regulatory Planning and Review, 58 FR 51735.

**Executive Order 13132, Federalism.** This final rule involves no policies that have federalism implications under Executive Order 13132.

**Executive Order 12988, Civil Justice Reform.** This final rule meets the applicable standards of Executive Order 12988.

**List of Subjects in 44 CFR Part 67**

Administrative practice and procedure, Flood insurance, Reporting and recordkeeping requirements.

■ Accordingly, 44 CFR part 67 is amended as follows:

**PART 67—[AMENDED]**

■ 1. The authority citation for part 67 continues to read as follows:

**Authority:** 42 U.S.C. 4001 *et seq.*; Reorganization Plan No. 3 of 1978, 3 CFR, 1978 Comp., p. 329; E.O. 12127, 44 FR 19367, 3 CFR, 1979 Comp., p. 376.

**§ 67.11 [Amended]**

■ 2. The tables published under the authority of § 67.11 are amended as follows:

Flooding source(s)	Location of referenced elevation	* Elevation in feet (NGVD) + Elevation in feet (NAVD) # Depth in feet above ground Modified	Communities affected
<b>Randolph County, Illinois, and Incorporated Areas</b> <b>Docket No.: FEMA-B-7740</b>			
Kaskaskia River .....	At confluence with Mississippi River .....	+392	Village of Evansville, Unincorporated Areas of Randolph County.
	Randolph/Monroe County boundary (approximately 700 feet upstream Anna Lane extended).	+392	
Mississippi River .....	Jackson/Randolph County boundary (approximately Cora Road extended).	+382	City of Chester, Unincorporated Areas of Randolph County, Village of Kaskaskia, Village of Prairie Du Rocher, Village of Rockwood.

103d Congress  
1st Session

COMMITTEE PRINT

S. PRT. 103-38  
Vol. II

**A LEGISLATIVE HISTORY OF THE CLEAN  
AIR ACT AMENDMENTS OF 1990**

TOGETHER WITH

**A SECTION-BY-SECTION INDEX**

PREPARED BY THE

**ENVIRONMENT AND NATURAL RESOURCES POLICY  
DIVISION**

OF THE

**CONGRESSIONAL RESEARCH SERVICE**

OF THE

**LIBRARY OF CONGRESS**

FOR THE

**COMMITTEE ON  
ENVIRONMENT AND PUBLIC WORKS  
U.S. SENATE**

**VOLUME II**



NOVEMBER 1993

Printed for the use of the Senate Committee  
on Environment and Public Works

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1993

69-532

ADD110

FOIL 140072 002296

Page 234 of 2671

Many different substances can be components of PM-10, including dust, dirt, soot, smoke, and "secondary particulates." The latter are formed by the transformation of pollutant gases such as sulfur dioxide, nitrogen oxides, or volatile organic compounds into airborne particulates.

#### HEALTH EFFECTS OF PM-10

High levels of PM-10 can produce an array of adverse health effects, ranging from temporary reductions in lung capacity, to aggravation of pre-existing respiratory diseases, to cancer and premature death.

Children are especially vulnerable to PM-10 due to their high respiratory rates and small lungs. A recent study in Utah found that hospital admissions for children with respiratory disease (pneumonia, pleurisy, and bronchitis) were three times higher than normal during months in which the federal PM-10 standards were exceeded. Other vulnerable populations include the elderly, asthmatics, and victims of respiratory disease.

Certain types of PM-10 pose special health risks. On especially dangerous component of PM-10 is the carbon-based particles that result from incomplete combustion in diesel engines. EPA has concluded that these particulates—which are emitted in the exhaust of diesel trucks, buses, and other vehicles—may cause as many as 860 cancer cases annually. Particulates from wood stoves have similar hazardous characteristics.

Sulfates and nitrates, also called acid aerosols, are another dangerous type of particulate. These are secondary particulates that form from emissions of sulfur dioxide and nitrogen oxides. Acid aerosols can sear sensitive lung tissues when inhaled. According to the Office of Technology Assessment, they could cause thousands of excess deaths each year.

Even small dust particles can be hazardous, because they build up in the lungs over time and impair breathing capacity.

#### ENVIRONMENTAL AND WELFARE EFFECTS

PM-10 pollution—especially PM-10 pollution less than 2.5 microns in diameter—impairs visibility. Along the East Coast, summer used to be the season of best visibility, but over the past 30 years it has become the season of worst visibility. EPA has linked this decline in visibility to PM-10 pollution. The National Park Service has reported that particulate pollution, especially fine sulfate particles, impairs scenic vistas within the national park system 90% of the time.

PM-10 also soils materials and building surfaces. According to an EPA estimate, the damage is about \$1 to \$2 billion annually.

#### SOURCES OF PM-10 POLLUTION

There are two basic sources of particulate pollution: natural sources and man-made sources. In turn, within the broad category of man-made sources, there are three major subsets of sources: fugitive emissions (e.g., dust and dirt), direct emissions (e.g., diesel particulates and wood smoke), and secondary particulates (e.g., sulfates and nitrates). The

### PM-10 PROVISIONS

H.R. 3030 substantially revises the regulation of particulate matter. EPA has promulgated a change from implementing standards for total suspended particulates (TSP) to standards for the fraction of particulates below a certain particle size, called PM-10. The steel industry has been contesting the basis for these new standards. If not implemented in a reasonable and cost effective manner, attainment with PM-10 standards could be very costly to the industry, with very little associated improvement in public health protection.

The title I PM-10 provisions of H.R. 3030 somewhat reschedule the attainment dates that would otherwise apply under the PM-10 standards as promulgated by EPA. The fundamental control strategy appears to be RACT requirements. As long as the Agency and the States implement RACT in a truly reasonable manner, the consequences of PM-10 control for the steel industry may be manageable. If overly stringent controls result from the new title I PM-10 subpart added to the Clean Air Act by H.R. 3030, however, it could impose a very costly burden on the steel industry. As I noted earlier, the steel industry has already achieved reductions in particulate matter greater than 90 percent from uncontrolled levels.

This is not intended to be an exhaustive list of the steel industry's concern with clean air legislation. I did want, Mr. Speaker, to provide my colleagues with a idea of the areas of greatest concern to the steel industry. Again, I thank the members of the Energy and Commerce Committee for the many improvements they made in this legislation. I hope they will continue to follow this approach in the upcoming conference with the Senate.

Mr. WOLPE. Mr. Chairman, I rise in strong support of H.R. 3030, the Clean Air Act Amendments of 1990, and I commend Mr. Dingell and Mr. Waxman and the other members of the Energy and Commerce Committee for all their diligent effort over many months which produced this extraordinary piece of environmental legislation.

The Clean Air Act, first enacted in 1970, is the cornerstone of our public health and environmental protection efforts. For more than a decade, Congress has been sharply divided over the issue of clean air. Today, however, the House is on the verge of passing landmark legislation. The House clean air bill far surpasses both the version of the legislation initially crafted by the administration, and the bill passed by the Senate. The bill before us today would not have been possible to achieve had it not been for the incredible grassroots effort by citizens all across the country. The House bill is both stronger from an environmental standpoint and more flexible and cheaper for industry to implement.

This legislation reflects a new public--and congressional--awareness that clean air is not simply a matter of aesthetics; it is also a matter of economics and survival. Indeed, we are today paying dearly for our earlier inability to recognize the economic and human consequences of our failure to provide adequate protection for our environment. The truth is that our future economic growth is directly dependent on the health and stability of our environment and resource base.

The clean air bill we are debating today represents a light-year's advance in our thinking in yet another respect: We are beginning to understand that pollution prevention must be given much higher priority in the management of our hazardous wastes. My hope is that we will not only insist on the toughest possible enforcement but that we will move

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To: Doniger, David <ddoniger@nrdc.org>;  
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Cc:  
Bcc:  
Subject: Prep Call for Thursday CEO Call  
Date: Wed Feb 29 2012 09:54:03 EST  
Attachments:

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StartTime: Wed Feb 29 14:00:00 Eastern Standard Time 2012  
EndTime: Wed Feb 29 15:00:00 Eastern Standard Time 2012  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Wed Feb 29 09:57:00 Eastern Standard Time 2012

Please use: 212-727-4600, code: 149510#

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From: Doniger, David <ddoniger@nrdc.org>  
To: Geertsma, Meleah <mgeertsma@nrdc.org>;  
Michael J. Myers </o=lawnet/ou=first administrative  
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Doniger, David <ddoniger@nrdc.org>

Cc:  
Bcc:  
Subject: Copy: Prep Call for Thursday CEO Call  
Date: Wed Feb 29 2012 09:54:19 EST  
Attachments:

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StartTime: Wed Feb 29 14:00:00 Eastern Standard Time 2012  
EndTime: Wed Feb 29 15:00:00 Eastern Standard Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: No

When: Wednesday, February 29, 2012 2:00 PM-3:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: 212-727-4600, code: 149510#  
Note: The GMT offset above does not reflect daylight saving time adjustments.  
\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Please use: 212-727-4600, code: 149510#

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From: Vickie Patton <vpatton@edf.org>  
To: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; ddoniger@nrdc.org <ddoniger@nrdc.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; John.Coequyt@sierraclub.org <john.coequyt@sierraclub.org>  
Cc:  
Bcc:  
Subject: Discussion w/Administrator and CEOs  
Date: Sat Mar 03 2012 00:35:09 EST  
Attachments:

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Re-scheduled for Friday March 9th at 430 ET.

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To: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: Teleconference with Health, Environmental and Legal Experts  
Date: Wed Apr 11 2012 22:01:05 EDT  
Attachments:

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## MEDIA ADVISORY

### Contact:

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Mary Havell, American Lung Association, 202-715-3459, Mary.Havell@lung.org

Sean Sarah, Sierra Club, 202-548-4589, Sean.Sarah@sierraclub.org

### TOMORROW: Teleconference with Health, Environment and Legal Experts

Regarding Friday's Oral Arguments in Lawsuits over EPA's Cross-State Air Pollution Rule

This Friday, U.S. Court of Appeals for the District of Columbia Circuit will hear oral arguments in lawsuits over the Environmental Protection Agency's (EPA) Cross-State Air Pollution Rule.

The Cross-State Air Pollution Rule reduces the sulfur dioxide and oxides of nitrogen pollution (key contributors to harmful particulate pollution and smog) emitted from coal-fired power plants across 28 eastern states. That pollution drifts across the borders of those states, contributing to dangerous -- and sometimes lethal -- levels of particulate and smog pollution in downwind states.

EPA estimates that the Cross-State Air Pollution Rule, when fully implemented, will:

\*Save up to 34,000 lives each year

\*Prevent 15,000 heart attacks each year

\*Prevent 400,000 asthma attacks each year

\*Provide \$120 billion to \$280 billion in health benefits for the nation each year

Nine states (Connecticut, Delaware, Illinois, Massachusetts, Maryland, New York, North Carolina, Rhode Island, Vermont), five major cities (District of Columbia, Baltimore, Bridgeport, Chicago, New York and Philadelphia), health and environmental organizations (the American Lung Association, the Clean Air Council, Environmental Defense Fund, NRDC, Sierra Club) and major power companies (Calpine, Exelon and Public Service Enterprise Group) have all intervened in support of these vital clean air protections. (Click here to see the briefs that have been filed in the case)

Tomorrow, lawyers and experts for some of those health and environmental groups will hold a teleconference with members of the media. The panelists will be happy to answer questions from all participating journalists.

WHAT: Teleconference with Health and Environment and Legal Experts about Lawsuits over EPA's Cross-State Air Pollution Rule

WHEN: Thursday, April 12 at 11:00 a.m. Eastern time

WHO: Sean Donahue, counsel for EDF, and presenting arguments for environmental intervenors

Janice Nolen, Assistant Vice President of the American Lung Association

Zachary Fabish, Associate Attorney for Sierra Club

WHERE: Call – 800-743-4304 (no passcode required)

###

#### About the American Lung Association

Now in its second century, the American Lung Association is the leading organization working to save lives by improving lung health and preventing lung disease. With your generous support, the American Lung Association is "Fighting for Air" through research, education and advocacy. For more information about the American Lung Association, a Charity Navigator Four Star Charity and holder of the Better Business Bureau Wise Giving Guide Seal, or to support the work it does, call 1-800-LUNG-USA (1-800-586-4872) or visit [www.lung.org](http://www.lung.org)

Environmental Defense Fund ([edf.org](http://edf.org)), a leading national nonprofit organization, creates transformational solutions to the most serious environmental problems. EDF links science, economics,

law and innovative private-sector partnerships. See [twitter.com/EnvDefenseFund](https://twitter.com/EnvDefenseFund); [facebook.com/EnvDefenseFund](https://facebook.com/EnvDefenseFund)

Sierra Club is the nation's largest grassroots environmental organization with more than 1.4 million members and supporters nationwide. Since 2002, Sierra Club's Beyond Coal campaign has successfully stopped 161 new coal plant proposals from moving forward, and is working to move our nation beyond coal to a clean, safe energy economy.

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Bcc:  
Subject: EHN Saturday: Lead poisoning from gold mining; Can opponents "buy" their science?  
Date: Sat Apr 14 2012 09:22:19 EDT  
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Lead poisoning from gold mining. In the Nigerian state of Zamfara, a gold boom has led to a medical disaster with more than 400 children dead from lead poisoning and thousands sickened. It is believed to be the worst lead poisoning epidemic in modern history. Living On Earth  
<http://www.loe.org/shows/segments.html?programID=12-P13-00015&segmentID=1>

Can science be bought? Opponents in fracking debate discredit each other's research. In several cases, those on both sides of the argument over hydraulic fracturing have moved quickly to downplay or discredit scientific studies based on the source of their funding. Ithaca Journal, New York.  
<http://www.theithacajournal.com/article/20120413/NEWS01/204130366/Can-science-bought-Opponents-fracking-debate-discredit-each-other-s-research?odyssey=mod%7Cnewswell%7Ctext%7CFRONTPAGE%7Cp>

Power brokers: How the Ithaca-based Park Foundation is fueling the fight against fracking. The Park Foundation hasn't been on the front lines trying to beat back attempts to tap into the state's portion of the gas-rich Marcellus Shale. But the decades-old, Ithaca-based philanthropic foundation has quickly become one of the natural-gas industry's top targets. Ithaca Journal, New York.  
<http://www.theithacajournal.com/article/20120413/NEWS01/204130367/Power-brokers-How-the-Ithaca-based-Park-Foundation-is-fueling-the-fight-against-fracking>

Hydraulic fracturing: Obama sets up unconventional gas working group. The White House is setting up a new interagency working group to promote the safe development of domestic natural gas, President Obama announced today. Greenwire  
<http://www.eenews.net/public/Greenwire/2012/04/13/1>

Fracking water linked to earthquakes. The use of underground wells to dispose of waste water produced by fracking – the process used to unlock oil and gas deposits hidden deep in rock formations – is “almost certainly” behind the surge in earthquakes in the central US in recent years, a government study has found. Financial Times, United Kingdom.  
<http://www.ft.com/intl/cms/s/0/e268a268-84f6-11e1-a3c5-00144feab49a.html#axzz1rymQ20Ee>

Dental X-rays: Little and not often, please. These days, the main source of ionising radiation for most people is neither fallout from bombs nor radiotherapy; it is dental X-rays. Despite that, surprisingly little

research has been done on those X-rays' effects. Economist  
<http://www.economist.com/node/21552538>

Japan seeks to restart some nuclear power plants. Hoping to avert potentially devastating summer power shortages, Prime Minister Yoshihiko Noda said Friday that his government would seek to restart two nuclear reactors, in what would be a first step toward ending an almost complete shutdown of the nation's nuclear power industry. New York Times [Registration Required]  
<http://www.nytimes.com/2012/04/14/world/asia/japan-seeks-to-restart-some-nuclear-reactors.html>

Italy's 'triangle of death' linked to premature ageing. An area of Italy's Campania region - between Acerra, Nola and Marigliano - has been dubbed the "triangle of death" for the high number of fatalities from cancer found there. Birth defects are also common. Now, studies show that residents are aging more quickly there. New Scientist  
<http://www.newscientist.com/article/mg21428604.100-italys-triangle-of-death-linked-to-premature-ageing.html>

Judges sharply question EPA, petitioners during cross-state rule arguments. In a vigorously contested oral argument, a federal appeals court today considered the legality of a key Obama administration regulation aimed at limiting air pollution that crosses state lines. Greenwire  
<http://www.eenews.net/public/Greenwire/2012/04/13/2>

Temperature variations lower life expectancies in the chronically ill. Researchers have found that it isn't just temperature extremes that pose risks to human health; sudden temperature changes can also increase mortality. ClimateWire  
<http://www.eenews.net/public/climatewire/2012/04/13/1>

Water shortages: Ms Fang's parched patch. Like many in south-west China over the past three years, Fang Haixin, a subsistence farmer near the village of Huopu in western Guizhou province, has learnt to grapple with the sort of drought conditions that, until now, were more commonly a feature of China's dry northern plains. Economist  
<http://www.economist.com/node/21552583>

Obama's green jobs have been slow to sprout. The millions of "green jobs" Obama promised have been slow to sprout, disappointing many. Supporters say the administration over-promised on the jobs front and worry that a backlash could undermine support for clean-energy policies in general. Reuters  
<http://www.reuters.com/article/2012/04/13/us-usa-campaign-green-idUSBRE83C08D20120413>

Northwest coal export projects could have 'significant' public health impacts, EPA says. The Environmental Protection Agency wants a thorough review of the consequences of coal export through Northwest ports, saying the first project in the pipeline -- at Oregon's Port of Morrow -- "has the potential to significantly impact human health and the environment." Portland Oregonian, Oregon.  
[http://www.oregonlive.com/environment/index.ssf/2012/04/northwest\\_coal\\_export\\_projects.html](http://www.oregonlive.com/environment/index.ssf/2012/04/northwest_coal_export_projects.html)

Zimbabwe ill-prepared for climate change challenges – experts. Zimbabwe's lack of preparedness for the impact of climate change is coming under increasing scrutiny, as the nation faces another year of drought and the government admits it has done little to mitigate the crisis. Reuters  
<http://www.trust.org/alertnet/news/zimbabwe-ill-prepared-for-climate-change-challenges>

Homegrown power for auto plants. Acknowledging that it makes little sense to spend billions to develop electric cars if charging their batteries produces roughly the same amount of carbon dioxide as the most efficient gasoline models, some European automakers are investing directly in renewable energy. New York Times [Registration Required]  
<http://www.nytimes.com/2012/04/15/automobiles/in-europe-homegrown-power-for-auto-plants.html>

'Water schools' foster more sustainable habits in Mexico. So-called water schools, which educate communities on the resource and its links with the environment, gender and climate change, are

helping to raise awareness on proper water management in Mexico, at a time of severe drought. Inter Press Service  
<http://www.ipsnews.net/news.asp?idnews=107430>

US House to try again to advance Keystone pipeline. US House Speaker John Boehner will make a new attempt to force approval of the stalled Keystone XL oil pipeline as part of legislation for another 90-day extension of federal road, bridge and transit construction funding, Republican aides said on Friday. Reuters  
<http://news.yahoo.com/house-try-again-advance-keystone-pipeline-165349502.html>

The long fight. A prominent activist in the fight to expose toxic emissions in the Town of Tonawanda's industrial section said on Friday that the battle to reign in polluters like Tonawanda Coke is far from over. North Tonawanda News, New York.  
[http://tonawanda-news.com/top\\_stories/x1789088130/The-long-fight](http://tonawanda-news.com/top_stories/x1789088130/The-long-fight)

Unexpected ally helps Wal-mart cut waste. Michelle Harvey, an employee of the Environmental Defense Fund, has a security badge to a site that used to be considered enemy territory: the headquarters of Wal-Mart Stores in Bentonville, Ark. New York Times [Registration Required]  
<http://www.nytimes.com/2012/04/14/business/wal-mart-and-environmental-fund-team-up-to-cut-waste.html>

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Subject: E&E article on CO2 NSPS  
Date: Tue Apr 17 2012 13:29:10 EDT  
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EPA's 'no plans' stance on existing power plants doesn't jibe with text of GHG rule

Jean Chemnick, E&E reporter

Published: Tuesday, April 17, 2012

Environmentalists and industry advocates who battle constantly on climate change issues have found common ground.

Both sides agree that U.S. EPA intends to promulgate a rule limiting emissions of heat-trapping greenhouse gases from existing power plants.

As evidence, both point to the proposed emissions rule released last month for new power plants that refers in several places to a future standard for existing emission sources.

The proposed new-source standard -- 1,000 pounds of carbon dioxide per megawatt-hour -- doesn't apply to existing power plants that are modified to comply with other air pollution rules and increase CO2 emissions, EPA explains on page 52 of the proposed rule, because "those projects would involve equipment changes to improve efficiency to meet the requirements of a future [Clean Air Act, Section] 111(d) rulemaking for existing sources."

And EPA says on page 268 that in addition to limiting greenhouse gas emissions from future power plants, the proposed new source rule "serves as a necessary predicate for the regulation of existing sources within this source category under section 111(d)."

The Office of Management and Budget appears to have trimmed other, more explicit references to EPA's future plans that were part of the rule when it arrived for review at the White House.

Left on OMB's cutting-room floor: "At a future date, EPA intends to promulgate emission guidelines for states to develop plans reducing CO2 emissions from existing fossil-fuel-fired" power plants.

EPA officials have been as vague in recent months, with Administrator Lisa Jackson and air chief Gina McCarthy insisting on Capitol Hill, in blog posts and elsewhere that the agency has "no plans" to regulate greenhouse gas emissions from existing power plants.

But EPA is required to do just that under Section 111 of the Clean Air Act. And environmentalists -- including groups that have sued EPA to regulate CO2 -- have expressed no concern that that agency might renege on its court-ordered agreement to introduce new source performance standards for new and existing power plants and petroleum refineries.

Environmentalists are generally reluctant to discuss EPA not having plans for existing sources. David Doniger of the Natural Resources Defense Council, a plaintiff, responded to EPA's stance in an interview last month by saying he had "no plans" to return to court. He declined to comment for this story.

Megan Ceronsky, an attorney with the Environmental Defense Fund, said changes made at OMB "appear to be focusing on the new source proposal on new sources, and clarifying that the administration is not currently proposing standards for existing sources."

"EDF firmly believes that common sense standards can be designed for existing sources that will mobilize solutions such as demand-side energy efficiency to reduce heat-trapping emissions and other harmful air pollutants while saving families and businesses money and strengthening the economy," she added.

Jeff Holmstead, who was EPA air chief under President George W. Bush and is now a partner at Bracewell & Giuliani, said it is interesting to see EPA taking such a careful stance on its future

greenhouse gas rules, which are certain to come. He attributed that caution to election-year strategy by the Obama White House.

"My impression is that there was a lot of discussion back and forth between the White House and EPA, and EPA was really pushing to get this out and the White House was really concerned about the politics of this," he said.

The final compromise between the agency and White House appears to be that EPA could release its new power plants standard but must stay mum about existing source standards, he said.

"That's just a way to get past the election without going another ox that could come back to hurt them," he said.

If EPA never promulgates existing-source rules, it will be sued, he said. But he said he expects the agency to roll them out after the November election.

Michael Livermore, who directs the Institute for Policy Integrity at New York University's School of Law, said EPA has a statutory obligation to write existing-source rules for greenhouse gases. He suggested the agency might want to avoid heightened speculation about what form those rules will take so early in the rulemaking process.

"They're trying to keep the focus on this rule, rather than on the rules that are on the horizon," he said. Existing-source rules, he said, could take months or years to write.

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To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: May 2012 Columbia Center for Climate Change Law Update  
Date: Fri May 04 2012 10:19:23 EDT  
Attachments: image001.jpg

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May 2012 Update (Update #40 May 4, 2012)

New from Columbia Law School's Center for Climate Change Law:

New climate law blog items:

The Scream and Climate Change (May 3, 2012)

Green Tech Companies Seek Market Dominance Through IP Litigation (April 30, 2012)

Columbia Environmental Law Clinic Students Release Livestock and Climate Change Annotated Bibliography (April 24, 2012)

Mississippi Supreme Court Reverses Approval for Lignite Plant with Carbon Capture and Storage (April 10, 2012)

New green building law update service items:

New York City Council Unanimously Approves Zone Green (May 2, 2012)

Recent Report Quantifies the Market for Energy Efficiency Retrofits (April 18, 2012)

New Field Report from the Columbia Journal of Environmental Law:

Nuclear Power and New York City: Columbia's Forum on the Environmental Consequences and Catastrophic Risks of Indian Point (April 7, 2012)

Upcoming event:

Key Environmental Issues in EPA Region II, May 23, 2012, Columbia Law School

Information and registration available here

New Hydraulic Fracturing Case Chart published by Arnold & Porter LLP

New book:

The Law of Clean Energy: Efficiency and Renewables, edited by Michael B. Gerrard (ABA 2011)

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Here are the additions to the Climate Case Chart since Update #39.

## FEATURED DECISION

*Rocky Mountain Farmers Union v. Goldstene* (9th Cir. April 23, 2012): added to the “challenges to state action” slide. The 9th Circuit held that California could continue to enforce its low-carbon fuel standard pending the state’s appeal of a December 2011 district court decision holding that the standard was unconstitutional. The decision in effect lifted an injunction issued by the district court pending appeal. In the December 2011 decision, the district court held that because the standard assigns more favorable carbon intensity values to corn-derived ethanol in California than to ethanol derived outside California, it impermissibly discriminates against out-of-state entities. In addition, the district court held that the standard impermissibly regulates channels of interstate commerce. The district court further held that although the standard serves a legitimate local purpose, that purpose could be accomplished through other nondiscriminatory means. The standard aims to reduce the carbon intensity of transportation fuels in California by at least 10 percent by 2020.

## DECISIONS AND SETTLEMENTS

*AES Corp. v. Steadfast Insurance Co.* (Vir. Sup. Ct. April 20, 2012): added to the “common law claims” slide under “money damages.” The Virginia Supreme Court reaffirmed its previous holding that an insurance company has no obligation to defend or indemnify an energy company against a lawsuit alleging that its greenhouse gas emissions were contributing to the destruction of an Alaskan village. AES was sued by the Alaskan coastal village of Kivalina, a case that is now before the 9th Circuit. The insurance company refused to defend or indemnify AES in the litigation, declaring that the damage allegedly caused by AES’s emissions was not the result of an accident or occurrence covered by its policy. AES sued the insurance company in Virginia state court, contending that the damages alleged by its emissions were the result of a covered occurrence. The trial court dismissed the case. AES appealed the case to the Virginia Supreme Court, which affirmed. AES requested a rehearing, which

the court granted. Upon rehearing, the court reaffirmed its prior holding, stating that the allegations by the village were that its damages were the result of AES's intentional actions and not an accident or other occurrence covered by the policy.

*Conservancy of Southwest Florida v. U.S. Fish and Wildlife Service* (11th Cir. April 18, 2012): added to the "Endangered Species Act" slide. The 11th Circuit affirmed a district court decision dismissing a lawsuit challenging the U.S. Fish and Wildlife Service's denial of petitions to designate critical habitat for the Florida panther. In 2009, several environmental advocacy groups petitioned the FWS to initiate such rulemaking, contending that the species was suffering a decline in population due to fragmentation and degradation of its habitat caused, in part, by climate change. The FWS denied the petitions on the grounds that the measures it was already taking were sufficient. The groups subsequently filed suit in federal court alleging that the denial violated the Administrative Procedure Act and the Endangered Species Act. The district court granted the FWS' motion to dismiss, holding that the FWS' decision was committed to agency discretion by law and thus it could not be reviewed. On appeal, the 11th Circuit affirmed on identical grounds.

*Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (Cal. Ct. App. April 17, 2012): added to the "state NEPAs" slide. A California appellate court affirmed a ruling that held that a public authority responsible for constructing a light rail line connecting downtown Los Angeles with Santa Monica did not violate the California Environmental Quality Act (CEQA) when it analyzed the impact of the project on, among other things, greenhouse gas emissions using as baseline conditions projected for 2030. The court rejected the notion that CEQA forbids, as a matter of law, the use of projected conditions as a baseline. The petitioners had argued that CEQA required the authority to use baseline conditions that existed sometime between when the notice of preparation of the construction phase was filed in 2007 and when the authority certified the final environmental impact report (EIR) in 2010. The appellate court disagreed, holding that the project would not begin operating until 2015 at the earliest and thus its impact would yield no practical information to decision makers or the public until that time.

*Loorz v. Jackson* (D.D.C. April 2, 2012): added to the "common law claims" slide under "Public Trust Doctrine." A federal district court in Washington D.C. issued a decision allowing business groups to intervene in a lawsuit that seeks to require the federal government to establish a plan for an immediate cap on greenhouse gas emissions and start lowering these emissions by 6 percent a year beginning in 2013. Several advocacy groups, including Our Children's Trust, filed the federal lawsuit in May 2011 along with similar actions in many states. The lawsuit alleges that the federal government has a duty under the Public Trust Doctrine to reduce greenhouse gas emissions in the atmosphere. Thus far, none of the state actions have been successful.

*Sierra Club v. Mississippi Public Service Commission* (Miss. Sup. Ct. March 15, 2012): added to the "coal-fired power plant challenges" slide. In a unanimous decision, the Mississippi Supreme Court reversed a 2010 decision by the Mississippi Public Service Commission that permitted a company to construct a \$2.4 billion coal-fired power plant in Kemper County. The plant was to burn locally mined lignite coal and employ a novel type of Integrated Gasification Combined Cycle Gasification technology called "TRIG," which has never before been used on a commercial scale. The company proposed to capture the carbon dioxide associated with burning the gasified lignite and sell it to oil companies who would then sequester it in unidentified geologic formations. The Sierra Club challenged the approval on a number of grounds, including that the carbon sequestration plan had no buyer for the carbon dioxide and that the electricity that would be produced was not in fact needed. The Supreme Court, in a short opinion, held that the Commission's approval was not supported by substantial evidence and thus

remanded the case for further proceedings. A CCCL blog post examining this ruling is available [here](#).

*California Building Industry Association v. Bay Area Air Quality Management District* (Cal. Super. Ct. March 5, 2012): added to the “state NEPAs” slide. A California state court issued a decision ordering the Bay Area Air Quality Management District to set aside, depublish, and stop the circulation of thresholds of significance for greenhouse gas emissions when conducting CEQA analyses. The thresholds were intended to be used by the District and other local agencies in the San Francisco Bay Area to determine whether a local land use project would have significant air quality impacts under CEQA. In 2010, the District adopted a resolution which included numeric air quality thresholds, including greenhouse gas emissions, for analyses by lead agencies under CEQA. If a project’s emissions exceeded the thresholds, it would result in a finding of significant impact necessitating preparation of an EIR and adoption of mitigation measures. A building industry association filed suit, alleging that the District did not analyze the thresholds as a project under CEQA and failed to study their impact on future development patterns. The court agreed, holding that the thresholds should be set aside pending full CEQA compliance.

*New Energy Economy v. Vanzi* (N.M. Sup. Ct. Feb. 16, 2012): added to the “challenges to state action” slide. In a procedurally complex action, several nonprofit groups sought to participate in a proceeding challenging rules adopted by the New Mexico Environmental Improvement Board (EIB). Previously, New Energy Economy (NEE) petitioned the EIB to adopt a new rule, known as Rule 100, which cap greenhouse gas emissions from large power producers in the state. After the EIB adopted Rule 100 in December 2010, seven groups, including the New Mexico Public Service Commission (PSC) appealed EIB’s adoption of the rule. None of the parties who appealed the rule named NEE or any of the nonprofit groups as a party. In April 2011, NEE and the other nonprofits sought to intervene as a party in the appeal. The appellate court ordered mediation between EIB and PSC but denied the motions to intervene. Thus, the mediation included the seven groups opposing Rule 100 and the newly appointed members of EIB, now composed of members appointed by New Mexico Governor Susana Martinez, who publically opposed the rule. After the mediation began, PSC and EIB requested that the proceeding be remanded to EIB for further proceedings. On remand, the seven groups opposing the rule filed a new petition with EIB, essentially taking the role of petitioners to rescind or amend Rule 100. The nonprofit groups filed an appeal with the New Mexico Supreme Court seeking a writ of superintending control to overturn the appellate court’s decision denying their motions to intervene. The court granted the motions, holding that the appellate court did not have discretion to deny the motions given that the groups were proper parties to the proceeding and participated in a legally sufficient manner.

*Consolidated Irrigation District v. City of Selma* (Cal. Ct. App. Feb. 8, 2012): added to the “state NEPAs” slide. An irrigation district in California petitioned for a writ of mandate challenging the City of Selma’s use of a negative declaration under CEQA in approving a 160-unit, 44-acre residential development. The trial court granted the petition, holding among other things that the evidence presented supported a fair argument that the proposed development may have a significant effect on the environment. In particular, the court held that the negative declaration did not adequately address greenhouse gas emissions from the project. On appeal, the appellate court affirmed, holding that the irrigation district had standing to maintain the action and that the evidence in the record should not have been discounted by the city absent a credibility determination.

Sincerely,

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For the U.S. climate change case chart, see <http://www.climatecasechart.com>

Chart searching tip: the chart is a pdf document that allows users to search by word or case name. Simply type the word or case name into the "find" portion at the top center of each page and hit return.

For previous Columbia Climate Center Law updates, click [here](#) and then click on the "past email updates" link in the upper left hand corner.

For information about the ABA book Global Climate Change and U.S. Law, click [here](#).

For information about the recent ABA-ELI book *The Law of Green Buildings*, edited by J. Cullen Howe and Michael B. Gerrard, [click here](#).

For information about Columbia Law School's Center for Climate Change Law, [click here](#).

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To: Jared Snyder <jjsnyder@gw.dec.state.ny.us>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Lois New <lanew@gw.dec.state.ny.us>  
Cc:  
Bcc:  
Subject: NJ & RGGI  
Date: Mon May 07 2012 08:08:28 EDT  
Attachments:

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Did N.J. make the right call in leaving RGGI?

Colin Sullivan, E&E reporter

Published: Friday, May 4, 2012

New Jersey officials this week dismissed claims that the state lost net value when it left the nine-state trading scheme known as the Regional Greenhouse Gas Initiative (RGGI), saying the fledgling market neither improved its economy nor reduced its contribution to climate change.

Led by Gov. Chris Christie (R), the Garden State pulled out of RGGI at the end of 2011 amid little fanfare. Christie called the system a backdoor carbon tax on electricity consumers in the Northeast that he could not support as a conservative with free-market roots.

New Jersey Gov. Chris Christie (R). Photo courtesy of Wikipedia.

Along the way, Christie vetoed legislation that would have put New Jersey back into the cap-and-trade system, which requires the region's power sector to cut its greenhouse gas emissions to 1990 levels by 2020. He also made light of the first-ever U.S. carbon market, calling it a "gimmicky" program that failed to achieve its intended aim since carbon permits were first auctioned in September 2008.

Christie, who says he believes in man-made global warming but does not support cap and trade, won praise from tea party activists and others on the right for his stand. Now that fervor is being matched by a backlash from the left. Sierra Club New Jersey just yesterday gave the governor an F on its environmental scorecard for, among other decisions, opting out of RGGI.

Also this week, a group called Environment Northeast issued a report that says New Jersey has missed out since ditching RGGI. The group hired a consulting firm to conduct an analysis of RGGI and found it had generated \$159 million in "net economic value" for New Jersey through 2011.

The report went on to suggest that a revamped RGGI that lowers carbon caps to current emissions levels -- which have been held down by low natural gas prices, warm weather and the recession -- would add \$11.6 billion in value and thousands of jobs in the entire Northeast region by 2020.

Losing out on a 'net positive'?

"Participation in RGGI has been a net positive for New Jersey residents and the environment, and the state could gain much more by getting back in the program," said Daniel Sosland, executive director of Environment Northeast.

How so? The group says the revenue generated from auctions will continue to beef up renewable energy in the state and add jobs. During its time in RGGI, the report says, \$75 million of the \$159 million was diverted to help with New Jersey budget shortfalls, while the rest went to support innovative energy projects starting from the ground up.

Larry Hajna, of the New Jersey Department of Environmental Protection, responded that even if the report from Environment Northeast is correct, that contribution to the state economy would be fairly negligible.

"When New Jersey pulled out of RGGI, we did so because we didn't feel it was the right approach, as has been evidenced by recent auctions that have been coming out at the minimal or minimal allowed,"

he said. "RGGI is not working as designed."

Hajna credited the state's steady increase in solar, wind and biopower to separate state incentives provided under state law. He said the state is right on track to cut its emission by 22.5 percent by 2021, starting in 2010.

Hanja added that Christie has committed to building no more coal-fired power plants in the state. He argued that the administration is doing all it can to reduce greenhouse gas emissions ahead of the deadlines established under state law.

"All of these factors give us a lot of confidence that we're doing the right thing without a complicated emissions trading scheme that wasn't working," he said.

When asked to weigh in, Robert Stavins, director of Harvard University's Environmental Economics Program, surprisingly sided with New Jersey officials, saying the state's exit is "not of major consequence" because RGGI is nonbinding in the first place.

"Their withdrawal is not of great significance," he said.

Stavins explained that low natural gas prices, the recent recession and one of the mildest winters in recent memory have helped to do the work that was envisioned by RGGI back when it was conceived. Or leaving a 'not very ambitious' program?

"It was originally not very ambitious," Stavins said of RGGI, "in order to keep prices down and avoid leakage to neighboring states."

As for the revenue claim, Stavins said it is likely New Jersey lost some revenue from auction proceeds, but he doubts that number is significant. He added that any analysis made by the state itself or environmental groups would likely be skewed and influenced by politics.

"They're probably making claims one way or the other because they're strong advocates," he said.

Hanja was asked to assess whether his state's position is fundamentally political. He admitted Christie has "a philosophical difference" with RGGI advocates but insisted most of his thinking on the topic is substantive.

"You have to take into account that RGGI does come at a cost to ratepayers. This is very important in New Jersey, which has some of the highest electricity rates in the nation," he said. "At the same time, allowances have been auctioned off at the minimum price.

"Again, this administration is more focused on practical solutions. We did not feel that RGGI was practical," he said.

When asked the same question, Jamie Howland, director of the Climate and Energy Analysis Center at Environment Northeast, responded that it was "kind of insulting" to be asked whether the group's position on cap and trade had influenced its work.

"We're a research-and-analysis-based advocacy group," he said. "We do not start with predetermined conclusions."

Sullivan is based in New York.

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Cc:  
Bcc:  
Subject: wrap up call for discuss Yale clinic mercury project  
Date: Tue May 08 2012 16:39:28 EDT  
Attachments:

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When: Friday, May 11, 2012 10:00 AM-10:30 AM (GMT-05:00) Eastern Time (US & Canada).  
Where: call in: 858.200.4900; access code 642-8857

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To: Kennedy, Kit <kkennedy@nrdc.org>;  
Nicholas R. Goldstein <nicholas.goldstein@yale.edu>; Maisah  
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Subject: wrap up call for discuss Yale clinic mercury project  
Date: Tue May 08 2012 16:44:51 EDT  
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<nicholas.goldstein@yale.edu>; Maisah Khan  
<maisah.khan@gmail.com>; Maria Ortiz <mariaeortiz@gmail.com>;  
Isaac Cheng </o=lawnet/ou=first administrative  
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## Major Court Ruling Forces Nuclear Waste Disposal Review

FRIDAY, 08 JUNE 2012 13:42 PRESS RELEASE SCIENCE AND ENVIRONMENTAL



( 0 Votes )

NRDC: 'This Is A Game Changer'

WASHINGTON--(ENEWSPF)--June 8, 2012 -- A federal appeals court's unanimous decision today forces the country to re-evaluate the environmental impacts of the storage and disposal of its nuclear waste in a way that has never been done before.



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The decision will send the Nuclear Regulatory Commission back to square one to determine the safety and consequences of allowing nuclear reactors to produce and accumulate radioactive nuclear waste, including the potential environmental effects of the failure to develop a geologic repository.

"This is a game changer," said Geoff Fettus, senior project attorney in the nuclear program at the Natural Resources Defense Council. "This forces the Nuclear Regulatory Commission to take a hard look at the environmental consequences of producing highly radioactive nuclear waste without a long-term disposal solution. The court found: 'The Commission apparently has no long-term plan other than hoping for a geologic repository.'"

The court granted petitions for review by the environmental community and the states by vacating the NRC's recent Waste Confidence Decision and the associated Temporary Storage Rule.

Geoff Fettus of NRDC argued the case in March before the U.S. Court of Appeals for the D.C. Circuit, with co-counsel Diane Curran who represented the other environmental petitioners, Southern Alliance for Clean Energy, Riverkeeper, Inc., and Blue Ridge Environmental Defense League.

A copy of the U.S. Court of Appeals for the D.C. Circuit decision can be found here:

[http://www.cadc.uscourts.gov/internet/opinions.nsf/57ACA94A8FFAD8AF85257A1700502AA4/\\$file/11-1045-1377720.pdf](http://www.cadc.uscourts.gov/internet/opinions.nsf/57ACA94A8FFAD8AF85257A1700502AA4/$file/11-1045-1377720.pdf)

Key excerpts:

**Page 3:** We further hold that the Commission's evaluation of the risks of spent nuclear fuel is deficient in two ways: First, in concluding that permanent storage will be available "when necessary," the Commission did not calculate the environmental effects of failing to secure permanent storage—a possibility that cannot be ignored.

Second, in determining that spent fuel can safely be stored on site at nuclear plants for sixty years after the expiration of a plant's license, the Commission failed to properly examine future dangers and key consequences.

**Page 4:** Twenty years of work on establishing such a repository at Yucca Mountain was recently abandoned when the Department of Energy decided to withdraw its license application for the facility. Id. at 3. At this time, there is not even a prospective site for a repository, let alone progress toward the actual construction of one.

**Page 9:** Though we give considerable deference to an agency's decision regarding whether to prepare an EIS, the agency must 1) "accurately identifi[y] the relevant environmental concern," 2) take a "hard look at the problem in preparing its EA," 3) make a "convincing case for its finding of no significant impact," and 4) show that even if a significant impact will occur, "changes or safeguards in the project sufficiently reduce the impact to a minimum."

**Page 13:** The Commission apparently has no long term plan other than hoping for a geologic repository. If the government continues to fail in its quest to establish one, then [spent nuclear fuel] will seemingly be stored on site at nuclear plants on a permanent basis. The Commission can and must assess the potential environmental effects of such a failure.

The **Natural Resources Defense Council (NRDC)** is an international nonprofit environmental organization with more than 1.3 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC has offices in New York City, Washington, D.C., Los Angeles, San Francisco, Chicago, Livingston, Montana, and Beijing. Visit us at

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From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Linda M. Wilson </o=lawnet/ou=first administrative group/cn=recipients/cn=lindawilson>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Longstreth, Ben <blongstreth@nrdc.org>; Andrew deLaski <adelaski@standardsasap.org>; Charlie Harak <charak@nclc.org>; Kennedy, Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: Copy: call on furnace efficiency  
Date: Thu Jun 21 2012 12:56:41 EDT  
Attachments:

---

StartTime: Thu Jun 21 14:00:00 Eastern Daylight Time 2012  
EndTime: Thu Jun 21 15:00:00 Eastern Daylight Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Thu Jun 21 14:23:00 Eastern Daylight Time 2012

When: Thursday, June 21, 2012 2:00 PM-3:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: 212-727-4600; pin 182703#

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Video Conference Calendar  
</o=lawnet/ou=exchange administrative group  
(fydibohf23spdlt)/cn=recipients/cn=vccsupp>  
To: Video Conference Calendar  
</o=lawnet/ou=exchange administrative group  
(fydibohf23spdlt)/cn=recipients/cn=vccsupp>; Lemuel Srolovic  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=lsrolovi>; Norman Spiegel  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=normanspiegel>  
Cc:  
Bcc:  
Subject: Copy: FW: Video Conference: Environmental Protection  
Date: Tue Jun 26 2012 11:22:26 EDT  
Attachments:

---

StartTime: Tue Jun 26 13:45:00 Eastern Daylight Time 2012  
EndTime: Tue Jun 26 17:00:00 Eastern Daylight Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: No

When: Tuesday, June 26, 2012 1:45 PM-5:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: NYC 25B56, NRDC & NYS DEC

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Video Conference Calendar  
Sent: Tuesday, June 26, 2012 8:28 AM  
To: Video Conference Calendar; Kevin Olson  
Cc: Albany Help Desk; Denise Lantigua; Tasha L. Bartlett; Catherine Slater; Ian Summers; Jennifer  
Cyrus; Osiris Caceres; Tyrone Harris; Justin Wawrzonek (jmwawrzo@gw.dec.state.ny.us)  
Subject: Video Conference: Environmental Protection  
When: Tuesday, June 26, 2012 1:45 PM-5:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: NYC 25B56, NRDC & NYS DEC

Please Note:

A video conference has been scheduled for Tuesday, June 26th, 2012 from 2:00 PM until 5:00 PM.

The three sites included are NYC 25B56, NRDC & NYS DEC. We have all the information needed to perform the video conference. NYC 25B56 & NRDC will dial into NYS DEC Bridge using ISDN # (518) 549-3000. When prompted, "Please enter the number you wish to dial followed by the pound sign," enter 02520#. Desktop Support Staff from NYC will be onsite 15 minutes prior to the start time in order to dial in and verify audio and video quality.

If you require assistance on day of the video conference, please contact the Call Center at 518-486-4527 or 800-624-1177 or the NYC Helpdesk at 212-416-6306.

Thank You.

Video Conference Team

---

From: Megan Ceronsky <mceronsky@edf.org>  
To: Megan Ceronsky <mceronsky@edf.org>;  
Vickie Patton <vpatton@edf.org>; Doniger, David  
<ddoniger@nrdc.org>; Joanne Spalding  
<joanne.spalding@sierraclub.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Copy: NSPS litigants check-in -- hold  
Date: Fri Jun 29 2012 11:50:32 EDT  
Attachments:

---

StartTime: Tue Jul 03 14:00:00 Eastern Daylight Time 2012  
EndTime: Tue Jul 03 15:00:00 Eastern Daylight Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Fri Jun 29 11:57:00 Eastern Daylight Time 2012

Hi all-

Please let me know if this time doesn't work.

Best,  
Megan

202.572.3550  
Participant- 0139892

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---

From: Megan Ceronsky <mceronsky@edf.org>  
To: Megan Ceronsky <mceronsky@edf.org>;  
Vickie Patton <vpatton@edf.org>; Doniger, David  
<ddoniger@nrdc.org>; Joanne Spalding  
<joanne.spalding@sierraclub.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: NSPS litigants check-in -- hold  
Date: Fri Jun 29 2012 11:50:32 EDT  
Attachments:

---

StartTime: Tue Jul 03 14:00:00 Eastern Daylight Time 2012  
EndTime: Tue Jul 03 15:00:00 Eastern Daylight Time 2012  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Fri Jun 29 11:54:00 Eastern Daylight Time 2012

Hi all-

Please let me know if this time doesn't work.

Best,  
Megan

202.572.3550  
Participant- 0139892

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---

From: Robert Emmet Hernan  
<rehjms@earthlink.net>  
To: O'Cleireacain Seamus  
<sco4@columbia.edu>; Strickland, Jr. Carter H.  
<carter.strickland@dep.nyc.gov>; McCarthy Richard and Geraldine  
<rmccarthy1@gmail.com>; Granger Raymond R.  
<rgranger@grangerassociates.com>; Brennan Glucksman Loretta  
<lorettabg@tmo.blackberry.net>; O'Sullivan Anna  
<director@butlergallery.com>; Leff Eugene  
<elgene10@earthlink.net>; McDonnell Petria <2petria@gmail.com>;  
Boepple Maggie <maggie.boepple@gmail.com>; Collins Michael  
<mcollins@lawlibrary.ie>; Hollinger Jacob  
<jacob.hollinger@verizon.net>; Munro Dave <dam@nyserda.org>;  
Veneman Peer <peerveneman@gmail.com>; Watson Philip  
<philipatlarge@aol.com>; Jodi Feld </o=lawnet/ou=first  
administrative group/cn=recipients/cn=jodifeld>; Dornbos  
William E <wdornbos@gmail.com>; Shovlin John  
<john.shovlin@nyu.edu>; Suchman Gail <gsuchman@stroock.com>;  
Morris Jim <morrisjd@aol.com>; Oliver Quintin  
<quintin@stratagem-ni.com>; Johnson Gordon  
<gojohnso@mtahq.org>; Alpert Stan  
<salpert@constantinecannon.com>; Enck Judith <enckj@aol.com>;  
Cronin Brian <brian@briancronin.com>; Herson Dan and Moira  
<d\_herson@sky.com>; Kulik Bill <foolonthehil2222@msn.com>;  
Lemuel Srolovic </o=lawnet/ou=first administrative  
group/cn=recipients/cn=lsrolovi>; Barrington Anne  
<barrington\_annes@yahoo.ie>; Sheerin Pauric  
<pauric.sheerin@hse.ie>; O'Driscoll Jacqueline  
<jacquelineodriscoll@eircom.net>; O'Caollai Brendan  
<brendan.ocaollai@dfa.ie>; Wynn Simon  
<swynn@empire.state.ny.us>; O'Donoghue Chris  
<chrisod2000@yahoo.com>; O'Cleireacain Carol  
<coc315@gmail.com>; Foster Ray <raymondfoster5050@yahoo.com>;  
McBratney John <guano@indigo.ie>; Surgan Michael  
<mjsurgan@yahoo.com>; Schmid Kathleen <annablume4@yahoo.com>;  
McCullough Mulvin Architects McCullough Mulvin  
<info@mcculloughmulvin.com>; Kassel Rich  
<richard.kassel@gmail.com>; Kuhns Madeleine  
<madeleine.kuhns@gmail.com>; Redden Sandy  
<sandyredden@comcast.net>; Boyle Bruce  
<bruceboyle26@comcast.net>; Garvey Carl <garveys7@verizon.net>;  
Sheridan Aine <aine@irishradio.com>; Desnoyers Patty Mastrianni  
<pjdesnoy@gw.dec.state.ny.us>; Seggos Basil  
<basilseggos@gmail.com>; McGimpsey William <wjmcgi@yahoo.com>;  
Charleton Peter <pcharleton@courts.ie>; Lehner Peter  
<plehner@nrdc.org>; Turner Lorraine <lturner@nibureau.com>;  
Bric Maurice <maurice.bric@ucd.ie>  
Cc:  
Bcc:  
Subject: irish environment  
Date: Mon Jul 02 2012 14:47:13 EDT  
Attachments: pastedGraphic.jpg

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Just to let you know that we have published the July 2012 (34th) issue of irish environment, which includes: .

News: updated each Monday, Wednesday, and Friday

Commentary: Christopher Dobson, Dispelling the myths – let's tell the truth about wind farms

Report: International Energy Agency's Golden Age of Gas and Golden Rules on Fracking

Podcast: Interview with Jim Dillon, Leitrim Farmer, Speaking about Fracking

iePEDIA: Unconventional Gas

YouTube: Veganism. Saving the planet one plant at a time

Please pass along this Notice about the magazine to colleagues, friends and others interested in protecting the environment.

: an online resource for environmental matters on the island of Ireland  
.com

[www.irishenvironment.com](http://www.irishenvironment.com)

---

Owner: Robert Emmet Hernan <rehjms@earthlink.net>  
Filename: pastedGraphic.jpg  
Last Modified: Mon Jul 02 14:47:13 EDT 2012

---

Could not print file content for:

Document ID: 0.7.691.233622-000001

Attachment Name: pastedGraphic.jpg

Locator: esa:pst/\*:\vm-afb-med2\med2\_E\CW-Data\foil\140072-Custodian\_em-edid-edid9296  
\srolovi\Lsrolovi\_Live\_02242014.pst:00000000223f95f996b5d5469c3320adfe089c9084972f00:  
:070045fef63af8c1f1f95b629d7e4503cf0447d1c17bd736142772f791f4ded559f1

Reason: It is an unsupported file type

---

From: Megan Ceronsky <mceronsky@edf.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: RE: NSPS litigants call  
Date: Fri Jul 13 2012 10:14:08 EDT  
Attachments:

---

Thanks Mike!

Morgan, I hope you have a wonderful break.

Megan

Megan Ceronsky

Attorney

Environmental Defense Fund

(303) 447-7224 (P)

(303) 440-8052 (F)

2060 Broadway

Suite 300

Boulder, CO 80302

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Friday, July 13, 2012 8:13 AM  
To: Morgan Costello; Megan Ceronsky  
Subject: RE: NSPS litigants call

yes, I'm free those times. Thanks.

From: Morgan Costello  
Sent: Friday, July 13, 2012 10:13 AM  
To: 'Megan Ceronsky'; Michael J. Myers  
Subject: RE: NSPS litigants call

I will be out of the office next week. Mike, are you free then?

Morgan A. Costello  
Assistant Attorney General  
New York State Office of the Attorney General  
Environmental Protection Bureau  
The Capitol  
Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

---

From: Megan Ceronsky [mailto:mceronsky@edf.org]  
Sent: Friday, July 13, 2012 10:12 AM  
To: Michael J. Myers; Morgan Costello  
Subject: NSPS litigants call

Hi Mike and Morgan—

I hope you both are well and had lovely 4th of July holidays. Would you be able to join an NSPS litigants call on Monday at 1 ET? Alternatively, 2 ET?

Thanks much--Megan

Megan Ceronsky

Attorney

Environmental Defense Fund

(303) 447-7224 (P)

(303) 440-8052 (F)

2060 Broadway

Suite 300

Boulder, CO 80302

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Megan Ceronsky <mceronsky@edf.org>  
Cc:  
Bcc:  
Subject: Accepted: NSPS litigants call  
Date: Fri Jul 13 2012 10:22:07 EDT  
Attachments:

---

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Megan Ceronsky <mceronsky@edf.org>  
Cc:  
Bcc:  
Subject: Accepted: NSPS litigants call  
Date: Fri Jul 13 2012 17:23:28 EDT  
Attachments:

---

---

From: Megan Ceronsky <mceronsky@edf.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Vickie Patton <vpatton@edf.org>; Joanne Spalding  
<joanne.spalding@sierraclub.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Megan Ceronsky  
<mceronsky@edf.org>  
Cc:  
Bcc:  
Subject: Copy: NSPS litigants call  
Date: Sat Jul 14 2012 00:01:43 EDT  
Attachments:

---

StartTime: Mon Jul 16 13:00:00 Eastern Daylight Time 2012  
EndTime: Mon Jul 16 13:30:00 Eastern Daylight Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Mon Jul 16 08:57:00 Eastern Daylight Time 2012

When: Monday, July 16, 2012 11:00 AM-11:30 AM (UTC-07:00) Mountain Time (US & Canada).  
Where: (303) 447-7225; participant code 0139892

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Let's hope this works. :-)

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Megan Ceronsky <mceronsky@edf.org>  
Cc:  
Bcc:  
Subject: Accepted: NSPS litigants call  
Date: Mon Jul 16 2012 08:57:01 EDT  
Attachments:

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From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Call with NRDC on NSPS for natural gas drilling  
Date: Tue Jul 24 2012 10:03:15 EDT  
Attachments:

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When: Tuesday, July 24, 2012 11:00 AM-11:30 AM (GMT-05:00) Eastern Time (US & Canada).  
Where: EPB conf. room (if the phone's working)

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Alan Belenz </o=lawnet/ou=first  
administrative group/cn=recipients/cn=abelenz>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Copy: Call with NRDC on NSPS for natural gas drilling  
Date: Tue Jul 24 2012 10:03:16 EDT  
Attachments:

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StartTime: 07/24/2012 11:00:00 AM GMT  
EndTime: 07/24/2012 11:30:00 AM GMT  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: No

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Call with NRDC on NSPS for natural gas drilling  
Date: Tue Jul 24 2012 10:03:17 EDT  
Attachments:

---

StartTime: Tue Jul 24 11:00:00 Eastern Daylight Time 2012

EndTime: Tue Jul 24 11:30:00 Eastern Daylight Time 2012

Location:

Invitees:

Recurring: No

ShowReminder: No

Accepted: Yes

AcceptedTime: Tue Jul 24 10:03:00 Eastern Daylight Time 2012

When: Tuesday, July 24, 2012 11:00 AM-11:30 AM (GMT-05:00) Eastern Time (US & Canada).

Where: EPB conf. room (if the phone's working)

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Geertsma, Meleah <mgeertsma@nrdc.org>  
Cc:  
Bcc:  
Subject: court decision  
Date: Tue Jul 24 2012 12:02:57 EDT  
Attachments: ARTBA v. EPA (DDC 2012).pdf

---

Meleah, thanks for the info. Attached is the decision that Ann sent me. We'll be in touch.

p.s. I don't think you'll have a problem sending the brief in terms of size limits.

---

Owner: Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>  
Filename: ARTBA v. EPA (DDC 2012).pdf  
Last Modified: Tue Jul 24 12:02:57 EDT 2012

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**UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF COLUMBIA**

**AMERICAN ROAD &  
TRANSPORTATION BUILDERS  
ASSOCIATION,**

**Plaintiff,**

**v.**

**ENVIRONMENTAL PROTECTION  
AGENCY et al.,**

**Defendants.**

**Civil Action 11-1713 (RC)**

**MEMORANDUM OPINION**

For the last ten years, the American Road and Transportation Builders Association (“ARTBA”) has sought to alter the regulations implementing section 209(e) of the Clean Air Act. The Environmental Protection Agency (“EPA”) has consistently denied its petitions. In 2009, the D.C. Circuit dismissed a challenge to one such denial; two other challenges are currently pending in the courts of appeals. ARTBA now asks this court to review the EPA’s denial of its petitions. But only the courts of appeals may review final action taken under the Clean Air Act, *see* 42 U.S.C. § 7607(b)(1), and so this court dismisses the case for lack of subject matter jurisdiction.

**I. BACKGROUND**

In 1990, Congress amended the Clean Air Act to authorize the federal regulation of emissions from nonroad engines,<sup>1</sup> which power vehicles and mobile equipment from

---

<sup>1</sup> The statute defines “nonroad engine” as “an internal combustion engine (including the fuel system) that is not used in a motor vehicle or a vehicle used solely for competition, or that is

lawnmowers to locomotives. Pub. L. No. 101-549, § 213, 104 Stat. 2399, 2500 (*codified at* 42 U.S.C. § 7547). At the same time, in section 209(e) of the amended Act, Congress preempted state regulation of such emissions. 42 U.S.C. § 7543(e). Section 209(e)(1) prohibits states from adopting or enforcing “any standard or other requirement relating to the control of emissions” from “new” locomotives or their engines or “new” engines below a certain horsepower that are used in farm or construction vehicles or equipment. *Id.* § 7543(e)(1). That bar is absolute, but section 209(e)(2) requires the EPA under certain conditions to “authorize California to adopt and enforce standards and other requirements relating to the control of emissions” from nonroad engines and vehicles not named in section 209(e)(1). *Id.* § 7543(e)(2)(A). Other states can then opt in to the California standards. *Id.* § 7543(e)(2)(B).

In 1994, the EPA published two regulations interpreting the preemptive scope of section 209(e). One regulation—the “preemption rule”—defined statutory terms and clarified the class of preempted state law, *see* Preemption of State Regulation for Nonroad Engine and Vehicle Standards, 59 Fed. Reg. 36,969, 36,986–87 (July 20, 1994) (“1994 Preemption Rule”) (codified at 40 C.F.R. § 85.1602–03 (1995)), while the other—the “interpretive rule”—emphasized the types of state regulation that were permitted without federal authorization, *see* Emission Standards for New Nonroad Compression-Ignition Engines At or Above 37 Kilowatts, 59 Fed. Reg. 31,306, 31,339–40 (June 17, 1994) (“1994 Interpretive Rule”) (codified at 40 C.F.R. § 89 subpt. A, App’x A (1995)). The agency’s rationales for the two regulations were nearly

---

not subject to standards promulgated under section 7411 of this title or section 7521 of this title,” that is, Clean Air Act sections 111 and 202. 42 U.S.C. § 7550(10). Most of the provisions concerning nonroad engines also apply to nonroad vehicles, defined as “a vehicle that is powered by a nonroad engine and that is not a motor vehicle or a vehicle used solely for competition,” *id.* § 7550(11).

identical. *Compare id.* at 31,328–31 with 1994 Preemption Rule, 59 Fed. Reg. at 36,971–74. In justifying both the preemption rule and the interpretive rule, the EPA acknowledged the “clear preemption of state regulation of nonroad engines . . . in section 209(e)(1)” and determined that, although “[t]he language of section 209(e)(2) does not state any clear preemption,” some preemption was nonetheless implied.<sup>2</sup> The agency further “noted that section 209(e)(2) of the Act does not prevent California or other states from regulating nonroad engines and vehicles *in use*,” and stated its belief that “the requirements of section 209(e)(2) apply only to *new* nonroad engines and vehicles.” 1994 Interpretive Rule, 59 Fed. Reg. at 31,330 (emphases added); 1994 Preemption Rule, 59 Fed. Reg. at 36,973 (same). The preemption rule therefore provided that no state could “enforce any standards or other requirements relating to the control of emission[s] from *new* nonroad engines or vehicles” unless California was first authorized to enforce them. 1994 Preemption Rule, 59 Fed. Reg. at 36,987 (codified at 40 C.F.R. § 85.1603(d) (1995)) (emphasis added). It defined a “new” engine or vehicle as one which has neither been “placed

---

<sup>2</sup> 1994 Interpretive Rule, 59 Fed. Reg. at 31,330; 1994 Preemption Rule, 59 Fed. Reg. at 36,973. As the D.C. Circuit explained when the regulation was challenged:

. . . if no state regulation were preempted, California would have no need to seek authorization for its regulations, and other states would not need to opt in to the California rules. Thus, the California authorization provision assumes the existence of a category of sources that are subject to preemption. In other words, states must be preempted from adopting any regulation for which California could seek authorization.

*Engine Mfrs. Ass’n v. EPA*, 88 F.3d 1075, 1087–88 (D.C. Cir. 1996) (citations omitted).

into service” nor had its “equitable or legal title . . . transferred to an ultimate purchaser.”<sup>3</sup> The interpretive rule described the EPA’s understanding of “in-use” regulations:

EPA believes that states are not precluded under section 209 from regulating the use and operation of nonroad engines, such as regulations on hours of usage, daily mass emission limits, or sulfur limits on fuel; nor are permits regulating such operations precluded once the engine is placed into service or once the equitable or legal title to the engine or vehicle is transferred to an ultimate purchaser, as long as no certification, inspection, or other approval related to the control on emissions is required as a condition precedent to the initial retail sale, titling, or registration of the engine or equipment.

1994 Interpretive Rule, 59 Fed. Reg. at 31,339 (codified at 40 C.F.R. § 89 subpt. A, App’x A (1995)).

An industry group challenged the preemption rule’s definition of “new” and its limitation of section 209(e)(2)’s preemptive effect to new nonroad engines, as well as the interpretive rule’s assertion that section 209(e)(2) did not preempt state regulation of the use of nonroad engines. *Engine Mfrs. Ass’n v. EPA*, 88 F.3d 1075 (D.C. Cir. 1996) (“*EMA*”). This suit was brought in the D.C. Circuit under Clean Air Act § 307(b)(1), which provides that review of “nationally applicable regulations promulgated” under the Act “may be filed *only* in the United States Court of Appeals for the District of Columbia.” 42 U.S.C. § 7607(b)(1) (emphasis added). The D.C. Circuit upheld the definition of “new,” ruling that the statutory term was ambiguous and the agency’s interpretation permissible. *EMA*, 88 F.3d at 1087. Turning to the question

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<sup>3</sup> 1994 Preemption Rule, 59 Fed. Reg. at 36,986 (codified at 40 C.F.R. § 85.1602 (1995)). This definition of “new” did not apply to locomotives and their engines. *Id.* (codified at 40 C.F.R. § 85.1602 (1995)) (“This definition of *new* shall not apply to locomotives or engines used in locomotives.”). “New” was defined for that purpose in 1998. *See* Emission Standards for Locomotives and Locomotive Engines, 63 Fed. Reg. 18,978, 18,998 (Apr. 16, 1998) (codified at 40 C.F.R. §§ 85.1602, 85.1603(c) (1998)).

“whether, as the EPA decided, only new nonroad sources are covered by § 209(e)(2), or, as [the industry group] argue[d], both new and non-new sources are covered,” *id.* at 1088, the court concluded that Congress had spoken to the issue by omitting the word “new” from § 209(e)(2), *see id.* at 1087–93. The agency’s attempt to limit the scope of the provision was therefore barred by the statutory text. *Id.* at 1093. Having established “which nonroad sources the states are preempted from regulating,” the Circuit addressed the question of “what sorts of regulations the states are preempted from adopting,” *id.*, upholding the EPA’s determination that section 209(e)(2) did not preempt state regulation of the use of nonroad engines. *Id.* at 1094.

The EPA revised its regulations to conform to the Circuit’s decision in *EMA*. *See* Preemption of State Regulation for Nonroad Engine and Vehicle Standards; Amendments to Rules, 62 Fed. Reg. 67,733, 67,735 (Dec. 30, 1997) (“Amendments to Rules”) (“Today’s direct final rule implements the opinion of the Court regarding the scope of preemption of section 209(e)(2) by amending the language of the implementing regulations to reflect that California must request authorization for its emissions standards and other related requirements for *all* nonroad vehicles and engines.”) (emphasis added). The agency removed the word “new” from the preemption rule’s description of the engines whose emissions could not be regulated without federal approval, *see id.* at 67,736 (amending 40 C.F.R. § 85.1603(d)), and revised the language of the interpretive rule’s “determination that states are not precluded from regulating the use of nonroad engines,” *id.* at 67,734.

In 2002, ARTBA petitioned the EPA to amend its regulations. Petition to Amend Rules Implementing Clean Air Act § 209(e), EPA Docket HQ-OAR-2004-0008, Doc. 531 (July 12, 2002) (“Petition to Amend Rules”). The association asked the agency to declare that certain

types of state regulation which the revised interpretive rule<sup>4</sup> listed as permissible were in fact preempted by section 209(e), along with other types of regulation not discussed in the extant rules. Petition to Amend Rules at 1. ARTBA criticized the research and reasoning of the *EMA* decision at some length and identified allegedly untenable distinctions introduced by an amendment to the preemption rule dealing with locomotives. *Id.* at 3 (discussing Emissions Standards for Locomotives and Locomotive Engines, 63 Fed. Reg. 18,978, 18,998 (Apr. 16, 1998) (amending 40 C.F.R. § 85.1602–03)). ARTBA also noted that it had successfully challenged a Texas regulation as preempted by section 209(e). *Id.* at 1 (describing the holding of *Engine Mfrs. Ass’n v. Huston*, 190 F. Supp. 2d 922 (W.D. Tex. 2001), *vacated* (5th Cir. Mar. 5, 2002) and *dismissed as moot* (5th Cir. May 14, 2002)). After the Supreme Court’s decision in *Engine Manufacturers Association v. South Coast Air Quality Management District*, 541 U.S. 246 (2004), ARTBA argued in an email to the EPA that the new precedent compelled the agency to grant the regulatory revisions that the association was seeking. ARTBA Petition, EPA Docket HQ-OAR-2004-0008, Doc. 532 (Apr. 30, 2004).

The EPA put ARTBA’s petition out for comment in 2007, *see* Control of Emissions from Nonroad Spark-Ignition Engines and Equipment, 72 Fed. Reg. 28,098, 28,209–10 (May 18,

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<sup>4</sup> The revised description of “the authority of states to regulate the use and operation of nonroad engines” read:

EPA believes that states are not precluded under section 209 from regulating the use and operation of nonroad engines, such as limitations on hours of usage, daily mass emission limits, or sulfur limits on fuel; nor are permits regulating such operations precluded, once the engine is no longer new.

Amendments to Rules, 62 Fed. Reg. at 67,736 (codified at 40 C.F.R. § 89 Subpt. A, Appx. A (1998)).

2007), and rejected it the following year, *see* Control of Emissions From Nonroad Spark-Ignition Engines and Equipment, 73 Fed. Reg. 59,034, 59,130 (Oct. 8, 2008) (“After reviewing ARTBA’s petition and the comments received regarding the petition, EPA is not adopting the changes requested by ARTBA in its petition.”).<sup>5</sup> The agency explained that “although EPA does agree in part with ARTBA’s interpretation, EPA does not believe it is necessary or appropriate to revise its regulations based on ARTBA’s petition.” Response to the Petition of ARTBA to Amend Regulations Regarding the Preemption of State Standards Regulating Emissions from Nonroad Engines, EPA Docket HQ-OAR-2004-0008, Doc. 921, at 11 (Aug. 21, 2008). Where the EPA agreed that certain forms of state regulation unmentioned in its regulations were in fact preempted by section 209(e), it nonetheless concluded that “the regulations as written are sufficient and need not be revised” to make that preemption explicit. *Id.* at 1. And the EPA maintained its position that, contrary to ARTBA’s reading of the statute, “Congress did not intend to preempt state and local regulation of the use and operation of nonroad engines under section 209(e) of the Clean Air Act.” *Id.* at 27 (abbreviation expanded).

ARTBA challenged the denial of its petition before the D.C. Circuit. *ARTBA v. EPA*, 588 F.3d 1109 (D.C. Cir. 2009). This challenge was also brought directly to that court under Clean Air Act § 307(b)(1), which provides that petitions for review of regulations promulgated under the Act “shall be filed within sixty days from the date notice of such promulgation . . . appears in the Federal Register,” unless the “petition is based solely on grounds arising after such sixtieth

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<sup>5</sup> At the same time, the EPA recodified the preemption rule at 40 C.F.R. part 1074. *See* Control of Emissions From Nonroad Spark-Ignition Engines and Equipment, 73 Fed. Reg. at 59,130 (noting that, with two exceptions not relevant here, the EPA was “not changing the meaning of these regulations”); *id.* at 59,379–80 (codified at 40 C.F.R. § 1074.1 *et seq.* (2009)).

day.” 42 U.S.C. § 7607(b)(1). The Circuit held that ARTBA’s suit was an untimely attack on the 1997 re-promulgation of the preemption and interpretive rules rather than a timely challenge to the EPA’s denial of its 2008 petition because Clean Air Act § 307(b)(1) enacted an exception to “[t]he general rule . . . that it is a perfectly valid ‘method of obtaining judicial review of agency regulations once the limitations period has run . . . to petition the agency for amendment or rescission of the regulations and then to appeal the agency’s decision.’” *ARTBA*, 588 F.3d at 1112 (quoting *NLRB Union v. FLRA*, 834 F.2d 191, 196 (D.C. Cir. 1987)) (second ellipsis in original). Because ARTBA had not filed suit within sixty days of either the 1997 re-promulgation or a later event that ripened its claim, the Circuit dismissed the case for lack of subject matter jurisdiction. *Id.* at 1113–16.

In 2010, ARTBA submitted comments on California’s proposed revisions to a portion of its state implementation plan (“SIP”),<sup>6</sup> and “renew[ed] [ARTBA’s] petition with respect to the nonroad preemption rules.” ARTBA Comments and Rulemaking Petition Regarding Revision to California State Implementation Plan, EPA Docket R09-OAR-2010-0430, Doc. 14, at 1 (July 6, 2010). The association sought “EPA’s denial of California’s SIP revision for the same reasons that ARTBA ha[d] long sought amendment of EPA’s rules implementing Section 209(e).” *Id.* at 2. Rejecting the petition, the EPA explained that “ARTBA’s petition seems to be little more than a renewal of its earlier request for an amendment to EPA’s rule implementing Clean Air Act section 209(e).” Revisions to the California State Implementation Plan, 76 Fed. Reg. 26,609,

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<sup>6</sup> Under the Clean Air Act, “states must adopt, and submit to the EPA for approval, SIPs that provide for the implementation, maintenance, and enforcement” of the national air quality standards. *County of Delaware, Pennsylvania v. Dep’t of Transp.*, 554 F.3d 143, 145 (D.C. Cir. 2009).

26,611–12 (May 9, 2011). The agency noted that it had “already reviewed these issues several times and [was] not revisiting these broader issues in this limited proceeding.” *Id.* at 26,612.

On July 8, 2011, ARTBA filed suit in the Ninth and D.C. Circuits. ARTBA petitioned the D.C. Circuit to review (1) the EPA’s approval of the SIP revisions, (2) the agency’s refusal to designate its action as having “nationwide scope or effect” under section 307(b)(1) and therefore subject to challenge in the D.C. Circuit instead of the Ninth Circuit, and (3) its denial of ARTBA’s petition to amend or repeal the rules concerning the preemptive scope of section 209(e). *See* Petition for Review, *ARTBA v. EPA*, No. 11-1256 (D.C. Cir. July 8, 2011). ARTBA petitioned the Ninth Circuit to review only the approval of the SIP revisions. *See* Petition for Review, *ARTBA v. EPA*, No. 11-71897 (9th Cir. July 8, 2011). The Ninth Circuit case is currently stayed pending the resolution of the D.C. Circuit case.

On September 22, 2011, ARTBA brought this case “to challenge EPA’s final agency action with respect to” the 2008 rulemaking at issue in *ARTBA v. EPA*, 588 F.3d 1109 (D.C. Cir. 2009), as well as the 2011 rulemaking regarding the California SIP revisions, both of which “relate to the preemptive scope of Clean Air Act § 209(e), 42 U.S.C. § 7543(e).” Compl. ¶ 1. ARTBA seeks, in essence, a declaratory judgment approving its interpretation of that provision and requiring the EPA to amend its regulations accordingly. ARTBA also asks this court to void decisions of the United States Supreme Court and the D.C. Circuit. The association has named as defendants the United States, the EPA, and its Administrator, Lisa P. Jackson, acting in her

official capacity (collectively, “the government”). The government has moved to dismiss the case for lack of jurisdiction.<sup>7</sup>

## II. LEGAL STANDARD

Sovereign immunity, which shields from suit the federal government, its agencies, and federal officials acting in their official capacities, is “jurisdictional in nature.” *FDIC v. Meyer*, 510 U.S. 471, 475 (1994) (the federal government and its agencies); *Jackson v. Donovan*, 2012 WL 574075, at \*1 (D.D.C. Feb. 23, 2012) (citing *Kentucky v. Graham*, 473 U.S. 159, 165–66 (1985)) (federal officials in their official capacities); *see also United States v. Mitchell*, 463 U.S. 206, 212 (1983) (“It is axiomatic that the United States may not be sued without its consent and that the existence of consent is a prerequisite for jurisdiction”). “A waiver of the Federal Government’s sovereign immunity must be unequivocally expressed in statutory text, and will not be implied.” *Lane v. Pena*, 518 U.S. 187, 192 (1996) (citations omitted). “Indeed, the ‘[statutory] terms of [the United States’] consent to be sued in any court define that court’s jurisdiction to entertain the suit.’” *Meyer*, 510 U.S. at 475 (quoting *United States v. Sherwood*, 312 U.S. 584, 586 (1941)). By the same token, because “the inferior courts of the United States . . . are creatures of statute,” *Owens v. Republic of Sudan*, 531 F.3d 884, 887 (D.C. Cir. 2008), which “may not exercise jurisdiction absent a statutory basis,” *Exxon Mobil Corp. v. Allapattah Servs., Inc.*, 545 U.S. 546, 552 (2005), the terms of jurisdiction-conferring statutes both define and limit a federal court’s authority to hear a given case. The plaintiff bears the burden of establishing both the court’s statutory jurisdiction and the government’s waiver of its sovereign

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<sup>7</sup> The government argues in the alternative that ARTBA cannot state a claim on which relief can be granted and that the case is barred by *res judicata*, but the court need not reach those arguments to resolve the motion.

immunity. See *Kokkonen v. Guardian Life Ins. Co.*, 511 U.S. 375, 377 (1994); *Tri-State Hosp. Supply Corp. v. United States*, 341 F.3d 571, 575 (D.C. Cir. 2003) (“A party bringing suit against the United States bears the burden of proving that the government has unequivocally waived its immunity.”); *Jackson v. Bush*, 448 F. Supp. 2d 198, 200 (D.D.C. 2006) (noting that “a plaintiff must overcome the defense of sovereign immunity in order to establish the jurisdiction necessary to survive a Rule 12(b)(1) motion to dismiss”).

### III. ANALYSIS

Section 307(b)(1) of the Clean Air Act “channels review of final EPA action exclusively to the courts of appeals, regardless of how the grounds for review are framed.” *Virginia v. United States*, 74 F.3d 517, 523 (4th Cir. 1996); *Missouri v. United States*, 109 F.3d 440, 441 (8th Cir. 1997) (“The Clean Air Act . . . channels all petitions for review of EPA actions into the courts of appeals.”) (abbreviation expanded); see also *Massachusetts v. EPA*, 415 F.3d 50, 54 (D.C. Cir. 2005), *overruled on other grounds*, 549 U.S. 497 (2007) (“Section 307(b)(1), 42 U.S.C. § 7607(b)(1), gives this court *exclusive* jurisdiction over ‘nationally applicable regulations promulgated, or final action taken, by the Administrator’ under chapter 85 of the Act.”) (emphasis added); *Envtl. Def. Fund v. Thomas*, 870 F.2d 892, 896 (2d Cir. 1989) (“Because Section 307 embodies a grant of *exclusive* jurisdiction, it appears that if the District of Columbia [Circuit] has jurisdiction over the present action, the district court does not.”) (emphasis added); *Royster-Clark Agribusiness, Inc. v. Johnson*, 391 F. Supp. 2d 21, 25–26 (D.D.C. 2005) (“It is well-settled that subsection 307(b)(1) of the Clean Air Act provides the *exclusive* means of obtaining review of final actions by EPA under the Clean Air Act.”) (emphasis added) (abbreviation expanded). This case seeks review of final agency action by the

EPA under the Clean Air Act. Compl. ¶ 1. It must therefore be brought in the appropriate court of appeals—where, indeed, ARTBA has already sought identical relief.

In an attempt to avoid that conclusion, ARTBA principally invokes the citizen-suit provision of the Clean Air Act, §304(a)(2), 42 U.S.C. § 7604(a)(2), and the Administrative Procedure Act, 5 U.S.C. §§ 701–706. The government responds that neither waives the sovereign immunity of the United States nor gives the plaintiff a cause of action. It might have added—and this court is obliged to note—that ARTBA must also identify a source of statutory jurisdiction. When a party challenges administrative action, the three inquiries are closely related. For instance, if the Administrative Procedure Act provides a cause of action, then it also provides a waiver of sovereign immunity, and the federal question statute grants jurisdiction to the district courts. *See Trudeau v. FTC*, 456 F.3d 178, 185 (D.C. Cir. 2006) (“[T]he APA . . . provide[s] . . . a limited cause of action for parties adversely affected by agency action.”); *id.* at 187 (“[W]e hold that APA § 702’s waiver of sovereign immunity permits [the plaintiff’s] APA cause of action . . . .”); *Road Sprinkler Fitters Local Union 669 v. Herman*, 234 F.3d 1316, 1319 (D.C. Cir. 2000) (“28 U.S.C. § 1331 . . . gives federal courts . . . ‘jurisdiction of all civil actions arising under the . . . laws . . . of the United States,’ including those brought under the APA.”) (quoting 28 U.S.C. § 1331). If, however, another statute provides an “adequate remedy in a court,” 5 U.S.C. § 704, then the APA neither provides a cause of action nor waives sovereign immunity. *Washington Legal Found. v. Alexander*, 984 F.2d 483, 486 (D.C. Cir. 1993) (“[A]n adequate remedy is available to appellants, and we therefore conclude that appellants have no cause of action under the APA . . . .”); *Fornaro v. James*, 416 F.3d 63, 66 (D.C. Cir. 2005) (“The APA excludes from its waiver of sovereign immunity . . . claims for which an adequate remedy

is available elsewhere.”) (quoting *Transohio Sav. Bank v. Dir., Office of Thrift Supervision*, 967 F.2d 598, 607 (D.C. Cir. 1992)) (alterations in original); *Nat’l Wrestling Coaches Ass’n v. Dep’t of Educ.*, 366 F.3d 930, 947 (D.C. Cir. 2004) (“[T]he waiver of sovereign immunity under § 702 is limited by the ‘adequate remedy’ bar of § 704.”). And if the statute providing the adequate remedy channels review to the courts of appeals, it eliminates the federal question jurisdiction that the district courts would otherwise enjoy. See *Harrison v. PPG Indus., Inc.*, 446 U.S. 578, 584 (1980). Because statutory jurisdiction, sovereign immunity, and the ability to state a claim are interrelated in this way, the court will analyze them together as it considers each asserted basis for its jurisdiction and ARTBA’s claims.

The citizen suit provision of the Clean Air Act authorizes “any person” to sue the EPA in district court “where there is alleged a failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator . . . .” 42 U.S.C. § 7604(a)(2). In doing so, it provides jurisdiction to the district courts, waives the sovereign immunity of the United States, and establishes a cause of action. See *Royster-Clark*, 391 F. Supp. 2d at 25–26 (“The Clean Air Act provides its own waiver of sovereign immunity and procedures for review . . . .”) (abbreviation expanded). To invoke this court’s jurisdiction under the citizen suit provision, a plaintiff must point to an “act or duty under [the Clean Air Act] which is not discretionary with the Administrator.” The provision “has been construed narrowly,” *Monongahela Power Co. v. Reilly*, 980 F.2d 272, 276 n.3 (4th Cir. 1992), because “Congress provided for district court enforcement under section 304 in order to permit citizen enforcement of clear-cut violations by polluters or defaults by the Administrator where the only required judicial role would be to make a clear-cut factual determination of whether a violation

did or did not occur,” *Sierra Club v. Thomas*, 828 F.2d 783, 791 (D.C. Cir. 1987) (quotation marks omitted); *see also Env'tl. Def. Fund v. Thomas*, 870 F.2d 892, 899 (2d Cir. 1989) (“[T]he district court has jurisdiction, under Section 304, to compel the Administrator to perform purely ministerial acts, not to order the Administrator to make particular judgmental decisions.”); *Mountain States Legal Found. v. Costle*, 630 F.2d 754, 766 (10th Cir. 1980) (“Congress . . . restricted citizens’ suits to actions seeking to enforce specific non-discretionary clear-cut requirements of the Clean Air Act.”); *Kennecott Copper Corp. v. Costle*, 572 F.2d 1349, 1355 (9th Cir. 1978) (describing the citizen suit provision as “intended to provide relief only in a narrowly-defined class of situations in which the Administrator failed to perform a mandatory function” and “not designed to permit review of the performance of those functions”) (quoting *Wis. Env'tl. Decade, Inc. v. Wis. Power & Light Co.*, 395 F. Supp. 313, 321 (W.D. Wis. 1975)).

ARTBA suggests that agencies’ “everpresent duty to insure that their actions are lawful,” *Pub. Citizen v. Nuclear Regulatory Comm’n*, 901 F.2d 147, 152 (D.C. Cir. 1990), gives the Administrator a nondiscretionary duty to grant the petitions that she denied. ARTBA’s theory is evidently that those petitions merely asked the EPA to bring its regulations into conformity with statutory law—and, of course, the duty to conform with the law is not discretionary. If an allegation of such an abstract duty were enough to satisfy the citizen suit provision, then section 307(b)(1) would mean nothing: any party could challenge regulations promulgated under the Clean Air Act in district court at any time by arguing that those regulations were contrary to the statute. The Clean Air Act clearly forecloses that interpretation. Because ARTBA seeks substantive review of EPA regulations rather than an order that the Administrator perform a purely ministerial act, its case is well outside the scope of the citizen suit provision.

ARTBA next argues that it can bring this suit under the APA. As discussed above, “[u]nder APA § 704, only ‘final agency action for which there is no other adequate remedy in a court [is] subject to judicial review,’” *Transohio Sav. Bank v. Dir., Office of Thrift Supervision*, 967 F.2d 598, 608 (D.C. Cir. 1992) (quoting 5 U.S.C. § 704) (second alteration in original), and “[t]he APA excludes from its waiver of sovereign immunity . . . claims for which an adequate remedy is available elsewhere.” *Fornaro v. James*, 416 F.3d 63, 66 (D.C. Cir. 2005) (quoting *Transohio*, 967 F.2d at 607) (alterations in original). The D.C. Circuit, “in determining whether an adequate remedy exists, has focused on whether a statute provides an independent cause of action or an alternative review procedure.” *El Rio Santa Cruz Neighborhood Health Ctr., Inc. v. HHS*, 396 F.3d 1265, 1270 (D.C. Cir. 2005). Section 307(b)(1) of the Clean Air Act provides just such a procedure. The fact that, as the Circuit ruled when ARTBA first sought relief there, a particular petition is filed after the statutory period for review does not make the statutory review procedure inadequate. *Martinez v. United States*, 333 F.3d 1295, 1319–20 (Fed. Cir. 2003) (“The fact that the complaint was untimely filed . . . does not mean that that court could not offer a full and adequate remedy; it merely means that [the plaintiff] did not file his complaint in time to take advantage of that remedy.”); *Town of Sanford v. United States*, 140 F.3d 20, 23 (1st Cir. 1998) (“A legal remedy is not inadequate for purposes of the APA because it is procedurally inconvenient for a given plaintiff, or because plaintiffs have inadvertently deprived themselves of an opportunity to pursue that remedy.”); *Sable Commc’ns, Inc. v. FCC*, 827 F.2d 640, 642 (9th Cir. 1987) (holding that the remedy provided by 28 U.S.C. § 2342 was adequate within the meaning of 5 U.S.C. § 704 when it was the plaintiff’s “own inaction which foreclosed review under section 2342”). ARTBA argues that the review procedures of the Clean Air Act are

inadequate because another provision of the Act limits judicial review to “objection[s] . . . raised with reasonable specificity during the period for public comment.” 42 U.S.C. § 7607(d)(7)(B). The association argues that many of its objections to the preemption rule and the interpretive rule arose more than sixty days after those rules were re-promulgated in 1997. (ARTBA does not explain why its challenges to the California SIP revisions now pending in the courts of appeals will not provide an adequate remedy as to those objections.) But the Clean Air Act accounts for just such an eventuality, providing that:

If the person raising an objection can demonstrate to the Administrator that it was impracticable to raise such objection within [the period for public comment] or if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule, the Administrator shall convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed.

*Id.* The judicial review provision, in turn, allows for the review of petitions based on grounds arising after the statutory period for review has expired. *Id.* § 7607(b)(1). Such grounds include “the occurrence of an event that ripens a claim,” although “a petition predicated on any such new event [must] be filed within 60 days of the event.” *ARTBA*, 588 F.3d at 1113–14. The D.C. Circuit held that “none of the[] events” that ARTBA cited there and now cites here occurred within sixty days of its petition either to the EPA or to the court of appeals. *Id.* at 1114. Had ARTBA filed its claim no more than sixty days after an event that ripened its claims, those claims would have been heard as timely brought.<sup>8</sup> ARTBA did not do so, and its claims were therefore dismissed. That the association failed to comply with the review procedures of the

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<sup>8</sup> The D.C. Circuit acknowledged that there is some ambiguity as to whether such claims should first be presented to the Administrator or brought directly to the Circuit, *see ARTBA*, 588 F.3d at 1114, but that ambiguity is not enough to render the review procedure inadequate.

Clean Air Act does not render those procedures inadequate, nor permit ARTBA to bring its claim under the APA. ARTBA therefore has no cause of action under the APA, and cannot depend upon that statute's waiver of sovereign immunity.

ARTBA raises other arguments, which the court addresses briefly. There is a narrow exception to sovereign immunity for suits alleging that a federal officer has acted outside of his delegated power, *see Larson v. Domestic & Foreign Commerce Corp.*, 337 U.S. 682, 689–90 (1949); *Chamber of Commerce v. Reich*, 74 F.3d 1322, 1329 (D.C. Cir. 1996), but “[a] claim of error in the exercise of that power is . . . not sufficient.” *Larson*, 337 U.S. at 690; *see also Royster-Clark*, 391 F. Supp. 2d at 24–25. There is no doubt that the Administrator had the power to promulgate regulations implementing Clean Air Act section 209(e). 42 U.S.C. § 7543(e) (“The Administrator shall issue regulations to implement this subsection.”). To claim that she erred in doing so is not to state a claim that she acted *ultra vires*. ARTBA also invokes *Ex parte Young*, 209 U.S. 123 (1908), which is simply the first instance of the theory at work in *Larson*. *See Vann v. Kempthorne*, 534 F.3d 741, 751 (D.C. Cir. 2008) (discussing the “rationale set forth in *Ex parte Young* and described in *Larson*”). Moreover, “since 1976 federal courts have looked to § 702 of the Administrative Procedure Act to serve the purposes of the *Ex parte Young* fiction in suits against federal officers.” *EEOC v. Peabody W. Coal Co.*, 610 F.3d 1070, 1085 (9th Cir. 2010) (citation omitted). In *Leedom v. Kyne*, 358 U.S. 184 (1958), “the Supreme Court held that, even though there is a statutory prohibition against review of representation orders of the National Labor Relations Board, a District Court has jurisdiction under section [28 U.S.C. §] 1331 in the *very limited circumstance* where the Board has clearly violated an express mandate of the statute and the plaintiff has no alternative means of review.” *Telecomm.*

*Research & Action Ctr. v. FCC*, 750 F.2d 70, 78 (D.C. Cir. 1984). ARTBA has pointed to no “express mandate of the statute” and, as discussed above, it has an alternate means of review. ARTBA next invokes the Declaratory Judgment Act, 28 U.S.C. §§ 2201–02, which is not a basis for federal jurisdiction. *See Skelly Oil Co. v. Phillips Petroleum Co.*, 339 U.S. 667, 671–72; *see also Motor Vehicle Mfrs. Ass’n v. Costle*, 647 F.2d 675, 677 n.3 (6th Cir. 1981) (per curiam) (“Neither the Mandamus Act, the Declaratory Judgment Act, nor a district court’s federal question jurisdiction authorizes review . . . in the district court in light of the exclusive grant of jurisdiction to the United States Court of Appeals for the District of Columbia by Section 307(b)(1) of the Clean Air Act.”). Finally, ARTBA urges the court to exercise its general equity jurisdiction. But “[i]t is a basic doctrine of equity jurisprudence that courts of equity should not act when the moving party has an adequate remedy at law . . . .” *Morales v. Trans World Airlines, Inc.*, 504 U.S. 374, 381 (1992) (ellipsis and internal quotation marks omitted). The court emphasizes once more that the Clean Air Act gave ARTBA an adequate means of judicial review.

#### IV. CONCLUSION

The Clean Air Act gives the courts of appeals exclusive jurisdiction over the claims that ARTBA would raise here. In doing so, it provides an adequate remedy at law. There is no basis for jurisdiction over ARTBA’s claims in this court, and no applicable waiver of the federal government’s sovereign immunity. The court will therefore grant the government’s motion to dismiss the case for lack of jurisdiction.

Rudolph Contreras  
United States District Judge

Date: June 7, 2012

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<mastro.donna@epamail.epa.gov>; Doug Snyder  
<snyder.doug@epamail.epa.gov>; David Schulz  
<schulz.david@epamail.epa.gov>; Fisherow, Walter Benjamin  
(ENRD) <wfisherow@enrd.usdoj.gov>  
Cc:  
Bcc:  
Subject: Copy: AEP CD Modification  
Date: Mon Aug 27 2012 15:18:52 EDT  
Attachments:

---

StartTime: Wed Aug 29 11:00:00 Eastern Daylight Time 2012  
EndTime: Wed Aug 29 12:00:00 Eastern Daylight Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Mon Aug 27 15:18:00 Eastern Daylight Time 2012

When: Wednesday, August 29, 2012 11:00 AM-12:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: Conference Call

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Phone: 866-410-9426.  
Passcode: is 202-514-2468.



---

From: Flint, Myles (ENRD)  
<myles.flint@usdoj.gov>  
To: Fisherow, Walter Benjamin (ENRD)  
<walter.benjamin.fisherow@usdoj.gov>; Augenstern, Fred (AGO)  
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<argentieri.sabrina@epa.gov>; allen.brooks@doj.nh.gov  
<allen.brooks@doj.nh.gov>; jon.martin@dol.lps.state.nj.us  
<jon.martin@dol.lps.state.nj.us>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>;  
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Cc: jmmcmanus@aep.com <jmmcmanus@aep.com>;  
jjhenry@aep.com <jjhenry@aep.com>  
Bcc:  
Subject: Friday Call with AEP  
Date: Thu Aug 30 2012 15:11:47 EDT  
Attachments:

---

Date: Friday, August 31.

Time: 10:00 a.m.(Eastern).

Call in number: 866-410-9426

Conf. code: 2023071859

Please call me with any questions.

Regards,

Myles

Myles E. Flint, II

Trial Attorney

U.S. Department of Justice

Environmental Enforcement Section

Regular Mail: P.O. Box 7611, Ben Franklin Station, Washington, DC 20044-7611

Express Mail: ENRD Mailroom, Room 2121, 601 D Street, NW, Washington, DC 20004

Phone: (202) 307-1859

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Mike Meyers & David Doniger  
Date: Wed Sep 05 2012 16:52:31 EDT  
Attachments:

---

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From: Boudreau, Lorene L. (Phila)  
<boudreaul@ballardspahr.com>  
To: Neil Gormley  
<ngormley@earthjustice.org>; John Suttles  
<jsuttles@selcnc.org>; Sanjay Narayan  
<sanjay.narayan@sierraclub.org>; Ann Weeks <aweeks@catf.us>;  
Darin Schroeder <dschroeder@catf.us>; Davis, Emily  
<edavis@nrdc.org>; Pamela Campos <pcampos@edf.org>; McKinstry,  
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<susan.durbin@doj.ca.gov>; Iancu, Carol (AGO)  
<carol.iancu@state.ma.us>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>;  
sean@donahuegoldberg.com <sean@donahuegoldberg.com>; Boudreau,  
Lorene L. (Phila) <boudreaul@ballardspahr.com>  
Cc:  
Bcc:  
Subject: Copy: MATS Intervenors Call - Sept. 12 at 11:30 AM EST  
Date: Wed Sep 05 2012 16:57:14 EDT  
Attachments:

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StartTime: Wed Sep 12 11:30:00 Eastern Daylight Time 2012  
EndTime: Wed Sep 12 12:00:00 Eastern Daylight Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Wed Sep 05 17:09:00 Eastern Daylight Time 2012

The purpose of this call is to discuss the outline for the NGO/industry intervenors brief and coordination with the states/cities brief.

Please use the following information:

Dial-in: 888-857-7121  
Passcode: 215-864-8245

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton <vpatton@edf.org>; Monica Wagner </o=lawnet/ou=first administrative group/cn=recipients/cn=monicawagner>; Doniger, David <ddoniger@nrdc.org>; Joanne Spalding <joanne.spalding@sierraclub.org>; Ann Weeks <aweeks@catf.us>  
Cc: sean@donahuegoldberg.com <sean@donahuegoldberg.com>; Cecelia Chang </o=lawnet/ou=first administrative group/cn=recipients/cn=ceceliachang>  
Bcc:  
Subject: RE: 09-1322 Coalition for Responsible Reg v. EPA "Order Filed (CLERK)" (EPA-74FR66496)  
Date: Thu Sep 06 2012 12:27:03 EDT  
Attachments:

---

I can do Monday at 3.

---

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Thursday, September 06, 2012 12:01 PM  
To: Monica Wagner; Michael J. Myers; Doniger, David; 'Joanne Spalding'; Ann Weeks  
Cc: sean@donahuegoldberg.com  
Subject: FW: 09-1322 Coalition for Responsible Reg v. EPA "Order Filed (CLERK)" (EPA-74FR66496)

Hi All – Sean and I were hoping to pull together a call for Monday to discuss the combined response for intervenors-respondent. How is Monday at 3pm ET? And please include others. Best wishes, Vickie

From: ecfnoticing@cadc.uscourts.gov [mailto:ecfnoticing@cadc.uscourts.gov]  
Sent: Thursday, September 06, 2012 7:57 AM  
To: Vickie Patton  
Subject: 09-1322 Coalition for Responsible Reg v. EPA "Order Filed (CLERK)" (EPA-74FR66496)

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United States Court of Appeals for District of Columbia Circuit

Notice of Docket Activity

The following transaction was entered on 09/06/2012 at 9:54:45 AM EDT and filed on 09/06/2012

Case Name:

Coalition for Responsible Reg v. EPA

Case Number:

09-1322

Document(s):

Document(s)

Docket Text:

CLERK'S ORDER filed [1393022] Upon consideration of the petition of the Chamber of Commerce for rehearing en banc and the petition of the Non-State Petitioners for rehearing en banc, it is ORDERED that, within 15 days from the date of this order, respondent EPA file a combined response to the above-referenced en banc petitions, and intervenors for respondent file a combined response to the above-referenced en banc petitions. Each response may not exceed 20 pages. Absent further order of the court, no replies to the responses will be accepted. [09-1322, 10-1024, 10-1025, 10-1026, 10-1030, 10-1035, 10-1036, 10-1037, 10-1038, 10-1039, 10-1040, 10-1041, 10-1042, 10-1044, 10-1045, 10-1046, 10-1073, 10-1083, 10-1099, 10-1109, 10-1110, 10-1114, 10-1118, 10-1119, 10-1120, 10-1122, 10-1123, 10-1124, 10-1125, 10-1126, 10-1127, 10-1128, 10-1129, 10-1131, 10-1132, 10-1145, 10-1147, 10-1148, 10-1199, 10-1200, 10-1201, 10-1202, 10-1203, 10-1206, 10-1207, 10-1208, 10-1210, 10-1211, 10-1212, 10-1213, 10-1216, 10-1218, 10-1219, 10-1220, 10-1221, 10-1222, 10-1092, 10-1094, 10-1134, 10-1143, 10-1144, 10-1152, 10-1156, 10-1158, 10-1159, 10-1160, 10-1161, 10-1162, 10-1163, 10-1164, 10-1166, 10-1182, 10-1167, 10-1168, 10-1169, 10-1170, 10-1173, 10-1174, 10-1175, 10-1176, 10-1177, 10-1178, 10-1179, 10-1180, 10-1234, 10-1235, 10-1239, 10-1245, 10-1281, 10-1310, 10-1318, 10-1319, 10-1320, 10-1321]

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Montgomery, AL 36104

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\*Margaret I. Olson, Assistant Attorney General  
\*Scott Charles Oostdyk  
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\*Mr. William Lyon Pardee  
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<snyder.doug@epamail.epa.gov>; Thea Schwartz  
<tschwartz@atg.state.vt.us>; Fisherow, Walter Benjamin (ENRD)  
<walter.benjamin.fisherow@usdoj.gov>  
Cc:  
Bcc:  
Subject: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-1182  
Date: Fri Sep 07 2012 11:08:40 EDT  
Attachments:

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Dear Counsel:

Below are the instructions for the telephone conference call at 2:00 p.m. today with Judge Sargus. Please e-mail me back and let me know if you are planning to participate so I can advise the Judge of the names of the participants.

The call in number is 888-684-8852., please call about 5 minutes prior to the scheduled time of call.

You will be asked for an access code, which is: 9586353#

Then you will be asked for a Conference Security Code, which is 1182

If you have any questions, please feel free to contact me.

Debra Hepler  
Secretary to Judge Edmund A. Sargus, Jr.  
(614) 719-3240

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: jjhenry@aep.com <jjhenry@aep.com>;  
Flint, Myles (ENRD) <myles.flint@usdoj.gov>  
Cc: allen.brooks@doj.nh.gov  
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<walter.benjamin.fisherow@usdoj.gov>  
Bcc:  
Subject: RE: Friday Call with AEP  
Date: Fri Sep 07 2012 11:44:07 EDT  
Attachments:

---

I have a conflict, which I am trying now to reschedule. I'd appreciate a little more notice next time.

---

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Sent: Friday, September 07, 2012 10:44 AM  
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Subject: Re: Friday Call with AEP

Counsel - I have contacted the Judge's office and he is available to talk with us at 2:00 p.m. this afternoon. Penny Barrick in the Judge's office will send around call-in information to all of the parties copied on this e-mail. I have used the same e-mail list used for the call this morning, which I believe includes representatives for all parties.

I have also advised Penny that we would like to discuss the possibility of scheduling a meeting with Judge Sargus early the week of September 17, and she has told me that the judge has some availability on Tuesday, September 17 and is available all day Wednesday, September 18. The AEP representatives are available on either or both of those dates.

Thank you for your cooperation.

Janet J. Henry  
American Electric Power Service Corporation  
1 Riverside Plaza  
Columbus, OH 43215  
(614) 716-1612  
Fax: (614) 716-1613

[jjhenry@aep.com](mailto:jjhenry@aep.com)

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Bcc:  
Subject: RE: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-  
1182  
Date: Fri Sep 07 2012 12:21:09 EDT  
Attachments:

---

Debra--I will participate on behalf of the State of NY. Thanks.--Mike

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New York State Attorney General  
The Capitol  
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From: Debra\_A\_Hepler@ohsd.uscourts.gov [mailto:Debra\_A\_Hepler@ohsd.uscourts.gov]  
Sent: Friday, September 07, 2012 11:09 AM  
To: jjhenry@aep.com; Flint, Myles (ENRD); penny\_barrick@ohsd.uscourts.gov; allen.brooks@doj.nh.gov; argentieri.sabrina@epa.gov; Brooks.Phillip@epamail.epa.gov; Bruce Nilles; Apple Chapman; Shallcross, Douglas (DEP); Braczyk, Edward (DEP); Faith Bugel; Augenstern, Fred (AGO); Gregory Fried; Gregory Schultz (gschultz@riag.ri.gov); jjhenry@aep.com; dmike1947@gmail.com; jhadden@porterwright.com; jon.martin@dol.lps.state.nj.us; Seema Kakade; Eleanor Kane; lori.dibella@po.state.ct.us; Mastro.Donna@epamail.epa.gov; Michael J. Myers; MZimmerman@mde.state.md.us; nmarks@nrdc.org; Chris Pilla; David Schulz; Doug Snyder; Thea Schwartz; Fisherow, Walter Benjamin (ENRD)  
Subject: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-1182

Dear Counsel:

Below are the instructions for the telephone conference call at 2:00 p.m. today with Judge Sargus. Please e-mail me back and let me know if you are planning to participate so I can advise the Judge of the names of the participants.

The call in number is 888-684-8852., please call about 5 minutes prior to the scheduled time of call.

You will be asked for an access code, which is: 9586353#

Then you will be asked for a Conference Security Code, which is 1182

If you have any questions, please feel free to contact me.

Debra Hepler

Secretary to Judge Edmund A. Sargus, Jr.  
(614) 719-3240

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<myles.flint@usdoj.gov>  
To: Flint, Myles (ENRD)  
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<edward.braczyk@state.ma.us>; jon.martin@dol.lps.state.nj.us  
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<snyder.doug@epamail.epa.gov>; Fisherow, Walter Benjamin (ENRD)  
<walter.benjamin.fisherow@usdoj.gov>; Eleanor Kane  
<kane.eleanor@epamail.epa.gov>  
Bcc:  
Subject: AEP - Today's call  
Date: Tue Sep 11 2012 10:17:53 EDT  
Attachments:

---

Here is the call in information for today's 11:00 (eastern) call:

Call in: (866)410-9426

Conference Code: 2025143907

Talk to you at 11:00.

Myles

Myles E. Flint, II

Trial Attorney

U.S. Department of Justice

Environmental Enforcement Section

Regular Mail: P.O. Box 7611, Ben Franklin Station, Washington, D.C., 20044-7611

Express Mail: ENRD Mailroom, Room 2121, 601 D. Street, N.W., Washington, D.C. 20044

(202) 307-1859

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Lipshultz, Jon (ENRD) <jon.lipshultz@usdoj.gov>; Sean Donahue <sean@donahuegoldberg.com>; Carol Holmes <holmes.carol@epamail.epa.gov>; John Hannon <hannon.john@epamail.epa.gov>; Silverman, Steve (ENRD) <steve.silverman@usdoj.gov>; Elliott Zenick <zenick.elliott@epamail.epa.gov>; Howard Hoffman <hoffman.howard@epamail.epa.gov>; Kristi Smith <smith.kristi@epamail.epa.gov>; Hostetler, Eric (ENRD) <eric.hostetler@usdoj.gov>; Berman, Amanda (ENRD) <amanda.berman@usdoj.gov>; Rosen, Perry (ENRD) <perry.rosen@usdoj.gov>; Vaden, Christopher (ENRD) <christopher.vaden@usdoj.gov>  
Cc: Purdy, Angeline (ENRD) <angeline.purdy@usdoj.gov>; ddoniger@nrdc.org <ddoniger@nrdc.org>; Joanne Spalding <joanne.spalding@sierraclub.org>; Ann Weeks <aweeks@catf.us>; Susan Durbin <susan.durbin@doj.ca.gov>; Iancu, Carol (AGO) <carol.iancu@state.ma.us>; Gavin McCabe <gavin.mccabe@doj.ca.gov>; chaake@gibsondunn.com <chaake@gibsondunn.com>  
Bcc:  
Subject: RE: Draft Extension Motion - GHG Rehearing Petition Responses  
Date: Tue Sep 11 2012 12:45:21 EDT  
Attachments:

---

The draft looks fine. Thanks Jack.

---

From: Lipshultz, Jon (ENRD) [mailto:Jon.Lipshultz@usdoj.gov]  
Sent: Tuesday, September 11, 2012 11:40 AM  
To: Sean Donahue; Carol Holmes; John Hannon; Silverman, Steve (ENRD); 'Elliott Zenick'; Howard Hoffman; 'Kristi Smith'; Hostetler, Eric (ENRD); Berman, Amanda (ENRD); Rosen, Perry (ENRD); Vaden, Christopher (ENRD)  
Cc: Purdy, Angeline (ENRD); ddoniger@nrdc.org; Joanne Spalding; Ann Weeks; Michael J. Myers; Susan Durbin; Iancu, Carol (AGO); Gavin McCabe; chaake@gibsondunn.com  
Subject: Draft Extension Motion - GHG Rehearing Petition Responses

All: Per our discussions, attached please find a very simple draft extension motion for responses to the rehearing petitions in the DC Circuit GHG litigation. If you have any comments I'd appreciate it if you could let me know by early afternoon, as I would like to get this filed later this afternoon if it's OK with everyone. Thanks much. Jack

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Debra\_A\_Hepler@ohsd.uscourts.gov  
<debra\_a\_hepler@ohsd.uscourts.gov>  
Cc:  
Bcc:  
Subject: RE: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-1182  
Date: Wed Sep 12 2012 13:00:54 EDT  
Attachments:

---

Debra, I plan to represent New York at the conference with Judge Sargus on September 19. I wanted to reach out in advance of that conference with a question. My former colleague, Scott Bassinson (and subsequently Robert Rosenthal) represented NY in the case and in negotiations over the consent decree. I represented NY in the related but separate AEP case that was assigned to Judge Frost, and was admitted pro hac vice in that matter. The consent decree resolved NY's claims in both of those cases. My question is whether, for purposes of participating in the Sept. 19 conference concerning the consent decree, Judge Sargus would consider my pro hac vice admission in the related AEP case sufficient, or whether he would prefer that I file a separate pro hac motion in this case in advance. Thank you.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
Michael.myers@ag.ny.gov

-----Original Message-----

From: Debra\_A\_Hepler@ohsd.uscourts.gov [mailto:Debra\_A\_Hepler@ohsd.uscourts.gov]  
Sent: Friday, September 07, 2012 11:09 AM  
To: jjhenry@aep.com; Flint, Myles (ENRD); penny\_barrick@ohsd.uscourts.gov; allen.brooks@doj.nh.gov; argentieri.sabrina@epa.gov; Brooks.Phillip@epamail.epa.gov; Bruce Nilles; Apple Chapman; Shallcross, Douglas (DEP); Braczyk, Edward (DEP); Faith Bugel; Augenstern, Fred (AGO); Gregory Fried; Gregory Schultz (gschultz@riag.ri.gov); jjhenry@aep.com; dmike1947@gmail.com; jhadden@porterwright.com; jon.martin@dol.lps.state.nj.us; Seema Kakade; Eleanor Kane; lori.dibella@po.state.ct.us; Mastro.Donna@epamail.epa.gov; Michael J. Myers; MZimmerman@mde.state.md.us; nmarks@nrdc.org; Chris Pilla; David Schulz; Doug Snyder; Thea Schwartz; Fisherow, Walter Benjamin (ENRD)  
Subject: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-1182

Dear Counsel:

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The call in number is 888-684-8852., please call about 5 minutes prior to the scheduled time of call.

You will be asked for an access code, which is: 9586353#  
Then you will be asked for a Conference Security Code, which is 1182

If you have any questions, please feel free to contact me.

Debra Hepler  
Secretary to Judge Edmund A. Sargus, Jr.  
(614) 719-3240

---

From: Ceres <test@reply.ceres.org>  
To: Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>  
Cc:  
Bcc:  
Subject: Save the Date for the Ceres Conference 2013!  
Date: Wed Sep 12 2012 13:09:27 EDT  
Attachments:

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Ceres Conference 2013, May 1-2, San Francisco CA

Save the Date for the Ceres Conference 2013!

Join us in San Francisco May 1-2, 2013

Featured Speaker Dan Hesse

Dan Hesse  
CEO Sprint Nextel Corporation

Record heat. Extreme storms. Devastating droughts. The climate is changing - but you don't go to a conference just to talk about the weather.

The climate and the economy are inextricably linked, and each year the Ceres Conference connect the dots.

More than ever, issues like water and resource scarcity, fragile supply chains and physical risks of climate change are increasingly intertwined. By bringing together business, investor and NGO leaders working to address the world's most pressing sustainability challenges, the Conference explores strategies for managing these escalating risks.

The scale of these challenges is immense, but there are signs of progress in every sector. From electric power to auto manufacturing to insurance, companies and investors are adapting business models to increase efficiency, reduce impacts and boost the bottom line.

Join us at the Ceres Conference 2013 to connect with fellow leaders creating the innovative solutions that will build a more sustainable global economy.

Registration for the Ceres Conference will open in December. In the meantime we have an opportunity for you to engage in the conference now!

Sign up for Conference Updates

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Do you know an investor, business or NGO leader who is working to create a sustainable global economy? Nominate your sustainability hero for the 2013 Joan Bavaria Award . The Joan Bavaria Award is presented annually by Ceres and Trillium Asset Management LLC to a unique investor, business or NGO leader who is working to transform the capital markets into a system that balances economic prosperity with social and environmental concerns. The winner will be announced at the 2013 Ceres Conference.

Nominations for the 2013 Joan Bavaria Award are now open! Nominate your sustainability hero online today.

To learn more about Joan Bavaria and the award, [click here](#) or email Brian Sant.

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This email was sent to: [lemuel.srolovic@ag.ny.gov](mailto:lemuel.srolovic@ag.ny.gov)

This email was sent by: Ceres  
99 Chauncy Street, Boston, MA, 02111,

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---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Penny\_Barrick@ohsd.uscourts.gov  
<penny\_barrick@ohsd.uscourts.gov>  
Cc: Debra\_A\_Hepler@ohsd.uscourts.gov  
<debra\_a\_hepler@ohsd.uscourts.gov>  
Bcc:  
Subject: RE: Fw: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-1182  
Date: Thu Sep 13 2012 16:32:33 EDT  
Attachments:

---

Thank you Penny. Bob is now counsel in the Governor's Office (he was actually here today for lunch to visit with us). I will certainly pass along the Judge's regards. I look forward to meeting the Judge and you next week.--Mike

-----Original Message-----

From: Penny\_Barrick@ohsd.uscourts.gov [mailto:Penny\_Barrick@ohsd.uscourts.gov]  
Sent: Thursday, September 13, 2012 4:26 PM  
To: Michael J. Myers  
Cc: Debra\_A\_Hepler@ohsd.uscourts.gov  
Subject: Re: Fw: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-1182

Michael,

You do not need to file for pro hac vice admission in the case before Judge Sargus. Judge Sargus asked if you would be able to pass a "hello" along to Robert Rosenthal from him?

Thanks,

Penny

Penny L. Barrick, Esq.  
Law Clerk to the Honorable Edmund A. Sargus, Jr.  
Telephone: 614-719-3243  
Facsimile: 614-719-3246  
Penny\_Barrick@ohsd.uscourts.gov

----- Forwarded by Debra A. Hepler/OHSD/06/USCOURTS on 09/13/2012 11:01 AM

-----

From:"Michael J. Myers" <Michael.Myers@ag.ny.gov>  
To:"Debra\_A\_Hepler@ohsd.uscourts.gov"  
<Debra\_A\_Hepler@ohsd.uscourts.gov>,  
Date:09/12/2012 01:01 PM  
Subject:RE: Call in Information for 2:00 pm Telephone Conference Call  
in Case No. C2-99-1182

Debra, I plan to represent New York at the conference with Judge Sargus on September 19. I wanted to reach out in advance of that conference with a question. My former colleague, Scott Bassinson (and subsequently Robert Rosenthal) represented NY in the case and in negotiations over the consent decree. I represented NY in the related but separate AEP case that was assigned to Judge Frost, and was admitted pro hac vice in that matter. The consent decree resolved NY's claims in both of those cases. My question is whether, for purposes of participating in the Sept. 19 conference concerning the consent decree, Judge Sargus would consider my pro hac vice admission in the related AEP case sufficient, or whether he would prefer that I file a separate pro hac motion in this case in advance. Thank you.--Mike

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Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
Michael.myers@ag.ny.gov

-----Original Message-----

From: Debra\_A.\_Hepler@ohsd.uscourts.gov [mailto:Debra\_A.\_Hepler@ohsd.uscourts.gov]  
Sent: Friday, September 07, 2012 11:09 AM  
To: jjhenry@aep.com; Flint, Myles (ENRD); penny\_barrick@ohsd.uscourts.gov; allen.brooks@doj.nh.gov; argentieri.sabrina@epa.gov; Brooks.Phillip@epamail.epa.gov; Bruce Nilles; Apple Chapman; Shallcross, Douglas (DEP); Braczyk, Edward (DEP); Faith Bugel; Augenstern, Fred (AGO); Gregory Fried; Gregory Schultz (gschultz@riag.ri.gov); jjhenry@aep.com; dmike1947@gmail.com; jhadden@porterwright.com; jon.martin@dol.lps.state.nj.us; Seema Kakade; Eleanor Kane; lori.dibella@po.state.ct.us; Mastro.Donna@epamail.epa.gov; Michael J. Myers; MZimmerman@mde.state.md.us; nmarks@nrdc.org; Chris Pilla; David Schulz; Doug Snyder; Thea Schwartz; Fisherow, Walter Benjamin (ENRD)  
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If you have any questions, please feel free to contact me.

Debra Hepler  
Secretary to Judge Edmund A. Sargus, Jr.  
(614) 719-3240

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Robert Rosenthal  
<robert.rosenthal@exec.ny.gov>  
Cc:  
Bcc:  
Subject: FW: Fw: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-1182  
Date: Thu Sep 13 2012 16:33:42 EDT  
Attachments:

---

Bob--Judge Sargus says "hello." Great to see you today. Take it easy.--Mike

-----Original Message-----

From: Penny\_Barrick@ohsd.uscourts.gov [mailto:Penny\_Barrick@ohsd.uscourts.gov]  
Sent: Thursday, September 13, 2012 4:26 PM  
To: Michael J. Myers  
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Law Clerk to the Honorable Edmund A. Sargus, Jr.  
Telephone: 614-719-3243  
Facsimile: 614-719-3246  
Penny\_Barrick@ohsd.uscourts.gov

----- Forwarded by Debra A. Hepler/OHSD/06/USCOURTS on 09/13/2012 11:01 AM  
-----

From:"Michael J. Myers" <Michael.Myers@ag.ny.gov>  
To:"Debra\_A\_Hepler@ohsd.uscourts.gov"  
<Debra\_A\_Hepler@ohsd.uscourts.gov>,  
Date:09/12/2012 01:01 PM  
Subject:RE: Call in Information for 2:00 pm Telephone Conference Call  
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New York State Attorney General  
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Albany, NY 12224  
(518) 402-2594  
Michael.myers@ag.ny.gov

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To: jjhenry@aep.com; Flint, Myles (ENRD); penny\_barrick@ohsd.uscourts.gov; allen.brooks@doj.nh.gov; argentieri.sabrina@epa.gov; Brooks.Phillip@epamail.epa.gov; Bruce Nilles; Apple Chapman; Shallcross, Douglas (DEP); Braczyk, Edward (DEP); Faith Bugel; Augenstern, Fred (AGO); Gregory Fried; Gregory Schultz (gschultz@riag.ri.gov); jjhenry@aep.com; dmike1947@gmail.com; jhadden@porterwright.com; jon.martin@dol.lps.state.nj.us; Seema Kakade; Eleanor Kane; lori.dibella@po.state.ct.us; Mastro.Donna@epamail.epa.gov; Michael J. Myers; MZimmerman@mde.state.md.us; nmarks@nrdc.org; Chris Pilla; David Schulz; Doug Snyder; Thea Schwartz; Fisherow, Walter Benjamin (ENRD)  
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From: Robert Rosenthal  
<robert.rosenthal@exec.ny.gov>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: Re: Fw: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-1182  
Date: Thu Sep 13 2012 16:35:51 EDT  
Attachments:

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Pretty cool. Please extend the same back to him. Thanks for that.

----- Original Message -----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Thursday, September 13, 2012 04:33 PM  
To: Robert Rosenthal  
Subject: FW: Fw: Call in Information for 2:00 pm Telephone Conference Call in Case No. C2-99-1182

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Date: 09/12/2012 01:01 PM

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Debra Hepler  
Secretary to Judge Edmund A. Sargus, Jr.  
(614) 719-3240

\*\*\*\*\*

WE WORK FOR THE PEOPLE  
Performance \* Integrity \* Pride

---

From: Longstreth, Ben <blongstreth@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Bcc:  
Subject: RE: Win in RGGI case  
Date: Tue Sep 18 2012 13:40:32 EDT  
Attachments:

---

Hi Mike and Morgan, did the plaintiffs in the Thrun case appeal? Thanks, Ben

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, June 13, 2012 2:24 PM  
To: 'Abigail Dillen'; Martinez, Luis; Longstreth, Ben  
Cc: Morgan Costello  
Subject: Win in RGGI case

All--Just wanted to pass along the good news that we received a favorable decision today granting our motion to dismiss the Thrun case. The judge found for us on standing and laches grounds. A copy of the decision is attached. Thanks for your help in making the laches case, which the judge obviously found convincing. I expect the plaintiffs will appeal, so will keep you posted.--Mike

Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

Michael.myers@ag.ny.gov

---

From: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
To: Longstreth, Ben <blongstreth@nrdc.org>;  
Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: Win in RGGI case  
Date: Tue Sep 18 2012 13:45:53 EDT  
Attachments: Pre-Calendar Statement and Notice of Appeal.pdf

---

Yes, they filed a notice of appeal in July -- see attached. They have not yet perfected.

Morgan A. Costello  
Assistant Attorney General  
New York State Office of the Attorney General  
Environmental Protection Bureau  
The Capitol  
Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

---

From: Longstreth, Ben [mailto:blongstreth@nrdc.org]  
Sent: Tuesday, September 18, 2012 1:41 PM  
To: Michael J. Myers  
Cc: Morgan Costello  
Subject: RE: Win in RGGI case

Hi Mike and Morgan, did the plaintiffs in the Thrun case appeal? Thanks, Ben

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, June 13, 2012 2:24 PM  
To: 'Abigail Dillen'; Martinez, Luis; Longstreth, Ben  
Cc: Morgan Costello  
Subject: Win in RGGI case

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Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

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Albany, NY 12224

(518) 402-2594

Michael.myers@ag.ny.gov

---

Owner: Morgan Costello </o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>  
Filename: Pre-Calendar Statement and Notice of Appeal.pdf  
Last Modified: Tue Sep 18 13:45:53 EDT 2012

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**PRE-CALENDAR STATEMENT**

State of New York  
 Supreme Court – Appellate Division  
 Third Judicial Department

SUPREME COURT OF THE STATE OF NEW YORK  
 COUNTY OF ALBANY

-----	X	
LISA THRUN, JUDITH FORD, and AVA	:	
ASHENDORFF,	:	
	:	
Plaintiffs-Appellants,	:	Albany County Index No. 4358/11
	:	
- against -	:	RJI No. 01-11-104776
	:	
ANDREW M. CUOMO, AS GOVERNOR OF THE	:	Date of Commencement: June 28,
STATE OF NEW YORK; NEW YORK STATE	:	2011
DEPARTMENT OF ENVIRONMENTAL	:	
CONSERVATION; and NEW YORK STATE	:	
ENERGY RESEARCH AND DEVELOPMENT	:	
AUTHORITY,	:	
	:	
Defendants-Respondents.	:	
	:	
-----	X	

1. PARTIES INVOLVED:

<u>PARTY NAME</u>	<u>ORIGINAL STATUS</u>	<u>APPELLATE STATUS</u>
Lisa Thrun	Plaintiff	Appellant
Judith Ford	Plaintiff	Appellant
Ava Ashendorff	Plaintiff	Appellant
Andrew M. Cuomo, as Governor of the State of New York	Defendant	Respondent
New York State Department of	Defendant	Respondent

Environmental Conservation

New York State Energy Research  
and Development Authority

Defendant

Respondent

2. COUNSEL FOR APPELLANTS:

Mark W. Smith, Esq.  
Noelle Kowalczyk, Esq.  
SMITH VALLIERE PLLC  
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(212) 755-5203 (facsimile)

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Competitive Enterprise Institute  
1899 L Street, NW  
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(202) 331-2265 (telephone)  
(202) 331-0640 (facsimile)

3. COUNSEL FOR RESPONDENTS:

Eric T. Schneiderman, Esq.  
Michael J. Myers, Esq.  
Morgan A. Costello, Esq.  
ATTORNEY GENERAL OF THE STATE OF NEW YORK  
Environmental Protection Bureau  
The Capitol  
Albany, New York 12224  
(518) 402-2594 (telephone)  
(518) 473-2534 (facsimile)

4. COURT, JUDGE AND COUNTY FROM WHICH APPEAL IS TAKEN:

Hon. Thomas J. McNamara  
Supreme Court of the State of New York  
County of Albany

5. NATURE AND OBJECT OF ACTION OR PROCEEDING:

This action challenges New York’s participation in the Regional Greenhouse Gas Initiative (“RGGI”) on the grounds that RGGI is unconstitutional and unlawful. RGGI is an unprecedented taxation and revenue distribution program that has neither been voted on nor approved by the New York State Legislature. Defendants’ regulatory scheme to reduce greenhouse gas emissions through a “cap and trade” program imposes an unlawful substantial and hidden tax on all electricity purchasers in New York. This case presents the simple question of who should decide upon and approve (or reject) the creation of a massive, complex, expensive, and radical environmental regime of taxation and regulation – New York’s legislature, which is specifically tasked by the New York State Constitution with the job of weighing competing policy interests, lawmaking and taxation in New York, or a group of unelected bureaucrats, who answer to only the Governor. The conduct of each Defendant constitutes a violation of the separation of powers doctrine and a usurpation of the constitutionally-mandated exclusive role of the Legislature to impose taxes and make law.

Plaintiffs’ complaint asserts four causes of action against each Defendant: (1) that the entry into RGGI was *ultra vires*; (2) that RGGI is an unlawful tax not authorized by the Legislature; (3) that the implementation of RGGI was arbitrary and capricious; and (4) that RGGI violates the Compact Clause of the United States Constitution.

6. APPELLATE ISSUES:

Plaintiffs seek the reversal of the Supreme Court’s June 12, 2012 Decision and Order (a copy of which is attached hereto), which dismissed Plaintiffs’ complaint in its entirety on the

grounds that Plaintiffs lack standing to raise their claims and their claims are barred by the doctrine of laches. The grounds for reversal are as follows:

- (a) The Supreme Court improperly determined that Plaintiffs lack standing either as ratepayers of electricity or as taxpayers under New York State Finance Law § 123-b;
- (b) The Supreme Court improperly determined that even if Plaintiffs had standing, their claims are barred by the doctrine of laches;
- (c) The Supreme Court improperly determined that Defendants moved to dismiss the claims against the Governor and the Compact Clause claim;
- (d) The Supreme Court failed to consider and/or made erroneous legal or factual determinations concerning, among other things:
  - Whether New York’s participation in RGGI is unconstitutional;
  - Whether RGGI imposes an unlawful substantial and hidden tax on all electricity purchasers in New York;
  - Whether Defendants’ creation of a massive, complex, expensive, and radical environmental regime of taxation and regulation is a violation of the separation of powers doctrine;
  - Whether the Governor and the Executive Branch unlawfully usurped the lawmaking and taxation powers of the Legislature by the creation and implementation of RGGI; and
  - Whether New York’s agreement to enter into the RGGI Memorandum of Understanding (“MOU”) is an unlawful interstate agreement that was entered into by the then-Governor without legislative approval;

- (e) All other grounds permitted under New York substantive and procedural law, including any grounds advanced by Plaintiffs in opposition to Defendants' Motion to Dismiss.

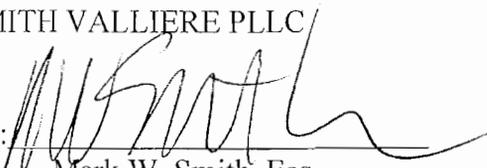
7. OTHER RELATED MATTERS:

None.

Dated: New York, New York  
July 10, 2012

SMITH VALLIERE PLLC

By:

  
Mark W. Smith, Esq.

Noelle Kowalczyk, Esq.

75 Rockefeller Plaza, 21st Floor  
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(202) 331-2265

*Attorneys for Plaintiffs-Appellants*

Attachments:

Notice of Appeal  
June 12, 2012 Decision and Order with Notice of Entry

SUPREME COURT OF THE STATE OF NEW YORK  
COUNTY OF ALBANY

----- X  
LISA THRUN, JUDITH FORD, and AVA  
ASHENDORFF,

Plaintiffs,

- against -

ANDREW M. CUOMO, AS GOVERNOR OF THE  
STATE OF NEW YORK; NEW YORK STATE  
DEPARTMENT OF ENVIRONMENTAL  
CONSERVATION; and NEW YORK STATE  
ENERGY RESEARCH AND DEVELOPMENT  
AUTHORITY,

Defendants.  
----- X

Index No. 4358/11

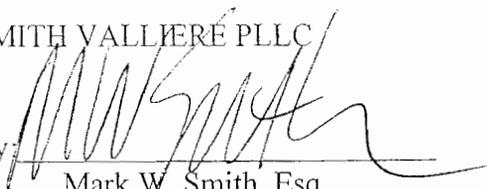
(Hon. Thomas J. McNamara)

**NOTICE OF APPEAL**

**PLEASE TAKE NOTICE** that Plaintiffs hereby appeal to the Supreme Court of the State of New York, Appellate Division, Third Department, from the Order of the Honorable Thomas J. McNamara, of the Supreme Court of the State of New York, County of Albany, duly entered in the Office of the Albany County Clerk on June 13, 2012, and from each and every part thereof.

Dated: New York, New York  
July 10, 2012

SMITH VALLIERE PLLC

By: 

Mark W. Smith, Esq.

Noelle Kowalczyk, Esq.

75 Rockefeller Plaza, 21st Floor  
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(202) 331-2265

*Attorneys for Plaintiffs*

TO:

Eric T. Schneiderman  
Attorney General of the State of New York  
Environmental Protection Bureau  
The Capitol  
Albany, New York 12224

*Attorneys for Defendants*

STATE OF NEW YORK  
SUPREME COURT : COUNTY OF ALBANY

-----  
LISA THRUN, JUDITH FORD and  
AVA ASHENDORFF,

Plaintiffs,

-against-

ANDREW M. CUOMO, AS GOVERNOR OF THE  
STATE OF NEW YORK; NEW YORK STATE  
DEPARTMENT OF ENVIRONMENTAL  
CONSERVATION; and NEW YORK STATE  
ENERGY RESEARCH AND DEVELOPMENT  
AUTHORITY,

Defendants.

NOTICE OF ENTRY

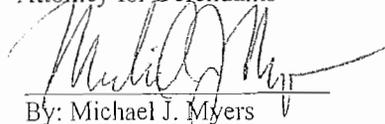
Index No.: 4358-11  
RJI No.: 01-11-104776

-----X

PLEASE TAKE NOTICE that a Decision and Order, a true copy of which is attached, was signed on June 12, 2012, by the Honorable Thomas J. McNamara, A.J.S.C., and was filed and entered in the office of the Clerk of Albany County on June 13, 2012.

Dated: June 13, 2012  
Albany, New York

ERIC T. SCHNEIDERMAN  
Attorney General of the State of New York  
Attorney for Defendants



By: Michael J. Myers  
Assistant Attorney General  
New York State Department of Law  
The Capitol  
Albany, New York 12224  
(518) 402-2594

TO: Mark W. Smith, Esq.  
Noelle Kowalczyk, Esq.  
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75 Rockefeller Plaza, 21<sup>st</sup> Floor  
New York, New York 10019

Sam Kazman, Esq.  
Competitive Enterprise Institute  
1899 L Street, NW  
Washington, D.C. 20036

PRESENT: HON. THOMAS J. McNAMARA  
Acting Justice

Albany County Clerk  
Document Number 11172626  
Rcvd 06/13/2012 2:52:38 PM



STATE OF NEW YORK  
SUPREME COURT COUNTY OF ALBANY

LISA THRUN, JUDITH FORD and  
AVA ASHENDORFF,

Plaintiffs,

**DECISION & ORDER**

Index No.: 4358-11

RJI No.: 01-11-104776

-against-

ANDREW M. CUOMO, AS GOVERNOR OF THE  
STATE OF NEW YORK; NEW YORK STATE  
DEPARTMENT OF ENVIRONMENTAL  
CONSERVATION; and NEW YORK STATE  
ENERGY RESEARCH AND DEVELOPMENT  
AUTHORITY,

Defendants.

(Supreme Court, Albany County, Motion Term)

APPEARANCES: Smith Valliere, PLLC  
(By: Mark W. Smith, Esq., and Noelle Kowalczyk, Esq., of Counsel)  
75 Rockefeller Plaza, 21st Floor  
New York, New York 10019

*and*

Sam Kazman, Esq.  
Competitive Enterprise Institute  
1899 L Street, NW  
Washington, D.C. 20036  
*Attorneys for Plaintiffs*

Eric T. Schneiderman  
Attorney General of the State of New York  
(By: Michael J. Myers, Esq. and Morgan A. Costello, Esq.,  
Assistant Attorneys General  
*Attorneys for Defendants*  
Environmental Protection Bureau  
The Capitol  
Albany, New York 12224-0341

*Thrun, et al v. Cuomo, et al*

*Index No.: 4358-11; RJI No.: 01-11-104776*

McNamara, J.

In December 2005 then-Governor George Pataki signed a Memorandum of Understanding (Memorandum) with the governors of six other States. In the Memorandum the seven signatory States each committed:

“to propose for legislative and/or regulatory approval a CO<sub>2</sub> Budget Trading Program (the “Program”) aimed at stabilizing and then reducing CO<sub>2</sub> emissions within the Signatory States, and implementing a regional CO<sub>2</sub> emissions budget and allowance trading program that will regulate CO<sub>2</sub> emissions from fossil fuel-fired electricity generating units having a rated capacity equal to or greater than 25 megawatts.”

The Memorandum allows for other States to sign on and also provides that any Signatory State may withdraw its participation in the program, known as the Regional Greenhouse Gas Initiative (RGGI), upon 30 days written notice. Three additional States later signed the Memorandum and in January 2012 New Jersey, one of the original Signatory States, ended its participation.

New York affirmed its participation in RGGI by promulgating regulations that implement the “CO<sub>2</sub> Budget Trading Program” (6 NYCRR Part 242, eff. September 24, 2008) and the “CO<sub>2</sub> Allowance Auction Program” (21 NYCRR Part 507, eff. October 8, 2008). The Budget Trading Program regulations were promulgated by the Department of Environmental Conservation (DEC) and the Auction Program regulations by the New York State Energy Research and Development Authority (NYSERDA). No specific legislative action was taken to authorize New York’s participation in RGGI though in 2011 the Legislature passed the Power NY Act of 2011 (Environmental Conservation Law § 19-0312). The act requires major electric generating facilities, those generating 25,000 kilowatts or more of electricity, to comply with applicable DEC air quality requirements relating to offsetting of emissions and directed the Commissioner to promulgate regulations targeting reductions in emissions of carbon dioxide that would apply to major

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*Index No.: 4358-11; RJI No.: 01-11-104776*

electric generating facilities that commenced construction after the effective date of the regulations. At the time RGGI was the only state carbon dioxide emission requirement applicable to power plants in New York.

In June 2011 plaintiffs commenced this action in which they assert four causes of action: each addressed in some manner to the legality of New York's participation in RGGI. In the first cause of action plaintiffs argue that the New York RGGI program is *ultra vires* because the Memorandum was executed, and the regulations were promulgated by DEC and NYSERDA, without the consent or authorization of the Legislature. The second cause of action presents an attack on the RGGI regulations as imposing an impermissible tax not authorized by the Legislature. In the third cause of action plaintiffs contend that the RGGI program, as implemented, is arbitrary and capricious. The fourth cause of action raises the question of whether the Memorandum violates the United States Constitution, Art I, § 10, cl 3: the Compact Clause. Plaintiffs seek declaratory judgments announcing that the entry of New York State into the RGGI was *ultra vires*; that in promulgating the RGGI regulations the actions of DEC and NYSERDA were *ultra vires*; created an unlawful tax and were arbitrary and capricious; and that the RGGI Memorandum is a multistate compact which has not been authorized by the United States Congress and therefore, is void under the Compact Clause.

Defendants have moved to dismiss the complaint on the grounds that plaintiffs lack standing, that the applicable Statute of Limitations has expired, that certain claims are barred by the doctrine of laches and that certain other claims are moot. Although plaintiffs maintain that defendants have not moved to dismiss claims against the Governor and the Compact Clause claim, the notice of motion does not so limit the relief sought and the arguments made in defendants' memorandum of law do not exclude any claim from the defenses of standing and laches. At a minimum defendants specifically assert in the memorandum that all

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*Index No.: 4358-11; RJI No.: 01-11-104776*

claims should be dismissed on laches grounds.

Standing is a threshold requirement for a party seeking to challenge governmental action and requires a showing that the party has suffered an injury-in-fact meaning that the party will actually be harmed by the challenged action (*New York State Assn. of Nurse Anesthetists v Novello*, 2 NY3d 207 [2004]). The injury must be particularized and the party asserting standing must show "special damage, different in kind and degree from the community generally" (*Matter of Sun-Brite Car Wash v Board of Zoning & Appeals*, 69 NY2d 406, 413 [1987]). Moreover, the harm must be shown to fall within the zone of interests, or concerns, sought to be promoted or protected by the authority under which the agency has acted (*Society of Plastics Indus. v County of Suffolk*, 77 NY2d 761, 773 [1991], citation and internal quotations omitted).

Plaintiffs contend that as electric utility rate-payers they have been harmed by having to pay increased costs passed along by electricity producers that must purchase CO<sub>2</sub> allowances under RGGI. Even assuming that plaintiffs could show that the cost they pay for electricity has increased because of RGGI, they have failed to show an injury distinct from the community generally. While acknowledging that RGGI impacts a large percentage of New York residents, plaintiffs maintain that as ratepayers they are distinguishable from the general public because there are members of the general public who do not pay electricity bills. The question, however, is whether the impact is felt by some, but not the community in general, and not whether, as plaintiffs' argue, that some segment of the community is not affected (see *Matter of Diederich v Lawrence*, 78 AD3d 1290 [2010], distinction between local taxpayers subjected to a tax and individuals not subjected to the tax fails). Such a strained interpretation would essentially eliminate the requirement of a distinct injury (*Id.* at 1292). Inasmuch as plaintiffs have failed to establish that as ratepayers they have suffered an injury distinct from that of the general public, they cannot assert

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standing on the basis of that alleged harm.

The argument that DEC and NYSERDA usurped legislative authority in promulgating the RGGI regulations raises another concern recognized by the courts in addressing standing issues. Claims of institutional harm raised to ensure the continued vitality of the constraints on power that lie at the heart of our constitutional scheme require additional analysis when determining standing (see *Saratoga County Chamber of Commerce v Pataki*, 100 NY2d 801, 814 [2003]). In instances where denial of standing would, in effect, pose an impenetrable barrier to judicial scrutiny of an action of constitutional dimensions, standing may be found (*Id.* at 814). Here, however, as defendants note, the utility companies subject to the RGGI regulations are potentially interested parties who would have standing to bring a challenge to implementation of the program. Thus, denial of standing to these plaintiffs does not shield the challenged actions from judicial review.

Though not pled in the complaint, plaintiffs assert that they have standing under State Finance Law § 123-b which provides:

“... any person, who is a citizen taxpayer, whether or not such person is or may be affected or specially aggrieved by the activity herein referred to, may maintain an action for equitable or declaratory relief, or both, against an officer or employee of the state who in the course of his or her duties has caused, is now causing, or is about to cause a wrongful expenditure, misappropriation, misapplication, or any other illegal or unconstitutional disbursement of state funds or state property...”

Citizen-taxpayers need not demonstrate an injury-in-fact to acquire standing to question the unlawful expenditure of state funds (*Saratoga County Chamber of Commerce, Inc. v Pataki*, 100 NY2d 801, 814 [2004]). The important distinction in such matters is between “cases that present a challenge to the expenditure of money and those that use the expenditure of money as a pretense to challenge a governmental

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decision (*Id.* at 814). The complaint here presents, generally, a challenge to New York's participation in RGGI and specifically challenges the authority of the Governor to sign the Memorandum and DEC and NYSERDA to promulgate the RGGI regulations. Both are essentially non-fiscal activities and consequently, section 123-b standing is not available.

Even if plaintiffs had standing, the doctrine of laches serves to bar the claims asserted. "Laches is defined as such neglect or omission to assert a right as, taken in conjunction with the lapse of time, more or less great, and other circumstances causing prejudice to an adverse party, operates as a bar in a court of equity" (*Matter of Schulz v State of New York*, 81 NY2d 336, 348 [1993] [internal quotation marks and citation omitted]). An action for a declaratory judgment, such as is present here, is subject to equitable principles (*Krieger v Krieger*, 25 NY2d 364 [1969]). The Memorandum was signed in December 2005 and the New York RGGI regulations became effective in September and October 2008. Plaintiffs did not commence this action until June 2011. Defendants argue that plaintiffs' delay in bringing this action would cause multifaceted prejudice to multiple parties if New York's participation in RGGI is invalidated as a consequence of this action. Defendants maintain that numerous projects that depend on proceeds from RGGI would be lost including the Green Jobs/Green New York Program that the Legislature has directed be funded with proceeds from the sale of CO<sub>2</sub> allowances. In addition, the State could face numerous lawsuits from purchasers of allowances. Defendants also contend that invalidation of New York's participation in RGGI would cause significant market uncertainty regarding the validity and value of New York issued CO<sub>2</sub> allowances held by out-of-state power generators and third-party investors. Defendants also point out the in-state power companies have made operational decisions and capital improvement planning decisions in reliance on having to meet a continuing compliance obligation. Power companies

*Thrun, et al v. Cuomo, et al*

*Index No.: 4358-11; RJI No.: 01-11-104776*

have made investments in their physical plants designed to reduce CO<sub>2</sub> emissions and in that way avoid the cost of having to purchase CO<sub>2</sub> allowances. Defendants contend that invalidation of New York's participation in RGGI would be prejudicial to these companies whose business models and strategic plans would be disrupted.

Plaintiffs' have not offered any reason for the delay in bringing the action. They argue, however, that any claim of prejudice is either curable by an award of prospective relief only or is undermined by the fact that the Memorandum provides that any Signatory State could withdraw from the agreement by providing 30 days notice. An award of prospective relief would not address all of the claimed prejudice such as disruption to the strategic plans of in-state power generators. And, while the possibility that New York could voluntarily withdraw from participation in RGGI has always existed, the risk of withdrawal based on a political decision is different in kind and degree from the risk posed by an end to participation based on legal reasons. The two risks present different considerations to those making decisions based on New York's participation in RGGI. The potential for harm to economic interest caused by the delay in bringing this action is sufficiently prejudicial to the interest of adverse parties to bar the action (see *Matter of Schulz v State of New York*, 81 N.Y.2d 336 [1993]).

Accordingly, it is

ORDERED, that the motion to dismiss each cause of action in the complaint is granted on the grounds that plaintiffs lack standing to raise the claims and the claims are barred by the doctrine of laches.

This constitutes the decision and order of the Court. The original decision and order are returned to the attorney for defendants. A copy of the decision and order and the supporting papers have been

Albany County Clerk  
Document Number 11172626  
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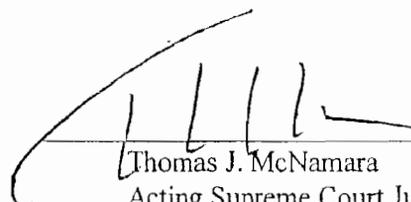


*Thrun, et al v. Cuomo, et al*  
Index No.: 4358-11; RJI No.: 01-11-104776

delivered to the County Clerk for placement in the file. The signing of this decision and order, and delivery of a copy of the decision and order shall not constitute entry or filing under CPLR 2220. Counsel is not relieved from the applicable provisions of that rule respecting filing, entry and notice of entry.

SO ORDERED.  
ENTER.

Dated: Saratoga Springs, New York  
June 14, 2012

  
Thomas J. McNamara  
Acting Supreme Court Justice

Papers Considered:

1. Notice of Motion dated September 2, 2011;
2. Affidavits Submitted in Support of Point IV of Defendants' Motion to Dismiss consisting of: affidavit of Michael Sheehan; affidavit of John G. Williams; affidavit of Pallas Lee VanSchaick; affirmation of Assistant Attorney General Michael J. Myers; affidavit of Kenneth L. Kimmell; affidavit of Daniel C. Esty; affidavit of Collin P. O'Mara; affidavit of Robert M. Summers, Ph.D.; affidavit of Douglas L. McVay; affidavit of Justin Johnson; affidavit of Robert D. Teetz; and affidavit of Scott Lorey;
3. Memorandum of Law in Support of Defendants' Motion to Dismiss dated September 2, 2011, with Exhibits A and B annexed thereto;
4. Affidavit of Lisa Thrun, sworn to November 30, 2011, with Exhibit 1 annexed thereto;
5. Affidavit of Judith Ford, sworn to November 29, 2011;
6. Affidavit of Ava Ashendorff, sworn to November 30, 2011;
7. Affidavit of Christopher S. Friend, sworn to December 1, 2011, with Exhibits 1 and 2 annexed thereto;
8. Affidavit of Daniel M. Engert, sworn to November 30, 2011, with Exhibits 1 and 2 annexed thereto;
9. Affidavit of John Syracuse, sworn to November 30, 2011, with Exhibits 1 through 4 annexed thereto;
10. Appendix of Affidavits of New York Ratepayers in Opposition to Defendants' Motion to Dismiss, Volumes 1 through 3;
11. Affirmation of Mark W. Smith, Esq., dated December 2, 2011, with Appendices of Exhibits 1 through 47;
12. Plaintiffs' Memorandum of Law in Opposition to Defendants' Motion to Dismiss dated

*Thrun, et al v. Cuomo, et al*

*Index No.: 4358-11; RJI No.: 01-11-104776*

13. December 2, 2011; and  
Reply Memorandum of Law in Support of Defendants' Motion to Dismiss dated January 13, 2012, with Exhibit 1 annexed thereto.

SUPREME COURT OF THE STATE OF NEW YORK  
COUNTY OF ALBANY

LISA THRUN, JUDITH FORD, and AVA  
ASHENDORFF,

Plaintiffs,

- against -

ANDREW M. CUOMO, AS GOVERNOR OF THE  
STATE OF NEW YORK, NEW YORK STATE  
DEPARTMENT OF ENVIRONMENTAL  
CONSERVATION, and NEW YORK STATE  
ENERGY RESEARCH AND DEVELOPMENT  
AUTHORITY,

Defendants.

Affidavit of Service

Index No. 4358/11

State of New York     )  
                              : ss.:  
County of Albany     )

**RUBY L. SALMOND** being duly sworn, deposes and says:

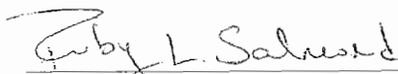
I am over eighteen years of age and an employee in the Office of Eric T. Schneiderman, Attorney General of the State of New York, attorney for defendants.

On June 13, 2012, I mailed copies of the Notice of Entry and attached Decision and Order to the attorneys named below by depositing one true copy thereof, properly enclosed in a sealed, postage-paid wrapper, in the Office of the Attorney General mail facility in the City of Albany, New York, a depository under the exclusive care and custody of the United States Postal

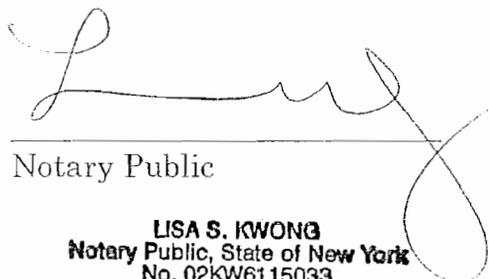
Service, directed to be sent via first class mail to the said attorneys at the addresses designated by them as follows:

Mark W. Smith, Esq.  
Noelle Kowalczyk, Esq.  
Smith Valliere PLLC  
75 Rockefeller Plaza  
21st Floor  
New York, New York 10019

Sam Kazman, Esq.  
Competitive Enterprise Institute  
1899 L Street, NW  
Washington, D.C. 20036

  
RUBY L. SALMOND

Sworn to before me this



Notary Public

**LISA S. KWONG**  
Notary Public, State of New York  
No. 02KW6115033  
Qualified in Albany County  
Commission Expires August 30, 20 12

---

From: Longstreth, Ben <blongstreth@nrdc.org>  
To: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: Win in RGGI case  
Date: Tue Sep 18 2012 13:48:32 EDT  
Attachments:

---

Thanks Morgan. - Ben

From: Morgan Costello [mailto:Morgan.Costello@ag.ny.gov]  
Sent: Tuesday, September 18, 2012 1:46 PM  
To: Longstreth, Ben; Michael J. Myers  
Subject: RE: Win in RGGI case

Yes, they filed a notice of appeal in July -- see attached. They have not yet perfected.

Morgan A. Costello  
Assistant Attorney General  
New York State Office of the Attorney General  
Environmental Protection Bureau  
The Capitol  
Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

---

From: Longstreth, Ben [mailto:blongstreth@nrdc.org]  
Sent: Tuesday, September 18, 2012 1:41 PM  
To: Michael J. Myers  
Cc: Morgan Costello  
Subject: RE: Win in RGGI case

Hi Mike and Morgan, did the plaintiffs in the Thrun case appeal? Thanks, Ben

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, June 13, 2012 2:24 PM  
To: 'Abigail Dillen'; Martinez, Luis; Longstreth, Ben  
Cc: Morgan Costello  
Subject: Win in RGGI case

All--Just wanted to pass along the good news that we received a favorable decision today granting our motion to dismiss the Thrun case. The judge found for us on standing and laches grounds. A copy of the decision is attached. Thanks for your help in making the laches case, which the judge obviously found convincing. I expect the plaintiffs will appeal, so will keep you posted.--Mike

Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

Michael.myers@ag.ny.gov

---

From: Flint, Myles (ENRD)  
<myles.flint@usdoj.gov>  
To: Augenstern, Fred (AGO)  
<fred.augenstern@state.ma.us>; allen.brooks@doj.nh.gov  
<allen.brooks@doj.nh.gov>; Bruce Nilles  
<bruce.nilles@sierraclub.org>; Shallcross, Douglas (DEP)  
<douglas.shallcross@state.ma.us>; Braczyk, Edward (DEP)  
<edward.braczyk@state.ma.us>; jon.martin@dol.lps.state.nj.us  
<jon.martin@dol.lps.state.nj.us>; lori.dibella@po.state.ct.us  
<lori.dibella@po.state.ct.us>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>;  
MZimmerman@mde.state.md.us <mzimmerman@mde.state.md.us>;  
nmarks@nrdc.org <nmarks@nrdc.org>; Thea Schwartz  
<tschwartz@atg.state.vt.us>; Gregory Schultz  
(gschultz@riag.ri.gov) <gschultz@riag.ri.gov>; Faith Bugel  
<fbugel@elpc.org>; Shannon Fisk <sfisk@earthjustice.org>;  
Kristin Henry <kristin.henry@sierraclub.org>; jjhenry@aep.com  
<jjhenry@aep.com>; jmmcmamus@aep.com <jmmcmamus@aep.com>  
Cc: argentieri.sabrina@epa.gov  
<argentieri.sabrina@epa.gov>; Brooks.Phillip@epamail.epa.gov  
<brooks.phillip@epamail.epa.gov>; Apple Chapman  
<chapman.apple@epamail.epa.gov>; Gregory Fried  
<fried.gregory@epamail.epa.gov>; Seema Kakade  
<kakade.seema@epamail.epa.gov>; Mastro.Donna@epamail.epa.gov  
<mastro.donna@epamail.epa.gov>; Chris Pilla  
<pilla.chris@epamail.epa.gov>; David Schulz  
<schulz.david@epamail.epa.gov>; Doug Snyder  
<snyder.doug@epamail.epa.gov>; Fisherow, Walter Benjamin (ENRD)  
<walter.benjamin.fisherow@usdoj.gov>; Eleanor Kane  
<kane.eleanor@epamail.epa.gov>  
Bcc:  
Subject: Call with AEP  
Date: Wed Sep 19 2012 14:51:28 EDT  
Attachments:

---

Janet, John, States and Citizens,

We have confirmed a call for Thursday, September 20th at 4:00 p.m. Eastern time.

The call in number is: (866) 410-9426

Conference Code: 2023071859

Let me know if you have any questions.

Thanks,

Myles

Myles E. Flint, II

Trial Attorney

U.S. Department of Justice

Environmental Enforcement Section

Regular Mail: P.O. Box 7611, Ben Franklin Station, Washington, DC 20044-7611

Express Mail: ENRD Mailroom, Room 2121, 601 D Street, NW, Washington, DC 20004

Phone: (202) 307-1859

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Siobhan Collins <collins@ceres.org>  
Cc: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Bcc:  
Subject: RE: INVITE: SEC Commissioner Meetings [Tuesday, October 23rd]  
Date: Wed Sep 26 2012 13:03:31 EDT  
Attachments:

---

Siobhan--Either Morgan Costello or I would like to attend on behalf of the NY AG's office. Thanks much for the invite. We need to obtain formal travel approval here, but please plan on one of us attending.--  
Mike

Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

Michael.myers@ag.ny.gov

-----  
From: Siobhan Collins [mailto:collins@ceres.org]  
Sent: Friday, September 21, 2012 1:17 PM  
To: Michael J. Myers  
Subject: INVITE: SEC Commissioner Meetings [Tuesday, October 23rd]

Dear Mr. Myers,

I'm writing to invite you to join Ceres staff on Tuesday, October 23rd at two INCR meetings with SEC Commissioners Aguilar and Walter at the U.S. Securities and Exchange Commission in Washington, D. C. At these meetings we'll be focused on SEC comment letters, plus climate risks related to oil and gas and water. In addition to these two meetings, we are hoping to confirm times with Chair Mary Schapiro and Corporation Finance Staff. The confirmed meeting times are as follows:

\*1:00 - 2:00pm ET: Commissioner Aguilar

\*4:00 - 5:00pm ET: Commissioner Walter

The purpose of these meetings is to discuss the state of climate change-related disclosure in SEC filings. As a reminder, INCR members were the key driver in encouraging the SEC to issue its groundbreaking interpretive guidance on climate change disclosure in 2010, and it's important for the SEC to hear from investors--in person--about the need for the Commission to better implement its guidance.

The SEC mentioned climate change disclosure in only 17 out of over 20,000 SEC comment letters sent to companies in the year and a-half after the guidance was issued. This level of implementation of the guidance indicates that SEC staff is missing opportunities to improve disclosure from corporations facing material climate risks and opportunities. At a time when the SEC is facing many constraints, it's especially important for us to position ourselves as a resource for the Commission and help them improve implementation of the guidance.

Please RSVP to these meetings by COB next Wednesday, September 26th. Due to limited space, we have capacity for one person from each organization at the meetings. If you should have any questions, please feel free to either e-mail me or call at (617) 247-0700 ex. 162.

Best Regards,

Siobhan

Siobhan Collins

Coordinator, Investor Programs | Ceres

99 Chauncy Street, 6th Floor | Boston, MA 02111

T: (617) 247-0700 X 162

[collins@ceres.org](mailto:collins@ceres.org) | [www.ceres.org](http://www.ceres.org) | [www.incr.com](http://www.incr.com)

Ceres is an advocate for sustainability leadership. Our mission is to mobilize investor and business leadership to build a thriving, sustainable global economy.

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton <vpatton@edf.org>  
Cc: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; Jodi Feld </o=lawnet/ou=first administrative group/cn=recipients/cn=jodifeld>  
Bcc:  
Subject: Fred's 8/6/12 WSJ piece on climate change  
Date: Mon Oct 01 2012 17:17:35 EDT  
Attachments:

---

Vickie--Several of us in the bureau enjoyed Fred's recent Wall Street Journal piece on trying to forge a coalition to move climate change efforts forward. Is there a possibility that he could come down to our NYC office (125 Broadway) for lunch and talk about it (and any other topics of interest) as part of our brown bag series? It's very informal. We would also plan to plug in our Albany and Buffalo offices by phone so our attorneys and scientists in those offices could listen in. If that would work, we'd be happy to reach out to Fred's scheduler to find a date that would work for him. Thanks!--Mike

p.s. Are you are someone else from EDF planning on participating in the meetings on Oct. 23 with SEC Commissioners' on disclosure of climate change risks? Either Morgan or I will be attending, pending travel approval.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
Michael.myers@ag.ny.gov

---

From: Siobhan Collins <collins@ceres.org>  
To: Siobhan Collins <collins@ceres.org>  
Cc: Jim Coburn <coburn@ceres.org>; Erica Scharn <scharn@ceres.org>  
Bcc:  
Subject: Scheduling SEC Meeting Prep Call: Doodle Poll (October 16,17,18)  
Date: Tue Oct 02 2012 10:05:11 EDT  
Attachments:

---

Good Morning,

Ceres looks forward to your participation in the upcoming SEC Commissioners Meetings in Washington, D.C. on Tuesday, October 23rd. We will circulate the draft agenda and prep materials by October 15th and welcome any questions from you prior to that date.

In preparation for meetings with Commissioner Elisse B. Walter, Commissioner Luis A. Aguilar and Corporate Finance staff, please let me know your availability for an hour-long prep call on the dates below by filling out this online poll: <http://doodle.com/uzuib9u6if98tmmt>.

Tuesday, 10/16: 3:00 - 4:00pm ET  
Wednesday, 10/17: 1:00 - 2:00pm ET  
Thursday, 10/18: 2:00 - 3:00pm ET

Please feel free to reach out to me via. email or phone (617) 247-0700 ex. 162 with any questions or concerns.

Best Regards,

Siobhan

Siobhan Collins  
Coordinator, Investor Programs | Ceres  
99 Chauncy Street, 6th Floor | Boston, MA 02111  
T: (617) 247-0700 X 162  
[collins@ceres.org](mailto:collins@ceres.org) | [www.ceres.org](http://www.ceres.org) | [www.incr.com](http://www.incr.com)

Ceres is an advocate for sustainability leadership. Our mission is to mobilize investor and business leadership to build a thriving, sustainable global economy.

---

From: Flint, Myles (ENRD)  
<myles.flint@usdoj.gov>  
To: Augenstern, Fred (AGO)  
<fred.augenstern@state.ma.us>; allen.brooks@doj.nh.gov  
<allen.brooks@doj.nh.gov>; Bruce Nilles  
<bruce.nilles@sierraclub.org>; Shallcross, Douglas (DEP)  
<douglas.shallcross@state.ma.us>; Braczyk, Edward (DEP)  
<edward.braczyk@state.ma.us>; jon.martin@dol.lps.state.nj.us  
<jon.martin@dol.lps.state.nj.us>; lori.dibella@po.state.ct.us  
<lori.dibella@po.state.ct.us>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>;  
MZimmerman@mde.state.md.us <mzimmerman@mde.state.md.us>;  
nmarks@nrdc.org <nmarks@nrdc.org>; Thea Schwartz  
<tschwartz@atg.state.vt.us>; Gregory Schultz  
(gschultz@riag.ri.gov) <gschultz@riag.ri.gov>; Faith Bugel  
<fbugel@elpc.org>; Shannon Fisk <sfisk@earthjustice.org>;  
Kristin Henry <kristin.henry@sierraclub.org>  
Cc: argentieri.sabrina@epa.gov  
<argentieri.sabrina@epa.gov>; Brooks.Phillip@epamail.epa.gov  
<brooks.phillip@epamail.epa.gov>; Apple Chapman  
<chapman.apple@epamail.epa.gov>; Gregory Fried  
<fried.gregory@epamail.epa.gov>; Seema Kakade  
<kakade.seema@epamail.epa.gov>; Mastro.Donna@epamail.epa.gov  
<mastro.donna@epamail.epa.gov>; Chris Pilla  
<pilla.chris@epamail.epa.gov>; David Schulz  
<schulz.david@epamail.epa.gov>; Doug Snyder  
<snyder.doug@epamail.epa.gov>; Fisherow, Walter Benjamin (ENRD)  
<walter.benjamin.fisherow@usdoj.gov>; Eleanor Kane  
<kane.eleanor@epamail.epa.gov>; Dunn, Jason (ENRD)  
<jason.dunn@usdoj.gov>  
Bcc:  
Subject: AEP - Call  
Date: Tue Oct 02 2012 16:03:07 EDT  
Attachments:

---

Let's schedule our call for tomorrow morning at 9:00.

Call in: (866) 410-9426

Pass Code: 2023071859

Thanks,

Myles

Myles E. Flint, II

Trial Attorney

U.S. Department of Justice

Environmental Enforcement Section

Regular Mail: P.O. Box 7611, Ben Franklin Station, Washington, DC 20044-7611

Express Mail: ENRD Mailroom, Room 2121, 601 D Street, NW, Washington, DC 20004

Phone: (202) 307-1859

---

From: Rubin, James W.  
<james.rubin@snrdenton.com>  
To: Lipshultz, Jon (ENRD)  
<jon.lipshultz@usdoj.gov>; Sonja Rodman <rodman.sonja@epa.gov>;  
norman.rave@usdoj.gov <norman.rave@usdoj.gov>; Brendan (Phila)  
Collins <collinsb@ballardspahr.com>; Robert (Phila) McKinstry  
<mckinstry@ballardspahr.com>; Sean Donahue  
<sean@donahuegoldberg.com>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Andrew G. Frank  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=andrewfrank>; Bernstein, Marc  
<mbern@ncdoj.gov>; Graham McCahan <gmccahan@edf.org>  
Cc: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Bcc:  
Subject: Updated: CSAPR Review  
Date: Wed Oct 03 2012 09:46:53 EDT  
Attachments:

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When: Wednesday, October 03, 2012 10:00 AM-11:00 AM (GMT-05:00) Eastern Time (US & Canada).  
Where: Teleconference Line below

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

1-800-330-3719 2024089146#

Please circulate if I have left anyone off the address list who should be on this call. I did not include everyone on our internal calls.

---

From: Rubin, James W.  
<james.rubin@snrdenton.com>  
To: Rubin, James W.  
<james.rubin@snrdenton.com>; Lipshultz, Jon (ENRD)  
<jon.lipshultz@usdoj.gov>; Sonja Rodman <rodman.sonja@epa.gov>;  
norman.rave@usdoj.gov <norman.rave@usdoj.gov>; Brendan (Phila)  
Collins <collinsb@ballardspahr.com>; Robert (Phila) McKinstry  
<mckinstry@ballardspahr.com>; Sean Donahue  
<sean@donahuegoldberg.com>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Andrew G. Frank  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=andrewfrank>; Bernstein, Marc  
<mbern@ncdoj.gov>; Graham McCahan <gmccahan@edf.org>  
Cc: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Bcc:  
Subject: Copy: Updated: CSAPR Review  
Date: Wed Oct 03 2012 09:46:53 EDT  
Attachments:

---

StartTime: Wed Oct 03 10:00:00 Eastern Daylight Time 2012  
EndTime: Wed Oct 03 11:00:00 Eastern Daylight Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: No

1-800-330-3719 2024089146#

Please circulate if I have left anyone off the address list who should be on this call. I did not include everyone on our internal calls.

---

From: Vickie Patton <vpatton@edf.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Laurel Lee  
<llee@edf.org>; Deborah Friant <dfriant@edf.org>  
Cc:  
Bcc:  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change  
Date: Tue Oct 09 2012 10:10:03 EDT  
Attachments:

---

Hi Mike, Fred would welcome this discussion. Laurel and Deb can help with scheduling. I'll follow up separately re the 126 petition. Best wishes, Vickie

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, October 01, 2012 3:18 PM  
To: Vickie Patton  
Cc: Morgan Costello; Lemuel Srolovic; Jodi Feld  
Subject: Fred's 8/6/12 WSJ piece on climate change

Vickie--Several of us in the bureau enjoyed Fred's recent Wall Street Journal piece on trying to forge a coalition to move climate change efforts forward. Is there a possibility that he could come down to our NYC office (125 Broadway) for lunch and talk about it (and any other topics of interest) as part of our brown bag series? It's very informal. We would also plan to plug in our Albany and Buffalo offices by phone so our attorneys and scientists in those offices could listen in. If that would work, we'd be happy to reach out to Fred's scheduler to find a date that would work for him. Thanks!--Mike

p.s. Are you are someone else from EDF planning on participating in the meetings on Oct. 23 with SEC Commissioners' on disclosure of climate change risks? Either Morgan or I will be attending, pending travel approval.

Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

Michael.myers@ag.ny.gov

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton <vpatton@edf.org>; Laurel  
Lee <llee@edf.org>; Deborah Friant <dfriant@edf.org>  
Cc: Jodi Feld </o=lawnet/ou=first  
administrative group/cn=recipients/cn=jodifeld>  
Bcc:  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change  
Date: Tue Oct 09 2012 10:39:39 EDT  
Attachments:

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Great, thanks Vickie. I'm cc'ing Jodi Feld, our chief scientist in NYC who is coordinating scheduling of these lunches. Jodi, please contact Laurel and Deb to schedule a time when Fred's available to join us. Vickie, I'll look forward to your call on the section 126 petition.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Tuesday, October 09, 2012 10:10 AM  
To: Michael J. Myers; Laurel Lee; Deborah Friant  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

Hi Mike, Fred would welcome this discussion. Laurel and Deb can help with scheduling. I'll follow up separately re the 126 petition. Best wishes, Vickie

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, October 01, 2012 3:18 PM  
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Cc: Morgan Costello; Lemuel Srolovic; Jodi Feld  
Subject: Fred's 8/6/12 WSJ piece on climate change

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New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
Michael.myers@ag.ny.gov

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Jodi Feld </o=lawnet/ou=first  
administrative group/cn=recipients/cn=jodifeld>  
Cc:  
Bcc:  
Subject: FW: Fred's 8/6/12 WSJ piece on climate change  
Date: Tue Oct 09 2012 10:40:21 EDT  
Attachments:

---

Fred Krupp is president of Environmental Defense Fund.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Tuesday, October 09, 2012 10:10 AM  
To: Michael J. Myers; Laurel Lee; Deborah Friant  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

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Sent: Monday, October 01, 2012 3:18 PM  
To: Vickie Patton  
Cc: Morgan Costello; Lemuel Srolovic; Jodi Feld  
Subject: Fred's 8/6/12 WSJ piece on climate change

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New York State Attorney General

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Michael.myers@ag.ny.gov

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: FW: SEC Investor Prep Call: Wednesday, October 17 [1:00-2:00pmET]  
Date: Tue Oct 09 2012 10:56:08 EDT  
Attachments:

---

Here's the e-mail about the prep call.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Siobhan Collins [mailto:collins@ceres.org]  
Sent: Friday, October 05, 2012 10:36 AM  
To: Siobhan Collins  
Cc: Jim Coburn; Erica Scharn  
Subject: SEC Investor Prep Call: Wednesday, October 17 [1:00-2:00pmET]

Good Morning,

Thank you for getting back to me about your availability for an "Investor Prep Call" for the October 23rd meetings at the Securities and Exchange Commission (SEC). It appears that most participants are free to touch base on Wednesday, October 17th from 1:00-2:00pmET. Please hold this time on your calendars and use the call-in information below.

Call-In Information

Toll-Free Access: 877-326-0011

Meeting #: \*8457128\*

For those of you who have not booked your travel, all meetings with SEC Commissioners and Corp.

Finance staff are in the afternoon - with lunch and refreshments provided. I will circulate background materials and draft agendas prior to the call.

If you should have any questions or conflicts, please contact me via. email or phone (617) 247-0700 ex. 162.

Have a great weekend,

Siobhan

Siobhan Collins

Coordinator, Investor Programs | Ceres

99 Chauncy Street, 6th Floor | Boston, MA 02111

T: (617) 247-0700 X 162

collins@ceres.org | www.ceres.org | www.incr.com

Ceres is an advocate for sustainability leadership. Our mission is to mobilize investor and business leadership to build a thriving, sustainable global economy.

On Oct 2, 2012, at 10:05 AM, Siobhan Collins wrote:

Good Morning,

Ceres looks forward to your participation in the upcoming SEC Commissioners Meetings in Washington, D.C. on Tuesday, October 23rd. We will circulate the draft agenda and prep materials by October 15th and welcome any questions from you prior to that date.

In preparation for meetings with Commissioner Elisse B. Walter, Commissioner Luis A. Aguilar and Corporate Finance staff, please let me know your availability for an hour-long prep call on the dates below by filling out this online poll: <http://doodle.com/uzuib9u6if98tmmt>.

Tuesday, 10/16: 3:00 - 4:00pm ET

Wednesday, 10/17: 1:00 - 2:00pm ET

Thursday, 10/18: 2:00 - 3:00pm ET

Please feel free to reach out to me via. email or phone (617) 247-0700 ex. 162 with any questions or concerns.

Best Regards,

Siobhan

Siobhan Collins

Coordinator, Investor Programs | Ceres

99 Chauncy Street, 6th Floor | Boston, MA 02111

T: (617) 247-0700 X 162

[collins@ceres.org](mailto:collins@ceres.org) | [www.ceres.org](http://www.ceres.org) | [www.incr.com](http://www.incr.com)

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---

From: Bataille, Lisa <lbataille@nysba.org>  
To: abrown@brownhutchinson.com  
<abrown@brownhutchinson.com>; abwils02@gmail.com  
<abwils02@gmail.com>; aknauf@nyenvlaw.com  
<aknauf@nyenvlaw.com>; amyismithesq@adelphia.net  
<amyismithesq@adelphia.net>; Andrew Gershon </o=lawnet/ou=first  
administrative group/cn=recipients/cn=andrewgershon>;  
aotis@curtis.com <aotis@curtis.com>; bowitch@bcalbany.com  
<bowitch@bcalbany.com>; ckraivit@ivisioninternational.com  
<ckraivit@ivisioninternational.com>; cordisco@gmail.com  
<cordisco@gmail.com>; cullen.howe@aporter.com  
<cullen.howe@aporter.com>; cvollweiler@traublieberman.com  
<cvollweiler@traublieberman.com>; david.cook@leclairryan.com  
<david.cook@leclairryan.com>; davidquist@earthlink.net  
<davidquist@earthlink.net>; dfreeman@gibbonslaw.com  
<dfreeman@gibbonslaw.com>; dgrant@grantlyons.com  
<dgrant@grantlyons.com>; dmorrison@jonesmorrisonlaw.com  
<dmorrison@jonesmorrisonlaw.com>; driesel@sprlaw.com  
<driesel@sprlaw.com>; druzow@woh.com <druzow@woh.com>;  
dsampson2@nycap.rr.com <dsampson2@nycap.rr.com>;  
dsommer@youngsommer.com <dsommer@youngsommer.com>;  
dzamelis@windstream.net <dzamelis@windstream.net>;  
efmctier@gw.dec.state.ny.us <efmctier@gw.dec.state.ny.us>;  
eierardi@frontiernet.net <eierardi@frontiernet.net>;  
emillett@ebglaw.com <emillett@ebglaw.com>; epremo@hselaw.com  
<epremo@hselaw.com>; erica.powers@gmail.com  
<erica.powers@gmail.com>; frenchiii.john@gmail.com  
<frenchiii.john@gmail.com>; gabraham44@eznet.net  
<gabraham44@eznet.net>; gbradlau@thebradlaugroup.com  
<gbradlau@thebradlaugroup.com>; gerard.cavaluzzi@arcadis-us.com  
<gerard.cavaluzzi@arcadis-us.com>; gport@proskauer.com  
<gport@proskauer.com>; grodenhausen@rapportmeyers.com  
<grodenhausen@rapportmeyers.com>; grusk@ene.com  
<grusk@ene.com>; gspbergen@gmail.com <gspbergen@gmail.com>;  
gsuchman@stroock.com <gsuchman@stroock.com>;  
hatsavage@optonline.net <hatsavage@optonline.net>;  
howard.carl@epa.gov <howard.carl@epa.gov>;  
htollin@sterlingrisk.com <htollin@sterlingrisk.com>;  
james.sevinsky@ge.com <james.sevinsky@ge.com>;  
jbaker.9118q@youngsommer.com <jbaker.9118q@youngsommer.com>;  
jbrown@mackenziehughes.com <jbrown@mackenziehughes.com>;  
jcaffry@caffrylawoffice.com <jcaffry@caffrylawoffice.com>;  
jdyer916@yahoo.com <jdyer916@yahoo.com>;  
jfehrenbach@winston.com <jfehrenbach@winston.com>;  
jgracer@sprlaw.com <jgracer@sprlaw.com>;  
jgreenthal@nixonpeabody.com <jgreenthal@nixonpeabody.com>;  
jhanna@woh.com <jhanna@woh.com>; jkaplan@swcblaw.com  
<jkaplan@swcblaw.com>; jkhealy@bryancave.com  
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<jlyons@grantlyons.com>; jpericoni@periconi.com  
<jpericoni@periconi.com>; jrigano@riganollc.com  
<jrigano@riganollc.com>; jsachs@kblaw.com <jsachs@kblaw.com>;  
jsk@mkms.com <jsk@mkms.com>; justinbirzon@gmail.com

<justinbirzon@gmail.com>; kbernstein@bsk.com  
<kbernstein@bsk.com>; kgr@ryanlawgroupllc.com  
<kgr@ryanlawgroupllc.com>; kkennedy@nrdc.org  
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kwilson@harrisbeach.com <kwilson@harrisbeach.com>;  
laalexan@gw.dec.state.ny.us <laalexan@gw.dec.state.ny.us>;  
larry@schnapflaw.com <larry@schnapflaw.com>; Bataille, Lisa  
<lbataille@nysba.org>; Lemuel Srolovic </o=lawnet/ou=first  
administrative group/cn=recipients/cn=lsrolovi>;  
lmartinez@nrdc.org <lmartinez@nrdc.org>;  
lsilberfeld@hrpt.ny.gov <lsilberfeld@hrpt.ny.gov>;  
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Maureen F. Leary </o=lawnet/ou=first administrative  
group/cn=recipients/cn=maureenleary>; mbaker@salans.com  
<mbaker@salans.com>; mbrillault@gmail.com  
<mbrillault@gmail.com>; mchertok@sprlaw.com  
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<nrobinson@law.pace.edu>; nward-willis@kblaw.com  
<nward-willis@kblaw.com>; parkerjl@mac.com <parkerjl@mac.com>;  
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<philln2009@hotmail.com>; plehner@nrdc.org <plehner@nrdc.org>;  
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<rbrickwedde@brickwedde.com>; redeming@umich.edu  
<redeming@umich.edu>; reed@superlawgroup.com  
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rhenrichs@porterhedges.com <rhenrichs@porterhedges.com>;  
rizzo@clm.com <rizzo@clm.com>; rkafin@proskauer.com  
<rkafin@proskauer.com>; rmclaughlin@bsk.com  
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<rmoore49@nycap.rr.com>; robiesq@aol.com <robiesq@aol.com>;  
rosemarynicholslaw@nycap.rr.com  
<rosemarynicholslaw@nycap.rr.com>; rstout@woh.com  
<rstout@woh.com>; rtyson@bsk.com <rtyson@bsk.com>;  
ryoung2934@aol.com <ryoung2934@aol.com>; saporita.chris@epa.gov  
<saporita.chris@epa.gov>; scalfone@gmail.com  
<scalfone@gmail.com>; scrusso@gw.dec.state.ny.us  
<scrusso@gw.dec.state.ny.us>; tau@fmbf-law.com  
<tau@fmbf-law.com>; tbakner@woh.com <tbakner@woh.com>;  
tputsavage@sandw.com <tputsavage@sandw.com>;  
twest@westfirmlaw.com <twest@westfirmlaw.com>; vrobbins@bsk.com  
<vrobbins@bsk.com>; wieder.marla@epa.gov  
<wieder.marla@epa.gov>; wmarsh@hancocklaw.com  
<wmarsh@hancocklaw.com>; yhennessey@hblaw.com  
<yhennessey@hblaw.com>; ymomot@bergmannpc.com  
<ymomot@bergmannpc.com>

Cc:

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Bcc:  
Subject: Environmental Law Section Executive Committee Meeting  
Date: Wed Oct 10 2012 15:56:06 EDT  
Attachments:

As a reminder, the Environmental Law Section's Executive Committee will meet on Sunday, October 14, from 9:15-11:30 in the Skyroom of the Crowne Plaza Resort and Golf Club in Lake Placid in conjunction with the Section's Fall Meeting.

If you have not yet indicated your attendance at the meeting, please send an email to Kathy Plog at [Kplog@nysba.org](mailto:Kplog@nysba.org) to let her know, as I will be out of the office tomorrow at another meeting.

Please click this link for an agenda and meeting materials. [www.nysba.org/ENVECAgendaOct2012](http://www.nysba.org/ENVECAgendaOct2012)

A limited number of hard copies will be available at the meeting.

If you have any questions, just let me know.

Lisa Bataille  
Chief Section Liaison  
Department of Section Services  
New York State Bar Association  
One Elk Street, Albany, NY 12207  
518.487.5680 Phone  
518.487.5579 Fax  
[lbataille@nysba.org](mailto:lbataille@nysba.org)

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From: Jodi Feld </o=lawnet/ou=first  
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To: Laurel Lee <llee@edf.org>; Deborah  
Friant <dfriant@edf.org>  
Cc: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Bcc:  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change  
Date: Thu Oct 11 2012 10:53:04 EDT  
Attachments:

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The Capitol  
Albany, NY 12224

(518) 402-2594  
michael.myers@ag.ny.gov

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Cc: Deborah Friant <dfriant@edf.org>;  
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Bcc:  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change  
Date: Tue Oct 23 2012 11:28:21 EDT  
Attachments: image001.jpg

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Last Modified: Tue Oct 23 11:28:21 EDT 2012

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Reason: It is an unsupported file type

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From: Laurel Lee <llee@edf.org>  
To: Jodi Feld </o=lawnet/ou=first administrative group/cn=recipients/cn=jodifeld>  
Cc: Deborah Friant <dfriant@edf.org>;  
Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Bcc:  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change  
Date: Tue Oct 23 2012 11:55:37 EDT  
Attachments: image001.jpg

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Most likely from our office 257 Park Avenue South bet. 20th/21st Streets.

From: Jodi Feld [mailto:Jodi.Feld@ag.ny.gov]  
Sent: Tuesday, October 23, 2012 11:52 AM  
To: Laurel Lee  
Cc: Deborah Friant; Michael J. Myers  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

where will he be coming from?

-----  
From: Laurel Lee [mailto:llee@edf.org]  
Sent: Tuesday, October 23, 2012 11:49 AM  
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Filename: image001.jpg  
Last Modified: Tue Oct 23 11:55:37 EDT 2012

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Reason: It is an unsupported file type

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Cc: Deborah Friant <dfriant@edf.org>  
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Subject: RE: Fred's 8/6/12 WSJ piece on climate change  
Date: Tue Oct 23 2012 12:00:32 EDT  
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Great. Thanks for coordinating.

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To: Michael J. Myers; Laurel Lee; Deborah Friant  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

Hi Mike, Fred would welcome this discussion. Laurel and Deb can help with scheduling. I'll follow up separately re the 126 petition. Best wishes, Vickie

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, October 01, 2012 3:18 PM  
To: Vickie Patton  
Cc: Morgan Costello; Lemuel Srolovic; Jodi Feld  
Subject: Fred's 8/6/12 WSJ piece on climate change

Vickie--Several of us in the bureau enjoyed Fred's recent Wall Street Journal piece on trying to forge a coalition to move climate change efforts forward. Is there a possibility that he could come down to our NYC office (125 Broadway) for lunch and talk about it (and any other topics of interest) as part of our brown bag series? It's very informal. We would also plan to plug in our Albany and Buffalo offices by phone so our attorneys and scientists in those offices could listen in. If that would work, we'd be happy to reach out to Fred's scheduler to find a date that would work for him. Thanks!--Mike

p.s. Are you are someone else from EDF planning on participating in the meetings on Oct. 23 with SEC Commissioners' on disclosure of climate change risks? Either Morgan or I will be attending, pending travel approval.

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Michael.myers@ag.ny.gov

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:07009cc5b6fd814568f24966250d22178921c0d1b2eb9daeddee859424633ddfc830

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From: Graham McCahan <gmccahan@edf.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Vickie  
Patton <vpatton@edf.org>; Graham McCahan <gmccahan@edf.org>  
Cc:  
Bcc:  
Subject: Copy: Interstate transport  
Date: Thu Oct 25 2012 12:22:02 EDT  
Attachments:

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StartTime: Fri Oct 26 14:30:00 Eastern Daylight Time 2012  
EndTime: Fri Oct 26 15:00:00 Eastern Daylight Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
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administrative group/cn=recipients/cn=michaelmyers>  
To: Graham McCahan <gmccahan@edf.org>  
Cc:  
Bcc:  
Subject: Accepted: Interstate transport  
Date: Thu Oct 25 2012 12:23:10 EDT  
Attachments:

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Peter Washburn </o=lawnet/ou=first  
administrative group/cn=recipients/cn=peterwashburn>  
Cc:  
Bcc:  
Subject: RE: Do you have time to talk today?  
Date: Wed Nov 07 2012 16:22:10 EST  
Attachments:

---

Yes, ALA, NRDC, Sierra Club, EDF, Clean Air Council

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michael.myers@ag.ny.gov

---

From: Peter Washburn  
Sent: Wednesday, November 07, 2012 4:13 PM  
To: Michael J. Myers  
Subject: RE: Do you have time to talk today?

Thanks. Any groups involved with us on CSAPR?

Peter Washburn/ Policy Advisor/ Environmental Protection Bureau/  
NYS Office of the Attorney General / 120 Broadway, NY, NY 10271/  
212-416-8483 (o) / 212-416-6007 (fax) / peter.washburn@ag.ny.gov

---

From: Michael J. Myers  
Sent: Wednesday, November 07, 2012 4:10 PM  
To: Peter Washburn  
Subject: RE: Do you have time to talk today?

April 2012

Michael J. Myers  
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michael.myers@ag.ny.gov

---

From: Peter Washburn  
Sent: Wednesday, November 07, 2012 4:03 PM  
To: Michael J. Myers  
Subject: RE: Do you have time to talk today?

One more question before you leave?

---

From: Michael J. Myers  
Sent: Wednesday, November 07, 2012 2:42 PM  
To: Peter Washburn  
Subject: RE: Do you have time to talk today?

Sure. Just tried calling you back. Am here til about 445.

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---

From: Peter Washburn  
Sent: Wednesday, November 07, 2012 2:31 PM  
To: Michael J. Myers  
Subject: Do you have time to talk today?

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Peter Washburn </o=lawnet/ou=first administrative group/cn=recipients/cn=peterwashburn>  
Cc:  
Bcc:  
Subject: FW: Furnace Efficiency Amicus brief -- MA, NY, and CEC  
Date: Thu Nov 08 2012 11:07:20 EST  
Attachments: AmicusBriefofMA-CEC-NY\_8-10-12.pdf

---

here you go

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---

From: Augenstern, Fred (AGO) [mailto:fred.augenstern@state.ma.us]  
Sent: Friday, August 10, 2012 2:51 PM  
To: Morgan Costello; Lemuel Srolovic; Monica Wagner; Michael J. Myers; Driskell, Kristen@Energy; Holmes, Caryn@Energy; Levy, Michael@Energy; Dennis Beck; jblees22@gmail.com; Longstreth, Ben; Kennedy, Kit; Charlie Harak  
Subject: RE: Furnace Efficiency Amicus brief -- MA, NY, and CEC

Here's a courtesy copy of the brief, which I just filed. I hope we are all successful in persuading the Court to affirm the DFR.

Thanks for all the hard work!

Fred

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ORAL ARGUMENT NOT SET

No. 11-1485

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IN THE UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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AMERICAN PUBLIC GAS ASSOCIATION,  
Petitioner,  
v.

UNITED STATES DEPARTMENT OF ENERGY,  
Respondent.

---

On Petition for Review of a Direct Final Rule Issued by the  
United States Department of Energy

---

**JOINT BRIEF OF *AMICI CURIAE* THE COMMONWEALTH OF  
MASSACHUSETTS, THE STATE OF NEW YORK, AND THE  
CALIFORNIA ENERGY COMMISSION IN SUPPORT OF RESPONDENT**

---

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## GLOSSARY OF ABBREVIATIONS

ACCA	Air Conditioning Contractors of America
ACEEE	American Council for an Energy Efficient Economy
AFUE	Annual Fuel Utilization Efficiency
AHRI	Air-Conditioning, Heating and Refrigeration Institute
APGA	American Public Gas Association
ASAP	Appliance Standards Awareness Project
ASE	Alliance to Save Energy
CEC	State Energy Resources Conservation and Development Commission of the State of California, aka California Energy Commission
C.M.R.	Code of Massachusetts Regulations
DOE	Respondent, the United States Department of Energy
DOER	Massachusetts Department of Energy Resources
EPCA	Energy Policy and Conservation Act of 1975, as amended, 42 U.S.C. §§ 6291-6309
GWSA	Massachusetts Global Warming Solutions Act
GCA	Massachusetts Green Communities Act
HARDI	Heating, Air Conditioning & Refrigeration Distributors International
JSC	Joint Stakeholder Comment (submitted by American Council for an Energy Efficient Economy; Alliance to Save Energy, Appliance Standards Awareness Project, Natural Resources Defense Council, Northeast Energy Efficiency Project)
M.G.L.	Massachusetts General Laws

NEEP        Northeast Energy Efficiency Project

NOPR        Notice of Proposed Rulemaking

NPV         Net present value

NRDC        Natural Resources Defense Council

NWGFs      Non-weatherized gas furnaces

## **IDENTITY AND INTERESTS OF THE *AMICI***

The Commonwealth of Massachusetts and the State of New York (the “Amici States”) are national leaders on energy efficiency and environmental protection. As sovereign states, they are entitled to “special solicitude” because of their roles “as *parens patriae* to protect . . . public or governmental interests that concern the state as a whole.” *See Massachusetts v. EPA*, 549 U.S. 497, 520, and n. 17 (other citations omitted) (2007). The Amici States may file an *amicus curiae* brief with this Court pursuant to Rule 29(a) of the Federal Rules of Appellate Procedure and Circuit Rule 29(a).

The State Energy Resources Conservation and Development Commission of the State of California, more commonly known as the California Energy Commission (“CEC”), is California’s primary energy policy and planning agency. The CEC was created by the California Legislature in 1974 by the Warren-Alquist State Energy Resources Conservation and Development Act (“Warren-Alquist Act”) (Stats. 1974, ch. 276), codified at Cal. Pub. Res. Code § 25000, *et seq.* The CEC has obtained the consent of all parties to join the *amicus curiae* brief of the Amici States pursuant to Rule 29(a) of the Federal Rules of Appellate Procedure and Circuit Rule 29(b).

The Amici States and the CEC share common interests in supporting the furnace, central air conditioner, and heat pump efficiency standards set by the

Department of Energy's ("DOE") "direct final rule" being challenged by petitioner American Public Gas Association ("APGA"), and each also has its own special interests in seeing the standards upheld. Massachusetts and New York support the standards because, by reducing demand for natural gas, the 90 percent efficiency gas-furnace standard for northern tier states (including Massachusetts and New York) should result in significant cost savings for residents on their heating bills and improvements in the reliability of our energy systems, which depend on natural gas. The CEC supports the standards because the more stringent central air conditioner and heat pump efficiency standards for southwestern states (including California) should similarly result in significant cost savings for residents on their electric bills and improvements in system reliability. Thus, the standards will assist the Amici States and the CEC in advancing their energy and environmental laws and policies. *See, e.g.*, Massachusetts State Energy Plan<sup>1</sup> (reflecting Massachusetts' view that increased energy efficiency is "the best cost-containment tool we have to reduce energy use and greenhouse gas emissions that are causing global warming"); Massachusetts Green Communities Act ("GCA"), 2008 Mass. Acts, Ch. 169<sup>2</sup> (requiring utilities to meet electric or natural gas resource needs

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<sup>1</sup> Available as Attachment B, at: [http://www1.eere.energy.gov/buildings/appliance\\_standards/pdfs/ma\\_state\\_petition.pdf](http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/ma_state_petition.pdf).

<sup>2</sup> Available at: <http://www.malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169/>

first through “all available energy efficiency and demand reduction resources that are cost-effective or less expensive than supply”); N.Y. Energy Law § 3-101 (stating the policy of the State “to obtain and maintain an adequate and continuous supply of safe, dependable and economical energy for the people of the state,” and to “encourage conservation of energy . . . in heating”); N.Y. State Energy Plan<sup>3</sup> (setting forth goal to reduce demand for natural gas through energy efficiency improvements); Cal. Pub. Res. Code § 25402(c) (mandating that the CEC reduce energy consumption in California); *Id.* at § 25006, 25007 (expressing state policy to employ a range of measures to reduce wasteful, uneconomical, and unnecessary uses of energy and promotion of all feasible means of energy conservation); 2011 Integrated Energy Policy Report<sup>4</sup> (stating California’s commitment to meet new electricity demand first with energy efficiency).

In addition, both the Amici States and the CEC view the new furnace standard as an important tool in addressing the harms from climate change and other air pollution resulting from the combustion of fossil fuels during electricity generation. The Amici States and the State of California have participated in several cases in this Circuit, including *Massachusetts v. EPA*, *supra*, and, most recently, the *Coalition for Responsible Regulation v. EPA* cases, 684 F.3d 102

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<sup>3</sup> Available at: <http://www.nysenergyplan.com/2009stateenergyplan.html>.

<sup>4</sup> Available at: <http://www.energy.ca.gov/2011publications/CEC-100-2011-001/CEC-100-2011-001-CMF.pdf>.

(D.C. Cir. 2012), in an effort to either compel or support efforts of the federal government to address greenhouse gas pollution that is causing, and will continue to cause, harm to our residents and natural resources due to climate change. In the absence of federal standards, the Amici States and the State of California enacted statutes and promulgated regulations to reduce emissions of greenhouse gas pollution. *See, e.g.*, Massachusetts Global Warming Solutions Act (“GWSA”), 2008 Mass. Acts. Ch. 298<sup>5</sup> (setting strict greenhouse gas reduction goals, including reducing those emissions 80 percent below 1990 levels by 2050); N.Y. CO<sub>2</sub> Budget Trading Program, N.Y. Comp. Codes R. & Regs., tit. 6, ch. 242<sup>6</sup> (establishing a cap-and-trade air pollution reduction program to reduce emissions of carbon dioxide from power plants in New York); California Global Warming Solutions Act of 2006 (AB 32), Cal. Health & Saf. Code § 38550, *et seq.*<sup>7</sup> (requiring the state to reduce greenhouse gas emissions to 1990 levels by 2020); Cal. Code Regs. tit. 17, § 95801, *et seq.*<sup>8</sup> (establishing a cap-and-trade program to implement AB 32). Because DOE projects that the furnace efficiency standards will reduce greenhouse gas pollution by approximately 82 million metric tons per year, and because the standards would eliminate the need for many power plants, the Amici States and

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<sup>5</sup> Available at: <http://www.malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter298>.

<sup>6</sup> Available at: <http://www.dec.ny.gov/regs/2492.html>.

<sup>7</sup> Available at: [http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab\\_0001-0050/ab\\_32\\_bill\\_20060927\\_chaptered.html](http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_0001-0050/ab_32_bill_20060927_chaptered.html).

<sup>8</sup> Available at: <http://www.arb.ca.gov/regact/2010/capandtrade10/finalrevfro.pdf>.

the CEC support the standards as an important measure to address climate change and other forms of air pollution.

The CEC also has a unique interest as a signatory to the consensus agreement that underlies the direct final rule at issue in this case. The preamble of the consensus agreement requires the Joint Stakeholders to pursue a multipronged approach to achieve implementation of the standards contained in that agreement.<sup>9</sup> It is therefore in the CEC's interest, in furtherance of that obligation and in light of the energy and environmental benefits of the direct final rule, to see that the standards contained in the consensus agreement, and the regulatory process used to adopt those standards, are upheld by this Court.

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<sup>9</sup> Available at:  
[http://www1.eere.energy.gov/buildings/appliance\\_standards/residential/pdfs/hvac\\_consensus\\_agreement.pdf](http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/hvac_consensus_agreement.pdf).

## STATEMENT OF FACTS<sup>10</sup>

### A. The Federal Efficiency Standards.

#### 1. The States' Lawsuit to Compel DOE to Issue Revised Furnace Efficiency Standards.

As of 2005, the federal annual fuel utilization efficiency standard set by DOE for gas-furnaces was only 78 percent. It had remained at this low level for many years because DOE had failed to engage in rulemaking required under the Energy Policy and Conservation Act (“EPCA”)<sup>11</sup> to promulgate a more stringent, technologically feasible and cost effective standard. Because DOE had also missed deadlines to upgrade efficiency standards for 21 other consumer and commercial products (*e.g.*, air conditioners, clothes dryers and some lamps) covered by EPCA, a coalition of stakeholders and fifteen states, including the

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<sup>10</sup> While some materials submitted with and in this brief are not part of the record on appeal, this Court may still take notice of them because they are offered to show the Amici States’ and the CEC’s interest in the direct final rule and that DOE had full knowledge of those interests when it adopted the rule, thus informing the agency’s discretion to conclude that the sample of signatories to the JSC and the consensus agreement was “representative” under EPCA § 325(p)(4)(A). *Marshall County Health Care Auth. v. Shalala*, 988 F.2d 1221, 1226, n.6 (D.C. Cir. 1993) (as matters of public record, statements in the Federal Register can be examined); *Interstate Nat. Gas Co. v. S. California Gas Co.*, 209 F.2d 380, 385 (9th Cir. 1953) (“We may take judicial notice of records and reports of administrative bodies.”); *Native Village of Point Hope v. Salazar*, 680 F.3d 1123, 1129, n.6 (9th Cir. 2012) (notice taken of agency plan approval); *United States v. 14.02 Acres of Land More or Less in Fresno County*, 547 F.3d 943, 955 (9th Cir. 2008) (DOE study noticed).

<sup>11</sup> EPCA Subchapter III, Parts A & A-1, 42 U.S.C. §§ 6291-6317.

Amici States and the CEC,<sup>12</sup> brought suit against DOE in 2005 to force the issuance of new standards. *New York v. Bodman*; *NRDC v. Bodman*, Consolidated C.A. Nos. 05 Civ. 7807 (JES) and 05 Civ. 7808 (JES) (U.S.D.C., S.D.N.Y).

In November 2006, the parties to the consolidated cases against DOE, including the Amici States and the CEC, entered into a consent decree approved by the District Court that established deadlines for issuance of new DOE rules for all products at issue. The Consent Decree set September 30, 2007, as the deadline for issuance of an amended furnace and boiler standard (including for mobile home and small furnaces).

## **2. The Lawsuit Challenging DOE's Failure to Adopt a Ninety-Percent Efficiency Standard.**

After a short stay, DOE published a new final rule on November 19, 2007,<sup>13</sup> raising the gas-furnace standard to only 80 percent efficiency, still a very lenient standard. Government agencies in several states, including Michigan, New Hampshire, New York and Ohio, had submitted comments during the rulemaking

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<sup>12</sup> Joined by: Connecticut, Illinois, Iowa, Maine, New Hampshire, New Jersey, New Mexico, North Carolina, Rhode Island, Vermont and Wisconsin, the Pennsylvania Department of Environmental Protection, the City of New York, Natural Resources Defense Council ("NRDC"), the Massachusetts Union of Public Housing Tenants, and the Texas Ratepayers' Organization to Save Energy.

<sup>13</sup> 72 Fed. Reg. 65,136 (Nov. 19, 2007).

proceeding urging DOE to adopt a 90 percent or higher efficiency standard for furnaces.<sup>14</sup>

On January 17, 2008, New York, Massachusetts, New York City, Connecticut and NRDC, filed petitions for review of this rule in the Court of Appeals for the Second Circuit, *New York v. DOE*, Nos. 08-311-ag(L), 08-312-ag(con). California, the California Energy Commission, and New Jersey subsequently intervened as petitioners. In briefs submitted in that case, the State petitioners expressly argued that DOE improperly rejected a more stringent 90 percent furnace efficiency standard.<sup>15</sup> By Court Order dated April 21, 2009, the 80 percent efficiency rule was voluntarily remanded to DOE for further notice and comment rulemaking.

DOE was further made aware of Massachusetts' interest in implementing a more stringent 90 percent gas-furnace efficiency standard when, on October 6, 2009, DOE received the "Waiver Petition of the Commonwealth of Massachusetts to Exempt from Federal Preemption Massachusetts' 90% Annual Fuel Utilization

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<sup>14</sup> See Comments 114, 117, 124 & 134 submitted in rulemaking docket # EE-RM/STD-01-350, available at: <http://www.regulations.gov/#!searchResults;dct=PS;rpp=25;po=0;s=EE-RM%25FSTD-01-350>

<sup>15</sup> See, e.g., Final Opening Brief for Government Petitioners States of New York, Connecticut, New Jersey, and California, Commonwealth of Massachusetts, City of New York, and California Energy Comm'n, *New York v. DOE*, No. 08-0311ag(L) (2d Cir., May 7, 2008).

Efficiency Standard for Non-Weatherized Gas Furnaces” (“Waiver Petition”).<sup>16</sup>

(This is described more fully in Statement of Facts subsection B, below.)

### **3. The “Joint Stakeholder Comment” Process.**

The CEC, as California’s energy policy and planning agency, regularly participates in coalition efforts and federal efficiency rulemakings to seek more stringent energy conservation regulations from DOE under Part B of Title III of EPCA that will apply to California’s regulated appliances, especially where, as here, DOE’s authority to adopt new efficiency standards preempts states from issuing their own without prior DOE approval or waiver.

During 2009, the CEC participated extensively in the negotiations that led to a consensus agreement and the submission of a Joint Stakeholder Comment (“JSC”) to DOE, including face-to-face discussions with AHRI and other stakeholders on July 9, 2009.

On October 13, 2009, fifteen interested stakeholders (including seven furnace manufacturers, energy efficiency advocates, and the CEC) reached a consensus agreement that, among other things, supported a regional 90 percent

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<sup>16</sup> The Waiver Petition and all Attachments thereto are available at: [http://www1.eere.energy.gov/buildings/appliance\\_standards/pdfs/ma\\_state\\_petition.pdf](http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/ma_state_petition.pdf).

efficiency gas-furnace rule for thirty “northern tier” states.<sup>17</sup> 76 Fed. Reg., at 37,422. On January 26, 2010, various stakeholders (AHRI, ACEEE, ASE, ASAP, NRDC and NEEP) submitted the JSC to DOE that referenced the consensus agreement and advocated for such a rule. *Id.*

**4. DOE’s Adoption of the Direct Final Rule Establishing a Ninety-Percent Standard.**

On June 27, 2011, DOE issued a direct final rule establishing energy conservation standards for residential furnaces, central air conditioners, and heat pumps, including the regional standards for non-weatherized gas furnaces advocated in the consensus agreement. Energy Conservation Program: Energy Conservation Standards for Residential Furnaces and Residential Central Air Conditioners and Heat Pumps, Direct Final Rule, 76 Fed. Reg. 37,408. In adopting the direct final rule, DOE concluded that similarly-situated states in the northern tier would all benefit from a 90 percent furnace efficiency standard. *Id.* at 37,410 (citing EPCA § 325(o)(3)(B)’s requirement that a new or amended standard must

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<sup>17</sup> Available at: [https://www1.eere.energy.gov/buildings/appliance\\_standards/residential/pdfs/furnaces\\_framework\\_jointstakeholdercomments.pdf](https://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/furnaces_framework_jointstakeholdercomments.pdf)

“result in significant conservation of energy.”)<sup>18</sup>

Comments for and against retaining the direct final rule were submitted to DOE, and the agency, pursuant to the discretion afforded by EPCA § 325(p)(4)(C), declined to withdraw it. Energy Conservation Program: Energy Conservation Standards for Residential Furnaces and Residential Central Air Conditioners and Heat Pumps, 76 Fed. Reg. 67,037 (Oct. 31, 2011).

### **B. The Massachusetts Efficiency Standards.**

In 2005, because of its concerns about high energy costs, the availability of natural gas for home heating, and market barriers that exist for conservation programs, and to advance other overarching state energy and environmental policy goals, including addressing climate change, the Massachusetts Legislature amended its energy efficiency standards statute, M.G.L. c. 25B, §5,<sup>19</sup> to require that non-weatherized gas- and propane-fired residential furnaces” (“NWGF”)<sup>20</sup>

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<sup>18</sup> Although California is not in the northern tier of states, the direct final rule also sets regional efficiency standards for central air conditioners and heat pumps in the southwest, of which California is a part. *See* 76 Fed. Reg. 37,408, 37,430-31 (June 27, 2011). The CEC supports the rule for this reason (as it appears APGA seeks to vacate the entire rule and not just the furnace standards) and because the gas-furnace standards will help address climate change concerns in the Nation and globally.

<sup>19</sup> *See* §11 of Chapter 139 of the Acts of 2005.

<sup>20</sup> A weatherized furnace is designed for installation outdoors and resistance to weather, and has its own venting system.” 10 C.F.R. §430.2. NWGFs are far more typical, are located indoors, and need no weatherization.

sold in-state meet a 90 percent annual fuel utilization efficiency standard.<sup>21</sup> The Massachusetts standard, much stricter than the then-existing 78 percent federal efficiency standard, was tightened to reduce the significant contribution furnaces make to overall Massachusetts energy consumption, to reduce high consumer energy costs, and to prevent unnecessary air pollution that results from excess fossil-fuel energy generation. Projections at that time were that the new standard would allow Massachusetts to avoid consuming one billion cubic feet of natural gas annually by the year 2020, and that the net present value (“NPV”) of the economic savings to consumers could be as high as \$100 million.<sup>22</sup>

Because furnaces are “covered products” for which DOE is authorized to set efficiency standards under 42 U.S.C. §§ 6291(2) and 6292(a)(5), Massachusetts could not implement its 90 percent standard without obtaining from DOE a waiver of federal preemption under EPCA § 327(d). In early October 2009,

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<sup>21</sup> Following M.G.L. c. 25B, §5, the Massachusetts DOER revised its regulations to add the 90 percent AFUE standard. *See* 225 C.M.R. 9.03(10).

<sup>22</sup> An analysis prepared by the Appliance Standards Awareness Project (“ASAP”), a commenter on the JSC and signatory to the consensus agreement, estimated \$144 million in net present value savings from the adoption of 90 percent AFUE in Massachusetts. Formerly found at:

[http://www.standardsasap.org/state/2009%20federal%20analysis/states/fedappl\\_m\\_a.pdf](http://www.standardsasap.org/state/2009%20federal%20analysis/states/fedappl_m_a.pdf) Now replaced by [http://www.appliance-standards.org/sites/default/files/2009\\_Mass\\_fed\\_svngs.pdf](http://www.appliance-standards.org/sites/default/files/2009_Mass_fed_svngs.pdf)

Massachusetts filed the Waiver Petition” and supporting reports and exhibits.<sup>23</sup>

While Massachusetts knew about and supported the consensus agreement and JSC, it did not sign on because of its assessment that doing so might have undercut its request to DOE for a waiver of preemption.

Massachusetts identified in the Waiver Petition certain “unusual and compelling state . . . interests” that it believed justified a waiver under EPCA § 327(d)(1)(B). First, Massachusetts’ residential heating consumers have long been burdened by some of the nation’s highest energy costs,<sup>24</sup> which are well above the national average.<sup>25</sup>

Second, those customers need to consume far more natural gas to operate their furnaces than customers in many other states because heating degree days in Massachusetts generally exceed 6,000 and are higher than the national average.<sup>26</sup>

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<sup>23</sup> Available at:

[http://www1.eere.energy.gov/buildings/appliance\\_standards/pdfs/ma\\_state\\_petition.pdf](http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/ma_state_petition.pdf).

<sup>24</sup> For example, in 2008, Massachusetts residential natural gas prices averaged \$17.18 per thousand cubic feet (“mcf”) - 8th highest in the country - according to the Energy Information Administration’s listing of “Natural Gas Prices” by area (available at:

[http://tonto.eia.doe.gov/dnav/ng/ng\\_pri\\_sum\\_a\\_EPG0\\_PRS\\_DMcf\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_a_EPG0_PRS_DMcf_a.htm)). In 2011, Massachusetts rose to the 6th highest-cost state in the country. *Id.*

<sup>25</sup> The Optimal Report, Fig. 2, submitted as Attachment D to the Waiver Petition (*see* URL in footnotes 1, 16 & 23, above, showed Massachusetts residential gas prices to be 20% to 30% above national average since 2000.

<sup>26</sup> Optimal Report, at Fig. 1. Regardless of the year chosen, the U.S. average is generally between 4,000 and 4,500 heating degree days, compared to Massachusetts’ more than 6,000.

Third, residences and gas-fired power plants compete for regional gas supplies in Massachusetts,<sup>27</sup> which could cause winter gas interruptions and reliability problems.

Fourth, Massachusetts' high rate of rental housing (8th highest nationally)<sup>28</sup> creates unusual barriers to increasing the percentage of households that install high-efficiency furnaces because owners and renters have divergent interests. Owners have an "interest in reducing first cost, that is, putting in the least expensive equipment," while tenants who pay for fuel are "focused on reducing operation cost." These "split incentives" make it "significantly more challenging . . . to influence purchasing decisions through means other than standards."<sup>29</sup> *Id.*

Fifth, Massachusetts continues to seek lower gas consumption to help meet state policies and laws whose purposes are to save energy costs and address climate change, including the Massachusetts State Energy Plan ("Energy Plan")

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<sup>27</sup> Optimal Report, Sec. II.D., at 7. *See also* ISO-New England, "CIGRE 2008 Case Study: Electric and Natural Gas Market Interdependencies Within New England" (Sept. 1, 2008), available at [http://www.iso-ne.com/pubs/spcl\\_rpts/2008/final\\_isonone\\_cigre\\_case\\_study\\_090108.pdf](http://www.iso-ne.com/pubs/spcl_rpts/2008/final_isonone_cigre_case_study_090108.pdf). This study noted, *id.* at 8: "There is no natural gas production or underground storage in New England," unlike much of the rest of the country, thus creating a relative scarcity of supply. Moreover, "gas-fired peaking generation" in New England "can also experience fuel related problems, exacerbated during winter conditions" because gas-fired generation is sometimes "treated as secondary on the priority list with respect to fuel delivery needs." *Id.* at 21.

<sup>28</sup> Optimal Report, at 8 & Fig. 8.

<sup>29</sup> Optimal Report, at 8.

and Gas Forecast (“Forecast”),<sup>30</sup> the GWSA<sup>31</sup> and the GCA.<sup>32</sup>

As required by EPCA § 327(d)(1)(C), Massachusetts evaluated its 90 percent rule “within the context of the State’s energy plan and forecast,” which reflects Massachusetts’ view that increased energy efficiency is “the best cost-containment tool we have to reduce energy use and greenhouse gas emissions that are causing global warming.”<sup>33</sup> During 2008, Massachusetts adopted the GWSA, which sets strict greenhouse gas reduction goals, including reducing those emissions 80 percent below 1990 levels by 2050.<sup>34</sup> Massachusetts also adopted the GCA to require in-state utilities to meet their electric and natural gas resource needs first by achieving all cost-effective energy efficiency.<sup>35</sup> The Waiver Petition explained that Massachusetts had already adopted a very broad range of programs to reduce energy consumption in light of the aggregated Forecast for regulated gas companies projecting yearly increases in gas consumption through 2015.

In its Waiver Petition, Massachusetts demonstrated that cost and energy savings from its 90 percent rule would be substantial. Estimates of the NPV savings (in 2009 dollars) to Massachusetts’ consumers ranged as high as \$144

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<sup>30</sup> Waiver Petition, Attachments B & C.

<sup>31</sup> 2008 Mass. Acts, Ch. 298.

<sup>32</sup> 2008 Mass. Acts, Ch. 169.

<sup>33</sup> Energy Plan, at 2.

<sup>34</sup> *Id.*

<sup>35</sup> *Id.*, at 3.

million,<sup>36</sup> with avoided consumption of approximately 19 million therms of natural gas by 2030.<sup>37</sup>

Under EPCA § 327(d)(1)(C), Massachusetts needed to demonstrate to DOE that the “costs, benefits, burdens and reliability of energy . . . savings resulting from the State regulation make such regulation preferable or necessary when measured against the costs, benefits, burdens and reliability of alternative approaches to energy . . . savings . . .” Massachusetts prepared an Alternatives Analysis<sup>38</sup> that evaluated five alternative programs - consumer rebates, low-income grants, tax incentives, consumer financing, and a public information/education campaign. It concluded that high-efficiency furnaces had already reached high market penetration in Massachusetts through aggressive non-regulatory efficiency programs; that those approaches had largely reached maximum benefit; and that improving penetration would be difficult and costly without new regulations.<sup>39</sup> Implementing the 90 percent efficiency standard would have cost only \$24,000, compared to a range of \$3 million for tax incentives to

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<sup>36</sup> Massachusetts offered an ASAP Project analysis found at [http://www.standardsasap.org/state/2009%20federal%20analysis/states/fedappl\\_m\\_a.pdf](http://www.standardsasap.org/state/2009%20federal%20analysis/states/fedappl_m_a.pdf), that has now been replaced at: [http://www.appliance-standards.org/sites/default/files/2009\\_Mass\\_fed\\_svngs.pdf](http://www.appliance-standards.org/sites/default/files/2009_Mass_fed_svngs.pdf)

<sup>37</sup> *Id.* (revising estimate to 18 million therms).

<sup>38</sup> Waiver Petition, Attachment E.

<sup>39</sup> Alternatives Analysis, at 2.

almost \$58 million for grant programs.<sup>40</sup> Thus, it would cost 125 to about 2,400 times more for Massachusetts to try to achieve 95 percent penetration of the high-efficiency furnaces using the studied alternatives, compared to adopting a 90 percent efficiency standard.<sup>41</sup>

Despite agreeing with much of Massachusetts' data and analysis, on October 7, 2010, DOE denied the Waiver Petition, but described in the decision that it was simultaneously conducting a rulemaking on whether to adopt a regional 90 percent gas-furnace efficiency standard based on the consensus agreement. *See* Notice of Denial of a Petition for Waiver from Federal Preemption, 75 Fed. Reg. 62,115, 62,119 (Oct. 7, 2010).<sup>42</sup>

The interests set forth by Massachusetts in its Waiver Petition remain today, and are shared by all northern-tier states, which is precisely why affirmation of the direct final rule is so important to the Amici States.

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<sup>40</sup> *Id.*, at 3, 21-23.

<sup>41</sup> *Id.*

<sup>42</sup> Available at: <http://www.gpo.gov/fdsys/pkg/FR-2010-10-07/pdf/2010-25324.pdf>

## ARGUMENT

Although the Amici States and the CEC support the DOE's issuance of the direct final rule in all respects, we focus specifically here on APGA's erroneous contention<sup>43</sup> that DOE acted contrary to the statute by issuing, and then deciding not to withdraw, the direct final rule promulgating the 90 percent furnace efficiency standard. Contrary to APGA's arguments, DOE did not abuse its discretion by concluding that the JSC (and underlying consensus agreement) supporting issuance of the direct final rule was "fairly representative of relevant points of view . . . of interested parties," and by deciding that there was no reasonable basis offered by the Petitioner for withdrawing the direct final rule. EPCA § 325(p)(4).

Although APGA correctly notes<sup>44</sup> that the familiar test of *Chevron U.S.A. v. NRDC*, 467 U.S. 837, 842-43 (1984), governs, APGA fundamentally misapplies it here. APGA reads out of EPCA § 325(p)(4) the scope of the discretion Congress explicitly granted the Secretary to decide whether the JSC, supported by the consensus agreement, was made by parties who were "fairly representative of relevant points of view," and whether the adverse comments received about the direct final rule provided a "reasonable basis" for withdrawing it. Of course, that discretion is not unlimited; it is black-letter law that the Secretary must not act

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<sup>43</sup> APGA Br. 53-60.

<sup>44</sup> APGA Br. 38, n. 48.

unreasonably, arbitrarily, capriciously, or in violation law, and he must make his decisions based on substantial record evidence. 5 U.S.C. § 706. These requirements were met in this case.

**I. DOE Properly Exercised Its Discretion Under 42 U.S.C. § 6295(p)(4)(A) (EPCA § 325(p)(4)(A)) When Issuing the Direct Final Rule.**

**A. The Secretary Properly Applied EPCA § 325(p)(4)(A) in Determining That the Consensus Agreement’s Signatories Were “Representative of Relevant Points of View,” and in Issuing the Direct Final Rule.**

EPCA § 325(p)(4)(A) provides in relevant part that, upon “receipt of a statement that is submitted jointly by interested persons that are fairly representative of relevant points of view (including representatives of manufacturers of covered products, States, and efficiency advocates), *as determined by the Secretary*, and contains recommendations with respect to an energy or water conservation standard,” the Secretary “may issue” a direct final rule establishing the standard at the same time that the Secretary issues a proposed rule regarding the standard (emphasis added). Because the highlighted clause in the statute, “*as determined by the Secretary*,” is clear and not subject to any other reasonable interpretation, this Court should simply give effect to it as written, as required under the first step of the *Chevron* test. Under the facts and circumstances of this case, the Court should uphold DOE’s determinations because each had a rational basis and each was amply supported by the administrative record.

*Coalition for Responsible Regulation v. EPA*, 2012 WL 2381955, \*3, \*22 (2012);  
*Virginia Dep't of Med. Assistance Servs. v. U.S. Dep't of Health & Human  
Services*, 678 F.3d 918, 921-22, 926 (D.C. Cir. 2012); *AKM LLC dba Volks  
Constructors v. Sec'y of Labor*, 675 F.3d 752, 755 (D.C. Cir. 2012).

Subject to the general requirements of administrative law, EPCA  
§ 325(p)(4)(A) unambiguously delegates discretionary authority to the Secretary to  
do two things: first, to decide whether a statement of joint interest is “fairly  
representative” of “relevant points of view” on a proposed new energy standard,  
and then, if so, to decide whether to issue a direct final rule on the proposal.  
Congress required the Secretary to give due consideration to whether the group  
expressing views deemed “relevant” by DOE is representative of the entities listed  
in the parenthetical of the statute. The Amici States and the CEC agree with DOE  
that it did so, and that it properly found that the consensus agreement in this case,  
joined by seven product manufacturers, multiple efficiency advocates, and the  
CEC on behalf of California, and informed by the views of Massachusetts, New  
York and other interested states, and receiving no opposition from any State, was  
“fairly representative” of “relevant points of view.” 76 Fed. Reg., at 67,038.

**B. The Secretary Properly Determined That the Consensus Agreement Was Fairly Representative of Relevant States' Views.**

The claim of Intervenors ACCA and HARDI<sup>45</sup> that the consensus agreement submitted with the JSC was not representative because only a single “State entity” and no “State” signed on is plainly wrong. The CEC<sup>46</sup> signed on and has been authorized by California’s Legislative and Executive Branches to speak for California on matters involving appliance efficiency standards. The California Legislature established and consolidated the state’s responsibility for energy resources in the CEC when it passed the Warren-Alquist Act. Cal. Pub. Res. Code § 25006. The Warren-Alquist Act establishes as state policy the employment of a range of measures to reduce wasteful, uneconomical, and unnecessary uses of energy, and the promotion of all feasible means of energy conservation. *Id.*, at §§ 25007 and 25008. The CEC is required to carry out, directly or indirectly, various energy conservation measures, including prescribing efficiency standards for appliances. *Id.*, at §§ 25216(a) & 25402(c)(1). The CEC is also authorized to request and utilize the services of all federal, state, local, and regional agencies and to take any action it deems reasonable and necessary to carry out its duties to

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<sup>45</sup> ACCA/HARDI Br. 29 & 28, n. 58.

<sup>46</sup> The CEC is comprised of five Commissioners appointed by the Governor and confirmed by the California Senate, who may be removed from office only by a majority vote of each house of the state Legislature. *Id.*, at §§ 25200, 25204, & 25216. Each Commissioner serves the state at large on a full-time basis for a five-year term. *Id.*, at §§ 25203 & 25206.

represent California's efficiency interests. *Id.*, at §§ 25218(d) & (e); § 25219.

Taken together, the provisions of the Warren-Alquist Act designate the CEC as a California agency that must be considered the "State" for the purposes of the involvement that led to the consensus agreement and the JSC. DOE acted appropriately in according the CEC this status here, as it has done in prior proceedings.

This treatment of the CEC by DOE is historically supported. Over the years, the CEC has submitted numerous letters and written comments to DOE in various rulemaking proceedings involving appliance efficiency. Particularly noteworthy is the CEC's 2005 petition to DOE for a waiver of federal preemption under EPCA § 327(d) to permit California to implement new water conservation standards for residential clothes washers.<sup>47</sup> DOE accepted and considered the CEC's petition and in doing so properly recognized the CEC's ability to act as the "State" of California in the context of an EPCA proceeding.<sup>48</sup>

Moreover, when considering the direct final rule, the Secretary was well aware of the strong, publicly expressed interest of numerous other states in a 90 percent efficiency gas-furnace standard from comments they submitted to DOE in

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<sup>47</sup> The facts and issues involved in the petition are discussed in *California Energy Commission v. Department of Energy*, 585 F.3d 1143 (9th Cir. 2009).

<sup>48</sup> More recently, CEC staff recently attended DOE's May 2, 2012, public meeting regarding energy conservation standards for battery chargers and external power supplies and subsequently submitted written comments to the proceeding on May 29, 2012.

its prior rulemaking adopting an 80 percent efficiency standard,<sup>49</sup> the Second Circuit litigation filed by several states, including the Amici States and the CEC, challenging this standard as inadequate,<sup>50</sup> and Massachusetts' Waiver Petition.<sup>51</sup> Although these states did not join the JSC because they were already advocating for the higher furnace standard through the related Second Circuit litigation and the waiver process, their position undoubtedly informed the agency's determination that the sample of signatories to the JSC and the consensus agreement was indeed "representative" of relevant points of view and not underinclusive under EPCA § 325(p)(4)(A), as APGA erroneously claims.

**C. There is No *Per Se* Rule That Multiple State Signatures Are Required to Make a Joint Statement Fairly Representative of Relevant Points of View.**

Intervenors ACCA's and HARDI's claim<sup>52</sup> that "multiple States . . . must sign a joint statement before DOE may issue a DFR" is similarly unfounded. The touchstone under EPCA § 325(p)(4)(A) is a determination by the Secretary that the joint statement is fairly representative of relevant points of view. As the statutory text makes clear, in this analysis, the Secretary must consider whether the views of the States are represented in the joint statement.

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<sup>49</sup> See 72 Fed. Reg. at 65,136.

<sup>50</sup> See *New York v. DOE*, No. 08-0311ag(L).

<sup>51</sup> See Notice of Denial, 75 Fed. Reg. at 62,115-20.

<sup>52</sup> ACCA/HARDI Br. 28, n. 58.

But contrary to intervenors' claims, the statute sets forth no *per se* rule that multiple States must sign a joint statement before it ever may be considered fairly representative of state views. As discussed above, the particular facts here provided ample basis for the Secretary to conclude that the States' views were fairly represented in the JSC. The CEC signed the consensus agreement, and through a variety of public proceedings - including DOE's own prior rulemaking proceedings, related litigation brought by the States, and DOE's handling of Massachusetts' waiver petition - DOE had been fully apprised of many States' interest in the passage of a 90 percent gas-furnace efficiency rule. Moreover, no State opposed the direct final rule, nor has any state challenged it or DOE's process as non-representative of the States' interests. Consequently, DOE had a sound basis here to conclude that the JSC was fairly representative of many States' views, and the direct final rule should not be annulled merely because the numerous States that publicly supported a 90 percent rule did not themselves sign the JSC. DOE thus satisfied the procedural threshold set forth in the statute to permit the Secretary to utilize the more streamlined mechanism available under EPCA to issue a direct final rule based on what he considered to be a representative group of entities with relevant opinions.

ACCA's and HARDI's restrictive viewpoint makes little logical sense under the facts of this case. The signatory to the consensus agreement was the CEC,

representing the country's largest state with a population (according to 2009 U.S. census data)<sup>53</sup> of approximately 37 million people. If, for example, Wyoming and Vermont, with populations totaling just under 1.2 million, had signed the consensus agreement and the CEC had not, this would presumably comply with ACCA's and HARDI's proposed *per se* rule, even though those two States together have only about 3% of California's population and only about 0.4% of the country's population. Congress could not have meant for DOE to rigidly apply EPCA § 325(p)(4)(A) to produce such anomalous results when its goal was to ensure "representativeness" for the greater good, and the Secretary had a sound basis to conclude that the States' views were well represented here.

**D. The Secretary Properly Determined That Entities Not Mentioned in the Statute Are Not Necessary to Make a Joint Statement Fairly Representative of Relevant Points of View.**

Curiously, and without adequate legal support, APGA argues<sup>54</sup> that DOE cannot "predicate" a direct final rule on the views of the kinds of entities specifically mentioned in the statute (*i.e.*, manufacturers, States, and efficiency advocates), without considering the views of certain other entities that the statute does not mention - namely "energy suppliers, contractors, distributors, and

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<sup>53</sup> Available at: <http://www.census.gov/compendia/statab/2012/ranks/rank01.html>

<sup>54</sup> APGA Br. 54-55.

consumers.”<sup>55</sup> But, the “other” categories APGA lists were neither enumerated by Congress in the statute as entities whose opinions DOE had to consider in determining whether the consensus agreement was “representative,” nor as entities with “relevant points of view” in this area.

Moreover, DOE’s issuance of the direct final rule without any signatories from the specific entities that APGA represents is logical. Those entities are peripheral to the focus of the direct final rule’s 90 percent efficiency gas-furnace standard, which is directed only at furnace manufacturers, not energy suppliers, distributors or installers. As discussed above, the consensus agreement provided a representative sample of those parties specifically enumerated in the statute, and no such parties voiced any objection to it or the JSC. Furthermore, several groups advocating on behalf of energy consumers besides the consensus agreement signatories also supported the standards.<sup>56</sup> Thus, DOE acted well within the discretion and authority Congress delegated to it when determining that the viewpoints represented in support of the standards were sufficient under the statute

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<sup>55</sup> In point of fact, many of the signatories to the consensus agreement and the JSC represent consumer groups.

<sup>56</sup> In addition to the energy efficiency advocates who signed the JSC (ACEEE, ASE, ASAP, NRDC and NEEP), Northwest Energy Efficiency, Environment America, and the Northwest Power and Conservation Council submitted comments in support of the direct final rule. (R.60 [EERE-2011-BT-STD-0011], submitted Nov. 17, 2011.)

to issue a direct final rule.<sup>57</sup>

Adopting Petitioner's view of the statute would frustrate EPCA's grant of expedited rulemaking authority to DOE to issue long-overdue energy efficiency standards. That authority gives DOE the discretion to utilize a streamlined rulemaking process where, as here, a representative set of stakeholders has negotiated a proposal for energy conservation standards that are technologically feasible and economically justified, and several other interested parties made their support for such standards clear in prior rulemaking proceedings, litigation, and legislation. APGA's reading of the statute is rigid, overly technical and without textual support. Adopting such an interpretation would undermine DOE's ability to use the Congress's valuable direct final rule procedure to expeditiously adopt efficiency standards that benefit consumers and the environment in the Amici States and in California and to avoid further unnecessary delay.

**II. EPCA § 325(p)(4)(C) Provides DOE with Authority to Refuse to Withdraw a Direct Final Rule Even When It Receives Substantive Opposition to the Rule.**

APGA's arguments<sup>58</sup> that DOE was required to withdraw the direct final rule once it received any substantive opposition to the rule ignores the plain

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<sup>57</sup> It is also noteworthy that APGA and its supporting intervenors submitted comments on the consensus agreement that was the basis of the JSC, and therefore the direct final rule. 76 Fed. Reg. at 37,423-25. Thus, APGA and its supporting intervenors cannot plausibly say that they had no meaningful input in the rulemaking process.

language in the second part of subsection (C) of the statute, which expressly delegates authority to the Secretary to determine whether any adverse comments it has received provide a “reasonable basis” for withdrawing the rule. Section 325(p)(4)(C) of EPCA provides in relevant part that “the Secretary shall withdraw” the direct final rule “*if* . . . the Secretary receives 1 or more adverse public comments relating to” the rule *and* “based on the . . . record . . . the Secretary determines that such adverse public comments . . . *may* provide a reasonable basis for withdrawing” it. (Emphasis added.)

If, as the statute says, the Secretary is empowered to decide that adverse comments *may* provide a reasonable basis for withdrawing a direct final rule, he also possesses the corollary authority to decide that adverse comments *may not* or *do not* provide a reasonable basis for withdrawal. Of course, the Secretary’s power is not unlimited under the statute, and he still must act reasonably based on sufficient record evidence. That is precisely what the Secretary did here when, based on a thorough review of the record before him, including the submitted comments of APGA, HARDI and ACCA, he determined that the comments failed to raise concerns that would compel DOE to adopt a different standard upon further review. 76 Fed. Reg., at 67,037, 67,040, 67,051. Under the facts of this case, and given the long history of DOE’s consideration of new furnace standards,

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<sup>58</sup> APGA Br. 56-58.

the Secretary permissibly exercised the discretion Congress granted him when he refused to withdraw the direct final rule.<sup>59</sup>

APGA fails to cite any authority in support of its argument that only “noncontroversial” consensus standards may be implemented through direct final rules.<sup>60</sup> There is no such limitation in the language of EPCA § 325(p)(4)(C), which is unambiguous with respect to the Secretary’s discretion. As such, under the first step of the *Chevron* test, it would not be appropriate for the Court to construe the statute in the manner the Petitioner argues.

Even if the Court were to conclude that the statute was not clear on its face, DOE’s interpretation of the statute as allowing it discretion not to withdraw the direct final rule in light of adverse comments received is reasonable and entitled to deference under the second step of the *Chevron* test. Given DOE’s long-term study and review of furnace standards, the agency properly concluded that it was well within its discretion to retain the rule.

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<sup>59</sup> Here, DOE pointed out in its decision to retain the direct final rule that it “weighed the significance of each comment individually and all comments cumulatively” to evaluate whether they provided a reasonable basis for withdrawing the direct final rule,” and it considered “each adverse comment based on its merits and the background data and information that supported that comment.” 76 Fed. Reg., at 67,050.

<sup>60</sup> APGA Br. 57 (citing only to a quote from a comment on the direct final rule submitted by AHRI (R. 52 [EERE-2011-BT-STD-0011], at 2), in which the commenter ultimately supported the consensus agreement).

## CONCLUSION

For the foregoing reasons, and for the reasons cited by DOE in its brief, the petition for review should be denied and the direct final rule should be upheld.

Respectfully submitted,

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Dated: August 10, 2012

## CERTIFICATE OF COMPLIANCE

Pursuant to FRAP 32(a)(7)(C), I hereby certify that the foregoing Joint Brief of *Amici Curiae* the Commonwealth of Massachusetts, the State of New York, and the California Energy Commission in Support of Respondent, complies with the type-volume limitation of FRAP 32(a)(7)(B). The brief is proportionately spaced, printed in Times New Roman font in 14 point typeface, and the body of the brief contains 5,353 words, as counted by Word.

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## CERTIFICATE OF SERVICE

I hereby certify that on August 10, 2012, I electronically filed the foregoing Joint Brief of *Amici Curiae* the Commonwealth of Massachusetts, the State of New York, and the California Energy Commission in Support of Respondent, with the Clerk of the Court for the United States Court of Appeals for the District of Columbia Circuit by using the CM/ECF system. Counsel for the parties listed below are registered CM/ECF users, and have been served by the CM/ECF system:

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**ADDENDUM:**  
**STATUTES AND REGULATIONS**

## **FEDERAL STATUTES AND REGULATIONS**

### **42 U.S.C. § 6291(2)**

For purposes of this part:

(2) The term “covered product” means a consumer product of a type specified in section 6292 of this title.

### **42 U.S.C. § 6292(a)(5)**

(a) In general.

The following consumer products, excluding those consumer products designed solely for use in recreational vehicles and other mobile equipment, are covered products:

(5) Furnaces.

### **42 U.S.C. § 6295(p)(4)**

(p) Procedure for prescribing new or amended standards

Any new or amended energy conservation standard shall be prescribed in accordance with the following procedure:

(4) Direct final rules.

(A) In general. On receipt of a statement that is submitted jointly by interested persons that are fairly representative of relevant points of view (including representatives of manufacturers of covered products, States, and efficiency advocates), as determined by the Secretary, and contains recommendations with respect to an energy or water conservation standard—

(i) if the Secretary determines that the recommended standard contained in the statement is in accordance with subsection (o) or section 6313(a)(6)(B) of this title, as applicable, the Secretary may issue a final rule that establishes an energy or water conservation standard and is published simultaneously with a notice of proposed rulemaking that proposes a new or amended energy or water conservation standard that is identical to the standard established in the final rule to establish the recommended standard (referred to in this paragraph as a “direct final rule”); or

(ii) if the Secretary determines that a direct final rule cannot be issued based on the statement, the Secretary shall publish a notice of the determination, together with an explanation of the reasons for the determination.

(B) Public comment. The Secretary shall solicit public comment for a period of at least 110 days with respect to each direct final rule issued by the Secretary under subparagraph (A)(i).

(C) Withdrawal of direct final rules.

(i) In general. Not later than 120 days after the date on which a direct final rule issued under subparagraph (A)(i) is published in the Federal Register, the Secretary shall withdraw the direct final rule if

(I) the Secretary receives 1 or more adverse public comments relating to the direct final rule under subparagraph (B)(i) or any alternative joint recommendation; and

(II) based on the rulemaking record relating to the direct final rule, the Secretary determines that such adverse public comments or alternative joint recommendation may

provide a reasonable basis for withdrawing the direct final rule under subsection (o), section 6313(a)(6)(B) of this title, or any other applicable law.

(ii) Action on withdrawal. On withdrawal of a direct final rule under clause (i), the Secretary shall

(I) proceed with the notice of proposed rulemaking published simultaneously with the direct final rule as described in subparagraph (A)(i); and

(II) publish in the Federal Register the reasons why the direct final rule was withdrawn.

(iii) Treatment of withdrawn direct final rules.—A direct final rule that is withdrawn under clause (i) shall not be considered to be a final rule for purposes of subsection (o).

#### **42 U.S.C. § 6297(d)**

(d) Waiver of Federal preemption

(1)(A) Any State or river basin commission with a State regulation which provides for any energy conservation standard or other requirement with respect to energy use, energy efficiency, or water use for any type (or class) of covered product for which there is a Federal energy conservation standard under section 6295 of this title may file a petition with the Secretary requesting a rule that such State regulation become effective with respect to such covered product.

(B) Subject to paragraphs (2) through (5), the Secretary shall, within the period described in paragraph (2) and after consideration of the petition and the comments of interested persons, prescribe such rule if the Secretary finds (and publishes such finding) that the State or river basin commission has established by a preponderance of the evidence that such State regulation is needed to meet unusual and compelling State or local energy or water interests.

(C) For purposes of this subsection, the term "unusual and compelling State or local energy or water interests" means interests which

(i) are substantially different in nature or magnitude than those prevailing in the United States generally; and

(ii) are such that the costs, benefits, burdens, and reliability of energy or water savings resulting from the State regulation make such regulation preferable or necessary when measured against the costs, benefits, burdens, and reliability of alternative approaches to energy or water savings or production, including reliance on reasonably predictable market-induced improvements in efficiency of all products subject to the State regulation. The factors described in clause (ii) shall be evaluated within the context of the State's energy plan and forecast, and, with respect to a State regulation for which a petition has been submitted to the Secretary which provides for any energy conservation standard or requirement with respect to water use of a covered product, within the context of the water supply and groundwater management plan, water quality program, and comprehensive plan (if any) of the State or river basin commission for improving, developing, or conserving a waterway affected by water supply development.

(2) The Secretary shall give notice of any petition filed under paragraph (1)(A) and afford interested persons a reasonable opportunity to make written comments, including rebuttal comments, thereon. The Secretary shall, within the 6-month period beginning on the date on which any such petition is filed, deny such petition or prescribe the requested rule, except that the Secretary may publish a notice in the Federal Register extending such period to a date certain but no longer than one year after the date on which the petition was filed. Such notice shall

include the reasons for delay. In the case of any denial of a petition under this subsection, the Secretary shall publish in the Federal Register notice of, and the reasons for, such denial.

(3) The Secretary may not prescribe a rule under this subsection if the Secretary finds (and publishes such finding) that interested persons have established, by a preponderance of the evidence, that such State regulation will significantly burden manufacturing, marketing, distribution, sale, or servicing of the covered product on a national basis. In determining whether to make such finding, the Secretary shall evaluate all relevant factors, including -

(A) the extent to which the State regulation will increase manufacturing or distribution costs of manufacturers, distributors, and others;

(B) the extent to which the State regulation will disadvantage smaller manufacturers, distributors, or dealers or lessen competition in the sale of the covered product in the State;

(C) the extent to which the State regulation would cause a burden to manufacturers to redesign and produce the covered product type (or class), taking into consideration the extent to which the regulation would result in a reduction -

(i) in the current models, or in the projected availability of models, that could be shipped on the effective date of the regulation to the State and within the United States; or

(ii) in the current or projected sales volume of the covered product type (or class) in the State and the United States; and

(D) the extent to which the State regulation is likely to contribute significantly to a proliferation of State appliance efficiency requirements and the cumulative impact such requirements would have.

(4) The Secretary may not prescribe a rule under this subsection if the Secretary finds (and publishes such finding) that interested persons have established, by a preponderance of the evidence, that the State regulation is likely to result in the unavailability in the State of any covered product type (or class) of performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as those generally available in the State at the time of the Secretary's finding, except that the failure of some classes (or types) to meet this criterion shall not affect the Secretary's determination of whether to prescribe a rule for other classes (or types).

(5) No final rule prescribed by the Secretary under this subsection may -

(A) permit any State regulation to become effective with respect to any covered product manufactured within three years after such rule is published in the Federal Register or within five years if the Secretary finds that such additional time is necessary due to the substantial burdens of retooling, redesign, or distribution needed to comply with the State regulation; or

(B) become effective with respect to a covered product manufactured before the earliest possible effective date specified in section 6295 of this title for the initial amendment of the energy conservation standard established in such section for the covered product; except that such rule may become effective before such date if the Secretary finds (and publishes such finding) that, in addition to the other requirements of this subsection the State has established, by a preponderance of the evidence, that -

(i) there exists within the State an energy emergency condition or, if the State regulation provides for an energy conservation standard or other requirement with respect to the water use of a covered product for which there is a Federal energy conservation standard under subsection (j) or (k) of section 6295 of this title, a water emergency condition, which -

(I) imperils the health, safety, and welfare of its residents because of the inability of the State or utilities within the State to provide adequate quantities of gas or electric energy or, in the case of a water emergency condition, water or wastewater treatment, to its residents at less than prohibitive costs; and

(II) cannot be substantially alleviated by the importation of energy or, in the case of a water emergency condition, by the importation of water, or by the use of interconnection agreements; and

(ii) the State regulation is necessary to alleviate substantially such condition.

(6) In any case in which a State is issued a rule under paragraph (1) with respect to a covered product and subsequently a Federal energy conservation standard concerning such product is amended pursuant to section 6295 of this title, any person subject to such State regulation may file a petition with the Secretary requesting the Secretary to withdraw the rule issued under paragraph (1) with respect to such product in such State. The Secretary shall consider such petition in accordance with the requirements of paragraphs (1), (3), and (4), except that the burden shall be on the petitioner to show by a preponderance of the evidence that the rule received by the State under paragraph (1) should be withdrawn as a result of the amendment to the Federal standard. If the Secretary determines that the petitioner has shown that the rule issued by the State should be so withdrawn, the Secretary shall withdraw it.

#### **10 C.F.R. § 430.2**

*Weatherized warm air furnace or boiler* means a furnace or boiler designed for installation outdoors, approved for resistance to wind, rain, and snow, and supplied with its own venting system.

### **MASSACHUSETTS STATUTES AND REGULATIONS**

#### **M.G.L. 25B § 5.**

Establishment of energy efficiency standards; revision

The commissioner shall by regulation establish the level of energy efficiency standards for lamps, so that each lamp covered by said standard shall consume less power in watts per unit of light output in lumens than a maximum reference level to be established by the commissioner; provided, however, that said standards shall not become effective until January first, nineteen hundred and ninety. The commissioner may by regulation increase the level of the energy efficiency standards for lamps, fluorescent ballasts, luminaires and showerheads. Said commissioner may also by regulation increase the level of the energy efficiency standards for refrigerators, refrigerator-freezers, freezers and water heaters, provided that said standards shall not become effective until January first, nineteen hundred and ninety. Any revision of such standards shall be based upon the determination by the commissioner that such efficiency levels are cost-effective to the users, as a group, of the covered appliance or lamp. Any standard revised pursuant to this section which conflicts with a corresponding standard in the state plumbing code shall take precedence over the standard in said code. Any standard revised pursuant to this section shall not take effect for at least one year after its adoption.

The commissioner, in consultation with the heads of other appropriate agencies, shall adopt regulations, in accordance with this chapter, establishing minimum energy efficiency standards for the types of new products set forth in clauses (f) to (s), inclusive, of section 3.

The regulations shall provide for the following minimum efficiency standards:

(1) New medium voltage dry-type distribution transformers, single voltage external AC to DC power supplies, and state-regulated incandescent reflector lamps manufactured on or after January 1, 2008, shall not be sold or offered for sale in the commonwealth unless the efficiency of the new product meets or exceeds the efficiency standards set forth in 225 CMR 9.03.

(2) Metal halide lamp fixtures designed to be operated with lamps rated greater than or equal to 150 watts but less than or equal to 500 watts shall not contain a probe-start metal halide ballast.

(3) Residential furnaces or boilers shall meet or exceed the following Annual Fuel Utilization Efficiency (AFUE):

Product Type	Minimum Efficiency Level
Gas and propane furnaces	90% AFUE
Oil furnaces	83% AFUE
Gas and propane hot water boilers	84% AFUE
Oil-fired hot water boilers	84% AFUE
Gas and propane steam boilers	82% AFUE
Oil-fired steam boilers	82% AFUE

The commissioner may adopt rules to exempt compliance with these furnace or boiler standards at any building, site or location where complying with said standards would be in conflict with any local zoning ordinance, building or plumbing code or other rule regarding installation and venting of boilers or furnaces.

Residential furnace air handlers shall have an ER of 2 per cent or less, except residential oil furnaces with a capacity of less than 94,000 Btu per hour shall have an ER of 2.3 per cent or less.

(4) Single-voltage external AC to DC power supplies shall meet the tier 1 energy efficiency requirements of California Code of Regulations, Title 20, Section 1605.3, as published in April 2005. This standard applies to single-voltage AC to DC power supplies that are sold individually and to those that are sold as a component of or in conjunction with another product.

(5) State-regulated incandescent reflector lamps shall meet the minimum average lamp efficiency requirements for federally-regulated incandescent reflector lamps contained in 42 U.S.C. section 6295 (i)(1)(A). The following lamps are exempt from these requirements: ER30, BR30, BR40 and ER40 of 50 watts or less; BR30, BR40 and ER40 of 65 watts; and R20 of 45 watts or less.

On or after January 1, 2008, no new medium voltage dry-type distribution transformer, single-voltage external AC to DC power supply or state-regulated incandescent reflector lamp may be

sold or offered for sale in the state unless the efficiency of the new product meets or exceeds the efficiency standards set forth in the regulations adopted pursuant to this section. On or after January 1, 2009, no new metal halide lamp fixture may be sold or offered for sale in the commonwealth unless the efficiency of the product meets or exceeds the efficiency standards set forth in the regulations adopted pursuant to this section. In accordance with section 9, the commissioner, in consultation with the attorney general, shall determine if implementation of state standards for residential furnaces or boilers requires a waiver from federal preemption, and shall apply for such waivers if necessary. If the commissioner determines that a waiver from federal preemption is necessary for residential furnaces or boiler standards established by this section, the state standard shall go into effect at the earliest date permitted by federal law. If the commissioner determines that a waiver from federal preemption is not needed for residential furnaces or boilers, then such state standards shall go into effect on June 1, 2008.

One year after the date upon which sale or offering for sale of certain products is limited pursuant to the preceding paragraph of this section, no new products may be installed for compensation in the state unless the efficiency of the new product meets or exceeds the efficiency standards set forth in the regulations adopted pursuant to this section.

## **225 C.M.R. 9.03(10)**

### Product Standards and Test Methods

#### (10) Residential Furnaces or Boilers.

(a) Residential furnaces or boilers shall meet or exceed the following Annual Fuel Utilization Efficiency (AFUE):

<u>Product Type</u>	<u>Minimum Efficiency Level</u>
Gas and propane furnaces	*90% AFUE
Oil furnaces	*83% AFUE
Gas and propane hot water boilers	*84% AFUE
Oil-fired hot water boilers	*84% AFUE
Gas and propane steam boilers	*82% AFUE
Oil-fired steam boilers	Oil-fired steam boilers

(b) The commissioner may adopt rules to exempt compliance with these furnace or boiler standards at any building, site or location where complying with said standards would be in conflict with any local zoning ordinance, building or plumbing code or other rule regarding installation and venting of boilers or furnaces.

(c) Residential furnace air handlers shall have an ER of 2% or less, except residential oil furnaces with a capacity of less than 94,000 Btu per hour shall have an ER of 2.3% or less.

(d) The manufacturer shall cause the testing of samples of each model of residential furnaces and boilers to be sold for final retail sale in Massachusetts in accordance with the federal test method contained in 10 CFR § 430, Subpart B, Appendix N. The test method includes the testing methods required for both elements of Massachusetts standards (*i.e.* minimum AFUE standards and maximum electricity ratio standard.)

## **CALIFORNIA STATUTES**

### **CAL. PRC. CODE § 25006**

It is the policy of the state and the intent of the Legislature to establish and consolidate the state's responsibility for energy resources, for encouraging, developing, and coordinating research and development into energy supply and demand problems, and for regulating electrical generating and related transmission facilities.

### **CAL. PRC. CODE § 25007**

It is further the policy of the state and the intent of the Legislature to employ a range of measures to reduce wasteful, uneconomical, and unnecessary uses of energy, thereby reducing the rate of growth of energy consumption, prudently conserve energy resources, and assure statewide environmental, public safety, and land use goals.

### **CAL. PRC. CODE § 25008**

It is further the policy of the state and the intent of the Legislature to promote all feasible means of energy and water conservation and all feasible uses of alternative energy and water supply sources.

The Legislature finds and declares that the State of California has extensive physical and natural resources available to it at state-owned sites and facilities which can be substituted for traditional energy supplies or which lend themselves readily to the production of electricity or water. Due to increases in energy and water costs, the state's expenditures for energy and water have also increased, adding to the burden on California taxpayers and reducing the amount of funds available for other public purposes.

It is in the best interest of the state to use these resources when it can be demonstrated that long-term cost, water, and energy use reduction will result, and where increased independence from other fuel and water sources and development of additional revenues for the state may be obtained.

Therefore, in recognition of recent and projected increases in the cost of energy and water from traditional sources, it is the policy of the state to use available resources at state facilities which can substitute for traditional energy and water supplies or produce electricity or water at its facilities when use or production will reduce long-term energy or water expenditures. Criteria used in analysis of proposed actions shall include lifecycle cost evaluation, benefit to taxpayers, reduced fossil fuel or reduced water consumption depending on the application, and improved efficiency. Energy or water facilities at state-owned sites shall be scaled to produce optimal system efficiency and best economic advantage to the state. Energy or water produced may be reserved by the state to meet state facility needs or may be sold to state or nonstate purchasers. Resources and processes which may be used to substitute for traditional energy and water supplies and for the purpose of electrical generation at state facilities include, but are not limited

to, cogeneration, biomass, wind, geothermal, vapor compression, water reclamation, and solar technologies.

It is the intent of the Legislature that no policy in this section, expressed or implied, be in conflict with existing state or federal regulations regarding the production or sale of electricity or water, and that this policy be just and reasonable to utility ratepayers.

**CAL. PRC. CODE § 25200**

There is in the Resources Agency the State Energy Resources Conservation and Development Commission, consisting of five members appointed by the Governor subject to Section 25204.

**CAL. PRC. CODE § 25203**

Each member of the commission shall represent the state at large and not any particular area thereof, and shall serve on a full-time basis.

**CAL. PRC. CODE § 25204**

The Governor shall appoint the members of the commission within 30 days after the effective date of this division. Every appointment made by the Governor to the commission shall be subject to the advice and consent of a majority of the members elected to the Senate.

**CAL. PRC. CODE § 25218**

In addition to other powers specified in this division, the commission may do any of the following:

- (a)Apply for and accept grants, contributions, and appropriations.
- (b)Contract for professional services if such work or services cannot be satisfactorily performed by its employees or by any other state agency.
- (c)Be sued and sue.
- (d)Request and utilize the advice and services of all federal, state, local, and regional agencies.
- (e)Adopt any rule or regulation, or take any action, it deems reasonable and necessary to carry out the provisions of this division.
- (f)Adopt rules and regulations, or take any action, it deems reasonable and necessary to ensure the free and open participation of any member of the staff in proceedings before the commission.

**CAL. PRC. CODE § 25219**

As to any matter involving the federal government, its departments or agencies, which is within the scope of the power and duties of the commission, the commission may represent its interest or the interest of any county, city, state agency, or public district upon its request, and to that end may correspond, confer, and cooperate with the federal government, its departments or agencies.

## **CAL. PRC. CODE § 25402**

The commission shall, after one or more public hearings, do all of the following, in order to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water:

(a)(1)Prescribe, by regulation, lighting, insulation climate control system, and other building design and construction standards that increase the efficiency in the use of energy and water for new residential and new nonresidential buildings. The commission shall periodically update the standards and adopt any revision that, in its judgment, it deems necessary. Six months after the commission certifies an energy conservation manual pursuant to subdivision (c) of Section 25402.1, no city, county, city and county, or state agency shall issue a permit for any building unless the building satisfies the standards prescribed by the commission pursuant to this subdivision or subdivision (b) that are in effect on the date an application for a building permit is filed. Water efficiency standards adopted pursuant to this subdivision shall be demonstrated by the commission to be necessary to save energy.

(2)Prior to adopting a water efficiency standard for residential buildings, the Department of Housing and Community Development and the commission shall issue a joint finding whether the standard (A) is equivalent or superior in performance, safety, and for the protection of life, health, and general welfare to standards in Title 24 of the California Code of Regulations and (B) does not unreasonably or unnecessarily impact the ability of Californians to purchase or rent affordable housing, as determined by taking account of the overall benefit derived from water efficiency standards. Nothing in this subdivision in any way reduces the authority of the Department of Housing and Community Development to adopt standards and regulations pursuant to Part 1.5 (commencing with Section 17910) of Division 13 of the Health and Safety Code.

(3)Water efficiency standards and water conservation design standards adopted pursuant to this subdivision and subdivision (b) shall be consistent with the legislative findings of this division to ensure and maintain a reliable supply of electrical energy and be equivalent to or superior to the performance, safety, and protection of life, health, and general welfare standards contained in Title 24 of the California Code of Regulations. The commission shall consult with the members of the coordinating council as established in Section 18926 of the Health and Safety Code in the development of these standards.

(b)(1)Prescribe, by regulation, energy and water conservation design standards for new residential and new nonresidential buildings. The standards shall be performance standards and shall be promulgated in terms of energy consumption per gross square foot of floorspace, but may also include devices, systems, and techniques required to conserve energy and water. The commission shall periodically review the standards and adopt any revision that, in its judgment, it deems necessary. A building that satisfies the standards prescribed pursuant to this subdivision need not comply with the standards prescribed pursuant to subdivision (a). Water conservation design standards adopted pursuant to this subdivision shall be demonstrated by the commission to be necessary to save energy. Prior to adopting a water conservation design standard for residential buildings, the Department of Housing and Community Development and the

commission shall issue a joint finding whether the standard (A) is equivalent or superior in performance, safety, and for the protection of life, health, and general welfare to standards in the California Building Standards Code and (B) does not unreasonably or unnecessarily impact the ability of Californians to purchase or rent affordable housing, as determined by taking account of the overall benefit derived from the water conservation design standards. Nothing in this subdivision in any way reduces the authority of the Department of Housing and Community Development to adopt standards and regulations pursuant to Part 1.5 (commencing with Section 17910) of Division 13 of the Health and Safety Code.

(2)In order to increase public participation and improve the efficacy of the standards adopted pursuant to subdivisions (a) and (b), the commission shall, prior to publication of the notice of proposed action required by Section 18935 of the Health and Safety Code, involve parties who would be subject to the proposed regulations in public meetings regarding the proposed regulations. All potential affected parties shall be provided advance notice of these meetings and given an opportunity to provide written or oral comments. During these public meetings, the commission shall receive and take into consideration input from all parties concerning the parties' design recommendations, cost considerations, and other factors that would affect consumers and California businesses of the proposed standard. The commission shall take into consideration prior to the start of the notice of proposed action any input provided during these public meetings.

(3)The standards adopted or revised pursuant to subdivisions (a) and (b) shall be cost-effective when taken in their entirety and when amortized over the economic life of the structure compared with historic practice. When determining cost-effectiveness, the commission shall consider the value of the water or energy saved, impact on product efficacy for the consumer, and the life cycle cost of complying with the standard. The commission shall consider other relevant factors, as required by Sections 18930 and 18935 of the Health and Safety Code, including, but not limited to, the impact on housing costs, the total statewide costs and benefits of the standard over its lifetime, economic impact on California businesses, and alternative approaches and their associated costs.

(c)(1)Prescribe, by regulation, standards for minimum levels of operating efficiency, based on a reasonable use pattern, and may prescribe other cost-effective measures, including incentive programs, fleet averaging, energy and water consumption labeling not preempted by federal labeling law, and consumer education programs, to promote the use of energy and water efficient appliances whose use, as determined by the commission, requires a significant amount of energy or water on a statewide basis. The minimum levels of operating efficiency shall be based on feasible and attainable efficiencies or feasible improved efficiencies that will reduce the energy or water consumption growth rates. The standards shall become effective no sooner than one year after the date of adoption or revision. No new appliance manufactured on or after the effective date of the standards may be sold or offered for sale in the state, unless it is certified by the manufacturer thereof to be in compliance with the standards. The standards shall be drawn so that they do not result in any added total costs for consumers over the designed life of the appliances concerned.

In order to increase public participation and improve the efficacy of the standards adopted pursuant to this subdivision, the commission shall, prior to publication of the notice of proposed action required by Section 18935 of the Health and Safety Code, involve parties who would be subject to the proposed regulations in public meetings regarding the proposed regulations. All potential affected parties shall be provided advance notice of these meetings and given an opportunity to provide written or oral comments. During these public meetings, the commission shall receive and take into consideration input from all parties concerning the parties' design recommendations, cost considerations, and other factors that would affect consumers and California businesses of the proposed standard. The commission shall take into consideration prior to the start of the notice of proposed action any input provided during these public meetings.

The standards adopted or revised pursuant to this subdivision shall not result in any added total costs for consumers over the designed life of the appliances concerned. When determining cost-effectiveness, the commission shall consider the value of the water or energy saved, impact on product efficacy for the consumer, and the life cycle cost to the consumer of complying with the standard. The commission shall consider other relevant factors, as required by Sections 11346.5 and 11357 of the Government Code, including, but not limited to, the impact on housing costs, the total statewide costs and benefits of the standard over its lifetime, economic impact on California businesses, and alternative approaches and their associated costs.

(2)No new appliance, except for any plumbing fitting, regulated under paragraph (1), that is manufactured on or after July 1, 1984, may be sold, or offered for sale, in the state, unless the date of the manufacture is permanently displayed in an accessible place on that appliance.

(3)During the period of five years after the commission has adopted a standard for a particular appliance under paragraph (1), no increase or decrease in the minimum level of operating efficiency required by the standard for that appliance shall become effective, unless the commission adopts other cost-effective measures for that appliance.

(4)Neither the commission nor any other state agency shall take any action to decrease any standard adopted under this subdivision on or before June 30, 1985, prescribing minimum levels of operating efficiency or other energy conservation measures for any appliance, unless the commission finds by a four-fifths vote that a decrease is of benefit to ratepayers, and that there is significant evidence of changed circumstances. Before January 1, 1986, the commission shall not take any action to increase a standard prescribing minimum levels of operating efficiency for any appliance or adopt a new standard under paragraph (1). Before January 1, 1986, any appliance manufacturer doing business in this state shall provide directly, or through an appropriate trade or industry association, information, as specified by the commission after consultation with manufacturers doing business in the state and appropriate trade or industry associations on sales of appliances so that the commission may study the effects of regulations on those sales. These informational requirements shall remain in effect until the information is received. The trade or industry association may submit sales information in an aggregated form in a manner that allows the commission to carry out the purposes of the study. The commission shall treat any sales information of an individual manufacturer as confidential and that information shall not be a public record. The commission shall not request any information that cannot be reasonably

produced in the exercise of due diligence by the manufacturer. At least one year prior to the adoption or amendment of a standard for an appliance, the commission shall notify the Legislature of its intent, and the justification to adopt or amend a standard for the appliance. Notwithstanding paragraph (3) and this paragraph, the commission may do any of the following:

(A) Increase the minimum level of operating efficiency in an existing standard up to the level of the National Voluntary Consensus Standards 90, adopted by the American Society of Heating, Refrigeration, and Air Conditioning Engineers or, for appliances not covered by that standard, up to the level established in a similar nationwide consensus standard.

(B) Change the measure or rating of efficiency of any standard, if the minimum level of operating efficiency remains substantially the same.

(C) Adjust the minimum level of operating efficiency in an existing standard in order to reflect changes in test procedures that the standards require manufacturers to use in certifying compliance, if the minimum level of operating efficiency remains substantially the same.

(D) Readopt a standard preempted, enjoined, or otherwise found legally defective by an administrative agency or a lower court, if final legal action determines that the standard is valid and if the standard that is readopted is not more stringent than the standard that was found to be defective or preempted.

(E) Adopt or amend any existing or new standard at any level of operating efficiency, if the Governor has declared an energy emergency as described in Section 8558 of the Government Code.

(5) Notwithstanding paragraph (4), the commission may adopt standards pursuant to Commission Order No. 84-0111-1, on or before June 30, 1985.

(d) Recommend minimum standards of efficiency for the operation of any new facility at a particular site that are technically and economically feasible. No site and related facility shall be certified pursuant to Chapter 6 (commencing with Section 25500), unless the applicant certifies that standards recommended by the commission have been considered, which certification shall include a statement specifying the extent to which conformance with the recommended standards will be achieved.

Whenever this section and Chapter 11.5 (commencing with Section 19878) of Part 3 of Division 13 of the Health and Safety Code are in conflict, the commission shall be governed by that chapter of the Health and Safety Code to the extent of the conflict.

(e) The commission shall do all of the following:

(1) Not later than January 1, 2004, amend any regulations in effect on January 1, 2003, pertaining to the energy efficiency standards for residential clothes washers to require that residential clothes washers manufactured on or after January 1, 2007, be at least as water efficient as commercial clothes washers.

(2) Not later than April 1, 2004, petition the federal Department of Energy for an exemption from any relevant federal regulations governing energy efficiency standards that are applicable to residential clothes washers.

(3) Not later than January 1, 2005, report to the Legislature on its progress with respect to the requirements of paragraphs (1) and (2).

## **NEW YORK STATUTES**

### **N.Y. Energy Law § 3-101**

It shall be the energy policy of the state:

1. to obtain and maintain an adequate and continuous supply of safe, dependable and economical energy for the people of the state and to accelerate development and use within the state of renewable energy sources, all in order to promote the state's economic growth, to create employment within the state, to protect its environmental values, to husband its resources for future generations, and to promote the health and welfare of its people;

2. to encourage conservation of energy in the construction and operation of new commercial, industrial, and residential buildings, and in the rehabilitation of existing structures, through heating, cooling, ventilation, lighting, insulation and design techniques and the use of energy audits and life-cycle costing analysis;

3. to encourage the use of performance standards in all energy-using appliances, and in industrial and commercial applications of energy-using apparatus and processes;

4. to encourage transportation modes and equipment which conserve the use of energy;

5. to foster, encourage and promote the prudent development and wise use of all indigenous state energy resources including, but not limited to, on-shore oil and natural gas, off-shore oil and natural gas, natural gas from Devonian shale formations, small head hydro, wood, solar, wind, solid waste, energy from biomass, fuel cells and cogeneration; and

6. to encourage a new ethic among its citizens to conserve rather than waste precious fuels; and to foster public and private initiative to achieve these ends at the state and local levels.

\* 7. to conduct energy planning in an integrated and comprehensive manner through development of a long-range energy master plan which shall provide the framework for energy related decisions made throughout the state.

\* NB Expired January 1, 1984

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To:  
Cc:  
Bcc:  
Subject: Call with Ceres  
Date: Thu Nov 08 2012 15:02:37 EST  
Attachments:

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StartTime: 11/13/2012 01:00:00 PM GMT  
EndTime: 11/13/2012 02:00:00 PM GMT  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: No

---

From: Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>  
To: Moore, John <jmoore@nrdc.org>; Hayley  
Fink <hayley.fink@yale.edu>; Robert Schuwerk  
</o=lawnet/ou=exchange administrative group  
(fydibohf23spdlt)/cn=recipients/cn=rschuwer>; Isaac Cheng  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=isaaccheng>  
Cc:  
Bcc:  
Subject: NG and FERC  
Date: Thu Nov 15 2012 16:57:09 EST  
Attachments:

---

When: Monday, November 19, 2012 4:00 PM-4:30 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: 212 727 4600; code: 0155433

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Moore, John <jmoore@nrdc.org>  
To: Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>; Hayley Fink <hayley.fink@yale.edu>;  
Robert Schuwerk </o=lawnet/ou=exchange administrative group  
(fydibohf23spdlt)/cn=recipients/cn=rschuwerk>; Isaac Cheng  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=isaaccheng>  
Cc:  
Bcc:  
Subject: RE: NG and FERC  
Date: Thu Nov 15 2012 17:20:13 EST  
Attachments:

---

Hi, all,

Is there any way we could do this call at 3 pm ET on Monday instead of 4 pm?

-----Original Appointment-----

From: Gowrishankar, Vignesh  
Sent: Thursday, November 15, 2012 3:57 PM  
To: Moore, John; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: NG and FERC  
When: Monday, November 19, 2012 3:00 PM-3:30 PM (GMT-06:00) Central Time (US & Canada).  
Where: 212 727 4600; code: 0155433

---

From: Isaac Cheng </o=lawnet/ou=first  
administrative group/cn=recipients/cn=isaaccheng>  
To: Moore, John <jmoore@nrdc.org>;  
Gowrishankar, Vignesh <vgowrishankar@nrdc.org>; Hayley Fink  
<hayley.fink@yale.edu>; Robert Schuwerk </o=lawnet/ou=exchange  
administrative group  
(fydibohf23spdl)/cn=recipients/cn=rschuwer>  
Cc:  
Bcc:  
Subject: RE: NG and FERC  
Date: Thu Nov 15 2012 17:31:43 EST  
Attachments:

---

Hi all,

Thanks for your responses! I'm fine with 3pm EST on Monday, if Vignesh and Hayley can make it as well. I'll be out of pocket Tues.

Vignesh, thanks for circulating the appt. We also have a call-in number here-- if it's more convenient, just let us know.

Isaac Cheng  
Assistant Attorney General  
NY State Office of the Attorney General  
120 Broadway, 26th Floor  
New York, NY 10271-0332  
phone: 212-416-6695  
fax: 212-416-6007

Please save natural resources by not printing this email unless necessary.

---

From: Moore, John [mailto:jmoore@nrdc.org]  
Sent: Thursday, November 15, 2012 5:20 PM  
To: Gowrishankar, Vignesh; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: RE: NG and FERC

Hi, all,

Is there any way we could do this call at 3 pm ET on Monday instead of 4 pm?

-----Original Appointment-----

From: Gowrishankar, Vignesh

Sent: Thursday, November 15, 2012 3:57 PM

To: Moore, John; Hayley Fink; Robert Schuwerk; Isaac Cheng

Subject: NG and FERC

When: Monday, November 19, 2012 3:00 PM-3:30 PM (GMT-06:00) Central Time (US & Canada).

Where: 212 727 4600; code: 0155433

---

From: Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>  
To: Isaac Cheng </o=lawnet/ou=first  
administrative group/cn=recipients/cn=isaaccheng>; Moore, John  
<jmoore@nrdc.org>; Hayley Fink <hayley.fink@yale.edu>; Robert  
Schuwerk </o=lawnet/ou=exchange administrative group  
(fydibohf23spdl)/cn=recipients/cn=rschuwer>  
Cc:  
Bcc:  
Subject: RE: NG and FERC  
Date: Thu Nov 15 2012 17:32:57 EST  
Attachments:

---

Hi Isaac,

Unfortunately, I cannot do 3pm. How about 5pm EST Monday?

Thanks,

Vignesh

---

Vignesh Gowrishankar, Ph.D. | Sustainable Energy Fellow

Natural Resources Defense Council ([www.nrdc.org](http://www.nrdc.org))

(email) [vgowrishankar@nrdc.org](mailto:vgowrishankar@nrdc.org) | (office) 212 727 4525

Read my blog at: <http://switchboard.nrdc.org/blogs/vgowrishankar/>

From: Isaac Cheng [<mailto:Isaac.Cheng@ag.ny.gov>]  
Sent: Thursday, November 15, 2012 5:32 PM  
To: Moore, John; Gowrishankar, Vignesh; Hayley Fink; Robert Schuwerk  
Subject: RE: NG and FERC

Hi all,

Thanks for your responses! I'm fine with 3pm EST on Monday, if Vignesh and Hayley can make it as well. I'll be out of pocket Tues.

Vignesh, thanks for circulating the appt. We also have a call-in number here-- if it's more convenient, just let us know.

Isaac Cheng  
Assistant Attorney General  
NY State Office of the Attorney General  
120 Broadway, 26th Floor  
New York, NY 10271-0332  
phone: 212-416-6695  
fax: 212-416-6007

Please save natural resources by not printing this email unless necessary.

---

From: Moore, John [mailto:jmoore@nrdc.org]  
Sent: Thursday, November 15, 2012 5:20 PM  
To: Gowrishankar, Vignesh; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: RE: NG and FERC

Hi, all,

Is there any way we could do this call at 3 pm ET on Monday instead of 4 pm?

-----Original Appointment-----  
From: Gowrishankar, Vignesh  
Sent: Thursday, November 15, 2012 3:57 PM  
To: Moore, John; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: NG and FERC  
When: Monday, November 19, 2012 3:00 PM-3:30 PM (GMT-06:00) Central Time (US & Canada).  
Where: 212 727 4600; code: 0155433

---

From: Isaac Cheng </o=lawnet/ou=first administrative group/cn=recipients/cn=isaaccheng>  
To: Gowrishankar, Vignesh <vgowrishankar@nrdc.org>; Moore, John <jmoore@nrdc.org>; Hayley Fink <hayley.fink@yale.edu>; Robert Schuwerk </o=lawnet/ou=exchange administrative group (fydibohf23spdl)/cn=recipients/cn=rschuwer>  
Cc:  
Bcc:  
Subject: RE: NG and FERC  
Date: Thu Nov 15 2012 17:34:33 EST  
Attachments:

---

Works for me as well. Any time on Monday afternoon is fine for me. Otherwise a call later that week will work, although obviously we have Thanksgiving on Thursday! Which in NY, we should definitely celebrate with our families.

Isaac Cheng  
Assistant Attorney General  
NY State Office of the Attorney General  
120 Broadway, 26th Floor  
New York, NY 10271-0332  
phone: 212-416-6695  
fax: 212-416-6007

Please save natural resources by not printing this email unless necessary.

\_\_\_\_\_  
From: Gowrishankar, Vignesh [mailto:vgowrishankar@nrdc.org]  
Sent: Thursday, November 15, 2012 5:33 PM  
To: Isaac Cheng; Moore, John; Hayley Fink; Robert Schuwerk  
Subject: RE: NG and FERC

Hi Isaac,

Unfortunately, I cannot do 3pm. How about 5pm EST Monday?

Thanks,

Vignesh

---

Vignesh Gowrishankar, Ph.D. | Sustainable Energy Fellow

Natural Resources Defense Council ([www.nrdc.org](http://www.nrdc.org))

(email) [vgowrishankar@nrdc.org](mailto:vgowrishankar@nrdc.org) | (office) 212 727 4525

Read my blog at: <http://switchboard.nrdc.org/blogs/vgowrishankar/>

From: Isaac Cheng [<mailto:Isaac.Cheng@ag.ny.gov>]

Sent: Thursday, November 15, 2012 5:32 PM

To: Moore, John; Gowrishankar, Vignesh; Hayley Fink; Robert Schuwerk

Subject: RE: NG and FERC

Hi all,

Thanks for your responses! I'm fine with 3pm EST on Monday, if Vignesh and Hayley can make it as well. I'll be out of pocket Tues.

Vignesh, thanks for circulating the appt. We also have a call-in number here-- if it's more convenient, just let us know.

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Assistant Attorney General  
NY State Office of the Attorney General  
120 Broadway, 26th Floor  
New York, NY 10271-0332  
phone: 212-416-6695  
fax: 212-416-6007

Please save natural resources by not printing this email unless necessary.

---

From: Moore, John [<mailto:jmoore@nrdc.org>]

Sent: Thursday, November 15, 2012 5:20 PM

To: Gowrishankar, Vignesh; Hayley Fink; Robert Schuwerk; Isaac Cheng

Subject: RE: NG and FERC

Hi, all,

Is there any way we could do this call at 3 pm ET on Monday instead of 4 pm?

-----Original Appointment-----

From: Gowrishankar, Vignesh

Sent: Thursday, November 15, 2012 3:57 PM

To: Moore, John; Hayley Fink; Robert Schuwerk; Isaac Cheng

Subject: NG and FERC

When: Monday, November 19, 2012 3:00 PM-3:30 PM (GMT-06:00) Central Time (US & Canada).

Where: 212 727 4600; code: 0155433

---

From: Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>  
To: Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>; Moore, John <jmoore@nrdc.org>; Hayley  
Fink <hayley.fink@yale.edu>; Robert Schuwerk  
</o=lawnet/ou=exchange administrative group  
(fydibohf23spdlt)/cn=recipients/cn=rschuwer>; Isaac Cheng  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=isaaccheng>  
Cc:  
Bcc:  
Subject: NG and FERC  
Date: Thu Nov 15 2012 17:37:15 EST  
Attachments:

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StartTime: Mon Nov 19 17:00:00 Eastern Standard Time 2012  
EndTime: Mon Nov 19 17:30:00 Eastern Standard Time 2012  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Fri Nov 16 10:01:00 Eastern Standard Time 2012

---

From: Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>  
To: Moore, John <jmoore@nrdc.org>; Hayley  
Fink <hayley.fink@yale.edu>; Robert Schuwerk  
</o=lawnet/ou=exchange administrative group  
(fydibohf23spdlt)/cn=recipients/cn=rschuwer>; Isaac Cheng  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=isaaccheng>  
Cc:  
Bcc:  
Subject: NG and FERC  
Date: Thu Nov 15 2012 17:37:15 EST  
Attachments:

---

When: Monday, November 19, 2012 5:00 PM-5:30 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: 212 727 4600; code: 0155433

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Augenstern, Fred (AGO) <fred.augenstern@state.ma.us>; Driskell, Kristen@Energy <kristen.driskell@energy.ca.gov>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; Monica Wagner </o=lawnet/ou=first administrative group/cn=recipients/cn=monicawagner>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Holmes, Caryn@Energy <caryn.holmes@energy.ca.gov>; Levy, Michael@Energy <michael.levy@energy.ca.gov>; Dennis Beck <dennis.beck@doj.ca.gov>; jblees22@gmail.com <jblees22@gmail.com>; Longstreth, Ben <blongstreth@nrdc.org>; Charlie Harak <charak@nclc.org>; adelaski@standardsasap.org <adelaski@standardsasap.org>  
Cc: Thompson, Jared <jared.thompson@nrdc.org>  
Bcc:  
Subject: RE: Please call in -- Call on developments in APGA v. DOE (challenge to furnace efficiency standard)  
Date: Fri Nov 16 2012 14:31:37 EST  
Attachments:

---

Please call in if you can.

-----Original Appointment-----

From: Kennedy, Kit  
Sent: Thursday, November 15, 2012 1:47 PM  
To: Kennedy, Kit; 'Augenstern, Fred (AGO)'; 'Driskell, Kristen@Energy'; 'Morgan Costello'; 'Lemuel Srolovic'; 'Monica Wagner'; 'Michael J. Myers'; 'Holmes, Caryn@Energy'; 'Levy, Michael@Energy'; 'Dennis Beck'; 'jblees22@gmail.com'; Longstreth, Ben; 'Charlie Harak'; 'adelaski@standardsasap.org'  
Cc: Thompson, Jared  
Subject: Call on developments in APGA v. DOE (challenge to furnace efficiency standard)  
When: Friday, November 16, 2012 2:30 PM-3:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: Please call (212) 727-4600, participant code # 182703

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Kennedy, Kit <kkennedy@nrdc.org>;  
Augenstern, Fred (AGO) <fred.augenstern@state.ma.us>; Driskell,  
Kristen@Energy <kristen.driskell@energy.ca.gov>; Morgan  
Costello </o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Lemuel Srolovic  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=lsrolovi>; Monica Wagner  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=monicawagner>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Holmes, Caryn@Energy  
<caryn.holmes@energy.ca.gov>; Levy, Michael@Energy  
<michael.levy@energy.ca.gov>; Longstreth, Ben  
<blongstreth@nrdc.org>; Charlie Harak <charak@nclc.org>;  
adelaski@standardsasap.org <adelaski@standardsasap.org>  
Cc: Thompson, Jared  
<jared.thompson@nrdc.org>  
Bcc:  
Subject: Follow up Call on developments in APGA v. DOE (challenge to furnace efficiency  
standard)  
Date: Fri Nov 16 2012 16:36:32 EST  
Attachments:

---

StartTime: Mon Nov 19 15:30:00 Eastern Standard Time 2012  
EndTime: Mon Nov 19 16:30:00 Eastern Standard Time 2012  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: No

Sorry the call was rushed. Let us know if this time works.

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Augenstern, Fred (AGO) <fred.augenstern@state.ma.us>; Driskell, Kristen@Energy <kristen.driskell@energy.ca.gov>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; Monica Wagner </o=lawnet/ou=first administrative group/cn=recipients/cn=monicawagner>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Holmes, Caryn@Energy <caryn.holmes@energy.ca.gov>; Levy, Michael@Energy <michael.levy@energy.ca.gov>; Longstreth, Ben <blongstreth@nrdc.org>; Charlie Harak <charak@nclc.org>; adelaski@standardsasap.org <adelaski@standardsasap.org>; Kennedy, Kit <kkennedy@nrdc.org>  
Cc: Thompson, Jared <jared.thompson@nrdc.org>  
Bcc:  
Subject: Copy: Follow up Call on developments in APGA v. DOE (challenge to furnace efficiency standard)  
Date: Fri Nov 16 2012 16:36:34 EST  
Attachments:

---

StartTime: Mon Nov 19 15:30:00 Eastern Standard Time 2012  
EndTime: Mon Nov 19 16:30:00 Eastern Standard Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Mon Nov 19 09:30:44 Eastern Standard Time 2012  
  
When: Monday, November 19, 2012 3:30 PM-4:30 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: Please call (212) 727-4600, participant code # 182703

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Sorry the call was rushed. Let us know if this time works.

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Augenstern, Fred (AGO) <fred.augenstern@state.ma.us>; Driskell, Kristen@Energy <kristen.driskell@energy.ca.gov>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; Monica Wagner </o=lawnet/ou=first administrative group/cn=recipients/cn=monicawagner>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Holmes, Caryn@Energy <caryn.holmes@energy.ca.gov>; Levy, Michael@Energy <michael.levy@energy.ca.gov>; Longstreth, Ben <blongstreth@nrdc.org>; Charlie Harak <charak@nclc.org>; adelaski@standardsasap.org <adelaski@standardsasap.org>; Kennedy, Kit <kkennedy@nrdc.org>  
Cc: Thompson, Jared <jared.thompson@nrdc.org>  
Bcc:  
Subject: Copy: Follow up Call on developments in APGA v. DOE (challenge to furnace efficiency standard)  
Date: Fri Nov 16 2012 16:37:06 EST  
Attachments:

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StartTime: Mon Nov 19 15:30:00 Eastern Standard Time 2012  
EndTime: Mon Nov 19 16:30:00 Eastern Standard Time 2012  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: No

When: Monday, November 19, 2012 3:30 PM-4:30 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: Please call (212) 727-4600, participant code # 182703

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Sorry the call was rushed. Let us know if this time works.

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Kennedy, Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Follow up Call on developments in APGA v. DOE (challenge to furnace  
efficiency standard)  
Date: Mon Nov 19 2012 09:30:44 EST  
Attachments:

---

Accepted: Follow up Call on developments in APGA v. DOE (challenge to furnace efficiency standard)

---

From: Moore, John <jmoore@nrdc.org>  
To: Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>; Hayley Fink <hayley.fink@yale.edu>;  
Robert Schuwerk </o=lawnet/ou=exchange administrative group  
(fydibohf23spdlt)/cn=recipients/cn=rschuwerk>; Isaac Cheng  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=isaaccheng>  
Cc:  
Bcc:  
Subject: RE: NG and FERC  
Date: Mon Nov 19 2012 17:03:35 EST  
Attachments:

---

Is anyone else having trouble with the code?

---

From: Gowrishankar, Vignesh  
Sent: Thursday, November 15, 2012 3:57 PM  
Required: Gowrishankar, Vignesh; Moore, John; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: NG and FERC  
When: Monday, November 19, 2012 4:00 PM-4:30 PM.  
Where: 212 727 4600; code: 0155433

---

From: Isaac Cheng </o=lawnet/ou=first administrative group/cn=recipients/cn=isaaccheng>  
To: Moore, John <jmoore@nrdc.org>; Gowrishankar, Vignesh <vgowrishankar@nrdc.org>; Hayley Fink <hayley.fink@yale.edu>; Robert Schuwerk </o=lawnet/ou=exchange administrative group (fydibohf23spdl)/cn=recipients/cn=rschuwer>  
Cc:  
Bcc:  
Subject: RE: NG and FERC  
Date: Mon Nov 19 2012 17:03:52 EST  
Attachments:

---

We just jumped on seemingly w/o problem.

Isaac Cheng  
Assistant Attorney General  
NY State Office of the Attorney General  
120 Broadway, 26th Floor  
New York, NY 10271-0332  
phone: 212-416-6695  
fax: 212-416-6007

Please save natural resources by not printing this email unless necessary.

-----Original Message-----

From: Moore, John [mailto:jmoore@nrdc.org]  
Sent: Monday, November 19, 2012 5:04 PM  
To: Gowrishankar, Vignesh; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: RE: NG and FERC

Is anyone else having trouble with the code?

---

From: Gowrishankar, Vignesh  
Sent: Thursday, November 15, 2012 3:57 PM  
Required: Gowrishankar, Vignesh; Moore, John; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: NG and FERC  
When: Monday, November 19, 2012 4:00 PM-4:30 PM.  
Where: 212 727 4600; code: 0155433

---

From: Isaac Cheng </o=lawnet/ou=first administrative group/cn=recipients/cn=isaaccheng>  
To: Moore, John <jmoore@nrdc.org>; Gowrishankar, Vignesh <vgowrishankar@nrdc.org>; Hayley Fink <hayley.fink@yale.edu>; Robert Schuwerk </o=lawnet/ou=exchange administrative group (fydibohf23spdl)/cn=recipients/cn=rschuwer>  
Cc:  
Bcc:  
Subject: RE: NG and FERC  
Date: Mon Nov 19 2012 17:04:27 EST  
Attachments:

---

Might just want to try it again!

Isaac Cheng  
Assistant Attorney General  
NY State Office of the Attorney General  
120 Broadway, 26th Floor  
New York, NY 10271-0332  
phone: 212-416-6695  
fax: 212-416-6007

Please save natural resources by not printing this email unless necessary.

-----Original Message-----

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Subject: RE: NG and FERC

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Sent: Thursday, November 15, 2012 3:57 PM  
Required: Gowrishankar, Vignesh; Moore, John; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: NG and FERC  
When: Monday, November 19, 2012 4:00 PM-4:30 PM.  
Where: 212 727 4600; code: 0155433

---

From: Moore, John <jmoore@nrdc.org>  
To: Isaac Cheng </o=lawnet/ou=first  
administrative group/cn=recipients/cn=isaaccheng>;  
Gowrishankar, Vignesh <vgowrishankar@nrdc.org>; Hayley Fink  
<hayley.fink@yale.edu>; Robert Schuwerk </o=lawnet/ou=exchange  
administrative group  
(fydibohf23spdl)/cn=recipients/cn=rschuwerk>  
Cc:  
Bcc:  
Subject: RE: NG and FERC  
Date: Mon Nov 19 2012 17:07:57 EST  
Attachments:

---

Could someone dial me in through their phone's conference feature? No idea why I can't access, assuming that the code is still 0155433. My direct dial today is 847-868-8522. Thanks.

---

From: Isaac Cheng [Isaac.Cheng@ag.ny.gov]  
Sent: Monday, November 19, 2012 4:04 PM  
To: Moore, John; Gowrishankar, Vignesh; Hayley Fink; Robert Schuwerk  
Subject: RE: NG and FERC

Might just want to try it again!

Isaac Cheng  
Assistant Attorney General  
NY State Office of the Attorney General  
120 Broadway, 26th Floor  
New York, NY 10271-0332  
phone: 212-416-6695  
fax: 212-416-6007

Please save natural resources by not printing this email unless necessary.

-----Original Message-----

From: Moore, John [mailto:jmoore@nrdc.org]  
Sent: Monday, November 19, 2012 5:04 PM  
To: Gowrishankar, Vignesh; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: RE: NG and FERC

Is anyone else having trouble with the code?

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Sent: Thursday, November 15, 2012 3:57 PM  
Required: Gowrishankar, Vignesh; Moore, John; Hayley Fink; Robert Schuwerk; Isaac Cheng  
Subject: NG and FERC  
When: Monday, November 19, 2012 4:00 PM-4:30 PM.  
Where: 212 727 4600; code: 0155433

---

From: Laurel Lee <llee@edf.org>  
To: Jodi Feld </o=lawnet/ou=first administrative group/cn=recipients/cn=jodifeld>  
Cc: Deborah Friant <dfriant@edf.org>;  
Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Bcc:  
Subject: Fred Krupp lunch  
Date: Wed Nov 21 2012 17:13:25 EST  
Attachments: image001.jpg

---

Hi Jodi and Mike,

I'm very sorry to give you this news so close to Dec 6, but a conflict has come up on Fred's calendar for the day and I'm afraid we need to reschedule his lunch session with you. Hopefully there are other dates we can consider as Fred was looking forward to the discussion. Please let me know. I apologize for any inconvenience.

Have a nice Thanksgiving holiday.

Regards,

Laurel

From: Laurel Lee  
Sent: Tuesday, October 23, 2012 11:49 AM  
To: 'Jodi Feld'  
Cc: Deborah Friant; Michael J. Myers  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

Hi Jodi,

Happy to confirm Fred for Thurs, Dec 6th from 12:30-1:30pm. Any particular logistics for getting to your office at 120 Broadway?

Laurel

From: Jodi Feld [mailto:Jodi.Feld@ag.ny.gov]  
Sent: Tuesday, October 23, 2012 11:28 AM  
To: Laurel Lee  
Cc: Deborah Friant; Michael J. Myers

Subject: RE: Fred's 8/6/12 WSJ piece on climate change

Hi Laurel - Sorry it took me so long to get back to you but I have been involved in a trial. If Fred is still available on December 6th, then let's put that in the calendar. Thank you!

---

From: Laurel Lee [mailto:llee@edf.org]  
Sent: Wednesday, October 17, 2012 6:54 PM  
To: Jodi Feld  
Cc: Deborah Friant  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

Hi Jodi – resending in case you missed my earlier email. Laurel

From: Laurel Lee  
Sent: Friday, October 12, 2012 1:51 PM  
To: 'Jodi Feld'  
Cc: Deborah Friant (dfriant@edf.org)  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

Hi Jodi,

Thanks for the date options. Fred is available on Thurs, Dec 6th if that still works on your end (the 12:30-1:30 window is fine).

Regards,

Laurel

Laurel Lee  
Assistant to Fred Krupp

Environmental Defense Fund  
257 Park Avenue South  
New York, NY 10010  
T 212 616 1348  
F 212 505 2375  
llee@edf.org

www.edf.org

From: Jodi Feld [mailto:Jodi.Feld@ag.ny.gov]  
Sent: Thursday, October 11, 2012 10:53 AM  
To: Laurel Lee; Deborah Friant  
Cc: Michael J. Myers  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

Hi Laurel and Deb: As Mike and Vickie discussed, I would like to see if we can find a time to have Fred here to join us for one of our brown bag lunches which take place in the Environmental Protection Bureau conference room, here at 120 Broadway. Our lunches are typically every other Thursday from 12:30-1:30. Currently, the following dates are open:

Thursday November 29

Thursday December 6th

Thursday December 12th

Of course, if these dates do not work, we will certainly work with you and Fred to find a date/time that works. I look forward to hearing from you. Thanks!

---

From: Michael J. Myers  
Sent: Tuesday, October 09, 2012 10:40 AM  
To: 'Vickie Patton'; Laurel Lee; Deborah Friant  
Cc: Jodi Feld  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

Great, thanks Vickie. I'm cc'ing Jodi Feld, our chief scientist in NYC who is coordinating scheduling of these lunches. Jodi, please contact Laurel and Deb to schedule a time when Fred's available to join us. Vickie, I'll look forward to your call on the section 126 petition.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Tuesday, October 09, 2012 10:10 AM  
To: Michael J. Myers; Laurel Lee; Deborah Friant  
Subject: RE: Fred's 8/6/12 WSJ piece on climate change

Hi Mike, Fred would welcome this discussion. Laurel and Deb can help with scheduling. I'll follow up separately re the 126 petition. Best wishes, Vickie

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, October 01, 2012 3:18 PM  
To: Vickie Patton  
Cc: Morgan Costello; Lemuel Srolovic; Jodi Feld  
Subject: Fred's 8/6/12 WSJ piece on climate change

Vickie--Several of us in the bureau enjoyed Fred's recent Wall Street Journal piece on trying to forge a coalition to move climate change efforts forward. Is there a possibility that he could come down to our NYC office (125 Broadway) for lunch and talk about it (and any other topics of interest) as part of our brown bag series? It's very informal. We would also plan to plug in our Albany and Buffalo offices by phone so our attorneys and scientists in those offices could listen in. If that would work, we'd be happy to reach out to Fred's scheduler to find a date that would work for him. Thanks!--Mike

p.s. Are you are someone else from EDF planning on participating in the meetings on Oct. 23 with SEC Commissioners' on disclosure of climate change risks? Either Morgan or I will be attending, pending travel approval.

Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

Michael.myers@ag.ny.gov

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---

Owner: Laurel Lee <llee@edf.org>  
Filename: image001.jpg  
Last Modified: Wed Nov 21 17:13:25 EST 2012

---

Could not print file content for:

Document ID: 0.7.691.339973-000001

Attachment Name: image001.jpg

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\epamjm\EPAMJM\_Live\_02242014.pst:00000000a3f5eb319d9aae44a8edafa08be1fa9ae4532d00:  
:070062746ddb4a6eeba4ae78c24d888f812d12893cb8e899fc9a667ebe4ad4c338c8

Reason: It is an unsupported file type

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Laurel Lee <llee@edf.org>; Jodi Feld </o=lawnet/ou=first administrative group/cn=recipients/cn=jodifeld>  
Cc: Deborah Friant <dfriant@edf.org>  
Bcc:  
Subject: RE: Fred Krupp lunch  
Date: Mon Nov 26 2012 10:13:49 EST  
Attachments: image001.jpg

---

Thanks Laurel. No problem. Jodi will let you know some other potential dates.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Laurel Lee [mailto:llee@edf.org]  
Sent: Wednesday, November 21, 2012 5:13 PM  
To: Jodi Feld  
Cc: Deborah Friant; Michael J. Myers  
Subject: Fred Krupp lunch

Hi Jodi and Mike,

I'm very sorry to give you this news so close to Dec 6, but a conflict has come up on Fred's calendar for the day and I'm afraid we need to reschedule his lunch session with you. Hopefully there are other dates we can consider as Fred was looking forward to the discussion. Please let me know. I apologize for any inconvenience.

Have a nice Thanksgiving holiday.

Regards,

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Sent: Tuesday, October 23, 2012 11:49 AM  
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Cc: Deborah Friant; Michael J. Myers  
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Hi Jodi,

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Sent: Tuesday, October 23, 2012 11:28 AM  
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Laurel

Laurel Lee  
Assistant to Fred Krupp

Environmental Defense Fund  
257 Park Avenue South  
New York, NY 10010  
T 212 616 1348  
F 212 505 2375  
llee@edf.org

www.edf.org

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Thursday December 12th

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New York State Attorney General  
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Albany, NY 12224  
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michael.myers@ag.ny.gov

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Sent: Monday, October 01, 2012 3:18 PM  
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Commissioners' on disclosure of climate change risks? Either Morgan or I will be attending, pending travel approval.

Michael J. Myers

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Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

Michael.myers@ag.ny.gov

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---

Owner: Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>  
Filename: image001.jpg  
Last Modified: Mon Nov 26 10:13:49 EST 2012

---

Could not print file content for:

Document ID: 0.7.691.340204-000001

Attachment Name: image001.jpg

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:07008db08238c9f411d50d3521343c29e3490145521863caac3411424f5acbb62a5f

Reason: It is an unsupported file type

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: kkennedy@nrdc.org <kkennedy@nrdc.org>  
Cc: Lemuel Srolovic </o=lawnet/ou=first  
administrative group/cn=recipients/cn=lsrolovi>  
Bcc:  
Subject: Furnace stds  
Date: Tue Dec 04 2012 10:33:19 EST  
Attachments:

---

Kit, thanks for the VM. Lem and I will plan to call you at noon. Mike

Message sent from a Blackberry device

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc: Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>  
Bcc:  
Subject: RE: Furnace stds  
Date: Tue Dec 04 2012 10:36:04 EST  
Attachments:

---

Great, talk then.

-----Original Message-----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Tuesday, December 04, 2012 10:33 AM  
To: Kennedy, Kit  
Cc: Lemuel Srolovic  
Subject: Furnace stds

Kit, thanks for the VM. Lem and I will plan to call you at noon. Mike

Message sent from a Blackberry device

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Kennedy, Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: RE: Furnace stds  
Date: Tue Dec 04 2012 13:09:32 EST  
Attachments:

---

Thanks Kit for taking the time to work through some of these issues. I believe I have a phone # for Tom Byron. Do you happen to have a # for the General Counsel at DOE?

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Kennedy, Kit [mailto:kkennedy@nrdc.org]  
Sent: Tuesday, December 04, 2012 10:36 AM  
To: Michael J. Myers  
Cc: Lemuel Srolovic  
Subject: RE: Furnace stds

Great, talk then.

-----Original Message-----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Tuesday, December 04, 2012 10:33 AM  
To: Kennedy, Kit  
Cc: Lemuel Srolovic  
Subject: Furnace stds

Kit, thanks for the VM. Lem and I will plan to call you at noon. Mike

Message sent from a Blackberry device

---

From: Matthew Grieco </o=lawnet/ou=first administrative group/cn=recipients/cn=mgrieco>  
To: Monica Wagner </o=lawnet/ou=first administrative group/cn=recipients/cn=monicawagner>; Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; Pedro Medina </o=lawnet/ou=first administrative group/cn=recipients/cn=pedromedina>; Janice Dean </o=lawnet/ou=first administrative group/cn=recipients/cn=janicedean>  
Cc:  
Bcc:  
Subject: Opening brief in State of N.Y. v. Next Millennium Realty LLC  
Date: Wed Dec 05 2012 22:52:07 EST  
Attachments: 12-2894 State of NY v. Next Millennium OPENING BRIEF.pdf

---

Attached is a copy of the final version of our brief in this case, as filed with the Court.

---

Owner: Matthew Grieco </o=lawnet/ou=first administrative group/cn=recipients/cn=mgrieco>  
Filename: 12-2894 State of NY v. Next Millennium OPENING BRIEF.pdf  
Last Modified: Wed Dec 05 22:52:07 EST 2012

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# 12-2894

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## United States Court of Appeals for the Second Circuit

---

STATE OF NEW YORK, JOSEPH MARTENS, as Commissioner of  
the New York State Department of Environmental Conservation,

*Plaintiffs-Appellants,*

v.

NEXT MILLENIUM REALTY, LLC, 101 FROST STREET ASSOCIATES, L.P.,

*Defendants-Consolidated Plaintiffs-Consolidated  
Defendants-Cross Defendants-Appellees.*

*(caption continues inside front cover)*

On Appeal from the United States District Court  
for the Eastern District of New York

---

### BRIEF FOR APPELLANTS & SPECIAL APPENDIX

---

BARBARA D. UNDERWOOD  
*Solicitor General*  
CECELIA C. CHANG  
*Deputy Solicitor General*  
MATTHEW W. GRIECO  
*Assistant Solicitor General  
of Counsel*

ERIC T. SCHNEIDERMAN  
*Attorney General of the  
State of New York*  
Attorney for Appellants  
120 Broadway, 25th Floor  
New York, New York 10271  
(212) 416-8020

Dated: December 5, 2012

*(caption continued from front cover)*

101 FROST STREET CORPORATION, PAMELA SPIEGEL SANDERS, as executor of the Last Wills and Testaments of, and duly authorized administrators of the Estate of Emily Spiegel and Jerry Spiegel, LISE SPIEGEL WILKS, as executor of the Last Wills and Testaments of, and duly authorized administrators of the Estate of Emily Spiegel and Jerry Spiegel, PAUL MERANDI, ISLAND TRANSPORTATION CORPORATION,

*Defendants-Consolidated Defendants-Appellees,*

UTILITY MANUFACTURING CO., INC., NEST EQUITIES, INC., AUDIE KRANZ, WILBUR KRANZ, KAMAL CHOPRA, TISHCON CORP., AKA TISHCON CORPORATION, JOE ELBAZ, GRAND MACHINERY, INC., WILLIAM GROSS, PAUL MERANDI,

*Defendants-Consolidated Defendants-Cross Defendants-Appellees,*

ARKWIN INDUSTRIES, INC., WILLIAM MAGLIO, as executor of the Last Will and Testament of, and duly authorized administrator of the Estate of, defendant Daniel Berlin, FRANK JACOBSON, as executor of the Last Will and Testament of, and duly authorized administrator of the Estate of, defendant Daniel Berlin, THOMAS MALLOY, EQUITY SHARE I ASSOCIATES,

*Defendants-Consolidated Defendants-Cross Defendants-Cross Claimants-Appellees,*

BAROUH EATON ALLEN CORP., 2632 REALTY DEVELOPEMENT CORPORATION, RICHARD DEGENHART, ATLAS GRAPHICS, INC., H.D.P. PRINTING INDUSTRIES CORP., IMC EASTERN CORPORATION, FKA IMC MAGNETICS CORP., NMB (USA) INC.,

*Defendants-Appellees,*

C&O REALTY CO.,

*Defendant-Cross Defendant-Appellee,*

ADCHEM CORP., LINCOLN PROCESSING CORP., NORTHERN STATE REALTY CO., PUFAHL REALTY CORP.,

*Consolidated Defendants-Third Party Defendants-Cross Defendants,*

JOSEPH PUFAHL, CHARLES PUFAHL, HERMAN PUFAHL, JOHN PUFAHL, MARVEX PROCESSING CORP., UNICORD, AUTOLINE AUTOMOTIVE CORP., COBRALINE MANUFACTURING, MARKI REALTY, PHYSIO-CHEM, INC., BRONCO MODEL CRAFT, INC., APPLIED MAGNETICS, HYMAN HASS,

*Consolidated-Defendants,*

KORG U.S.A. INC., US-1 MARKETING GROUP INC., Individually and as successor to Cobraline Manufacturing Corp., VISHAY GENERAL SEMICONDUCTOR, INC., Individually and as Successor to General Semiconductor, Inc. and General Instruments Corporation, GENERAL SEMICONDUCTOR, INC., VISHAY MIC TECHNOLOGY, INC., Individually and as Successor to General Semiconductor, Inc. and General Instruments Corporation, GENERAL INSTRUMENTS CORPORATION, SULZER METCO (US) INC.,

*Third-Party-Defendants-Cross Defendants,*

VERIZON NEW YORK, INC., Individually and as Successor to GTE Operations Support Incorporated, GTE Corporation, GTE Sylvania Incorporated, Sylvania Electric Products Incorporated, Verizon Inc., Verizon, VERIZON INC., Individually and as Successor to GTE Operations Support Incorporated, GTE Corporation, GTE Sylvania Incorporated, Sylvania Electric Products Incorporated, Verizon New York Inc., Verizon, VERIZON COMMUNICATIONS, Individually and as Successor to GTE Operations Support Incorporated, GTE Corporation, GTE Sylvania Incorporated, Sylvania Electric Products Incorporated, Verizon Inc., Verizon, GTE OPERATIONS SUPPORT INCORPORATED, Individually and as Successor to GTE Corporation, GTE

Sylvania Incorporated, Sylvania Electric Products Incorporated, VISHAY INTERTECHNOLOGY, INC., Individually and as Successor to Vishay General Semiconductor, Inc., General Semiconductor, Inc., and General Instruments Corporation, GTE CORPORATION, GTE SYLVANIA INCORPORATED, SYLVANIA ELECTRICAL PRODUCTS INCORPORATED,

*Third-Party-Defendants,*

JERRY GOODMAN, EMILY SPIEGEL, as trustee under an agreement of trust for the benefit of Pamela Spiegel and Lisa Spiegel,

*Defendants-Cross Defendants,*

SCIBELLI BROTHERS AUTO COLLISION, INC., JOSEPH SCIBELLI, SAM-TON TOWING & SALVAGE INC.,

*Defendants.*

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## PRELIMINARY STATEMENT

The Comprehensive Environmental Remediation, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. § 9601 et seq., promotes the cleanup of hazardous waste spills that occurred long ago by empowering the federal government and States to commence a cleanup using public funds *before* suing to recover cleanup costs from the parties responsible for a spill. Congress crafted CERCLA's statute of limitations to serve these goals by enabling the federal and state government to focus on environmental cleanup and the elimination of immediate health risks rather than diverting scarce resources to commencing and pursuing cost-recovery litigation.

Thus CERCLA's limitations periods are not triggered by a spill itself or notice to the government of a spill. Instead, they commence at different times in the cleanup process depending on whether response costs are sought for actions designed to address immediate threats to public health ("removal" actions) or to permanently remediate hazardous wastes ("remedial" actions). Costs for a removal action must be sought within three years of *completing* that action, while costs for permanent

remediation must be sought within six years of *commencing physical construction* of that action.

This appeal concerns the timeliness of the State's suit to recover response costs for the New Cassel Industrial Area (NCIA), a 170-acre site located in Nassau County. In 1990, the Town of Hempstead discovered that two of its water-supply wells were contaminated with hazardous chemicals—later determined to result from chemical plumes that had migrated from the NCIA, contaminating the aquifer that fed the Town's wells. The Town installed a granulated activated carbon (GAC) system in 1990 and later added an air stripper in 1995 to treat its well water; both of these remain in operation today.

Independently, in 1995, the New York State Department of Environmental Conservation (DEC) began a comprehensive remedial investigation to identify the nature and extent of groundwater contamination at the nearby NCIA. When DEC confirmed that the NCIA was the source of the contamination in the Town's wells, it agreed to reimburse the Town for the air stripper; a reimbursement agreement was executed in 2000. DEC noted during its investigation that the Town's GAC system and air stripper could only address the water

quality of the water withdrawn from two individual wells, doing nothing to remediate the contaminant plumes emanating from the NCIA.

After DEC completed a full investigation and remedial assessment, the State commenced in 2006 this cost-recovery suit against the private parties potentially responsible for the contamination of the NCIA site, seeking costs for its remedial investigation as well as the funds spent on construction of the air stripper. The United States District Court for the Eastern District of New York (Feuerstein, J.) granted defendants' motion for summary judgment on statute of limitations grounds—concluding that the Town's GAC system and air stripper were part of the State's "permanent containment effort" and remedial action for the NCIA, and therefore that effort commenced in 1990, or no later than June 1995—in either event, more than six years before the filing of the complaint in this action or the execution of any tolling agreements.

This Court should vacate the judgment of the district court. The Town's actions in this case were designed to remove contaminants from the water withdrawn from the Town's water wells, not to remediate the

chemical plumes that were the source of chemicals in the wells. The State had not even begun its remedial investigation when the Town decided to build the GAC system and air stripper, and did not select a permanent remedy until 2003. CERCLA does not require a State to immediately file suit for response costs long before remediation has been planned, much less commenced, merely because the State reimburses the Town for taking prompt action to ensure safe drinking water to residents.

The district court's decision, if affirmed, will jeopardize the ability of local governments and States to proceed in an orderly fashion in addressing contamination: focusing first on swiftly addressing immediate threats posed by contamination, next on carefully developing and implementing complementary remedial plans to address the underlying causes of such contaminations, and finally on recovering the costs of these actions from responsible parties under CERCLA. This result is inconsistent with both statutory language and the purposes of CERCLA.

## JURISDICTIONAL STATEMENT

The district court had original jurisdiction over this action pursuant to 42 U.S.C. § 9613(b) and supplemental jurisdiction over related state-law claims pursuant to 28 U.S.C. § 1367(a). On August 20, 2012, a final judgment was entered: (1) in favor of all non-defaulting defendants; and (2) in favor of the State with respect to all claims against the defaulting defendants, who are not parties to this appeal. The State filed a timely notice of appeal on September 4, 2012. This Court has appellate jurisdiction pursuant to 28 U.S.C. § 1291 over the district court's final order granting summary judgment in favor of all non-defaulting defendants with respect to all federal claims and dismissing all supplemental state-law claims.

## ISSUES PRESENTED

1. Whether the GAC system and air stripper—planned, built, and operated by the Town of Hempstead to address an immediate threat to the users of its drinking water—were removal measures subject to a separate limitations period under CERCLA, and not remedial actions that started the CERCLA limitations period for recovery of all response costs, including investigation costs, because (a)

they were not designed to and could not remediate the underlying source of the contaminants in the drinking water withdrawn from the wells, and (b) they were constructed more than eight years before the State adopted a final remedial plan?

2. Assuming that the GAC system and air stripper were both remedial actions rather than removal actions, whether the statute of limitations on the *State's* remediation efforts began to run only when physical construction of the air stripper began—no sooner than July 27, 1995—because (a) the State had no involvement with the GAC system at all and (b) test borings for the air stripper preceded and were not part of its physical construction?

## STATEMENT OF THE CASE

### A. Statutory and Regulatory Background

#### 1. CERCLA's cost-recovery scheme

Congress enacted CERCLA with dual goals: (1) to ensure the prompt and effective cleanup of hazardous waste sites and also (2) to assure that those responsible for the contaminated sites—rather than taxpayers—bear the costs of remediation. *Niagara Mohawk Power*

*Corp. v. Chevron U.S.A., Inc.*, 596 F.3d 112, 120 (2d Cir. 2010). In balancing these interests, Congress enacted a unique scheme that gives priority to environmental remediation rather than cost collection. Rejecting a sue-first, litigation-driven model, “CERCLA empowers the federal government and the states to initiate comprehensive cleanups,” *id.*, using public funds, *before* identifying potentially responsible parties or suing to recover costs and determine liability.

Congress specifically drafted CERCLA’s limitations period to ensure the responding agencies would not be compelled to commence cost-recovery litigation while cleanup efforts remain underway. For cost-recovery purposes, CERCLA recognizes two types of authorized government responses: removal actions, which are typically “short-term cleanup arrangements” designed to address immediate risks, and remedial actions, providing for “permanent containment or disposal programs” for a hazardous waste site. *New York v. Shore Realty Corp.*, 759 F.2d 1032, 1040 (2d Cir. 1985).<sup>1</sup>

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<sup>1</sup> CERCLA § 101 defines removal actions as, *inter alia*, actions that “may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise  
(continued on the next page)

Rather than forcing litigation to commence as soon as an agency undertakes a removal action—which frequently happens in the earliest stage of a cleanup action, before the cause, nature and extent of the contamination has been fully investigated, Congress permitted cost-recovery suits to be brought, “for a removal action, within 3 years after completion of the removal action.” 42 U.S.C. § 9613(g)(2)(A). CERCLA also provides that an investigation is to be treated for this purpose as a removal action, *id.* § 9601(23), allowing an agency to complete its investigation before seeking to recover the costs of the investigation.

Once an agency has fully investigated the contamination and selected appropriate remedial action, CERCLA provides that a suit to recover the costs of that action must be brought “within 6 years after initiation of physical on-site construction of the remedial action.”

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result from a release or threat of release.” 42 U.S.C. § 9601(23). Remedial actions include “those actions consistent with permanent remedy taken instead of or in addition to removal actions . . . to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger.” *Id.* § 9601(24). The term “response” refers generically to all removal and remedial actions and related enforcement activities. *Id.* § 9601(25).

*Id.* § 9613(g)(2)(B).<sup>2</sup> These limitations periods do not mandate litigation at the earliest dates. Instead, Congress allowed responding agencies to devote their attention to remediation, delaying suit until: (1) immediate removal actions are completed and imminent risks eliminated, and (2) physical construction has started on permanent remedial solutions.

## 2. State law: The role of DEC

In New York, DEC is responsible for and has primary authority over cleanup of hazardous sites within the State. *See* Environmental Conservation Law (ECL) § 27-1313(1)(a). Federal regulations, which govern response actions by the United States Environmental Protection Agency (EPA), classify EPA-initiated cleanup measures as either removal or remedial actions, adopting the terms of art employed by CERCLA. *See* 40 C.F.R. § 300.1 et seq.

State law does not use the same technical language. However, DEC is empowered to take both: (1) “interim remedial measures” similar to

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<sup>2</sup> If a responding agency undertakes both removal and remedial actions at a single site, it may wait to seek removal costs within the longer six-year limitations period applicable to remedial actions if it initiates a remedial action “within 3 years after the completion of [its] removal action.” 42 U.S.C. § 9613(g)(2)(B).

“removal actions” as defined by CERCLA, 6 N.Y.C.R.R. § 375-1.2(ab), and (2) final remedial actions comparable to the full-scale “remedial actions” contemplated by CERCLA. State and federal law are also parallel in another respect. Because of the complexity and public importance of effective cleanup of hazardous waste sites, DEC—like EPA—is authorized to undertake full-scale remedial action only after a detailed field investigation, an assessment and study of remedial options, and completion of a public notice-and-comment process, procedural steps designed to ensure the selection of the most optimal and effective cleanup plan. *See* 6 N.Y.C.R.R. § 375-2.8(c), (e) (listing state requirements); 40 C.F.R. § 300.430(d)-(e) (listing federal requirements).

## **B. Factual Background**

This case stems from hazardous waste contamination at the 170-acre New Cassel Industrial Area (NCIA) site located in Nassau County (Joint Appendix [JA] 507). The NCIA was first developed in the early 1950s, and today is a highly developed commercial and industrial area (JA 506). In 1986, an investigation by the Nassau County Department of Health first revealed that the groundwater below the NCIA was extensively contaminated with volatile organic compounds (VOCs) (JA

506-507). The presence of elevated VOC levels in drinking water is a health risk because some VOCs are carcinogens and others may harm certain human organs. See Barbara L. Rowe, et al., Occurrence And Potential Human Health Relevance of Volatile Organic Contaminants in Drinking Water from Domestic Wells in the United States, 115 *Envtl. Health Perspectives* 1539 (2007).

Based upon the Nassau County Department of Health investigation, in 1988, DEC listed the NCIA on the State Registry of hazardous waste sites and began to conduct preliminary site assessments (JA 507, 990-991). No one knew at the time that VOC contamination from the NCIA was migrating offsite through three separate VOC plumes, contaminating groundwater in adjacent communities (JA 914, 987). A plume is a contaminated area of groundwater that migrates away from the original source of the contaminants.

## **1. Contamination of Town of Hempstead water-supply wells outside the NCIA**

In 1989, the Town of Hempstead, which is located outside the NCIA, identified VOC contamination in two of its water-supply wells. The Town's Water Commissioner determined that immediate action was necessary to ensure safe drinking water, and the Town subsequently hired an engineering firm, Dvirka and Bartilucci Consulting Engineers (D&B), to evaluate options to treat the water withdrawn from the wells. D&B initially recommended the installation of a granulated activated carbon (GAC) adsorption system<sup>3</sup> to treat the well water (JA 670-687, 914). The State Department of Health was copied on correspondence that the Town sent to the Nassau County Department of Health to secure the county agency's approval of the GAC (JA 692-697, 974). Construction of the GAC system, which was paid for entirely by the Town, was completed in 1990 (JA 917). In 1995, after the GAC failed to remove sufficient levels of VOC's from the Town's drinking water, the Town's Water Commissioner asked D&B to

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<sup>3</sup> A GAC system functions like a giant filter—passing water through a carbon filter bed, which absorbs VOCs. The filter bed must be continually replaced as it absorbs the toxic chemicals (JA 679-680).

design a packed tower aeration system (an “air stripper”) to supplement the GAC system (JA 918).<sup>4</sup>

The Nassau County Department of Health also approved construction of the air stripper; the State Department of Health was again copied on correspondence between the Town and the County Health Department (JA 931). In June 1995 a subcontractor took exploratory soil borings to determine if the soil could bear the weight of an air-stripper, which requires a large above-ground tank to hold the well-water (JA 726-728, 918-919). On July 11, 1995, the Town of Hempstead awarded Region Associates, Inc., the contract to build the air-stripper; physical construction of the air stripper began some time there after (JA 660, 920, 975).

## **2. DEC’s investigation of the NCIA site and assessment of remedial options**

While Town officials were responding to the immediate health risks posed by contamination of the Town’s drinking water, DEC was

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<sup>4</sup> An air stripper works by aerating the well water, thus removing some of the VOCs through evaporation, before the water enters the GAC system for additional removal of VOCs (JA 975).

conducting a parallel investigation into the NCIA site. After DEC listed the NCIA as a “Class 2” site<sup>5</sup> in the State registry of hazardous waste sites in 1988, it retained an engineering firm to conduct preliminary site assessments within the NCIA to determine the source and extent of groundwater contamination and to identify parties potentially responsible for the contamination (JA 507, 990-991).

In early 1995, DEC held a meeting to inform the public about its NCIA site investigation and possible next steps (JA 712), and Town officials realized, based on preliminary investigation results discussed at that meeting, that the NCIA site was the apparent source of the VOCs in the Town’s drinking water (JA 711, 713-715). The Town subsequently requested that the State reimburse the Town for the cost of installing the supplemental air stripper. In June 1995, DEC informed the Town by letter that it expected to do so (JA 729-730).

By 1998, DEC had identified seventeen specific parcels within the NCIA as sources of the VOC contamination (JA 507). By 1999,

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<sup>5</sup> A Class 2 site is a site that contains hazardous wastes that pose a significant threat to public health or the environment. <sup>6</sup> N.Y.C.R.R. § 375-2.7(b)(3)(ii).

engineers had confirmed the existence of three migrating VOC plumes from the NCIA site (the eastern, western, and central plumes)—extending beyond the boundaries of the NCIA into adjacent areas, including the Town of Hempstead (JA 518-521, 987).

In 2000, after DEC had confirmed that NCIA VOC plumes had contaminated the Town's drinking water, DEC and Town entered into an assistance agreement. DEC agreed to reimburse the Town only for the cost of constructing and installing the supplemental air stripper (an expense of approximately \$1.2 million) (JA 741-750). Under the agreement, the Town retained ownership of the air stripper and remained responsible for its continued operation and maintenance (JA 742).

In compliance with state law, DEC conducted a full remedial investigation and feasibility study (RI/FS) to determine the best remedial option for the NCIA sites. Because of the extent and degree of contamination, DEC divided its remedial strategy into three phases.<sup>6</sup>

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<sup>6</sup> The phases were described as "operable units," a term used under both CERCLA and state law to describe a discrete phase of a remedial plan. 6 N.Y.C.R.R. § 375-1-2(af).

Phase one identified and selected remedial options for the ground-level areas of contamination within the NCIA. Phase two investigated and selected remedial options for the contaminated groundwater directly underneath the NCIA. Finally, phase three investigated the migration of VOC plumes out of the NCIA and remedial options for dealing with resulting offsite contamination (JA 991).

In 2000, the engineering firm retained by DEC to assist with the NCIA investigation issued a final RI/FS report (JA 991). Based on the report, DEC prepared a proposed remedial action plan for dealing with the VOC plumes migrating out of the NCIA sites (JA 992). The proposed action plan was released for public comment and review in 2003—giving members of the community as well as parties potentially liable for cleanup costs an opportunity to weigh in on proposed remedial options (JA 992).

During the comment stage, DEC made clear that complete remediation would require more than treating contaminated water withdrawn from the Town's *currently* contaminated water-supply wells. The threat of groundwater contamination would have to be entirely eliminated, including from the sole-source aquifer underneath the Town

of Hempstead, which was a primary source of drinking water for the Town. Thus, when asked during the comment stage why the agency would propose and consider more expensive options for remediating the NCIA plumes—rather than simply relying on the Town of Hempstead’s existing GAC and air stripper to treat the Town’s water supply—DEC replied that it was “opposed” to simply relying on “perpetual operation” of the GAC and air stripper as an effective remedial option for two reasons. (JA 585-586, 984-995)

First, that approach “would not address the groundwater contamination outside the radii” of the Water District wells and would inappropriately leave “a significant contaminant plume in [the] sole source aquifer [beneath the Town of Hempstead] untreated.” Second, DEC noted, there was “a shortage of suitable locations for water supply wells” in the affected area and that local officials were trying to increase water-supply capacity. Because the GAC and air stripper only treated water withdrawn from the two specific wells, they would not provide safe drinking water if additional wells were needed. (JA 585-586, 994-995)

In the fall of 2003, DEC issued a final Record of Decision (ROD) for its phase 3 investigation into the migrating NCIA plumes (JA 499-603). In the ROD, DEC considered twelve alternative remedies, ranging from no further action to full remediation of the contaminant plumes by physical extraction of the VOCs from the groundwater (JA 524-544). After considering the feasibility of each option, DEC selected alternative 8—“Full Plume Remediation of Upper and Deep Portions of the Aquifer (to 225 ft [below ground surface]) with In-Well Vapor Stripping/Localized Vapor Treatment” as the best remedial option (JA 544-546, 992). The selected remedy called for deep, in-ground vapor stripping wells that circulate groundwater and lift contaminants out of the water using a vacuum blower (JA 540). In contrast to the well water treatment provided by the Town’s GAC and air stripper, DEC’s selected remedy includes full capture and treatment of the groundwater, including the groundwater supplying the Town’s affected wells, to a depth of 225 feet below ground (JA 540, 544).

DEC estimated that the cost of full remediation would be approximately \$5 million and that the process would take about seven years (JA 540). Engineering design work on the planned vapor stripping

wells continued over the next several years (JA 997-998). Pursuant to a 2007 contract, pilot tests were conducted and the results evaluated to determine the effectiveness of stripping. (JA 997-998). As the ROD had warned might occur, the plan had to be modified for economic and engineering reasons, and in 2009, engineers recommended that the original system be modified to provide for above-ground extraction and treatment of the contaminated groundwater (JA 546, 998).

DEC and its contractors worked on the design of the extraction and treatment system until 2011. At that time, the EPA took over responsibility for the NCIA after the federal government determined that the NCIA site and its off-site plumes qualified for the National Priorities List of hazardous waste sites in need of comprehensive remediation. *See* National Priorities List, Final Rule No. 52, 76 Fed. Reg. 57662, 57671 (table 1) (Sept. 16, 2011).

## **C. Procedural History**

### **1. Tolling agreements and complaint**

As CERCLA contemplates, the State's efforts and DEC's attention were initially focused on effective remediation of the NCIA rather than immediate cost-recovery litigation. In June 2001, while DEC was still

crafting a remedial action plan for the NCIA VOC plumes through the RI/FS process, the State entered into tolling agreements with several owners or operators of sources of contamination in the NCIA site. The agreements tolled the CERCLA statutes of limitations from the dates of the agreements' execution until the State later filed cost-recovery claims.<sup>7</sup>

The State filed the present cost-recovery action on March 13, 2006, in the United States District Court for the Eastern District of New York (JA 207). The complaint asserts claims under CERCLA and state law seeking to recover past and future recovery costs expended by the State for investigating and remediating the off-site groundwater contamination in the area south of the NCIA (JA 242). Those costs include—but are not limited to—the expenses of the State's

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<sup>7</sup> Specifically, agreements were executed with: (1) defendant Arkwin Industries, Inc. to toll the statute of limitations from June 27, 2001 (JA 1153); (2) defendants Grand Machinery and Tishcon Corporation to toll the statute of limitations from June 28, 2001 (JA 1149-1150); (3) defendants Next Millennium Realty LLC and 101 Frost Street Associates LP to toll the statute of limitations from July 9, 2001 (SPA 26); and (4) defendants Utility Manufacturing Corporation, and Nest Equities, Inc., to toll the statute of limitations from August 23, 2001 (JA 1129, 1132).

investigation and the State's costs for reimbursing the Town for the air stripper installed by the Town in 1995, but no costs for the GAC system, which were covered entirely by the Town. The named defendants are the current owners and operators of contamination sources at the NCIA site and successors to entities that were owners or operators at the time of hazardous releases (JA 242). In 2009, most of the defendants moved for summary judgment—claiming that the Town of Hempstead's GAC system and air stripper were remedial actions as defined by CERCLA, and that the State's CERCLA claims for cost recovery were therefore time-barred because the State did not file the present actions (or enter into tolling agreements) within six years of the initiation of physical on-site construction of the GAC system in 1990 and the air stripper in 1995 (JA 322-328).<sup>8</sup>

## 2. Report and recommendation

In 2010, Magistrate Judge Orenstein issued a report and recommendation (R&R) recommending that defendants' motions for

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<sup>8</sup> Several defendants defaulted, and the State obtained default judgments against them (JA 181-182). The defaulting defendants are not parties to this appeal.

summary judgment be granted (Special Appendix [SPA] 1-29). The R&R concluded that the Town's GAC system and air stripper—constructed before the location and existence of the NCIA plumes had been determined or DEC's remedial investigation completed—were long-term remedial actions by the State (SPA 13-20). The R&R attributed the GAC system and air stripper to the State because the State Department of Health had been copied on correspondence sent to the Nassau County Department of Health to secure the county agency's approval of the Town's GAC and air stripper construction plans (SPA 17-18).

The R&R further concluded that the Town's GAC system and air stripper were part of the State's long-term remedial strategy for cleaning up the NCIA VOC plumes because: (1) the GAC and air stripper had been operating for “nearly nineteen years;” (2) DEC used the word “remedial” in some engineering documents to refer to the purpose of the GAC system and air stripper; and (3) the \$1.25 million cost of the GAC system and \$1.22 million cost of the air stripper were not consistent with a “short-term clean-up arrangement” (SPA 20-23).

Because it deemed the Town's GAC system and air stripper to be the initiation of full remedial action by the State, the R&R found that CERCLA's six-year limitations period for remediation costs applied and that the deadline for seeking cost recovery began to run: (1) either in 1990, when the Town's GAC system was built, or (2) on June 12, 1995, when the Town's subcontractor took exploratory soil borings prior to physical construction of the air stripper—dates the State neither controlled nor even knew about at the time they occurred, as they pertained only to the Town's construction schedules (SPA 23-25). Under the R&R's reasoning, when calculated from the date of the air-stripper soil borings, the State missed the deadline for filing a cost-recovery action by less than a month with respect to the parties who signed tolling agreements.

### **3. District court decision**

The State filed detailed objections to the R&R explaining that: (1) the R&R erred in deeming the GAC system and air stripper remedial actions, given that the State did not even begin a remedial investigation until 1995 and that the GAC system and air stripper were simply interim measures by the Town to clean its drinking water;

(2) DEC's remedial investigation was a removal action for which it was entitled to recover costs regardless of whether the GAC system and air stripper were remedial actions; (3) the R&R improperly resolved a disputed question of fact in determining, on summary judgment, that the State was "involved with" the Town's decisions to select and build the GAC system and supplemental air stripper; and (4) the on-site physical construction of the air stripper did not begin until after the exploratory soil bearings in June 1995 and construction commenced at the earliest on July 27, 1995, when the concrete mix for the air stripper's foundation was approved, or September 6, 1995, when construction plans for the air stripper as a whole were approved (JA 234).

The district court adopted the R&R in full as the opinion of the court, granting summary judgment to defendants, and dismissing the state-law claims without prejudice (SPA 30-36). The State filed a timely notice of appeal (JA 239-240, 1158-1159).<sup>9</sup>

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<sup>9</sup> For reasons unrelated to the appeal, the State has agreed not to pursue its claim against individual defendant Paul Merandi.  
*(continued on the next page)*

## STANDARD OF REVIEW

Classification of a response activity as a remedial action or removal action is a question of law. *United States v. W.R. Grace & Co.*, 429 F.3d 1224, 1234-35 (9th Cir. 2005); *Geraghty & Miller, Inc. v. Conoco Inc.*, 234 F.3d 917, 295-26 (5th Cir. 2000), *abrogated on other grounds, Burlington N. & Santa Fe Ry. Co. v. United States*, 556 U.S. 599 (2009). This Court reviews *de novo* a district court's grant of summary judgment, *Niagara Mohawk Power Corp.*, 596 F.3d at 129 n.22, "construing all evidence and drawing all reasonable inferences in favor of the State, the non-moving party," *New York v. Nat'l Serv. Indus., Inc.*, 460 F.3d 201, 206 (2d Cir. 2006).

## SUMMARY OF ARGUMENT

The district court's decision undermines CERCLA's goals by requiring that a State bring a cost-recovery action before it has had adequate time to prepare a remedial plan. The district court erred both in deeming the construction of the GAC system and air stripper to be

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Accordingly, the State does not ask this Court to reverse or vacate the grant of summary judgment in Merandi's favor.

part of a response planned by the State and in characterizing them as a remedial action. The Town devised the GAC system and air stripper as interim responses to the immediate threat of contamination in its drinking water, while the State, in a separate, legally required remedial investigation, developed a plan to remediate the underlying cause of that contamination. The GAC system and air stripper could not have been remedial actions, because they left the VOC plumes migrating from the NCIA entirely intact. Furthermore, they were planned and approved entirely at the town and county level, with no State involvement.

But even if the GAC system and air stripper had been remedial actions, the State still would have had no cause of action before the initiation of construction on a project for which it is seeking to recover costs. The State spent no money on the GAC system built by the Town in 1990, and cannot be expected to have filed suit based on the construction date of that project—yet that is exactly what the district court demanded. The earliest date on which the statute of limitations could have begun to run was when physical construction began on the air stripper—and contrary to the holding of the district court,

exploratory soil borings designed to test the firmness of the ground are not physical construction. Accordingly, regardless of whether the GAC system and air stripper were remedial actions, the district court's decision must be vacated and remanded with respect to the defendants who signed tolling agreements with the State.

## ARGUMENT

### POINT I

#### **THE STATE'S SUIT IS TIMELY BECAUSE IT SEEKS RECOVERY OF COSTS UNDERTAKEN BEFORE LONG-TERM REMEDIAL PLANS FOR THE NCIA VOC PLUMES HAD BEEN FINALIZED OR IMPLEMENTED**

The primary issue on appeal is whether the Town's GAC system and air stripper are properly deemed part of a comprehensive remedial action by the State under CERCLA. Defendants moved for summary judgment on the ground that the State's cost-recovery action was untimely because the GAC and air stripper installed to protect Town residents by removing contaminants from their drinking water marked the commencement of long-term remedial action by the State. They do not contest that the State's cost-recovery suit would otherwise be timely because the State filed suit: (1) *before* commencement of physical

construction on full-plume remediation, the comprehensive remedy for the NCIA plumes DEC selected, and (2) *while* the GAC and air stripper remained in operation as removal actions—addressing immediate health risks to the Town’s residents—and DEC completed a more comprehensive investigation into the NCIA sites themselves.

The district court’s holding that the limitations period began to run as early as 1990—based on local officials’ attempts to provide clean drinking water before the existence or scope of the NCIA plumes had even been determined or DEC’s remedial investigation even commenced—fundamentally misapprehends the underlying remedial goals of CERCLA and the function of its limitations period. CERCLA was designed to authorize precisely what occurred here: a rapid local response to an immediate public health threat as well as a planned State response to investigate and fully remediate the underlying source of contamination. Congress did not compel suit—as the district court found—before the State could coherently devise an appropriate remedy for cleaning up the underlying contamination.

**A. The Town's GAC System and Air Stripper Were Installed to Respond to an Immediate Threat and Did Not Initiate the State's Remedial Response.**

In interpreting and applying CERCLA, courts must heed “the drafters’ overarching concern that aggressive action be taken to protect the public health.” *W.R. Grace & Co.*, 429 F.3d at 1240; *see also Sierra Club v. Seaboard Farms Inc.*, 387 F.3d 1167, 1172 (10th Cir. 2004) (“CERCLA . . . must be interpreted liberally so as to accomplish its remedial goals.”). CERCLA was enacted to address a problem of vast proportions. Before enactment of comprehensive federal and state laws regulating the disposal of hazardous waste materials, many commonly-used industrial materials were stored and disposed of improperly, contaminating the environment and creating long-term environmental and public health risks.

Since CERCLA was enacted, federal and state officials have engaged in long-term cleanup at thousands of contaminated sites. Today, there remain more than 1,300 sites on the federal National Priorities List,<sup>10</sup> and nearly 500 Class 2 sites on the State Registry of

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<sup>10</sup>See <http://www.epa.gov/superfund/sites/npl/>.

hazardous waste sites in New York designated for DEC investigation and cleanup.<sup>11</sup> Because of the complexity in identifying the sources of contamination and the challenges in designing an effective remediation plan, the cleanup process at even a single site is lengthy and demanding. It may take several years just to study the problem and even more time to develop an effective remedy and actually clean up the site. The challenges are especially great at large hazardous waste sites like the 170-acre NCI and with contaminants like VOCs, which are mobile and can migrate into off-site areas—making the full zone and impact of contamination unpredictable and unknown.

Recognizing the unique challenges involved in cleaning up hazardous waste sites, Congress authorized recovery for both the costs of immediate removal actions, necessary to address imminent health and environmental risks, and longer-term remedial actions to permanently clean up hazardous waste sites. Moreover, Congress drafted CERCLA's limitations period to ensure a wide window for government response-cost suits. CERCLA's cost-recovery scheme is not designed to

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<sup>11</sup>See <http://www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=3> (search method #2: "Site Class 02").

compel a suit for response costs before interim removal actions are complete. Its limitations periods recognize the exigencies present in a cleanup action by allowing a suit to recover the costs of a removal action to await the completion of that action while requiring a suit to recover the costs of a remedial action to be brought after physical construction is commenced.

Here, the State agreed to reimburse the Town of Hempstead for construction of a supplemental air stripper to secure safe drinking water for Town residents. The contaminated water withdrawn from the Town's two water-supply wells, however, was merely a symptom of the larger underlying contamination problem: VOC plumes are migrating from the NCIA site and contaminating a large portion of the aquifer adjacent to the site. Both the record and common sense preclude any finding that the GAC and air stripper were remedial actions: they removed the VOCs from the water pumped from the Town's wells but were not intended to and could not remedy the contamination in the underlying aquifer.

At the time the GAC and air stripper were planned by the Town, the existence and full scope of the NCIA VOC plumes had not been

determined or verified. Town officials were not acting to address VOC plumes; they were not even aware of the source of the VOCs in their well-water (JA 914, 987). The State agreed in 2000—after DEC confirmed that a VOC plume from the NCIA extended southwards into the Town of Hempstead (JA 987)—to reimburse the Town for the construction of the supplemental air stripper. But that one-time reimbursement does not retroactively transform the Town’s GAC and air stripper into long-term remedial actions by the State for the NCIA sites, or NCIA plumes, as a whole. CERCLA defines “remedial action” as including response actions designed “to prevent or minimize the release of hazardous substances so that they *do not migrate*.” 42 U.S.C. § 9601(24) (emphasis added). The GAC and air stripper did nothing, however, to prevent continued migration of hazardous VOCs from the NCIA site to off-site locations via contaminant plumes. The Town’s water wells are merely two points within the plumes.

And the record, which must be interpreted in the State’s favor for purposes of defendants’ motion for summary judgment, *see Nat’l Serv. Indus., Inc.*, 460 F.3d at 206, refutes defendants’ claim that the GAC

and air stripper were part of *the State's* comprehensive remedial plan for the NCIA plumes:

- The State did not pay for construction of the GAC system in 1990, or later. It did not own or operate the GAC system, or select the GAC system as the best treatment option.
- By later agreement in 2000, the State reimbursed the Town for one-time costs of constructing a supplemental air stripper, but the agreement expressly recognized the air-stripper as an “interim remedial measure,” a term which state law reserves for interim measures short of “remedial action” as that term is defined by CERCLA. See *supra* at 9-10.
- Town construction of the GAC system and air-stripper started in 1990 and 1995 respectively, more than eight years before DEC adopted a full remedial plan for the NCIA VOC plumes.
- In its remedial planning process, DEC expressly found that the Town’s GAC system and air stripper *were not* an acceptable remedial solution because the GAC system and air stripper were treatment solutions only for drinking water withdrawn from two individual wells. They would not eliminate VOC contamination in

the larger aquifer nor make the groundwater safe at other locations.

The R&R, which the district court adopted, emphasized that DEC's final remedial plan incorporated the Town's GAC and air stripper. However, DEC's plan simply recognizes a practical reality of environmental cleanup: if full remediation of a hazardous waste site will take many years, interim measures designed to eliminate immediate health risks will need to remain in place and continue to be operated. The continuation of interim removal measures, however, does not transform those measures from their inception into full-scale remedial actions. If the R&R were correct, many removal actions would later become remedial actions, belatedly changing the deadline to seek costs for those actions from three years after an action is completed to six years after construction was commenced. Indeed, under the district court's reasoning, if a ROD were to incorporate aspects of a prior removal action into a final remedial plan more than six years after the removal action began, any § 107 suit for costs relating to the remedial plan would be immediately out of time, without regard to the limited purpose of the prior removal action.

CERCLA was designed to prompt cost-recovery suits when removal actions are complete—and health and environmental risks eliminated—or construction of permanent remedial actions well under way. See *supra* at 7. None of that was true in 1990 or 1995 when, according to the district court, the State’s time to sue was triggered. There is no evidence that *any* entity, let alone the State, understood the full risks at that time or had sufficient information to assess the full scope of contamination at the NCIA sites. Addressing a local problem related to two water-supply wells located outside the NCIA—while critical—is not remedial action under CERCLA.

Moreover, the State can recover its investigation costs independently of the costs it seeks for construction of the air stripper. CERCLA makes clear that an investigation is a removal action. 42 U.S.C. § 9601(23). Indeed, the entire RI/FS process falls within the broad definition of “removal,” even though the result of that process is selection of a remedial action. See *Kelley v. E.I. DuPont Nemours & Co.*, 17 F.3d 836, 843 (6th Cir. 1994). Because the State’s investigation of the NCIA site had not been completed at the time it brought this action, the State is entitled to recover the costs of the investigation.

**B. The District Court Relied on Erroneous Noncontrolling Factors in Classifying the Town's GAC System and Air Stripper as Remedial Actions.**

In deeming the Town's GAC and air stripper to be remedial actions despite the fact the DEC's remedial investigation was completed only years later, the district court relied upon several factors identified in the R&R: (1) the State's alleged involvement in the Town's construction of the GAC and air stripper; (2) the existence of DEC documents referring to the Town's GAC and air stripper as "remedial" measures; (3) the cost of constructing the GAC and air stripper; and (4) the lengthy period of time the GAC and air stripper had remained in place. None of those factors, however, is sufficient to transform the local water-well chemical removal options selected by the Town into a full-scale remedial action by the State, triggering the State's obligation to commence CERCLA cost-recovery litigation within six years of the commencement of construction.

**1. The Town's decisions to install the GAC system and air stripper are not attributable to the State.**

First, the district court improperly conflated the actions of the Town and the State, as well as the actions of different state agencies, in characterizing the construction of the GAC and air stripper as part of the State's long-term remedial strategy for the NCIA sites. State officials were *aware* of the Town's decision to install a GAC system and air stripper to treat the Town's well water. But CERCLA is not a notice-based statute, and its limitations periods are not written in terms of *notice*.

Moreover, at the time the GAC and air stripper were proposed, neither Town nor State officials knew the source of the VOCs in the drinking water pumped from the town wells. They were responding to a water-supply problem—not an environmental cleanup concern—and accordingly proposed construction of the GAC and air stripper under water-safety regulations promulgated by the State Department of Health, which regulations are implemented by county health departments. *See* 10 N.Y.C.R.R. § 5-1.22(a), (d). The regulations are focused on local provision of safe water—not development of

comprehensive remedial plans for hazardous waste sites. Thus, even if the R&R were correct that the “State” approved the GAC system and air stripper, merely because state officials were copied on correspondence to the Nassau County Department of Health, at most it was the State Department of Health responding to a public health issue, not DEC implementing a long-term remedial strategy.

DEC, not the State Department of Health, has legal authority to select or implement remedial actions for hazardous waste sites under state law. *See* ECL § 27-1313(1)(a). Thus, whatever “involvement” the State had with the Town’s decisions to construct a GAC and air-stripper, the question is at least disputed, and the record did not support the district court’s finding that in either 1990 or 1995 the State approved the Town’s decision as a final remedial action designed to permanently restore the NCIA site.

**2. DEC documents do not use of the term “remedial” as a CERCLA term of art.**

The R&R adopted by the district court also relied on the fact that various DEC documents referred to the Town’s GAC and air stripper as “remedial” (R&R 21). But under CERCLA, “remedial action” has a

specific technical meaning, see *supra* at 7 & n.1. New York law does not use the same terminology, referring to many response actions as “remedial,” including “interim remedial measures,” which more closely approximate removal actions under CERCLA, see *supra* at 9-10.

Furthermore, especially in the language of engineers, every response activity to a hazardous waste site is “remedial” in the colloquial sense of remedying some risk of harm (JA 993). As a result, use of the term “remedial” in official documents or records does not establish the appropriate classification of particular response actions for CERCLA purpose. See, e.g., *City of Moses Lake v. United States*, 416 F. Supp. 2d 1015, 1024 (E.D. Wash. 2005) (use of the word “remedial” in a “generic sense” in several documents over a thirteen-year period “do[es] not constitute an admission” that a response activity is a remedial action as meant by CERCLA). Here, for example, engineers who worked on DEC’s Record of Decision explained that engineers commonly use the generic term “remediate” in situations when that term would not be accurate in the technical sense to a CERCLA lawyer generating documents for litigation (JA 993).

Moreover, several uses of the word “remedial” cited by the magistrate’s report demonstrate why the Town’s GAC system and air stripper *are not* properly characterized as state remedial actions for CERCLA purposes. For example, the R&R notes that section 5.2 of DEC’s Record of Decision refer to the Town’s “GAC system and air strip[per] as an interim remedial measure.” But as noted above, New York law defines “interim remedial measure” in a manner similar to “removal action” under CERCLA—as precisely the opposite, for present purposes, of a permanent remedial plan. Such activities are interim actions that can be undertaken “without [the] extensive investigation and evaluation” necessary for development of a full remedial plan. 6 N.Y.C.R.R. § 375-1.2(ab).

**3. Neither the cost of the GAC system and air stripper nor the duration of their use disqualifies them as removal actions.**

Finally, neither the length of time the GAC and air stripper will need to remain in place, nor their cost, is sufficient to transform either measure into final remedial actions by the State. Congress could have defined remedial actions in terms of cost and duration, but declined to do so and with good reason. Cost and duration of interim response

measures will vary from site to site depending on the characteristics of particular hazardous waste sites and the specific health and environmental risks presented by each site.

As a result, interim removal actions, as the EPA has confirmed, may be “expensive and complex” without qualifying as full remedial action for a site. EPA, *Use of Non-Time-Critical Removal Authority in Superfund Response Actions*, at 4 (Feb. 14, 2000), available at <http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockkey=9100L9F9.txt>. Moreover, here the costs of \$1.22 million for the air-stripper were not large in comparison to the amounts Congress envisioned for removal measures, see 42 U.S.C. § 9604(c)(1) (setting cap on EPA-funded removal actions at \$2 million), and in fact, were much less than the \$5 million cost of the final remedial plan chosen by DEC.

Similarly, as courts have recognized, the “sheer magnitude” of the cleanup process at a particular site may require interim removal measures that last for many years until full remediation is accomplished—precisely what occurred here. *W.R. Grace & Co*, 429 F.3d at 1244; see also *United States v. Vertac Chem. Corp.*, 33 F. Supp. 2d 769, 783 (E.D. Ark. 1998) (“Removal actions, although of shorter

duration, do not have to be.”), *vacated on other grounds, United States v. Hercules, Inc.*, 247 F.3d 706 (8th Cir. 2001); *EPA v. TMG Enters., Inc.*, 979 F. Supp. 1110, 1130 (W.D. Ky. 1997) (neither “length of time” nor “permanency of the remedy” disqualifies a response activity from being a removal action).

#### **4. The district court’s holding undermines the remedial purposes of CERCLA.**

Ultimately, the district court’s ruling deserves the fundamental goals of CERCLA. Here, the State was facing a complex cleanup at a large hazardous waste site. The NCIA presented levels of contamination and environmental risks so grave that the federal government eventually placed the NCIA on the National Priorities List for sites in need of remediation and took over cleanup responsibilities.

CERCLA’s limitations period is specifically crafted to give responding agencies ample room to prioritize investigation and assessment and to ensure that meaningful remedial efforts are well under way before the government has to divert resources to pursuing cost recovery litigation. The limitations period also frees responding agencies to fund more immediate removal actions—responding to

imminent risks or emergent problems as they arise—without commencing comprehensive remedial action and triggering the clock on the time to seek recovery of full remedial costs.

Here, the district court held that the State's time to file suit began as early as 1990, with the Town's construction of the GAC. Under that reasoning, the State's time to seek cost recovery for remedial actions expired in 1996—before the State provided any reimbursement to the Town and before all but the earliest stages of the State's remedial investigation into the NCIA sites had taken place. That is not the result Congress intended. Indeed, the district court's rule will cause the most harm in complex cases that require lengthy remedial studies and a combination of removal and remedial actions—for it is in just those cases that a court may unexpectedly judge a removal action as a remedial action, cutting off compensation not only for that action but all genuinely remedial work that follows.

Imposing such a far-reaching, backwards-looking test would undermine CERCLA by discouraging urgently needed removal actions for fear that they will later be regarded as remedial actions, cutting off all further cost-recovery actions. It would also chill States from taking

those measures directly, and it would compel responding agencies to pursue litigation at ever earlier dates—diverting scarce resources from pursuing the difficult, challenging and time-consuming task for developing and implementing remedial plans for hazardous waste sites, CERCLA's primary goal.

## POINT II

### **EVEN IF THE AIR STRIPPER WERE A STATE REMEDIAL ACTION, THIS ACTION WOULD STILL BE TIMELY WITH RESPECT TO ANY DEFENDANT WHO SIGNED A TOLLING AGREEMENT**

If the district court were correct in characterizing the air stripper as part of the State's remedial effort, the State's cost-recovery action would still be timely as to the tolling defendants if properly calculated from the date physical construction on the air stripper began. (We exclude from this discussion the GAC system, because the State did not reimburse the Town for it, and does not seek compensation for it here.) In fact the State entered into tolling agreements with a number of defendants which tolled the statute of limitations with respect to any claims that arose starting between June 28, 1995, and August 23, 1995, depending on the defendant. Because *physical construction* of the air

stripper began within six years of the date that many of those agreements tolled the limitations period, this cost-recovery suit would have been timely against those defendants even if the district court had been correct to deem the air stripper a remedial action.

The plan to install an air stripper was initially devised by the Town, in order to remove VOCs immediately from the drinking water pumped from the Town's wells. When a drilling company visited the proposed site of the air stripper to test the ground via soil borings, it did so at the sole direction of the Town and its contractor. And if the soil borings had revealed that the ground could not support the air stripping tower, the Town would have had to devise an alternative means to remove the chemicals from its drinking water.

Physical construction of the air stripper did not begin with those borings, as the district court held, but rather no earlier than July 27, 1995 (JA 968), when the Town's general contractor approved the concrete mix, and possibly as late as September 1995, when the county health department approved the final plan for the air stripper (JA 967-968). As the designer of the air stripper explained, he hired a subcontractor to take soil borings in order to "determine whether the

soil could sustain the weight of the air stripping tower” and to provide guidance in locating the tower’s clearwell and foundation slab (JA 966-967).

Congress chose its words carefully, starting the clock based not on any “physical” act associated with a possible remedial action but on “construction,” a word that should be given its “ordinary meaning.” *United States v. Findett Corp.*, 220 F.3d 842, 848 (8th Cir. 2000). In order to qualify as “initiation of physical on-site construction” for purposes of the remedial action statute of limitations, an activity must be: (1) physical; (2) performed on-site; (3) construction; and (4) part of a permanent remedy. *Schaefer v. Town of Victor*, 457 F.3d 188, 203-04 (2d Cir. 2006) (citing 42 U.S.C. § 9613(g)(2)(B)).

When an on-site activity is merely exploratory, and does not involve the placement of any object, the spreading of any surface, or the pouring of any foundation, it is not “construction.” This distinction simply makes sense—for example, had the soil borings in this case revealed that the chosen location could not support an air stripper tower, the Town would have been forced to reevaluate its plans, requiring a delay of construction. A party cannot be expected to seek

costs under CERCLA before it has even determined that a given site can accommodate its intended response action. The soil borings taken in this case, which were necessary to determine *how* and *where* the air stripper could be built, are far more comparable to the sampling, surveying and design activities that were held not to be construction activity in *Findett Corp.* than to the spreading of cover—a physical substance that would remain in place permanently on a landfill—that was held to be construction activity in *Schaefer*.

“Actions such as visiting the Site, taking soil and water samples, and making engineering surveys are preliminary steps” do not trigger the statute of limitations. *Reichhold, Inc. v. U.S. Metals Refining Co.*, 655 F. Supp. 2d 400, 447 (D.N.J. 2009). Other exploratory measures are likewise not construction. *See, e.g., Louisiana v. Braselman Corp.*, 78 F. Supp. 2d 543, 549 (E.D. La. 1999) (installation of monitoring wells is not initiation of construction); *Illinois v. Grigoleit Co.*, 104 F. Supp. 2d 967, 976 (C.D. Ill. 2000) (inspection and soil sampling did not initiate construction).

As a matter of law, on-site physical construction of the air stripper could not have begun before July 27, 1995, and possibly later. Thus, at a

minimum, there is a material fact question regarding the date that on-site physical construction began. Accordingly, even if this Court were to conclude that construction and operation of the air stripper constituted a remedial action of the State, it should vacate the district court's judgment with respect to the defendants who signed tolling agreements.

### CONCLUSION

This Court should vacate the judgment of the district court and remand for further proceedings.

Dated: December 5, 2012  
New York, New York

Respectfully submitted,

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**CERTIFICATE OF COMPLIANCE**

Pursuant to Rule 32(a)(7)(C) of the Federal Rules of Appellate Procedure, Oren L. Zeve, an employee in the Office of the Attorney General of the State of New York, hereby certifies that according to the word count feature of the word processing program used to prepare this brief, the brief contains 8,897 words and complies with the type-volume limitations of Rule 32(a)(7)(B).

/s/ Oren L. Zeve

Oren L. Zeve

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UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF NEW YORK

-----X

STATE OF NEW YORK and ALEXANDER B. GRANNIS,  
as Commissioner of the New York State Department of  
Environmental Conservation,

Plaintiffs

**REPORT AND**  
**RECOMMENDATION**  
CV 06-1133 (SJF) (MLO)

-against-

NEXT MILLENIUM REALTY, LLC, et al.,

Defendants,

-----X

NEXT MILLENIUM REALTY, LLC, 101 FROST STREET  
CORPORATION, EMILY SPIEGEL, individually and as trustee  
under an agreement of trust for the benefit of Pamela Spiegel and  
Lisa Spiegel, JERRY SPIEGEL,

Third-Party Plaintiffs,

-against-

ADCHEM CORP., et al.,

Third-Party Defendants.

-----X

**ORENSTEIN, Magistrate Judge:**

Plaintiffs State of New York and Alexander B. Grannis, as Commissioner of the New York State Department of Environmental Conservation (collectively “Plaintiffs”) brought this action under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. §§ 9601 *et seq.*, (“CERCLA”) and New York’s common law of public nuisance, indemnification and restitution seeking to recover past and future response costs incurred by the State in responding to the

alleged release and threatened release of hazardous substances at or from thirteen facilities that form the New Cassel Industrial Area Superfund Site, located in North Hempstead, New York (the “NCIA Site”) and to redress harm to the public health and environment of the State resulting from defendants’ alleged acts and omissions at the NCIA Site. (Second Amended Compl. ¶¶ 1, 139-168.)

Pursuant to the Orders of District Judge Sandra J. Feuerstein dated October 5, 2009, December 15, 2009, June 17, 2010 and July 2, 2010, defendants’ (1) Next Millennium Realty, LLC (“Next Millennium”), 101 Frost Street Associates, L.P., 101 Frost Street Corporation, Alan Eidler, as Co-Executor of the Estate of Emily Spiegel, Pamela Spiegel Sanders, as Co-Executor of the Estate of Emily Spiegel, Lise Spiegel Wilks, as Co-Executor of the Estate of Emily Spiegel, and Jerry Spiegel (collectively the “Frost Street Defendants”); (2) Grand Machinery Exchange, Inc., Paul Merandi<sup>1</sup> and 2632 Realty Development Corporation (collectively the “Grand Machinery Defendants”)<sup>2</sup>; (3) Barouh Eaton Allen Corporation (“BEAC”)<sup>3</sup>; (4) Sulzer

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<sup>1</sup>In their Memorandum of Law in Opposition to the Grand Machinery Defendants’ Motion for Summary Judgment, Plaintiffs state that they submitted their opposition only as to defendants Grand Machinery Exchange Inc. and 2632 Realty Development Corporation, and that they intend to withdraw the claims against defendant Paul Merandi. (Pls.’ Mem. of Law in Opp. to Grand Machinery’s Motion for Summary Judgment, dated Jan. 15, 2010, at 2 n.1.) Accordingly, the Court respectfully reports and recommends that defendant Paul Merandi’s motion for summary judgment be granted.

<sup>2</sup>By Notice of Motion dated December 14, 2009, the Grand Machinery Defendants joined in the Frost Street Defendants’ motion for summary judgment. *Notice of Motion*, dated December 14, 2009.

<sup>3</sup>By letter dated June 11, 2010, defendant BEAC joined in the Frost Street Defendants’ and Grand Machinery Defendants’ motions for summary judgment. *Smith Letter*, dated June 11, 2010.

Metco (“Sulzer”)<sup>4</sup>; (5) Utility Manufacturing Corporation, Nest Equities, Inc., Audie Kranz and Wilbur Kranz (collectively the “Utility Manufacturing Defendants”)<sup>5</sup>; and Tishcon Corporation, Kamal Chopra and Joe Elbaz (collectively the “Tishcon Defendants”)<sup>6</sup> motions for summary judgment pursuant to Fed. R. Civ. P. 56 have been referred to the undersigned. In addition, defendants NMB (USA) Inc. and IMC Eastern Corporation (collectively the “IMC Defendants”)<sup>7</sup>; Island Transportation Inc.<sup>8</sup>; William Gross and C&O Realty (collectively the “C&O Defendants”)<sup>9</sup>; and Atlas Graphics, Inc., Richard Degenhart and H.D.P. Printing Industries, Inc. (collectively the “Atlas Graphics Defendants”)<sup>10</sup> (hereinafter all moving parties

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<sup>4</sup>By letter dated June 10, 2010 (and filed June 14, 2010), defendant Sulzer joined in the Frost Street Defendants’ and Grand Machinery Defendants’ motions for summary judgment. *O’leary Letter*, dated June 10, 2010.

<sup>5</sup>By Notice of Motion dated June 15, 2010, the Utility Manufacturing Defendants joined in the Frost Street Defendants’ and Grand Machinery Defendants’ motions for summary judgment. *Notice of Motion*, dated June 15, 2010.

<sup>6</sup>By letter dated June 29, 2010, the Tishcon Defendants joined in the Frost Street Defendants’ and Grand Machinery Defendants’ motions for summary judgment. *Landrigan Letter*, dated June 29, 2010.

<sup>7</sup>By letter dated June 9, 2010, the IMC Defendants joined in the Frost Street Defendants’ and Grand Machinery Defendants’ motions for summary judgment. *Lucic Letter*, dated July 9, 2010.

<sup>8</sup>By letter dated June 10, 2010, defendant Island Transportation, Inc. joined in the Frost Street Defendants’ and Grand Machinery Defendants’ motions for summary judgment. *Woolson Letter*, dated June 10, 2010.

<sup>9</sup>By letter dated June 15, 2010, the C&O Defendants joined in the Frost Street Defendants’ and Grand Machinery Defendants’ motions for summary judgment. *Schulz Letter*, dated June 15, 2010.

<sup>10</sup>By letter dated June 28, 2010, the Atlas Graphics Defendants joined in the Frost Street Defendants’ and Grand Machinery Defendants’ motions for summary judgment. *Robinson Letter*, dated June 28, 2010 (filed June 29, 2010).

referred to collectively as “Defendants”).<sup>11</sup>

For the reasons that follow, this Court respectfully reports and recommends that Defendants’ motions for summary judgment be granted.

### **BACKGROUND**

The factual background underlying this action is set forth in this Court’s prior Reports and Recommendations, dated February 17, 2007 and May 2, 2008, familiarity with which is presumed. *See Report and Recommendations*, dated February 17, 2007 and May 2, 2008, Orenstein, M., M.J.<sup>12</sup> The Court provides only those facts deemed pertinent to this motion.

The following facts are undisputed unless otherwise noted:

The NCIA is comprised of approximately 170 acres of industrial and commercial property, which is bounded by the Long Island Railroad, Frost Street, Old Country Road and Grand Boulevard in North Hempstead, Nassau County, New York. (Second Am. Compl. ¶¶ 2, 52-53, 140-42; Pl. 56.1 Statement at ¶¶ 2, 79.) The thirteen manufacturing and commercial facilities that are the subject of this action are a portion of the NCIA complex. (*Id.*) The NCIA is located over a sole-source aquifer identified by the United States Environmental Protection

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<sup>11</sup>The Court notes that defendants Arkwin Industries, Inc., Thomas Molloy, William Maglio, as co-executor of the Estate of Daniel Berlin, and Frank Jacobson, as co-executor of the Estate of Daniel Berlin (collectively the “Arkwin Defendants”) have filed a motion for summary judgment and have agreed to a separate briefing schedule with Plaintiffs. *See Ommen Letter*, dated September 9, 2010 (informing the Court that the Arkwin Defendants agreed to the following briefing schedule: State’s opposition papers shall be served by October 8, 2010 and the Arkwin Defendants’ reply papers shall be served by October 25, 2010). Accordingly, the Arkwin Defendants’ motion for summary judgment will not be considered.

<sup>12</sup>By Orders, dated August 14, 2007 and May 2, 2008, respectively, the district court adopted the Reports and Recommendations in their entirety as Orders of the Court. *State of New York v. Next Millennium Realty, LLC*, 2007 WL 23621444 (E.D.N.Y. Aug. 14, 2007); *State of New York v. Next Millennium Realty, LLC*, 2008 WL 1958002 (E.D.N.Y. May 2, 2008).

Agency (the “EPA”). (*Id.*) Groundwater underlies the Sites at a depth of approximately 60 feet, and two public water supply wells are located approximately 1,500 feet downgradient of the NCIA. (*Id.*)

According to the Second Amended Complaint, the disposal of hazardous substances at each of the thirteen facilities have contaminated the soil and groundwater at and in the vicinity of each facility, including in and around the Bowling Green Water District (“Bowling Green”) public water supply wells. (*Id.*) As the contaminants from each of the facilities commingled, Plaintiffs allege that they formed a plume<sup>13</sup> of pollutants that has migrated from the NCIA sites and has contaminated the nearby Bowling Green public water supply wells, thus threatening the environment and public health. (*Id.*) Defendants are alleged to be the current owners and/or operators of the facilities and/or the successors to the entities that owned or operated the thirteen NCIA Sites at the time of the disposal of hazardous substances. (*Id.*)

Development of the NCIA dates back to early 1950, and past industrial activities conducted within the NCIA have resulted in extensive contamination of groundwater at the NCIA by volatile organic compounds (“VOC”s). (Second Am. Compl. ¶¶ 54-56; Pl. 56.1 Statement at ¶¶ 79-81.) Based upon an investigation by the Nassau County Health Department in connection with the NCIA site which revealed the presence of VOCs in the groundwater, the New York State Department of Environmental Conservation (the “NYSDEC”) placed the entire NCIA properties on the New York State Registry of Inactive Hazardous Waste Disposal Sites (the “Registry”) in August 1988. (*Id.*) The NYSDEC retained Lawler, Matusky & Skelly

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<sup>13</sup>A plume is a volume of contaminated groundwater in an aquifer that extends downward and outward from a specific source of contamination. (Pls.’ Mem. of Law in Opp. to Defs. Grand Machinery’s Mot. for Summary Judgement, dated Jan. 15., 2010 at 3.)

("LMS") to conduct Preliminary Site Assessments ("PSA"s) to locate sources of groundwater contamination and to identify potentially responsible parties. (*Id.*) In March 1995, the NYSDEC delisted the NCIA Site as a whole and listed seven properties within the NCIA as Class 2 sites.<sup>14</sup> In 1996, 1997 and 1998 additional PSAs resulted in the NYSDEC listing additional properties within the NCIA as Class 2 sites. (*Id.*)

In remediating Class 2 sites in the NCIA, the NYSDEC employed a three-prong strategy. (Second Am. Compl. ¶¶ 57; Pl. 56.1 Statement at ¶¶ 82, 137-38.) First, the NYSDEC identified on-site source areas of contamination and chose appropriate remedial actions to address these areas. (*Id.*) Second, the NYSDEC investigated the on-site groundwater contamination at each site and chose appropriate remedial actions to address these areas. (*Id.*) Finally, the NYSDEC investigated off-site groundwater contamination migrating from Class 2 sites in the NCIA toward the Bowling Green public water supply. (*Id.*)

The NYSDEC conducted an area wide Remedial Investigation/Feasibility Study ("RI/FS") relating to off-site groundwater contamination that was migrating from the Class 2 sites in the NCIA. (*Id.*) The NYSDEC in 2003 issued its Record of Decision ("ROD") for the NCIA Site's off-site groundwater remediating south of the NCIA Site, called Operable Unit No. 3 ("OU-3"). (*Id.*) In its decision, the NYSDEC required the full plume remediating of the Western, Central and Eastern plumes, in the upper and lower portions of the aquifer with in-well stripping treatment systems. (*Id.*) In November 2005, the NYSDEC issued an Explanation of Significant Differences that separated the sites involved into two distinct groups: those located in the areas of the origin of the Eastern and Central plumes, and those located in the area of the

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<sup>14</sup>Class 2 sites listed on the Registry are those properties that contain hazardous wastes and pose a significant threat to the environment. (*Id.*); see NYCRR § 375-1.8(a)(2)(ii).

origin of the Western plum. (*Id.*)

On March 13, 2006, Plaintiffs commenced the instant action<sup>15</sup> in the United States District Court for the Eastern District of New York (Feuerstein, *D.J.*) against Defendants (1) seeking recovery costs under § 107 of CERCLA for the completion of the remediating of the off-site groundwater plumes including the costs of investigating and remediating the off-site groundwater contamination in and around the Bowling Green public water supply wells and of responding to releases of hazardous substances at the respective facilities; (2) injunctive relief to abate the contamination in the NCIA and for reimbursement of the State's costs in abating a public nuisance under New York common law; (3) restitution; and (4) indemnification. (Compl., dated Mar. 13, 2006.) Plaintiffs amended the Complaint to add certain NCIA parties to this action on May 12, 2006. (Am. Compl., dated May 20, 2006.) On May 20, 2008, Plaintiffs filed a Second Amended Complaint to add certain NCIA parties to this action. (Second Am. Compl., dated May 20, 2008.)

Defendants now move for summary judgment pursuant to Fed. R. Civ. P. 56 on the grounds that Plaintiffs' claims are time-barred.

The underlying facts and applicable law surrounding Defendants' motion will be

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<sup>15</sup> *State of New York et al. v. Next Millenium Realty, LLC et al.*, CV 06-1133 (SJF)(MLO) was consolidated into lead case, *Next Millenium Realty, LLC et al. v. Adchem Corp. et al.*, CV 03-5985 on May 4, 2006 as related actions. *See Order*, dated May 4, 2006 (Feuerstein, *D.J.*). Case number CV 06-1133 was administratively closed by *Order*, dated May 4, 2006. *Id.* Thereafter, in an *Order* dated September 8, 2010, the two actions were severed for all purposes, and the Clerk of the Court was directed to reopen the case entitled *State of New York et al. v. Next Millenium Realty, LLC et al.*, under docket number CV 06-1133. *See Order*, dated September 8, 2010 (Feuerstein, *D.J.*). By notice of motion dated September 17, 2010, defendants Adchem Corp., Northern State Realty Co., Pufahl Realty Corp. and Lincoln Processing moved for reconsideration of the *Order*, dated September 8, 2010 which severed the two actions for all purposes. (Notice of Motion, dated September 17, 2010.)

presented in the relevant discussion section below.

## DISCUSSION

### *I. Summary Judgment Standard*

Summary judgment is appropriate “if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law.” Fed. R. Civ. P. 56( c); *see also Celotex Corp. v. Catrett*, 477 U.S. 317, 322-23 (1986); *Major League Baseball Props., Inc. v. Salvino, Inc.*, 542 F.3d 290, 309 (2d Cir. 2008); *Globecom Group, LLC v. Hartford Fire Ins. Co.*, 434 F.3d 165, 170 (2d Cir. 2006). A dispute regarding a material fact is genuine “if the evidence is such that a reasonable jury could return a verdict for the nonmoving party.” *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 247-48 (1986); *see also SCR Joint Venture L.P. v. Warshawsky*, 559 F.3d 133, 137 (2d Cir. 2009); *Coppola v. Bear Stearns & Co.*, 499 F.3d 144, 148 (2d Cir. 2007). The nonmoving party “must do more than simply show that there is some metaphysical doubt as to the material facts.” *Matsushita Elec. Indus. Co., Ltd. v. Zenith Radio Corp.*, 475 U.S. 574, 586 (1986); *Murphy*, 2008 WL 2433615, at \*6. Rule 56(e) “requires the nonmoving party to go beyond the pleadings and by [its] own affidavits, or by the ‘depositions, answers to interrogatories, and admissions on file,’ designate specific facts showing there is a genuine issue for trial.” *Celotex Corp.*, 477 U.S. at 324, 106 S. Ct. 2548 (citing Fed. R. Civ. P. 56); *see Gilles v. Repicky*, 511 F.3d 239, 242 (2d Cir. 2007). In doing so, “[e]vidence submitted in support of a summary judgment motion must be admissible [at trial], and the proponent of the evidence bears the burden of showing that the evidence is admissible.” *Vahos v. General Motors Corp.*, 2008 WL 2439643, at \*4 (E.D.N.Y. June 16, 2008); *see Patterson v. County of Oneida*, 375 F.3d 206, 219-20, 222 (2d Cir. 2004).

In considering a motion for summary judgment, “the judge’s function is not himself to weigh the evidence and determine the truth of the matter but to determine whether there is a genuine issue for trial.” *Celotex*, 477 U.S. at 249, 106 S. Ct. at 2511; *see Caldarola v. Calabrese*, 298 F.3d 156, 160 (2d Cir. 2006). In doing so, “[t]he district court must draw all reasonable inferences and resolve all ambiguities in favor of the nonmoving party and grant summary judgment only if no reasonable trier of fact could find in favor of the nonmoving party.” *Sutera v. Schering Corp.*, 73 F.3d 13, 15 (2d Cir. 1995) (citation omitted); *see Augustin v. Yale Club of New York City*, 2008 WL 1813229, at \*1 (2d Cir. 2008).

## II. CERCLA Claims

CERCLA is a broad remedial statute that Congress enacted to encourage the timely cleanup of sites contaminated with hazardous wastes and other pollutants. *W.R. Grace & Co. v. Zotos Int’l, Inc.*, 559 F.3d 85 (2d Cir. 2009); *see Niagara Mohawk Power Corp. v. Chevron U.S.A., Inc.*, 596 F.3d 112,120 (2d Cir. 2010) (“CERCLA, remedial in nature, is designed to encourage prompt and effective cleanup of hazardous waste sites”). CERCLA “grants the President . . . power to command government agencies and private parties to clean up hazardous waste sites,” *Key Tronic Corp. v. Untied States*, 511 U.S. 809, 814 (1994), and provides that “everyone who is responsible for hazardous-waste contamination may be forced to contribute to the costs of cleanup,” *United States v. Bestfoods*, 524 U.S. 51, 56 & n.1 (1998) (internal quotation marks and citations omitted). *See Niagara Mohawk Power Corp.*, 596 F.3d at 120 (“CERCLA empowers the federal government and the states to initiate comprehensive cleanups, and to seek recovery of expenses associated with those cleanups”); *Commander Oil Corp. v. Barlo Equip. Corp.*, 215 F.3d 321, 326 (2d Cir. 2000) (CERCLA sets forth “a regime of broad-ranging liability, permitting the government to recover its remediating expenses directly from parties responsible

for pollution and authorizing private parties to pursue contribution or indemnification from potentially responsible parties for expenses incurred responding to environmental threats”) (citations omitted); *see also* S. Rep. No. 848, 96<sup>th</sup> Cong., 2d Sess. 13 (1980) (CERCLA’s expansive liability scheme is intended “to assure that the costs of injuries resulting from defective or hazardous substances are borne by the persons who create such risks rather than by the injured parties who are powerless to protect themselves”).

CERCLA’s goals include “encouraging the timely cleanup on those responsible for creating or maintaining the hazardous conditions.” *Consol. Edison Co. of N.Y. v. UGI Utilities, Inc.*, 423 F.3d 90, 94 (2d Cir. 2005) (internal quotation marks and citation omitted); *accord Burlington N. & Santa Fe Ry. Co. v. United States*, 129 S. Ct. 1870, 1874 (2009). In support of these goals, CERCLA provides two distinct legal remedies for the recoupment or reimbursement for hazardous waste cleanup and prevention costs at contaminated sites: (1) cost recovery actions by the government and private parties against potentially responsible parties under § 107(a) and (2) contribution actions under § 113(f). 42 U.S.C. §§ 9607(a) and 9613(f); *see Cooper Indus. Inc. v. Aviall Servs., Inc.*, 543 U.S. 157, 163 & n. 3 (2004); *Schaefer v. Town of Victor*, 457 F.3d 188, 194 (2d Cir. 2006). Only § 107(a) is at issue in the instant matter.

**(a) Statute of Limitations Under CERCLA § 107**

“Section 107 authorizes the United States, a state, or any other person to seek reimbursement for all removal or remedial costs associated with the hazardous materials on the property, provided that those actions are consistent with the National Contingency Plan – the federal government’s roadmap for responding to the release of hazardous substances.” *Niagara Mohawk Power Corp.*, 596 F.3d at 120-21 (internal quotation marks and citation omitted). Under §107 of CERCLA, there are two applicable limitations periods governing cost recovery actions

depending on whether the response costs were incurred in connection with a removal action or a remedial action. 42 U.S.C. § 9613(g)(2); *see Schaefer*, 457 F.3d at 195 (“For cost recovery actions under § 107, CERCLA distinguishes between two kinds of response: remedial actions – generally long-term or permanent containment or disposal programs – and removal efforts – typically short-term cleanup arrangements”) (internal quotation marks and citation omitted); *see also State of New York v. Shore Realty Corp.*, 759 F.2d 1032,1040 (2d Cir. 1985). Section 113(g)(2) of CERCLA provides in pertinent part:

An initial action for recovery of the costs referred to in [§ 107] of this title must be commenced;

(A) for a removal action, within 3 years after completion of the removal action, except that such cost recovery action must be brought within 6 years after a determination to grant a waiver under [§ 104(c)(1)(C)] of this title for continued response action; and

(B) for a remedial action, within 6 years after initiation of physical on-site construction of the remedial action, except that, if the remedial action is initiated within 3 years after the completion of the removal action, costs incurred in the removal action may be recovered in the cost recovery action brought under this subparagraph.

42 U.S.C. § 9613(G)(2). “Because of this difference in limitations periods, whether an activity is a “removal action” or a “remedial action” under § 107(a) can be determinative of the timeliness of a claim.” *Schaefer*, 457 F.3d at 195-96.

The statute defines removal actions as those responses that include

the cleanup or removal of released hazardous substances from the environment, such actions as may be necessary taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public

health or welfare or to the environment, which may otherwise result from a release or threat of release.

42 U.S.C. § 9601(23). Remedial actions are defined as those

actions consistent with permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment. The term includes, but is not limited to, such actions at the location of the release as storage, confinement, perimeter protection using dikes, trenches, or ditches, clay cover, neutralization, cleanup of released hazardous substances and associated contaminated materials, recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavations, repair or replacement of leaking containers, collection of leachate and runoff, onsite treatment or incineration, provision of alternative water supplies, and any monitoring reasonably required to assure that such actions protect the public health and welfare and the environment.

42 U.S.C. § 9601(24). “Distilled to its core, the key distinction between a remedial and a removal action is the purpose for which the action is undertaken. As a rule of thumb, though not an invariable guide, remedial actions are long-term or permanent containment or disposal programs, while removal actions are typically short-term cleanup arrangements.” *Yankee Gas Servs. Co. v. UGI Utilities, Inc.*, 616 F. Supp. 2d 228, 270 (D. Conn. 2009) (internal quotation marks and citations omitted).

**(b) Response Activities at the NCIA Site**

Defendants contend that (i) the physical on-site construction of the granulated activated carbon treatment system (the “GAC System”) to address contamination found in the Bowling Green aquifer which commenced on or before December 10, 1990; and/or alternatively (ii) the supplemental construction of a Packed Tower Aeration System (the “supplemental air stripping tower”) which was connected to the GAC System which commenced on June 12-13, 1995,

triggered the running of the time in which the State must have commenced its initial action for the recovery of costs associated with a remedial action under CERCLA. According to Defendants because Plaintiffs failed to commence the within action within six years of construction of (i) the GAC System in December 1990 and/or (ii) the supplemental air stripping tower on June 12-13, 1995, Plaintiffs' cost recovery claims under § 107 of CERCLA are barred by the applicable statute of limitations.

Plaintiffs disagree and argue that the instant action was timely commenced because the construction of the GAC System and the supplemental air stripping tower constituted removal actions, not remedial actions. In the alternative, Plaintiffs argue that the applicable statute of limitations was tolled by the execution of tolling agreements by Defendants.

**(i) Construction of GAC System**

A review of the record reveals the following. The "NCIA was first recognized as an area with widespread groundwater contamination during a county-wide groundwater investigation conducted by the NCDH in 1986." (ROD, dated October 2003, at 4.) The primary concern to human health and/or the environment was the threat of contamination to the sole source aquifer that is the source of the water supply at the Bowling Green water supply wells. (*Id.* at 1) As a result of the investigation, the NYSDEC listed the NCIA as a Class 2 site in the Registry in 1988. (*Id.*) In 1989, Bowling Green hired Dvirka & Bartilucci Consulting Engineers ("D&B") to recommend a "long-term treatment option" for remediating the VOC groundwater contamination migrating from the NCIA Site into the Bowling Green water supply wells. (*Davis Aff.*, dated Mar. 27, 2009, ¶¶ 2-4; Ex. 1.) Following its evaluation, D&B recommended the GAC System at an estimated project cost of \$1.25 million. (*Id.* at ¶ 6.) On July 28, 1990, the NCDH approved the GAC System and the construction of the treatment system was put out to bid. (*Id.* at ¶¶ 7-10.)

Although Plaintiffs argue that the State had no involvement with the design, construction or approval of the plans for the GAC System (or the supplemental air stripping tower), and therefore the recovery activity cannot be imputed to the State for purposes of calculating the CERCLA statute of limitations, Plaintiffs' argument is belied by the record and applicable law.

Section 5-1.22 of Part 5, Chapter 1 of the New York State Sanitary Code ("SSC"), provides that no supplier of water may construct or install an addition to or modification of an existing public water system until the plans and specifications have been submitted to and approved by the State. 10 N.Y.C.R.R. § 5-1.22; *see Dunn Decl.*, dated Nov. 18, 2009, ¶ 2. Plans for the modification of an existing public water system may be approved by the State when the modification is deemed necessary to protect public health or safety. (*Id.*) A supplier of water must receive approval of the State<sup>16</sup> before placing into service any public system constructed under the requirements of the SSC. The New York State Department of Health ("NYSDOH") delegates to local health departments the responsibility for reviewing, commenting, and ultimately approving plans by the local water supplier for modifying the existing water supply system. (*Dunn Decl.*, dated Nov. 18, 2009, ¶¶ 3-4.)

Here, NYSDOH delegated direct supervision of the review, approval and construction of the GAC System (and supplemental air stripping tower) at Bowling Green to its designated representative NCDH. (*Id.*) Notwithstanding, in March 1990, D&B advised both NYSDOH and NCDH that the Bowling Green water supply wells had detected levels of contamination. (*Alarcon Decl.*, dated Mar. 17, 2009, ¶ 5.) NYSDOH received the initial application for the approval of the plans and was copied on all necessary correspondence concerning the GAC System and

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<sup>16</sup>"State" is defined to mean the State Commissioner of Health or his designated representative. SSC § 5-1.1(bk).

supplemental air stripping tower. (*Id.*; see *Doyle Letter*, dated March 12, 1990 (attached as Ex. A to Frost Street Defs. Reply Mem., dated April 5, 2010)); *Davis Aff.*, dated Mar. 27, 2009, ¶ 6; Exs. 2-5; *Alarcon Decl.*, dated Mar. 17, 2009, ¶ 5; Exs. A-C, D-E ) Indeed, by letter dated March 12, 1990, D&B's plans for the construction of the GAC System were sent directly to Gilbert Faustel of the NYSDOH and sought the NYSDOH's assistance to expedite approval of the plans and specifications for the construction project. (*Doyle Letter*, dated March 12, 1990.) In pertinent part, the letter set forth the following:

Transmitted herewith are three (3) copies of Contract Nos. 1, 2, 3, and 4 for the Construction of Bowling Green Estates Water Treatment Facility and Application for Approval of Plans for Public Water Supply Improvement Gen. Form 296. The project involves the construction of a 4.0 MGD Granular Activated Carbon (GAC) Adsorption System to serve Well No. 1 and Well No. 2 in the Bowling Green Estates Water District, including the replacement of deep well turbine pumps and mortars. The project was broken down into several contracts to expedite fabrication and delivery of treatment equipment.

At present, the Town of Hempstead Department of Water is installing a Granular Activated Carbon (GAC) Adsorption System at the site of Wells No. 1 and 2 in order to maintain water of acceptable quality. The quality of water discharged from each of the wells has shown an increase in the levels of organic compounds; however, the concentration of organic compounds is below the maximum allowable limit as set forth in the New York State Sanitary Code Part 5, the Town of Hempstead Department of Water has initiated the installation of a GAC Adsorption System to ensure and maintain water of acceptable quantity and quality.

The treatment system is designed to remove, at a minimum, three times the actual influent concentration produced from any one well.

The combined discharge from the two public water supply wells is approximately 2,800 gallons per minute (gpm). The granular activated carbon adsorption system consisting of three (3) carbon adsorption units will treat the entire influent flow of 2,800 gallons per minute produced from the wells to reduce the levels of volatile organic compounds in the effluent . . . .

The Town of Hempstead is proceeding with the construction phase of the project with the intent of the system being completed and approved for use prior to the onset of summer, in order to meet area peak day demands. . . . We would appreciate any assistance your office can provide to expedite approval of plans and specification.

(*Id.*)

On June 28, 1990, NCDH approved the plans for the installation of the GAC System, notably giving its approval on NYSDOH Form DOH 101 which stated that the approval was “issued for the State Commissioner of Health.” (*Alarcon Decl.*, dated Mar. 17, 2009, ¶ 12, Ex. E.) Thereafter, the Town was permitted to operate the system when the NCDH issued an Approval of Completed Works certificate based upon the satisfactory water analysis results from the GAC System, and notably NCDH gave its approval on NYSDOH Form GEN219 which stated that the approval was “issued for the State Commissioner of Health.” (*Id.*, Ex. F.)

The fact that the NYSDOH delegated direct supervision of the installation of the GAC System to the NCDH does not relieve the State of its statutory responsibility for the approval of the treatment system. *See, e.g., Long Island Head Start Child Dev. Servs. v. Economic Opp. Comm’n of Nassau Cty.*, 558 F. Supp. 2d 378, 396 (E.D.N.Y. 2008) (holding “in general, under the law of agency, an agent’s knowledge is imputed to the principal, when the knowledge is material to the subject matter of his agency”). Moreover, there is sufficient evidence in the record that the State had involvement with the approval of the GAC System, including the facts that the NYSDOH received the initial application for the approval of the plans, was copied on all correspondence concerning the GAC System, and that the approval of the plans for the GAC System as well as the approval of a completed works certificate were officially noticed on NYSDOH letterhead and official forms under the authority of the State Commissioner of Health. (*Alarcon Decl.*, dated Mar. 17, 2009, ¶ 12, Ex. E.) Based on this evidence, the Court finds that

Plaintiffs had involvement with and approval of the construction of the GAC System at the NCIA Site.

On December 10, 1990, the construction of the GAC System was completed and D&B sought permission from NCDH to operate the GAC System at Bowling Green. (*Davis Aff.*, dated Mar. 27, 2009, ¶¶ 11-12; Ex. 1, 4, 8.) Between 1990 and the spring of 1995, the GAC System was the exclusive remedy in place to treat the groundwater contamination adversely affecting the Bowling Green public waters supply.

Notably, in March 1995, the NYSDEC delisted the NCIA Site as a whole and listed seven properties within the NCIA as Class 2 sites. Additional PSAs thereafter resulted in the NYSDEC listing additional properties within the NCIA as Class 2 sites. The GAC System remains in use to this date, nearly nineteen years after its construction.<sup>17</sup> (*Davis Aff.*, dated Mar. 27, 2009, ¶ 14; *see Merklin Aff.*, dated Mar. 9, 2009, ¶¶ 10-11.)

**(ii) Construction of the Supplemental Air Stripping Tower**

A review of the record indicates the following. In the spring of 1995, the NCDH issued a report indicating that higher concentrations of contamination originating from the NCIA were migrating toward Bowling Green. (*Davis Aff.*, dated Mar. 27, 2009, ¶¶ 15-18; Exs. 9-10.) On May 16, 1995, the NYSDEC and NYSDOH conducted a public meeting concerning the groundwater contamination, which was attended by Commissioner of the Town of Hempstead Water District Daniel Davis and the Town of Hempstead Town Attorney. (*Id.*) At the meeting, Commissioner Davis requested that the State reimburse Bowling Green for all costs associated

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<sup>17</sup>The GAC System is presently utilized in conjunction with the supplemental air stripping tower which was constructed in 1995, and is to be incorporated into any future remedial systems at OF-3. (*Davis Aff.*, dated Mar. 27, 2009, ¶ 14; *Merklin Aff.*, dated Mar. 9, 2009, ¶¶ 4-6, 10-11; and ROD at 1, 19-22.)

with the construction and operation of the GAC System, and he received assurance that (i) “recovery of the cost of the construction and operation of the GAC treatment system would be pursued against the parties responsible for the contamination at [the] NCIA,” and (ii) “that the NYSDEC would assist in the funding of necessary supplemental remedial systems to protect the quality of the Bowling Green water.” (*Id.* at ¶¶ 16-20.) Following the meeting, Commissioner Davis again hired D&B to identify further remedial options, and on May 23, 1995, D&B recommended an approximately 34' air stripping tower to supplement the GAC System. (*Id.* at ¶¶ 21-27.)

On June 12 and 13, 1995, construction of the air stripping tower commenced. (*Id.* at ¶¶ 28-32; Ex. 17; *Merklin Aff.*, dated Mar. 9, 2009, at ¶¶ 6-9.) D&B hired Warren George, Inc. (“WGI”) to drill three foundation borings<sup>18</sup> at Bowling Green that measured four inches in diameter and went down 32 feet below the ground surface. (*Id.*) These soil borings were drilled with a large drilling truck (similar to the type of equipment used to drill a household well) and were drilled below the area onto which the concrete slab for the air stripping tower was to be poured. (*Id.*) Construction of the supplemental air stripping tower continued into July 1995, with the construction of the concrete pad on the which the air stripping tower would be erected as well as mechanical, electric and site work on the air stripping tower. (*Davis Aff.*, dated Mar. 27, 2009, ¶¶ 33-34, 42-44, Ex. 22.) The supplemental air stripping tower continues to be utilized to this day in conjunction with the GAC System. (*Merklin Aff.*, dated Mar. 9, 2009, ¶ 11.)

### **(iii) Costs of Construction**

The November 1989 process evaluation by D&B estimated that the project cost for the

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<sup>18</sup>The foundation borings were necessary and required physical on-site construction in order to support the air stripping tower (which weighed several tons). (*Id.*)

GAC System was \$1.25 million. (*Davis Aff.*, dated Mar. 27, 2009, Ex. 1.)

By letter dated June 21, 1995, NYSDEC Director Michael J. O'Toole informed NCDH that the capital costs of the proposed supplemental water treatment system would be paid out of the State Superfund Program. (*Davis Aff.*, dated Mar. 27, 2009, ¶¶ 34-36, Ex. 18.) The following week, the NYSDEC Project Engineer for the Remediating of the NCIA, Jeff Trad, telephoned NCDH requesting certain information regarding the NCDH's activities for site remediating at the NCIA, directed that NCDH keep track of all expenses associated with the installation of the air stripping tower, informed him that the expenses would be refundable by the State (not the federal government), and stated "that their approach to a payout for this expense is that this is part of the remediating to clean up the groundwater which is basically the use of treatment at the well head." (*Id.* at ¶¶ 35-36, Ex. 19.)

By letter dated March 23, 1998, NCDH requested from the NYSDEC reimbursement for the cost of construction of the supplemental air stripping tower from the New York State Superfund, for an estimate cost of \$1.22 million, which included costs relating to integrating plant piping, instrumentation and safety controls with the existing granular activated carbon filters at the site.. (*Davis Aff.*, dated Mar. 27, 2009, ¶¶ 42-44, Ex. 22.) NCDH was subsequently reimbursed for all its costs, including the cost of the WGI foundation borings from the New York State Superfund as part of the capital cost of installing the air stripping tower. (*Id.*)

Significantly, in the instant CERCLA action, Plaintiffs are seeking to recover past and future response costs incurred in responding to the off-site groundwater contamination in the area bordering the NCIA south of Old Country Road and Grand Boulevard, including in and around the Bowling Green public water supply wells. (Second Amended Complaint, dated May 20,

2008.) In particular, the record indicates that Plaintiffs are seeking the recovery of NYSDOH oversight costs incurred in 1990 and in 1995-96 in connection with activities at NCIA, including oversight of the approval of the GAC System and air stripping tower, and all construction costs of the supplemental air stripping tower system. (*Maldonado Aff.* dated Aug. 21, 2009, Ex. 7, Attachment B, Exs.4, 23.)

**(iv) Classification of the Response Activities at the NCIA Site**

Given the facts surrounding the history of the construction, use and projected use of the response activities at the NCIA site set forth in the record evidence and the applicable legal principles, this Court concludes that the GAC System utilized in conjunction with the supplemental air stripping tower were part of a permanent containment effort that was intended “to prevent and minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment,” CERCLA § 101 (24), particularly with respect to groundwater contamination adversely affecting the Bowling Green public waters supply, *see Second Amended Compl.*, dated May 20, 2008.

First, the manner in which the project was planned, designed and implemented suggests that the response was intended to be a remedial action. Based on a groundwater investigation conducted by NCDH in 1986 that revealed a significant threat to public health and the environment posed by contamination found at and being released from the NCIA, the NYSDEC listed the entire NCIA as a Class 2 site in the Registry in 1988. Bowling Green thereafter hired D&B to recommend a long-term treatment option for remediating groundwater contamination migrating from the NCIA into the Bowling Green public drinking water supply well, and in 1989 D&B recommended the GAC System. The GAC System was completed in December 1990. Since the discovery of groundwater contamination in 1986, the only remedial response at OU-3

has been the installation of the GAC System as supplemented by the air stripping tower, and notably the GAC System in conjunction with the air stripping tower has been utilized at Bowling Green for nearly nineteen years.

Moreover, the response action was undertaken as part of a long-term strategy for the remediating of the groundwater contamination. The construction of the GAC System in 1990 at the Bowling Green water supply well was approved by both the NCDH and the NYSDEC and was constructed to permanently address, prevent and/or minimize the release of hazardous substances and remains in use to date as part of the remedial system for the NCIA. The construction of the supplemental air stripping tower which commenced on June 12-13, 1995 was added to the GAC System to address the higher concentrations of groundwater contamination originating from NCIA that were migrating toward Bowling Green and continues in conjunction with the GAC System to be in use to date.

Further, in its documents, the State's reference to the GAC System in combination with the supplemental air stripping tower as "remedial," while not dispositive, is significant. The ROD for OU-3, identifies the primary threat at the NCIA as the site's contravention of groundwater standards in the sole source aquifer that is the source of water supply at Bowling Green. (*Maldonado Decl.*, dated Aug. 21, 2009, Ex. 8, at 1.) Section 5.2 of the ROD refers to the GAC System and air stripping tower as an interim remedial measure and notes that the "supplemental water treatment system uses an air stripper to remove the contaminants, followed by carbon polishing" and was constructed using State Superfund money to ensure the protection of the public water supply. (*Id.* at 19.) In addition, Section 7.1 specifically lists the "supplemental treatment system consisting of air stripping followed by carbon polishing" as a

required “element of remediating” for “all remedial alternatives” considered in the ROD for OU-3 and notes that the air stripper followed by carbon polishing “was constructed to mitigate the impact of the groundwater contamination leaving the NCIA sites on the Bowling Green Water District supply wells.” (*Id.* at 21-22.) Thus, pursuant to the ROD, the GAC System in combination with the air stripping tower is expected to be part of the long term remedial response into the future and will be incorporated into any final remedial system. Moreover, in response to an interrogatory, the State stated in pertinent part “. . . it is necessary to supplement the existing air stripper system currently in use at the Town of Hempstead Bowling Green with additional remedial measures in order to complete the remediating of Hazardous Substances present or expected to be present in the groundwater at the Bowling Green well field.” (*Id.*, Ex. 7, at 22.) Finally, in a memorandum memorializing a conversation between the Commissioner of NCDH and the NYSDEC project engineer for the remediating of the New Cassel Industrial Waste Site on June 28, 1995, the Commissioner recorded as follows:

J. Trad indicated that the [Bowling Green Water] Department should keep track of all of the expenses associated with the installation of the air stripping tower at the Iris Place Pump Station [Bowling Green] and at the completion of the project the Department could then advise his office as to the total cost of the stripper.

This expense he indicated would be a refundable expense by the State (not the Federal Government) and that their approach to payout for this expense is that it is part of the remediating to clean up the groundwater which is basically the use of treatment at the well head.

(*Davis Aff.*, dated Mar. 27, 2009, ¶¶ 35-36, Ex. 19.)

Finally, the estimate costs expended for the GAC System (\$1.25 million) and for the supplemental air stripping tower (\$1.22 million) suggests that the response activities were

undertaken as the initial phases of remediation at the NCIA as opposed to a short-term clean-up arrangement.

(v) ***Timeliness of this Cost Recovery Action if Dated from the Construction of the GAC System***

Having concluded that the response activities (the GAC System utilized in conjunction with the supplemental air stripping tower) were remedial because they were part of long-term permanent containment effort and were intended to “prevent or minimize the release of hazardous substances,” CERCLA § 101(24), the applicable statute of limitations for this cost recovery action is “6 years after initiation of physical on-site construction of the remedial action,” CERCLA § 113(g)(2)(B). Thus, the determinative issue concerning the timeliness of Plaintiffs’ action is whether any of the response activities were initiated prior to (i) Mar. 13, 2000 (six years before Plaintiffs initiated the recovery action against the Frost Street Defendants when Plaintiffs filed their Complaint, dated Mar. 13, 2006); (ii) May 12, 2000 (six years before Plaintiffs initiated the recovery action against defendants Grand Machinery and Paul Merandi, the Utility Manufacturing Defendants, the Tishcon Defendants, and the C&O Defendants when Plaintiffs filed their Amended Complaint, dated May 12, 2006); or (iii) May 20, 2002 (six years before Plaintiffs initiated the recovery against defendants 2632 Realty Development Corporation, BEAC, Island Transportation Inc., and the Atlas Graphics Defendants when Plaintiffs filed their Second Amended Complaint, dated May 20, 2006), constitute the “initiation of physical on-site construction of the remedial action.” 42 U.S.C. § 113(g)(2)(B); *see Schaefer*, 457 F.3d at 203-04 (examining, for purposes of determining when the statute of limitations begins to run on remedial actions, whether the activity was a [1] “physical activity,” [2] that “occurred on site,” [3] which “qualifies as construction,” and thus [4] “qualifies as the initiation of remedial action”).

Here, the initiation of the remedial action began with the physical on-site construction of the GAC System. The GAC System project involved the construction of a 4.0 MGD Granular Activated Carbon (GAC) Adsorption System to serve Well No. 1 and Well No. 2 in the Bowling Green Estates Water District, including the replacement of deep well turbine pumps and mortors, and the project was broken down into several contracts, including general construction, electrical, plumbing and ventilation, to facilitate the fabrication and delivery of treatment equipment. The physical on-site construction of the GAC System at the Bowling Green water supply well commenced in 1990 and was completed by December 10, 1990.<sup>19</sup> Given the initiation of the physical, on-site construction of the GAC System occurred prior to Mar. 13, 2000, May 12, 2000, and/or May 20, 2002, Plaintiffs' recovery action is untimely. Accordingly, this Court respectfully reports and recommends that Defendants motion for summary judgment be granted on this basis.

**(vi) *Timeliness of this Cost Recovery Action if Dated from the Addition of the Air Stripping Tower***

In the alternative, should the District Court determine that the physical, on-site construction of the GAC System did not trigger the statute of limitations under CERCLA, then the Court respectfully reports and recommends that the supplementation of the GAC System, which began with the commencement of the construction of the air stripping tower that was connected to the GAC tower on June 12-13, 1995, started the clock for statute of limitations purposes. In such an instance, this Court finds that the physical on-site activity of a large drilling rig, drilling 32 foot deep foundation borings into the ground below the site of the proposed concrete slab for the air

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<sup>19</sup>Although the parties have not specified the date upon which the on-site construction of the GAC System at Bowling Green commenced, it is undisputed that it commenced sometime in 1990 and was completed on or before December 10, 1990. In any event, even using use the completion date, December 10, 1990, for statute of limitations purposes, as discussed *infra* Plaintiffs' CERCLA claims are time-barred.

stripping tower at the Bowling Green water supply well constitutes the initiation of the physical on-site activity related to the construction of the supplemental air stripping tower. *See, e.g., Schaefer*, 457 F.3d at 203 (“While the mere purchase of a crane does not constitute the initiation of physical on-site construction, Schaefer’s subsequent use of the crane to spread cover (a mixture of topsoil, sand, and gravel) over his landfill satisfies each of the four statutory prerequisites”). In any event, given the initiation of the physical, on-site construction of the supplemental air stripping tower that was connected to the GAC System occurred prior to Mar 13, 2000, May 12, 2000 and/or May 20, 2002, Plaintiffs’ recovery action would be untimely. Accordingly, on this alternative basis, this Court respectfully reports and recommends that Defendants motion for summary judgment be granted.

**(vii) *The Tolling Agreements***

Although Plaintiffs argue that tolling agreements entered into by certain of the Defendants tolled the applicable statute of limitations period, as set forth below, Plaintiffs’ CERCLA claims were already time-barred by the effective date of the each of the respective tolling agreements.<sup>20</sup>

The record indicates the following. Prior to commencing the instant action, Plaintiffs and certain of the Defendants entered into tolling agreements. Significantly, the tolling agreements preserved these defendants’ rights to raise the statute of limitations defense to claims that were time-barred prior to the effective dates of the agreements and provided that they shall only apply prospectively and do not operate to revive any limitations periods. The tolling agreements entered

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<sup>20</sup> As discussed *infra*, none of the tolling agreements entered between Plaintiffs and the respective above-listed defendants became effective prior to the expiration of the applicable statute of limitations, *i.e.*, either December 1996 (six years after on-site construction of the GAC System commenced), or in the alternative, June 12-13, 2001 (six years after on-site construction of the supplemental air stripping tower which connected to the GAC System).

into by these parties are as follows:

Plaintiffs and defendants Next Millennium and 101 Frost Street Associates entered into tolling agreements that were fully executed on July 9, 2001. As discussed above, the statute of limitations began to run (i) when on-site construction of the GAC System commenced (prior to December 10, 1990), or in the alternative, (ii) from the commencement of the construction of the supplemental air stripping tower which connected to the GAC System which commenced on June 12-13, 1995. Under either case, the tolling agreements did not become effective prior to the expiration of the applicable statute of limitations.

Defendant Grand Machinery and Paul Merandi (in his capacity as Treasurer of Grand Machinery) entered into tolling agreements with Plaintiffs in July 2001 with an effective date of June 28, 2001. (*Biblow Letter*, dated June 22, 2010.) As discussed above, the statute of limitations began to run (i) when on-site construction of the GAC System commenced (prior to December 10, 1990), or in the alternative, (ii) from the commencement of the construction of the supplemental air stripping tower which connected to the GAC System which commenced on June 12-13, 1995. Under either case, the tolling agreements did not become effective prior to the expiration of the applicable statute of limitations.

Defendants Utility Manufacturing Corporation, Nest Equities, Inc., Audie Kranz (in his capacity as President of Utility Manufacturing Corporation) and Wilbur Kranz (in his capacity as President of Nest Equities, Inc.) entered into tolling agreements with Plaintiffs on August 23, 2001. As discussed above, the statute of limitations began to run (i) when on-site construction of the GAC System commenced (prior to December 10, 1990), or in the alternative, (ii) from the commencement of the construction of the supplemental air stripping tower which connected to the

GAC System which commenced on June 12-13, 1995. Under either case, the tolling agreements did not become effective prior to the expiration of the applicable statute of limitations.

Defendants Tishcon Corporation entered into a tolling agreement with Plaintiffs on June 28, 2001. (*Landrigan Letter*, dated June 29, 2010.) As discussed above, the statute of limitations began to run (i) when on-site construction of the GAC System commenced (prior to December 10, 1990), or in the alternative, (ii) from the commencement of the construction of the supplemental air stripping tower which connected to the GAC System which commenced on June 12-13, 1995. Under either case, the tolling agreements did not become effective prior to the expiration of the applicable statute of limitations.

Accordingly, this Court respectfully reports and recommends that the Court find that the tolling agreements did not toll the relevant statute of limitations period.

### **III. New York State Law Claims**

Plaintiffs' Second Amended Complaint also asserts claims under New York State law for public nuisance, restitution and indemnification. (Second Amended Compl., ¶¶ 149-68.) Having found that Plaintiffs' federal CERCLA claims do not survive Defendants' summary judgment motion, this Court concludes that subject to the District Court's reconsideration of the motion to sever case Nos. CV-03-5985 and CV-06-1122 (*Order*, dated September 8, 2010 (Feuerstein, *D.J.*; *see supra* fn. 15), it is unwarranted to exercise supplemental jurisdiction over Plaintiffs' remaining state-law claims. *See* 28 U.S.C. § 1367(c)(3); *United Mine Workers of Am. v. Gibbs*, 383 U.S. 715, 726 (1966). "In the interest of comity, the Second Circuit instructs that absent exceptional circumstances, where federal claims can be disposed of pursuant to Rule 12(b)(6) or summary judgment grounds, courts should abstain from exercising pendent jurisdiction." *Maura v. Countrywide Home Loans, Inc.*, 2010 WL 2976506, at \*10-11 (E.D.N.Y. July 22, 2010) (quoting

*Walker v. Time Life Films, Inc.*, 784 F.2d 44, 53 (2d Cir. 1986) (internal quotation marks omitted)); *see Brzak v. United Nations*, 597 F.3d 107, 113-14 (2d Cir. 2010) (holding that “if a plaintiff’s federal claims are dismissed before trial, the state claims should be dismissed as well) (internal quotation marks and citations omitted); *Cave v. E. Meadow Union Free Sch. Dist.*, 514 F.3d 240, 250 (2d Cir. 2008) (“We have already found that the district court lacks subject matter jurisdiction over appellants’ federal claims. It would thus be clearly inappropriate for the district court to retain jurisdiction over the state law claims when there is no basis for supplemental jurisdiction”); *see also Seabrook v. Jacobson*, 153 F.3d 70, 72 (2d Cir. 1998) (observing that principles of federalism and comity may counsel in favor of the dismissal of state law claims where “the federal claim on which the state claim hangs has been dismissed”); *see also Karmel v. Claiborne, Inc.*, 2002 WL 1561126, at \*4 (S.D.N.Y. July 15, 2002) (“Where a court is reluctant to exercise supplemental jurisdiction because of one of the reasons put forth by § 1367(c), or when the interests of judicial economy, convenience, comity and fairness to litigants are not violated by refusing to entertain matters of state law, it should decline supplemental jurisdiction and allow the plaintiff to decide whether or not to pursue the matter in state court.”).

Accordingly, pursuant to 28 U.S.C. § 1367(c)(3), given the absence of any federal claims that survive the motion for summary judgment and in the interest of judicial economy, convenience and comity, this Court respectfully reports and recommends (subject to the District Court’s reconsideration of the motion to sever) that the District Court decline to exercise supplemental jurisdiction over Plaintiffs’ state law claims and dismiss these claims without prejudice.

## CONCLUSION

For the foregoing reasons, the Court respectfully reports and recommends that Defendants' motion for summary judgment be granted in its entirety on the federal claims. In addition, the Court respectfully reports and recommends that the Court decline to retain jurisdiction over Plaintiffs' remaining state law claims and dismiss such claims without prejudice.

## OBJECTIONS

Any objections to this Report and Recommendation must be filed with the Clerk of the Court with a copy to the undersigned within fourteen (14) days of receipt of this Report. Failure to file objections within this period waives the right to appeal the District Court's Order. *See* 28 U.S.C. 636 (b)(1); Fed. R. Civ. P. 72, 6(a), 6(e); *Beverly v. Walker*, 118 F.3d 900, 902 (2d Cir. 1997); *Savoie v. Merchants Bank*, 84 F.3d 52, 60 (2d Cir. 1996); *IUE AFL-CIO Pension Fund v. Herrmann*, 9 F.3d 1049, 1054 (2d Cir. 1993); *Roldan v. Racette*, 984 F.2d 85, 89 (2d Cir. 1993); *Frank v. Johnson*, 968 F.2d 298, 299 (2d Cir. 1992).

Dated:           Central Islip, New York  
                    September 24, 2010

\_\_\_\_\_/s/\_\_\_\_\_  
MICHAEL L. ORENSTEIN  
United States Magistrate Judge

**FILED**  
IN CLERK'S OFFICE  
U.S. DISTRICT COURT E.D.N.Y.

★ NOV 22 2011 ★

UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF NEW YORK

-----X  
NEXT MILLENIUM REALTY, LLC, and  
101 FROST STREET ASSOCIATES,

Plaintiffs,

-against-

LONG ISLAND OFFICE

**ORDER**  
**CV-03-5985(SJF)(ARL)**

ADCHEM CORP.; LINCOLN PROCESSING CORP.;  
NORTHERN STATE REALTY CORP.; NORTHERN  
STATE REALTY CO.; PUF AHL REALTY CORP.;  
AUTOLINE AUTOMOTIVE CORP.; US-1 MARKETING  
GROUP INC., individually and as successor to COBRALINE  
MANUFACTURING CORP.; COBRALINE  
MANUFACTURING CORP.; VERIZON NEW YORK, INC.,  
individually and as successor to GTE OPERATIONS  
SUPPORT INCORPORATED, GTE CORPORATION, GTE  
SYLVANIA INCORPORATED, SYLVANIA ELECTRIC  
PRODUCTS INCORPORATED, VERIZON INC., VERIZON  
COMMUNICATIONS, INC. and GENERAL TELEPHONE  
AND ELECTRONIC CORP.; VERIZON INC., individually and  
as successor to GTE OPERATIONS SUPPORT  
INCORPORATED, GTE CORPORATION, GTE SYLVANIA  
INCORPORATED, SYLVANIA ELECTRIC PRODUCTS  
INCORPORATED, VERIZON NEW YORK INC., VERIZON  
COMMUNICATIONS, INC. and GENERAL TELEPHONE  
AND ELECTRONIC CORP.; VERIZON  
COMMUNICATIONS INC., individually and as successor to  
GTE OPERATIONS SUPPORT INCORPORATED, GTE  
CORPORATION, GTE SYLVANIA INCORPORATED,  
SYLVANIA ELECTRIC PRODUCTS INCORPORATED,  
VERIZON INC., VERIZON NEW YORK, INC. and  
GENERAL TELEPHONE AND ELECTRONIC CORP.; GTE  
OPERATIONS SUPPORT INCORPORATED, individually and  
as successor to GTE CORPORATION, GTE SYLVANIA  
INCORPORATED and SYLVANIA ELECTRIC PRODUCTS  
INCORPORATED; VISHAY INTERTECHNOLOGY, INC.,  
individually and as successor to VISHAY GENERAL  
SEMICONDUCTOR, INC., GENERAL SEMICONDUCTOR,  
INC. and GENERAL INSTRUMENTS CORPORATION;  
VISHAY GENERAL SEMICONDUCTOR, INC., individually  
and as successor to GENERAL SEMICONDUCTOR, INC. and  
GENERAL INSTRUMENTS CORPORATION; GENERAL  
SEMICONDUCTOR, INC.; VISHAY MIC TECHNOLOGY,  
INC., individually and as successor to GENERAL  
SEMICONDUCTOR, INC., and GENERAL INSTRUMENTS  
CORPORATION; GENERAL INSTRUMENTS  
CORPORATION; and SULZER METCO (US) INC.,

Defendants.  
-----X

-----X  
STATE OF NEW YORK and ALEXANDER B.  
GRANNIS, as Commissioner of the New York  
State Department of Environmental Conservation,

Plaintiffs,

CV-06-1133(SJF)(ARL)

-against-

NEXT MILLENNIUM REALTY, LLC; 101 FROST STREET  
ASSOCIATES; 101 FROST STREET CORPORATION;  
ALAN EIDLER, PAMELA SPIEGEL SANDERS and LISE  
SPIEGEL WILKS, as co-executors of the Last Wills and  
Testaments of, and duly authorized administrators of the Estates  
of, defendants EMILY SPIEGEL and JERRY SPIEGEL;  
UTILITY MANUFACTURING CO., INC.; NEST EQUITIES,  
INC., AUDIE KRANZ, WILBUR KRANZ; ARKWIN  
INDUSTRIES, INC.; WILLIAM MAGLIO and FRANK  
JACOBSON, as co-executors of the Last Will and Testament of,  
and duly authorized administrators of the Estate of, defendant  
DANIEL BERLIN; THOMAS MALLOY [sic]; TISHCON  
CORP. a/k/a TISHCON CORPORATION; KAMAL CHOPRA;  
JOE ELBAZ; C&O REALTY CO.; WILLIAM GROSS;  
EQUITY SHARE I ASSOCIATES; GRAND MACHINERY,  
INC. [sic]; PAUL MERANDI; IMC EASTERN  
CORPORATION, f/k/a IMC MAGNETICS CORP.; NMB  
(USA) INC.; 2632 REALTY CORPORATION; ISLAND  
TRANSPORTATION CORPORATION; SCIBELLI  
BROTHERS, INC., a/k/a SCIBELLI AUTOMOTIVE, INC.;  
JOSEPH SCIBELLI; ATLAS GRAPHICS INC.; H.D.P.  
PRINTING INDUSTRIES CORP.; SAM-TON SALVAGE  
AND TOWING INC.; RICHARD DEGENHART; and  
BAROUH EATON ALLEN CORP.,

Defendants.

-----X  
ALAN EIDLER, et al.,

Third-Party Plaintiffs,

-against-

ADCHEM CORP., et al.,

Third-Party Defendants,

-----X  
FEUERSTEIN, J.

Pending before the Court are the objections of plaintiffs State of New York and Alexander B. Grannis, as Commissioner of the New York State Department of Environmental Conservation (collectively, “the State plaintiffs”), to the Report and Recommendation of former United States Magistrate Judge Michael L. Orenstein dated September 24, 2010 (“the Report”), recommending, *inter alia*, that the motions of (1) defendants Next Millennium Realty, LLC, 101 Frost Street Associates, L.P., 101 Frost Street Corporation, Alan Eidler, Pamela Spiegel Sanders and Lise Spiegel Wilks, as co-executors of the Last Wills and Testaments of, and as duly authorized administrators of the Estates of, defendants Emily Spiegel and Jerry Spiegel, deceased, (collectively, “the Next Millennium defendants”), and (2) defendants Grand Machinery Exchange, Inc., i/s/h as Grand Machinery Inc., Paul Merandi (“Merandi”) and 2632 Realty Development Corporation (collectively, “the Grand Machinery defendants”), seeking summary judgment dismissing the State plaintiffs’ federal claims against them<sup>1</sup> be granted, that the State

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<sup>1</sup> Defendants Barouh Eaton Allen Corp. (“BEAC”); Sulzer Metco (US) Inc. (“SMI”); Utility Manufacturing Co., Inc., Nest Equities, Inc., Audie Kranz and Wilbur Kranz (collectively, “the Utility defendants”); Tishcon Corp., a/k/a Tishcon Corporation, Kamal Chopra and Joe Elbaz (collectively, “the Tishcon defendants”); IMC Eastern Corporation, f/k/a IMC Magnetics Corp. and NMB (USA) Inc. (collectively, “the IMC defendants”); Island Transportation Corporation (“ITC”); C&O Realty Co. and William Gross (collectively, “the C&O defendants”); and Atlas Graphics Inc., H.D.P. Printing Industries Corp. and Richard Degenhart (collectively, “the Atlas defendants”) joined in the Next Millennium defendants’ and Grand Machinery defendants’ motions for summary judgment. Moreover, defendants Arkwin Industries, Inc., William Maglio and Frank Jacobson, as co-executors of the Last Will and Testament of, and as duly authorized administrators of, the Estate of Daniel Berlin, deceased, and Thomas Molloy, i/s/h Thomas Malloy (collectively, “the Arkwin defendants”), advised the Court that they intended to file motions for summary judgment dismissing the State plaintiffs’ claims against them, but have deferred doing so as a result of procedural issues that have arisen in this case. Accordingly, the Court deems the Arkwin defendants to have also joined in the Next Millennium defendants’ and Grand Machinery defendants’ motions for summary judgment. The only remaining defendant that has appeared in this action, Equity Share I Associates, has not joined in the motions for summary judgment. The Clerk of the Court has entered the defaults of the remaining three (3) defendants in the action commenced by the State plaintiffs, i.e., Scibelli Brothers Auto Collision Inc., f/k/a Scibelli Brothers, Inc., a/k/a Scibelli Automotive, Inc., Joseph

plaintiffs' federal claims against all answering defendants in the action entitled State of New York, et ano. v. Next Millennium Realty, LLC, et al., No. 06-cv-1133 ("the State action"), be dismissed in their entirety with prejudice and that I decline to exercise supplemental jurisdiction over any remaining state law claims in the State action. For the reasons stated herein, the State plaintiffs' objections are overruled and the Report is accepted in its entirety.

#### I. Standard of Review

Rule 72 of the Federal Rules of Civil Procedure permits magistrate judges to conduct proceedings on dispositive pretrial matters without the consent of the parties. Fed. R. Civ. P. 72(b). Any portion of a report and recommendation on dispositive matters, to which a timely objection has been made, is reviewed *de novo*. 28 U.S.C. § 636(b)(1); Fed.R.Civ.P. 72(b). The court, however, is not required to review the factual findings or legal conclusions of the magistrate judge as to which no proper objections are interposed. See, Thomas v. Arn, 474 U.S. 140, 150, 106 S.Ct. 466, 88 L.Ed.2d 435 (1985). To accept the report and recommendation of a magistrate judge on a dispositive matter, to which no timely objection has been made, the district judge need only be satisfied that there is no clear error on the face of the record. See, Fed. R. Civ. P. 72(b); Johnson v. Goord, 487 F.Supp.2d 377, 379 (S.D.N.Y. 2007), aff'd, 305 Fed. Appx. 815 (2d Cir. Jan. 1, 2009); Baptichon v. Nevada State Bank, 304 F.Supp.2d 451, 453 (E.D.N.Y. 2004), aff'd, 125 Fed.Appx. 374 (2d Cir. 2005). Whether or not proper objections have been filed, the district judge may, after review, accept, reject, or modify any of the magistrate judge's findings or recommendations. 28 U.S.C. § 636(b)(1); Fed.R.Civ.P. 72(b).

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Scibelli and Sam-Ton Salvage and Towing Inc. However, the State plaintiffs have not yet moved for default judgments to be entered against those defendants.

## II. State Plaintiffs' Objections

The State plaintiffs contend that Magistrate Judge Orenstein erred, *inter alia*, in finding that the construction of the granulated activated carbon (“GAC”) treatment system and the Packed Tower Aeration System (“the air stripping tower”) on the contaminated site triggered the statute of limitations applicable to remedial actions commenced under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. §§ 9601, *et seq.*, (“CERCLA”), because that conclusion (a) is based on the determination that both systems were remedial, rather than removal, in nature, (b) erroneously imputes the construction of the GAC treatment system and air stripping tower to the State and (3) improperly resolves a question of fact regarding the commencement date of the physical on-site construction of the air stripping tower.

Upon *de novo* review of the Report and motion papers, and consideration of the State plaintiffs' objections, the Report is accepted in its entirety. Contrary to the State plaintiffs' contention, Magistrate Judge Orenstein, *inter alia*, properly characterized the on-site construction of the GAC treatment system and air stripping tower as remedial, rather than removal, measures. See, e.g. United States v. Washington State Department of Transportation, No. C05-5447, 2007 WL 445972, at \* 19-20 (W.D. Wash. Feb. 7, 2007) (finding that the on-site installation of two (2) air strippers was improperly characterized as a removal, rather than remedial, action). The State plaintiffs' remaining contentions are likewise rejected as without merit.

## III. State Law Claims

Since all federal claims against the answering defendants in the State action are dismissed

in accordance with the Report and this Order, the branch of the Report recommending that I decline to exercise supplemental jurisdiction over the State plaintiffs' state law claims is accepted and the State plaintiffs' state law claims against the answering defendants are dismissed without prejudice pursuant to 28 U.S.C. § 1367.<sup>2</sup>

#### IV. CONCLUSION

Upon *de novo* review of the Report and all motion papers, and consideration of the State plaintiffs' objections, the Report is accepted in its entirety. The Next Millennium defendants' and Grand Machinery defendants' motions for summary judgment are granted<sup>3</sup>, the State plaintiffs' federal claims against the answering defendants are dismissed in their entirety with prejudice as time-barred, and the State plaintiffs' state law claims against the answering

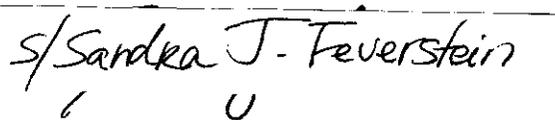
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<sup>2</sup> In light of the dismissal of all of the State plaintiffs' claims against the answering defendants in the State action, the defendants' and third-party plaintiffs' respective counterclaims, cross-claims and third-party claims seeking contribution and indemnification against the answering defendants are likewise dismissed without prejudice to recommencement in any subsequently commenced state law action. Moreover, since the State action is dismissed in its entirety, with the exception of the parties' claims against the defaulting defendants, the pending motion of defendants Adchem Corp., Northern State Realty Corp., Lincoln Processing Corp., Northern State Realty Co. and Pufahl Realty Corp. (collectively, "the Adchem defendants") seeking reconsideration of this Court's September 8, 2010 order severing the two (2) above-captioned actions is denied as moot, without prejudice to renewal in the event that the Adchem defendants object to the parties in the State action seeking a default judgment, if any, against the defaulting defendants in the severed State action. **The parties are directed to move for a default judgment against the three (3) defaulting defendants in the State action on or before December 22, 2011, or their claims against the defaulting defendants will be deemed dismissed with prejudice for failure to prosecute.** In the event any party in the State action moves for a default judgment against the defaulting defendants, the hearing in aid of such default judgment will be held at the same time as the status conference previously scheduled before the Court on **February 2, 2012 at 11:15 a.m.**

<sup>3</sup> This order resolves the following: docket entries 452, 499, 551, 552, 553, 563, 591 and 592.

defendants are dismissed in their entirety without prejudice pursuant to 28 U.S.C. § 1367. **The parties in the State action are directed to move for a default judgment against the three (3) defaulting defendants on or before December 22, 2011, or their claims against the defaulting defendants will be deemed dismissed with prejudice for failure to prosecute.** In the event any party so moves for a default judgment in accordance with this Order, the hearing in aid of judgment will be held on **February 2, 2012 at 11:15 a.m.**

SO ORDERED.



---

SANDRA J. FEUERSTEIN  
United States District Judge

Dated: November 22, 2011  
Central Islip, New York

## 42 U.S.C. § 9601. Definitions

For purpose of this subchapter—

\* \* \*

(23) The terms “remove” or “removal” means [*sic*] the cleanup or removal of released hazardous substances from the environment, such actions as may be necessary taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under section 9604(b) of this title, and any emergency assistance which may be provided under the Disaster Relief and Emergency Assistance Act [42 U.S.C. 5121 et seq.].

(24) The terms “remedy” or “remedial action” means 3 those actions consistent with permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment. The term includes, but is not limited to, such actions at the location of the release as storage, confinement, perimeter protection using dikes, trenches, or ditches, clay cover, neutralization, cleanup of released hazardous substances and associated contaminated materials, recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavations, repair or replacement of leaking containers, collection of leachate and runoff, onsite treatment or incineration, provision of alternative water supplies, and any monitoring reasonably required to assure that such actions protect the public health and welfare and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President determines that, alone or in combination with other measures, such relocation is more cost-effective than and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition offsite of hazardous substances, or may otherwise be necessary to protect the public health or welfare; the term includes offsite transport and offsite storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials.

## **42 U.S.C. § 9607(a). Liability**

### **(a) Covered persons; scope; recoverable costs and damages; interest rate; “comparable maturity” date**

Notwithstanding any other provision or rule of law, and subject only to the defenses set forth in subsection (b) of this section—

- (1) the owner and operator of a vessel or a facility,
- (2) any person who at the time of disposal of any hazardous substance owned or operated any facility at which such hazardous substances were disposed of,
- (3) any person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances owned or possessed by such person, by any other party or entity, at any facility or incineration vessel owned or operated by another party or entity and containing such hazardous substances, and
- (4) any person who accepts or accepted any hazardous substances for transport to disposal or treatment facilities, incineration vessels or sites selected by such person, from which there is a release, or a threatened release which causes the incurrence of response costs, of a hazardous substance, shall be liable for—
  - (A) all costs of removal or remedial action incurred by the United States Government or a State or an Indian tribe not inconsistent with the national contingency plan;
  - (B) any other necessary costs of response incurred by any other person consistent with the national contingency plan;
  - (C) damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release; and
  - (D) the costs of any health assessment or health effects study carried out under section 9604(i) of this title.

The amounts recoverable in an action under this section shall include interest on the amounts recoverable under subparagraphs (A) through (D). Such interest shall

accrue from the later of (i) the date payment of a specified amount is demanded in writing, or (ii) the date of the expenditure concerned. The rate of interest on the outstanding unpaid balance of the amounts recoverable under this section shall be the same rate as is specified for interest on investments of the Hazardous Substance Superfund established under subchapter A of chapter 98 of title 26. For purposes of applying such amendments to interest under this subsection, the term “comparable maturity” shall be determined with reference to the date on which interest accruing under this subsection commences.

## **42 U.S.C. § 9613. Civil Proceedings**

\* \* \*

### **(g) Period in which action may be brought**

\* \* \*

### **(2) Actions for recovery of costs**

An initial action for recovery of the costs referred to in section 9607 of this title must be commenced—

(A) for a removal action, within 3 years after completion of the removal action, except that such cost recovery action must be brought within 6 years after a determination to grant a waiver under section 9604(c)(1)(C) of this title for continued response action; and

(B) for a remedial action, within 6 years after initiation of physical on-site construction of the remedial action, except that, if the remedial action is initiated within 3 years after the completion of the removal action, costs incurred in the removal action may be recovered in the cost recovery action brought under this subparagraph. In any such action described in this subsection, the court shall enter a declaratory judgment on liability for response costs or damages that will be binding on any subsequent action or actions to recover further response costs or damages. A subsequent action or actions under section 9607 of this title for further response costs at the vessel or facility may be maintained at any time during the response action, but must be commenced no later than 3 years after the date of completion of all response action. Except as otherwise provided in this paragraph, an action may be commenced under section 9607 of this title for recovery of costs at any time after such costs have been incurred.

**N.Y. Environmental Conservation Law § 27-1313. Remedial programs.**

(1)(a) The department shall be responsible, as provided in this section, for inactive hazardous waste disposal site remedial programs except as provided in section one thousand three hundred eighty-nine-b of the public health law.

**6 N.Y.C.R.R. § 375-1.2. Definitions.**

The definitions set forth in ECL 27-1301; ECL 27-1405; and ECL 56-0502, some of which are clarified in this section, and the additional definitions set forth in this section, shall apply to these regulations. Certain definitions which apply only to the individual programs are set forth in Subparts 375-2, 375-3, 375-4 and 375-6 of this Part respectively.

\* \* \*

(ab) Interim remedial measure means activities to address both emergency and non-emergency site conditions, which can be undertaken without extensive investigation and evaluation, to prevent, mitigate or remedy environmental damage or the consequences of environmental damage attributable to a site, including, but not limited to, the following activities: construction of diversion ditches; collection systems; drum removal; leachate collection systems; construction of fences or other barriers; installation of water filters; provision of alternative water systems; the removal of source areas; or plume control.

**6 N.Y.C.R.R. § 375-2.8. Remedial program.**

(a) The goal of the remedial program for a specific site is to restore that site to pre-disposal conditions, to the extent feasible. At a minimum, the remedy selected shall eliminate or mitigate all significant threats to the public health and to the environment presented by contaminants disposed at the site through the proper application of scientific and engineering principles and in a manner not inconsistent with the national oil and hazardous substances pollution contingency plan as set forth in section 105 of CERCLA, as amended as by SARA.

(b) Application of the soil cleanup objectives.

(1) The remedial party must utilize soil cleanup objectives that eliminate or mitigate the significant threat and are protective of public health and the environment. The remedial party, subject to department approval, may:

(i) utilize the soil cleanup objectives, as set forth in section 375- 6.8 of this Part;

(ii) develop or modify site specific soil cleanup objectives, as set forth at section 375-6.9 of this Part; or

(iii) propose site-specific soil cleanup objectives which are protective of public health and the environment based upon other information.

(2) The soil component of the remedial program will consider the soil cleanup objectives for unrestricted use, as set forth in Table 375- 6.8(a) of this Part, as representative of pre-disposal conditions for remedial programs proceeding as set forth in subparagraph (1)(i) or (ii) of this subdivision, unless an impact to ecological resources has been identified.

(3) Cleanup objectives for other media. The threat to public health and the environment resulting from contamination in all other environmental media shall be evaluated in the development of remedial alternatives in the feasibility study to ensure that the remedial program meets the requirements of this subdivision and section 375-1.8 of this Part.

(c) Feasibility study.

(1) A feasibility study shall be conducted by the remedial party that develops and evaluates, using the factors in section 375-1.8(f) of this Part, alternatives for all contaminated media identified by the remedial investigation of the site.

(2) Where soil contamination above the unrestricted use soil cleanup objectives is identified by the remedial investigation, the feasibility study:

(i) shall develop and evaluate one or more alternatives that achieve the unrestricted use soil cleanup objectives for soil; and

(ii) may evaluate one or more alternatives that achieve a restricted use of the site which may be proposed by the remedial party. Where a restricted use is proposed, the feasibility study shall:

(a) develop and evaluate alternatives to achieve the restricted use proposed by the remedial party; and

(b) develop and evaluate other alternatives, if directed by the department, which will achieve the same use or a less restricted use of the site than that proposed by the remedial party.

(3) The department may approve a remedial program for soil that:

(i) utilizes different soil cleanup objectives between different areas of a site, provided such areas can be defined and described in the environmental easement and the necessary institutional and engineering controls can be effectively implemented, maintained, monitored and enforced through the site management plan;

(ii) considers site specific background concentrations, including the location of a site in areas of historic fill, in the development of the remedy; and/or

(iii) achieves a cleanup which is more stringent than the current, intended and reasonably anticipated future land uses of the site and its surroundings.

(4) The department shall select the remedy for the site from among the feasible alternatives:

(i) developed and evaluated by the feasibility study; or

(ii) developed by the department in addition to those presented by the feasibility study.

(d) Interim remedial measures. In the case of a site at which an interim remedial measure has been implemented, the department may determine, based on site-specific circumstances including post-implementation investigation and/or monitoring, that the interim remedial measure satisfies the goal of the remedial program for the site, where only continued implementation of the site management plan associated with the interim remedial measure or other engineering or institutional controls is required. In which event the department will propose the no

further action alternative. Provided no other operable units remain for the site requiring action, the department may reclassify or delist the site according to section 375-2.7(d) or (e) of this Subpart.

(e) Remedy selection. The process of selecting a remedy shall be documented in a record of decision, which includes the information identified below.

- (1) the location and a description of the site;
- (2) a history of the operation of the site;
- (3) the current environmental and public health status of the site;
- (4) an enforcement history and current status of the site;
- (5) The specific goals and objectives of the remedy selected for the site.
- (6) a description and evaluation of the remedial alternatives considered, except in the case of no further action remedies;
- (7) a summary of the basis for the department's decision;
- (8) a list of the documents the department used in its decisionmaking; and
- (9) a responsiveness summary.

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<britte.mcbride@state.ma.us>  
Bcc:  
Subject: Letter to Secretary Steven Chu re: Direct Final Rule/90% gas furnace efficiency  
standard  
Date: Thu Dec 06 2012 14:36:31 EST  
Attachments: FINAL LETTER TO DOE 12-6-12.doc

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Attached please find an electronic copy of a letter being sent this date by overnight mail to the Honorable Steven Chu, Secretary of the U.S. Department of Energy, on behalf of the Attorneys General of the Commonwealth of Massachusetts and the States of New York, Vermont, Illinois, and Oregon, and on behalf of the California Energy Commission, acting for the State of California with respect to appliance efficiency standards.

Thanks you very much for your attention.

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(or 617-727-2200 x.2427)

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Owner: Augenstern, Fred (AGO) <fred.augenstern@state.ma.us>  
Filename: FINAL LETTER TO DOE 12-6-12.doc  
Last Modified: Thu Dec 06 14:36:31 EST 2012

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State of Vermont  
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109 State Street  
Montpelier, VT 05609-1001

Office of the Attorney general  
State of Illinois  
500 South Second Street  
Springfield, IL 62706

December 6, 2012

**BY OVERNIGHT MAIL**

The Honorable Steven Chu  
Secretary  
United States Department of Energy  
1000 Independence Ave., SW  
Washington, DC 20585

Re: Defending the Department's Energy Efficiency Standards for Natural Gas  
Furnaces

Dear Secretary Chu:

The Attorneys General of the Commonwealth of Massachusetts and the States of New York, Oregon, Vermont and Illinois, and the California Energy Commission ("CEC"), acting for the State of California with respect to appliance efficiency standards, write to urge the United States Department of Energy ("Department") to proceed with its implementation of the regional 90% Annual Fuel Utilization Efficiency standard for gas-fired condensing furnaces for the thirty northern tier states ("90% Furnace Rule"). From our review of the now-granted abeyance motion filed in the D.C. Circuit appeal challenging the 90% Furnace Rule, we have become concerned that the Department is reconsidering its commitment to this critically important standard. We strongly encourage the Department to remain steadfast on the 90% Furnace Rule and to move forward with its defense in the D.C. Circuit.

As discussed in detail in the amicus brief Massachusetts, New York and the CEC filed in support of the Department in the litigation over the 90% Furnace Rule, the rule would deliver critical energy and environmental benefits to the northern tier states and to the Nation as a whole. These benefits would include substantial consumer energy savings and increased reliability in our energy systems, which depend on natural gas. In addition, the Department estimates that the furnace efficiency standards will reduce greenhouse gas emissions by 82 million metric tons annually. As evidenced from the recent damage caused by Hurricane Sandy, which may well have been made more severe by climate change, the federal government and the states must move forward expeditiously with measures to combat global warming, including efficiency standards.

The 90% Furnace Rule was the product of a consensus rulemaking by seven national furnace manufacturers and their principal trade association, the Air-Conditioning, Heating and Refrigeration Institute, numerous energy efficiency advocates, and the CEC, which had been authorized by the California Legislature to act on behalf of California on energy efficiency issues. Taking advantage of the then-new direct final rule process (under the Energy Policy and Conservation Act (“EPCA”), 42 U.S.C. § 6295(p)(4)(A)), to adopt the 90% Furnace Rule, the Department concluded that similarly situated northern tier states would all benefit from the new standard. In doing so, the Department clearly and carefully followed the requirements of the direct final rule process and recognized that the 90% Furnace Rule would “result in significant conservation of energy,” as EPCA requires.

The issuance of the 90% Furnace Rule was a proper exercise of the Department’s discretion under § 325(p)(4)(A) of the statute, because the joint statement submitted to the Department was, in fact, signed by “interested persons that are fairly representative of relevant points of view (including representatives of manufacturers of covered products, States, and efficiency advocates), as determined by the Secretary.” The consensus standards are the result of negotiations among efficiency and consumer advocates, the CEC, and the Air Conditioning, Heating, and Refrigeration Institute, representing furnace manufacturers. Hence, the appeal taken by the American Public Gas Association (“Association”) and its supporting intervenors, who are not furnace manufacturers, is unlikely to succeed. The 90% Furnace Rule was directed instead at manufacturers to provide significant energy savings to consumers.

As explained in the Department’s merits brief and the amici briefs of the states and others in support, the Department’s refusal to withdraw the direct final rule was also a proper exercise of the agency’s discretionary authority under EPCA. The Department’s review of the record, including the comments of the Association and those intervening on its behalf, was thorough, and the Department correctly determined that the comments failed to raise concerns that would compel the Department to adopt a different standard upon further review. If a direct final rule were to be withdrawn every time an interested party voiced objection, it would render the entire direct final rule process meaningless.

In short, the process leading to the direct final rule, including the 90% Furnace Rule, worked exactly as Congress envisioned it would under the statute, and the

Department's actions are completely defensible. The Department should firmly stand behind its decisions and actions.

The consequences of withdrawing the 90% Furnace Rule at this time would be severe. Even if a rulemaking on a new furnace standard were to be convened expeditiously, there likely would be a delay in implementation of a new rule until 2019 or later, more than six years after the May 2013 effective date of the 90% Furnace Rule. This would be even more prejudicial in light of the fact that the rule was in development for about a decade, and was prompted by a lawsuit filed in 2005 against the Department by a coalition of stakeholders and fifteen states to force the issuance of new standards, including furnace standards. *New York v. Bodman*; *NRDC v. Bodman*, Consolidated C.A. Nos. 05 Civ. 7807 (JES) and 05 Civ. 7808 (JES) (U.S.D.C., S.D.N.Y).

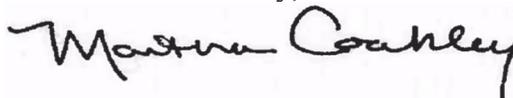
We offer Massachusetts' experience as an example of the unfairness of withdrawing the 90% Furnace Rule under the circumstances. Massachusetts has had its own 90% furnace efficiency rule on its books since 2005 but has been unable to implement it because of the Department's 2010 denial of the state's petition for waiver of federal preemption. The denial came at the time when the Department was about to issue the direct final rule. On the basis that the 90% Furnace Rule was likely to be issued, Massachusetts voluntarily relinquished its appeal rights on the Department's denial. Even if a prompt new rulemaking were to go forward, Massachusetts faces at a minimum a 14-year period between the passage of its own 90% furnace standard and the time a new federal standard would be implemented. EPCA requires a much more expeditious updating of federal furnace standards.

Because the 90% Furnace Rule would result in significant energy savings and would reduce greenhouse gas emissions and other air pollutants, any delay in implementing it would be an enormous energy efficiency set-back for all thirty northern tier states that are covered by the 90% Furnace Rule. The delay would cause the use of approximately 2 quads of energy that could otherwise have been saved, and would result in significantly more air pollution – including greenhouse gas emissions –because of a lost energy conservation opportunity. On these fronts, withdrawing the 90% Furnace Rule would represent a dramatic step backward.

We urge the Department to choose the path forward that would implement the 90% Furnace Rule, and to continue its defense of this standard in the D.C. Circuit.

Thank you for your consideration of this important matter.

Sincerely,



MARTHA COAKLEY  
Attorney General  
Commonwealth of Massachusetts



ROBERT WEISENMILLER  
Chair  
California Energy Commission



ELLEN F. ROSENBLUM  
Oregon Attorney General



ERIC SCHNEIDERMAN  
Attorney General of New York



WILLIAM SORRELL  
Attorney General

State of Vermont



LISA MADIGAN

Attorney General of Illinois

cc: Dr. David Danielson, Assistant Secretary for Energy Efficiency and Renewable Energy  
Dr. Kathleen Hogan, Deputy Assistant Secretary for Energy Efficiency  
Greg Woods, General Counsel  
Heather Zichal, Deputy Assistant to the President for Energy and Climate Change  
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Daniel Cohen (electronically)  
Roland J. Risser, Program Manager  
Michael R. Peevey, President, California Public Utilities Commission  
John Laird, California Secretary for Natural Resources  
Cliff Rechtschaffen, Senior Advisor, Office of Governor Edmund G. Brown Jr.

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From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Siobhan Kennedy </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=skennedy>; Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; Peter Washburn </o=lawnet/ou=first administrative group/cn=recipients/cn=peterwashburn>; Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Linda M. Wilson </o=lawnet/ou=first administrative group/cn=recipients/cn=lindawilson>  
Cc:  
Bcc:  
Subject: FW: Letter to Secretary Steven Chu re: Direct Final Rule/90% gas furnace efficiency standard  
Date: Thu Dec 06 2012 14:45:07 EST  
Attachments: FINAL LETTER TO DOE 12-6-12.doc

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Here's a copy of the signed letter to the Dept. of Energy.--Mike

Michael J. Myers  
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Albany, NY 12224  
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From: Augenstern, Fred (AGO) [mailto:fred.augenstern@state.ma.us]  
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To: hzichal@who.eop.gov; Daniel.Cohen@hq.doe.gov; michael.raab@usdoj.gov; Byron, H. Thomas (CIV) (H.Thomas.Byron@usdoj.gov)  
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Subject: Letter to Secretary Steven Chu re: Direct Final Rule/90% gas furnace efficiency standard

Attached please find an electronic copy of a letter being sent this date by overnight mail to the Honorable Steven Chu, Secretary of the U.S. Department of Energy, on behalf of the Attorneys General of the Commonwealth of Massachusetts and the States of New York, Vermont, Illinois, and Oregon, and on behalf of the California Energy Commission, acting for the State of California with respect to appliance efficiency standards.

Thanks you very much for your attention.

Fred Augenstern

Assistant Attorney General

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Owner: Michael J. Myers </o=lawnet/ou=first administrative  
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December 6, 2012

**BY OVERNIGHT MAIL**

The Honorable Steven Chu  
Secretary  
United States Department of Energy  
1000 Independence Ave., SW  
Washington, DC 20585

Re: Defending the Department's Energy Efficiency Standards for Natural Gas  
Furnaces

Dear Secretary Chu:

The Attorneys General of the Commonwealth of Massachusetts and the States of New York, Oregon, Vermont and Illinois, and the California Energy Commission ("CEC"), acting for the State of California with respect to appliance efficiency standards, write to urge the United States Department of Energy ("Department") to proceed with its implementation of the regional 90% Annual Fuel Utilization Efficiency standard for gas-fired condensing furnaces for the thirty northern tier states ("90% Furnace Rule"). From our review of the now-granted abeyance motion filed in the D.C. Circuit appeal challenging the 90% Furnace Rule, we have become concerned that the Department is reconsidering its commitment to this critically important standard. We strongly encourage the Department to remain steadfast on the 90% Furnace Rule and to move forward with its defense in the D.C. Circuit.

As discussed in detail in the amicus brief Massachusetts, New York and the CEC filed in support of the Department in the litigation over the 90% Furnace Rule, the rule would deliver critical energy and environmental benefits to the northern tier states and to the Nation as a whole. These benefits would include substantial consumer energy savings and increased reliability in our energy systems, which depend on natural gas. In addition, the Department estimates that the furnace efficiency standards will reduce greenhouse gas emissions by 82 million metric tons annually. As evidenced from the recent damage caused by Hurricane Sandy, which may well have been made more severe by climate change, the federal government and the states must move forward expeditiously with measures to combat global warming, including efficiency standards.

The 90% Furnace Rule was the product of a consensus rulemaking by seven national furnace manufacturers and their principal trade association, the Air-Conditioning, Heating and Refrigeration Institute, numerous energy efficiency advocates, and the CEC, which had been authorized by the California Legislature to act on behalf of California on energy efficiency issues. Taking advantage of the then-new direct final rule process (under the Energy Policy and Conservation Act (“EPCA”), 42 U.S.C. § 6295(p)(4)(A)), to adopt the 90% Furnace Rule, the Department concluded that similarly situated northern tier states would all benefit from the new standard. In doing so, the Department clearly and carefully followed the requirements of the direct final rule process and recognized that the 90% Furnace Rule would “result in significant conservation of energy,” as EPCA requires.

The issuance of the 90% Furnace Rule was a proper exercise of the Department’s discretion under § 325(p)(4)(A) of the statute, because the joint statement submitted to the Department was, in fact, signed by “interested persons that are fairly representative of relevant points of view (including representatives of manufacturers of covered products, States, and efficiency advocates), as determined by the Secretary.” The consensus standards are the result of negotiations among efficiency and consumer advocates, the CEC, and the Air Conditioning, Heating, and Refrigeration Institute, representing furnace manufacturers. Hence, the appeal taken by the American Public Gas Association (“Association”) and its supporting intervenors, who are not furnace manufacturers, is unlikely to succeed. The 90% Furnace Rule was directed instead at manufacturers to provide significant energy savings to consumers.

As explained in the Department’s merits brief and the amici briefs of the states and others in support, the Department’s refusal to withdraw the direct final rule was also a proper exercise of the agency’s discretionary authority under EPCA. The Department’s review of the record, including the comments of the Association and those intervening on its behalf, was thorough, and the Department correctly determined that the comments failed to raise concerns that would compel the Department to adopt a different standard upon further review. If a direct final rule were to be withdrawn every time an interested party voiced objection, it would render the entire direct final rule process meaningless.

In short, the process leading to the direct final rule, including the 90% Furnace Rule, worked exactly as Congress envisioned it would under the statute, and the

Department's actions are completely defensible. The Department should firmly stand behind its decisions and actions.

The consequences of withdrawing the 90% Furnace Rule at this time would be severe. Even if a rulemaking on a new furnace standard were to be convened expeditiously, there likely would be a delay in implementation of a new rule until 2019 or later, more than six years after the May 2013 effective date of the 90% Furnace Rule. This would be even more prejudicial in light of the fact that the rule was in development for about a decade, and was prompted by a lawsuit filed in 2005 against the Department by a coalition of stakeholders and fifteen states to force the issuance of new standards, including furnace standards. *New York v. Bodman*; *NRDC v. Bodman*, Consolidated C.A. Nos. 05 Civ. 7807 (JES) and 05 Civ. 7808 (JES) (U.S.D.C., S.D.N.Y).

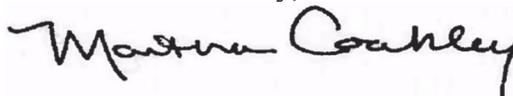
We offer Massachusetts' experience as an example of the unfairness of withdrawing the 90% Furnace Rule under the circumstances. Massachusetts has had its own 90% furnace efficiency rule on its books since 2005 but has been unable to implement it because of the Department's 2010 denial of the state's petition for waiver of federal preemption. The denial came at the time when the Department was about to issue the direct final rule. On the basis that the 90% Furnace Rule was likely to be issued, Massachusetts voluntarily relinquished its appeal rights on the Department's denial. Even if a prompt new rulemaking were to go forward, Massachusetts faces at a minimum a 14-year period between the passage of its own 90% furnace standard and the time a new federal standard would be implemented. EPCA requires a much more expeditious updating of federal furnace standards.

Because the 90% Furnace Rule would result in significant energy savings and would reduce greenhouse gas emissions and other air pollutants, any delay in implementing it would be an enormous energy efficiency set-back for all thirty northern tier states that are covered by the 90% Furnace Rule. The delay would cause the use of approximately 2 quads of energy that could otherwise have been saved, and would result in significantly more air pollution – including greenhouse gas emissions –because of a lost energy conservation opportunity. On these fronts, withdrawing the 90% Furnace Rule would represent a dramatic step backward.

We urge the Department to choose the path forward that would implement the 90% Furnace Rule, and to continue its defense of this standard in the D.C. Circuit.

Thank you for your consideration of this important matter.

Sincerely,



MARTHA COAKLEY  
Attorney General  
Commonwealth of Massachusetts



ROBERT WEISENMILLER  
Chair  
California Energy Commission



ELLEN F. ROSENBLUM  
Oregon Attorney General



ERIC SCHNEIDERMAN  
Attorney General of New York



WILLIAM SORRELL  
Attorney General

State of Vermont



LISA MADIGAN

Attorney General of Illinois

cc: Dr. David Danielson, Assistant Secretary for Energy Efficiency and Renewable Energy  
Dr. Kathleen Hogan, Deputy Assistant Secretary for Energy Efficiency  
Greg Woods, General Counsel  
Heather Zichal, Deputy Assistant to the President for Energy and Climate Change  
(electronically)  
Tom Byron, Esq.  
Michael Raab, Esq.  
Daniel Cohen (electronically)  
Roland J. Risser, Program Manager  
Michael R. Peevey, President, California Public Utilities Commission  
John Laird, California Secretary for Natural Resources  
Cliff Rechtschaffen, Senior Advisor, Office of Governor Edmund G. Brown Jr.

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: Letter to Secretary Steven Chu re: Direct Final Rule/90% gas furnace efficiency standard  
Date: Thu Dec 06 2012 22:04:11 EST  
Attachments: FINAL LETTER TO DOE 12-6-12.doc

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Thanks for your work on this, Mike.

Best, Kit

From: Augenstern, Fred (AGO) [mailto:fred.augenstern@state.ma.us]  
Sent: Thursday, December 06, 2012 02:37 PM Eastern Standard Time  
To: Kennedy, Kit; Longstreth, Ben  
Subject: FW: Letter to Secretary Steven Chu re: Direct Final Rule/90% gas furnace efficiency standard

Here it is, with a revised paragraph 1. I hope it helps.

Fred Augenstern  
Assistant Attorney General  
Environmental Protection Division  
Office of the Attorney General  
1 Ashburton Place, 18th Floor  
Boston, Massachusetts 02108  
Ph: 617-963-2427 (direct)  
(or 617-727-2200 x.2427)  
Fax: 617-727-9665  
E-mail: fred.augenstern@state.ma.us

From: Augenstern, Fred (AGO)  
Sent: Thursday, December 06, 2012 2:37 PM  
To: 'hzichal@who.eop.gov'; 'Daniel.Cohen@hq.doe.gov'; 'michael.raab@usdoj.gov'; Byron, H. Thomas (CIV) (H.Thomas.Byron@usdoj.gov)  
Cc: 'Dunn, Matthew'; 'Thea Schwartz'; 'Paul.Garrahan@doj.state.or.us'; 'Driskell, Kristen@Energy'; 'Michael J. Myers'; 'mike.altieri@state.ma.us'; Blumkin, Anna (EEA); Venezia, Steven (ENE) (steven.venezia@MassMail.State.MA.US); Hoffer, Melissa (AGO); Harper, Betsy (AGO); Pradas-Monne, Alicia

(AGO); Barry-Smith, Chris (AGO); Silva, Isabel J (AGO); Healey, Maura (AGO); McBride, Britte (AGO)  
Subject: Letter to Secretary Steven Chu re: Direct Final Rule/90% gas furnace efficiency standard

Attached please find an electronic copy of a letter being sent this date by overnight mail to the Honorable Steven Chu, Secretary of the U.S. Department of Energy, on behalf of the Attorneys General of the Commonwealth of Massachusetts and the States of New York, Vermont, Illinois, and Oregon, and on behalf of the California Energy Commission, acting for the State of California with respect to appliance efficiency standards.

Thanks you very much for your attention.

Fred Augenstern

Assistant Attorney General

Environmental Protection Division

Office of the Attorney General

1 Ashburton Place, 18th Floor

Boston, Massachusetts 02108

Ph: 617-963-2427 (direct)

(or 617-727-2200 x.2427)

Fax: 617-727-9665

E-mail: [fred.augenstern@state.ma.us](mailto:fred.augenstern@state.ma.us)

---

Owner: Kennedy, Kit <kkennedy@nrdc.org>  
Filename: FINAL LETTER TO DOE 12-6-12.doc  
Last Modified: Thu Dec 06 22:04:11 EST 2012

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Office of the Attorney General  
Commonwealth of Massachusetts  
One Ashburton Place, 18<sup>th</sup> Floor  
Boston, MA 02108

California Energy Commission  
1516 9<sup>th</sup> Street  
Sacramento, CA 95814

New York State Attorney General  
The Capitol  
Albany, NY 12224

Office of the Attorney General  
Oregon Department of Justice 1162  
Court Street NE  
Salem, OR 97301

State of Vermont  
Office of the Attorney General  
109 State Street  
Montpelier, VT 05609-1001

Office of the Attorney general  
State of Illinois  
500 South Second Street  
Springfield, IL 62706

December 6, 2012

**BY OVERNIGHT MAIL**

The Honorable Steven Chu  
Secretary  
United States Department of Energy  
1000 Independence Ave., SW  
Washington, DC 20585

Re: Defending the Department's Energy Efficiency Standards for Natural Gas  
Furnaces

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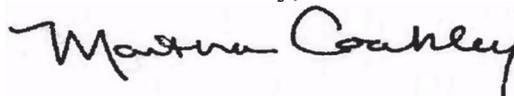
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Thank you for your consideration of this important matter.

Sincerely,



MARTHA COAKLEY  
Attorney General  
Commonwealth of Massachusetts



ROBERT WEISENMILLER  
Chair  
California Energy Commission



ELLEN F. ROSENBLUM  
Oregon Attorney General



ERIC SCHNEIDERMAN  
Attorney General of New York



WILLIAM SORRELL  
Attorney General

State of Vermont



LISA MADIGAN

Attorney General of Illinois

cc: Dr. David Danielson, Assistant Secretary for Energy Efficiency and Renewable Energy  
Dr. Kathleen Hogan, Deputy Assistant Secretary for Energy Efficiency  
Greg Woods, General Counsel  
Heather Zichal, Deputy Assistant to the President for Energy and Climate Change  
(electronically)  
Tom Byron, Esq.  
Michael Raab, Esq.  
Daniel Cohen (electronically)  
Roland J. Risser, Program Manager  
Michael R. Peevey, President, California Public Utilities Commission  
John Laird, California Secretary for Natural Resources  
Cliff Rechtschaffen, Senior Advisor, Office of Governor Edmund G. Brown Jr.

---

From: Lisa M. Burianek </o=lawnet/ou=first administrative group/cn=recipients/cn=lisaburianek>  
To: Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; Philip Bein </o=lawnet/ou=first administrative group/cn=recipients/cn=philipbein>  
Cc:  
Bcc:  
Subject: FW: Rigzone: Suit to Overturn NY Fracking Ban Likely to Set Precedent  
Date: Fri Dec 07 2012 10:12:13 EST  
Attachments: LENAPE\_AVON - Memorandum in Support of Petition and Complaint Final11\_13\_2012.pdf  
LENAPE\_AVON - Verified Petition and Complaint Final 11\_13\_2012 PDF.pdf

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Phil sent them around on Monday. Here they are again.

-----Original Message-----

From: Philip Bein  
Sent: Monday, December 03, 2012 10:09 AM  
To: Lisa M. Burianek; Morgan Costello; Stephen M. Nagle; Lemuel Srolovic; Alan Belenz; Jeremy Magliaro; Peter Washburn; Monica Wagner; Mauricio Roma  
Subject: RE: Rigzone: Suit to Overturn NY Fracking Ban Likely to Set Precedent

See attached.

Philip Bein  
Watershed Inspector General  
Assistant Attorney General  
NYS Office of the Attorney General  
The Capitol  
Albany, New York 12224  
tel: (518) 474-7178  
fax: (518) 473-2534

-----Original Message-----

From: Lisa M. Burianek  
Sent: Friday, November 30, 2012 3:51 PM  
To: Morgan Costello; Stephen M. Nagle; Lemuel Srolovic; Alan Belenz; Jeremy Magliaro; Peter Washburn; Monica Wagner; Philip Bein; Mauricio Roma  
Subject: FW: Rigzone: Suit to Overturn NY Fracking Ban Likely to Set Precedent

Swell. Can't imagine they really have a cause of action against the State.

-----Original Message-----

From: Alison Crocker [mailto:ahcrocke@gw.dec.state.ny.us]  
Sent: Friday, November 30, 2012 3:25 PM  
To: Lisa M. Burianek  
Cc: Leo Bracci; Maureen Coleman  
Subject: Fwd: Rigzone: Suit to Overturn NY Fracking Ban Likely to Set Precedent

I have not seen papers yet - Leo - has the Region seen anything?

>>> Emily DeSantis 11/30/2012 2:43 PM >>>

Suit to Overturn NY Fracking Ban Likely to Set Precedent by Karen Boman

|  
Rigzone Staff

|  
Friday, November 30, 2012

Lenape Resources' lawsuit seeking to overturn New York State's ban on hydraulic fracturing is likely to be a precedent setting case, said Michael Joy, a partner with the law firm Reed Smith Energy and Natural Resources.

However, Lenape has filed the case not to make a point, "but to save another small business in New York from being forced to close down because of oppressive government regulation," Joy said in a statement.

Lenape filed suit against the town of Avon, N.Y., and the New York State Department of Environmental Conservation Nov. 14 seeking to overturn the moratorium on hydraulic fracturing. The rule, which was enacted by the town's board in late June and finalized in July, placed a moratorium on oil and natural gas exploration, drilling and development, penalizing violators with criminal fines and jail time.

However, Lenape's oil and gas well operations were grandfathered into the law; Lenape argued that the clause does not allow Lenape to conduct essential field operations.

"Lenape is not proposing any new or unusual activity inconsistent with existing activities in the Town of Avon that is creating a dire necessity, the Prohibition on Natural Gas is not reasonably calculated to alleviate or prevent a crisis condition in the Town of Avon, and the Town of Avon is not taking action to rectify any real or perceived threat to the health, safety and welfare of any Town of Avon resident," Lenape said in the filing.

If Avon is allowed to enact the ban, Lenape said it would seek actual and compensatory damages of no less than \$50 million, the company said in the filing.

"Lenape Resources is absolutely concerned about the rampant spread of local laws attempting to ban natural gas in New York, but the action against the Town of Avon is to reverse an unlawful and improper local law that will force another small business in New York to close," Joy said in a statement.

"The issue is before the courts and we will let that process progress," said Emily DeSantis, director of public information for New York's Department of Environmental Conservation, in a statement.

Oil and gas exploration and production is nothing new to York, and has taken place in the state for 150 years. Low-volume hydraulic fracturing has taken place in New York state since the 1950s, while horizontal drilling has been used in New York since the 1980s.

In 1981, New York's Department of Conservation implemented a law which gave the state the right to regulate oil and gas operations, overriding the ability of local towns to regulate hydraulic fracturing. The law was implemented as the nation faced an energy crisis, and states were seeking to exploit their hydrocarbon resources, Joy said.

In the mid-1980s, the town of Kiantone, N.Y., adopted a local law trying to regulated oil and gas development, just like Avon is trying to do now. However, the court ruled in the case, EnviroGas vs Kiantone, against Kiantone, and held that the legislature had preempted all local regulation of oil and gas. This case made clear that the state has the exclusive right to regulate all oil and gas operations, preempting all local regulations of these activities, Joy noted.

The Fourth Appellate Court also upheld the lower court decision, setting a precedent in New York that the Department of Environmental Conservation, not the local government, had exclusive authority to regulate all aspects of oil and natural gas.

However, some towns in recent years have sought to indirectly ban or regulate hydraulic fracturing by implementing zoning laws or other regulations ahead of when the state does start issues permits for hydraulic fracturing, Joy told Rigzone.

While the 1980s case involving Kiantone followed the state law, court rulings involving the towns of Middlefield and Dryden upheld efforts by these towns to ban local drilling. These decisions go ahead the fact that only the state can regulate oil and gas operations.

"The Kiantone case was not even referenced in these legal opinions, which is highly improper," Joy commented.

However, a court ruling earlier this year involving the city of Binghamton went against the town's efforts to establish a moratorium.

In the case of Lenape, the town of Avon put a grandfathering clause in the law that would allow some

oil and gas activity but not all, meaning that Lenape can't drill additional wells or bring on new production as existing production declines. The real reason for the grandfathering clause is that Lenape provides free natural gas for the town's garage and a backup energy resource; some local residents also receive royalties from the production.

"The moratorium issue is very complex in that the moratorium in the towns also impacts pipeline operations; you can't just shut down one part of a system and continue to operate another part," said Joy, noting that the law was poorly written and does not reflect an understanding of the industry. The industry "cannot operate in such a patchwork" of conflicting rules in a densely populated region.

The Lenape story is unique and frustrating in that the company is a good operator with no incident on their record and Lenape President John Holko a guy "who makes Mitt Romney look like a wild child," Joy commented.

Lenape's operations in Avon are small, with between 16 to 20 wells and between 5,000 acres and 6,000 acres. The company has 56 wells on acreage near the town of Caledonia, which enacted the same type of law as Avon, and 50 wells in York, another nearby town that did not enact a moratorium. The debate over whether to allow hydraulic fracturing in New York has become a divisive issue for the state; in some cases, it's literally dividing communities.

"New York state is ground zero in this battle," said Joy. "I live in Pennsylvania and understand [the opposition oil and gas operators have faced] in Pennsylvania, Ohio, Colorado and Texas. If they think it's bad there, they need to come to New York, because it's the frontline in this war."

"I firmly believe that the Court that will hear the Lenape Resources case against the Town of Avon will follow the precedent established by the Kiantone case, the Court will strike down the local law enacted by the Town of Avon and in doing so will establish clear direction to the many other towns in New York that these ill-conceived local laws are not legal and are not enforceable," Joy said.

The laws are not locally generated laws designed to mitigate or prevent a local problem or concern, but are laws being shopped around the state by "radical anti-natural gas promoters" who are telling community leaders that they can do this, that nothing bad will happen, and that they will save their communities.

The opposition to hydraulic fracturing in the state is mostly based downstate in the New York City. While Sierra Club, EarthJustice and the other usual suspects among environmental groups oppose hydraulic fracturing, the predominant group behind the opposition in New York is the Community Environmental Defense Coalition (CEDC), which consists of two activist lawyers. CEDC receives funding from the Park Foundation.

On the other side, state level industry associations, chambers of commerce and unions favor development of New York's Marcellus and Utica development due to the jobs and economic activity that will be created.

Large landowner coalitions who originally banded together to aggregate their land in anticipation of oil and gas leasing also are speaking out, seeing the moratorium on fracking as a violation of their landowner rights.

"Since no one was doing any drilling or development, these groups have morphed into a community education and activist outlets," Joy noted.

Landowners who live in New York's southern tier can literally see across the border into Pennsylvania and the impact that Marcellus shale activity has had on landowners there.

"They look out the window and see this farmer is buying new equipment or trucks, while I'm struggling to work as hard as I can," Joy commented.

The advent of new technology that has enabled high-volume hydraulic fracturing and horizontal drilling prompted former New York Gov. David A. Paterson to require the New York Department of Environmental Conservation in 2008 to update the generic environmental impact state used to govern low-volume hydraulic fracturing to analyze and regulate new technology and ensure all environmental and public health impacts are mitigated or avoided.

Joy pointed out communities will not be adversely impacted by natural gas development, and that New York State will continue to have to most stringent drilling regulations in the nation, if not the world. If the local bans are upheld, the landowners and companies like Lenape who have invested in developing infrastructure will be liable for the value of the property they have taken.

"In Avon that amount will be at least and probably greater than \$50 million; in other towns across the state it could be considerably more,"

Joy commented. "There will be severe consequences to these ill-conceived local laws and the

promoters of these laws seem to be keeping that information from the communities – and that is wrong."

Karen Boman has more than 10 years of experience covering the upstream oil and gas sector. Email Karen at [kboman@rigzone.com](mailto:kboman@rigzone.com).

Emily DeSantis  
Director of Public Information  
Dept. of Environmental Conservation  
518-402-8000  
Fax 518-402-9016

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Owner: Lisa M. Burianek </o=lawnet/ou=first administrative  
group/cn=recipients/cn=lisaburianek>  
Filename: LENAPE\_AVON - Memorandum in Support of Petition and Complaint  
Final11\_13\_2012.pdf  
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Owner: Lisa M. Burianek </o=lawnet/ou=first administrative  
group/cn=recipients/cn=lisaburianek>  
Filename: LENAPE\_AVON - Verified Petition and Complaint Final 11\_13\_2012 PDF.pdf  
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From: Katelyn Ciolino </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=kciolino>  
To: Robert Schuwerk </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=rschuwer>; Isaac Cheng </o=lawnet/ou=first administrative group/cn=recipients/cn=isaaccheng>  
Cc:  
Bcc:  
Subject: FW: Copenhagen Accord/UNFCCC Assignment  
Date: Fri Dec 07 2012 15:41:12 EST  
Attachments: 120712\_FactualBackground.doc  
Chapter10\_IPCC4thAssessmentReport.pdf  
Chapter10Supplement\_IPCC4thAssessmentReport.pdf  
Chapter19\_IPCC4thAssessmentReport.pdf  
COP15Report\_CopenhagenAccord.pdf  
COP17Report\_Durban.pdf  
LetterToddStern\_to\_YvodeBoer.pdf  
Synthesis Report\_IPCC4thAssessmentReport.pdf  
CWEmbed1.unknown  
UNEPEmissionsGapReport.pdf  
UNFCCC.pdf  
WMO\_GHGBulletin.pdf

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Dear Rob and Isaac,

Below is the email with the Copenhagen assignment, along with the sources I cited (unless the source was a website, in which case I included the URL in the citation). The sources are also saved in my network folder under Monica Wagner --> International Climate Agreements.

Best,

Katelyn

---

From: Katelyn Ciolino  
Sent: Friday, December 07, 2012 9:40 AM  
To: Lemuel Srolovic; Monica Wagner  
Subject: Copenhagen Accord/UNFCCC Assignment

Dear Lem and Monica,

Attached is the assignment on the Copenhagen Accord/the UNFCCC in the form of a factual background for a complaint. I also included the more recent information about reports on the "emissions gap" leading into the Doha Conference. The sources I used are attached, unless the source has a URL listed in a footnote. I have hard copies of several of the reports that I can bring by one of your offices as well. These sources are saved in my network folder under Monica Wagner --> International Climate Agreements.

I really enjoyed working on this assignment. I did my best to communicate the more technical info, but I tried to cite as closely as possible to the IPCC reports for reference purposes.

Best,

Katelyn Ciolino

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## Factual Background

1. On October 15, 1992, the United States ratified the United Nations Framework Convention on Climate Change ("UNFCCC").<sup>1</sup>
2. Article 2 of the UNFCCC states, "The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."<sup>2</sup>
3. The UNFCCC outlined several principles to guide the achievement of this objective. First, it recognized that the parties to the Convention have "common but differentiated responsibilities" to reach these goals, and that developed country parties should take the lead in these efforts.<sup>3</sup> Second, that precautionary measures should be taken to "anticipate, prevent or minimize the causes of climate change and its adverse effects."<sup>4</sup> And third, that scientific uncertainty should not be a basis for postponing measures to address climate change.<sup>5</sup>
4. By ratifying the UNFCCC, the U.S. committed to working with the international community to reach the Convention's ultimate objective of preventing dangerous anthropogenic interference with the climate system, to submitting an annual inventory of greenhouse gas emissions and sinks to the UNFCCC, and to directing funds to climate change activities in developing countries.<sup>6</sup>

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<sup>1</sup> *Status of Ratification of the Convention*, United Nations Framework Convention on Climate Change, [http://unfccc.int/essential\\_background/convention/status\\_of\\_ratification/items/2631.php](http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php) (last visited Dec. 6, 2012).

<sup>2</sup> United Nations Framework Convention on Climate Change, May 9, 1992, S. Treaty Doc No. 102-38, 1771 U.N.T.S. 107, Article 2. [hereinafter *UNFCCC*]. The UNFCCC defines greenhouse gases as "those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit radiation." *Id.* at Article 1.

<sup>3</sup> *Id.* at art. 3, ¶ 1.

<sup>4</sup> *Id.* at art. 3, ¶ 3.

<sup>5</sup> *Id.*

<sup>6</sup> *International Climate Partnerships*, U.S. Environmental Protection Agency, <http://epa.gov/climatechange/EPAactivities/internationalpartnerships.html> (last visited Nov. 23, 2012).

5. The 195 parties to the UNFCCC make up the Conference of the Parties, the supreme decision making authority of the Convention. The Conference of the Parties is responsible for the review and implementation of the UNFCCC and any related legal instruments, and monitors the progress of the Parties towards the Convention's objectives.<sup>7</sup> The Conference of the Parties meets on an annual basis.<sup>8</sup>
6. Since the UNFCCC entered into force in 1994, the Conference of the Parties has held 17 sessions. The Conference of the Parties has the ability to adopt amendments or annexes to the UNFCCC by a consensus.<sup>9</sup> The Conference of the Parties may also adopt protocols, such as the Kyoto Protocol adopted in 1997.<sup>10</sup>
7. The 15<sup>th</sup> Conference of the Parties, that took place in Copenhagen, Denmark in December 2009, produced the Copenhagen Accord.<sup>11</sup> The Copenhagen Accord represents a statement of political intent to reduce global greenhouse gas emissions and address climate change in the short term and long term. "Since December 2009, 140 countries have associated themselves with the Copenhagen Accord," and 85 of these countries have "pledged to reduce their emissions or constrain their growth up to 2020."<sup>12</sup>
8. The United States is formally associated with the Copenhagen Accord. The United States additionally submitted economy-wide emission reduction targets of 17% of 2005 emissions by 2020, and approximately 83% of 2005 emissions by 2050. The United States submitted

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<sup>7</sup> UNFCCC, at art. 7, ¶ 2.

<sup>8</sup> UNFCCC, at art. 7, ¶ 4.

<sup>9</sup> A consensus is established by a three-fourths majority of the Parties present and voting. UNFCCC, at art. 15, ¶¶ 1 - 3.

<sup>10</sup> UNFCCC, at art. 17, ¶ 1. A protocol differs from the Convention in that it establishes binding commitments for the stabilization of greenhouse gas emissions. *Kyoto Protocol*, United Nations Framework Convention on Climate Change, [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php) (last visited Dec. 6, 2012).

<sup>11</sup> United Nations Framework Convention on Climate Change Report of the Conference of the Parties on its Fifteenth Session, Copenhagen, Dec. 7-19, 2009, *Copenhagen Accord*, U.N. Doc. FCCC/CP/2009/11/Add.1, Decision 2/CP.15 (Mar. 30, 2010). [hereinafter *Copenhagen Accord*].

<sup>12</sup> U.N. Environment Programme, *The Emissions Gap Report - Technical Summary*, 2 (Nov. 2010).

these targets on the understanding that other developed and developing countries would associate with the Copenhagen Accord and submit mitigation actions.<sup>13</sup>

9. The Copenhagen Accord creates a consensus that in order to prevent dangerous anthropogenic interference with the climate system, as stated in the UNFCCC's objective, global temperature increase must be stabilized at, or below, 2° Celsius.<sup>14</sup> This long-term goal is subject to an assessment in 2015, when the request of developing countries to limit global temperature increase at 1.5 ° Celsius will also be considered.<sup>15</sup>
10. In adopting the scientific view that the increase in global temperature should not exceed 2° Celsius, the Copenhagen Accord explicitly references the Intergovernmental Panel on Climate Change's ("IPCC") Fourth Assessment Report.<sup>16</sup>
11. The IPCC Fourth Assessment Report expresses high confidence that an increase in global mean temperature of more than 2° Celsius above 1990 levels would exacerbate increases in human mortality, loss of glaciers, the endangered status of threatened species, and increases in the frequency and or intensity of extreme events including floods, droughts, heat waves and fires.<sup>17</sup> There is high confidence that developing countries will experience greater vulnerability to climate change than developed countries.<sup>18</sup>

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<sup>13</sup> Letter from Todd Stern, U.S. Special Envoy for Climate Change, to Yvo de Boer, Executive Secretary United Nations Framework Convention on Climate Change (Jan. 28, 2010) (on file with United Nations Framework Convention on Climate Change).

<sup>14</sup> *Copenhagen Accord*, at ¶ 1.

<sup>15</sup> *Id.* at ¶ 12.

<sup>16</sup> *Id.* at ¶ 2.

<sup>17</sup> Schneider, S.H., et al., 2007: Assessing key vulnerabilities and the risk from climate change. In: *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, et al., Eds., Cambridge University Press, Cambridge, UK, 779-810, at 781, 796. Confidence levels are used to "express the assessed chance of a finding being correct." Bernstein, L., et al., *Climate Change 2007: Synthesis Report to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, et al., Eds., Cambridge University Press, Cambridge, UK, 26-73, at 27. High confidence is about an 8 out of 10, and medium confidence is about a 5 out of 10. *Id.*

<sup>18</sup> *Id.*

12. The IPCC Fourth Assessment Report found that if CO<sub>2</sub> equivalent concentrations are stabilized at 450 parts per million (ppm), there is likely to be a mean equilibrium surface temperature increase ranging from 1.4° – 3.1° Celsius, with the best guess as a 2.1 ° Celsius increase.<sup>19</sup> There is a medium probability of remaining below this temperature threshold at the CO<sub>2</sub> equivalent stabilization threshold of 450 ppm, which also means there is a 50% probability of exceeding the temperature threshold.<sup>20</sup>
13. At the 17<sup>th</sup> Conference of the Parties in Durban, South Africa in 2011, both developed and developing countries recognized that cuts in global greenhouse gas emissions are required to stabilize global average temperature increase at, or below 2 ° Celsius above pre-industrial levels, and recognized the need to consider strengthening this long-term goal to a global average temperature rise of 1.5 ° Celsius.
14. The 17<sup>th</sup> Conference of the Parties further acknowledged, with grave concern, that a significant gap remains between the aggregate effect of the Parties' mitigation pledges and the “aggregate emission pathways consistent with having a likely chance of holding the increase in global average temperature below 2 ° Celsius or 1.5 ° Celsius above pre-industrial levels.”<sup>21</sup>

<sup>19</sup> Meehl, G.A., et al., 2007: Global Climate Projections. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* Solomon, S., et al., eds., Cambridge University Press, Cambridge, UK, 747-846, at 826 (Table 10.8). “CO<sub>2</sub> equivalent concentration” is the “concentration of CO<sub>2</sub> that would cause the same amount of radiative forcing as a given mixture of CO<sub>2</sub> and other forcing components.” Bernstein, *supra* note 17, at 36. The IPCC's usage of the term “climate change” differs from that of the UNFCCC, in that it refers to any change in climate over time due to natural variability or human activity. *Id.* at 30. The UNFCCC's usage of term “climate change” refers to “change in climate that is attributed directly or indirectly to human activities ... that is in addition to natural climate variability observed over comparable time periods.” *Id.*

<sup>20</sup> Meehl, G.A., et al., 2007: Global Climate Projections Supplementary Materials. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Solomon, S., et al., eds., Cambridge University Press, Cambridge, UK, Figure S10.4; Bernstein, *supra* note 17, at 27.

<sup>21</sup> United Nations Framework Convention on Climate Change Report of the Conference of the Parties on its Seventeenth Session, Durban, Nov. 28 - Dec. 11, 2009, *Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action*, U.N. Doc. FCCC/CP/2011/9/Add.1, Decision 1/CP.17 (Mar. 15, 2011); United Nations Framework Convention on Climate Change Report of the Conference of the Parties on its Seventeenth

15. The atmospheric abundance of CO<sub>2</sub> in 2010 was 389 ppm. This is a 2.3 ppm increase from 2009.<sup>22</sup>
16. In 2010, the United States emitted 6,823.8 million metric tons of CO<sub>2</sub>, this represents an increase of 3.2 percent from 2009 to 2010.<sup>23</sup>
17. Projections of global emissions under a business-as-usual scenario find that global emissions could reach 56 gigatons of carbon dioxide equivalent (GtCO<sub>2</sub>e) in 2020.<sup>24</sup> However, to maintain a “likely” (greater than 66 percent) chance of stabilizing global average temperature increases at below 2 ° Celsius, global emissions in 2020 must be around 44 GtCO<sub>2</sub>e. This leaves an emissions gap of 12 GtCO<sub>2</sub>e.<sup>25</sup> Even if countries adopt their most ambitious conditional pledges to reduce global emissions, a 5 GtCO<sub>2</sub>e emissions gap is expected to remain.<sup>26</sup>
18. The Executive Secretary of the UNFCCC, Christina Figueres, recognized that there is gap in projections of global emissions between business-as-usual scenarios, and those scenarios necessary to stabilize global average temperature increase below 2 ° Celsius. In addition, Ms. Figueres noted that governments meeting at the 18<sup>th</sup> Conference of the Parties in Doha must focus on taking swift and ambitious action to determine how greenhouse gas emissions can be reduced globally by 2020, and in the long term.<sup>27</sup>

Session, Durban, Nov. 28 - Dec. 11, 2009, *Outcome of the Work of the Ad Hoc Working Group on Long Term Cooperative Action under the Convention*, U.N. Doc. FCCC/CP/2011/9/Add.1, Decision 2/CP.17 (Mar. 15, 2011).

<sup>22</sup> *Greenhouse Gas Bulletin*, World Meteorological Organization, 1-3 (Nov. 21, 2011).

<sup>23</sup> Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2010 Executive Summary Report, U.S. Environmental Protection Agency, 4 (Apr. 2012). Available at:

<http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html> (last visited Dec. 6, 2012).

<sup>24</sup> U.N. Environment Programme, *The Emissions Gap Report - Technical Summary*, 2, 6 (Nov. 2010). “CO<sub>2</sub> equivalent emission” is the “amount of CO<sub>2</sub> emission that would cause the same time-integrated radiative forcing, over a given time horizon, as an emitted amount of a long-lived GHG mixture or mixture of GHGs.” Bernstein, *supra* note 17, at 36.

<sup>25</sup> U.N. Environment Programme, *The Emissions Gap Report - Technical Summary*, 2, 6 (Nov. 2010).

<sup>26</sup> *Id.* at 8, 10.

<sup>27</sup> *Greenhouse Gas Emissions Gap Widening as Nations Head to Crucial Climate Talks in Doha*, U.N. Environment Programme News Centre, Nov. 21, 2012. Available at:

<http://www.unep.org/newscentre/default.aspx?DocumentID=2698&ArticleID=9335>.



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# 10

## Global Climate Projections

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## Executive Summary

The future climate change results assessed in this chapter are based on a hierarchy of models, ranging from Atmosphere-Ocean General Circulation Models (AOGCMs) and Earth System Models of Intermediate Complexity (EMICs) to Simple Climate Models (SCMs). These models are forced with concentrations of greenhouse gases and other constituents derived from various emissions scenarios ranging from non-mitigation scenarios to idealised long-term scenarios. In general, we assess non-mitigated projections of future climate change at scales from global to hundreds of kilometres. Further assessments of regional and local climate changes are provided in Chapter 11. Due to an unprecedented, joint effort by many modelling groups worldwide, climate change projections are now based on multi-model means, differences between models can be assessed quantitatively and in some instances, estimates of the probability of change of important climate system parameters complement expert judgement. New results corroborate those given in the Third Assessment Report (TAR). Continued greenhouse gas emissions at or above current rates will cause further warming and induce many changes in the global climate system during the 21st century that would *very likely* be larger than those observed during the 20th century.

### Mean Temperature

All models assessed here, for all the non-mitigation scenarios considered, project increases in global mean surface air temperature (SAT) continuing over the 21st century, driven mainly by increases in anthropogenic greenhouse gas concentrations, with the warming proportional to the associated radiative forcing. There is close agreement of globally averaged SAT multi-model mean warming for the early 21st century for concentrations derived from the three non-mitigated IPCC Special Report on Emission Scenarios (SRES: B1, A1B and A2) scenarios (including only anthropogenic forcing) run by the AOGCMs (warming averaged for 2011 to 2030 compared to 1980 to 1999 is between +0.64°C and +0.69°C, with a range of only 0.05°C). Thus, this warming rate is affected little by different scenario assumptions or different model sensitivities, and is consistent with that observed for the past few decades (see Chapter 3). Possible future variations in natural forcings (e.g., a large volcanic eruption) could change those values somewhat, but about half of the early 21st-century warming is committed in the sense that it would occur even if atmospheric concentrations were held fixed at year 2000 values. By mid-century (2046–2065), the choice of scenario becomes more important for the magnitude of multi-model globally averaged SAT warming, with values of +1.3°C, +1.8°C and +1.7°C from the AOGCMs for B1, A1B and A2, respectively. About a third of that warming is projected to be due to climate change that is already committed. By late century (2090–2099), differences between scenarios are large, and only about 20% of that warming arises from climate change that is already committed.

An assessment based on AOGCM projections, probabilistic methods, EMICs, a simple model tuned to the AOGCM responses, as well as coupled climate carbon cycle models, suggests that for non-mitigation scenarios, the future increase in global mean SAT is *likely* to fall within –40 to +60% of the multi-model AOGCM mean warming simulated for a given scenario. The greater uncertainty at higher values results in part from uncertainties in the carbon cycle feedbacks. The multi-model mean SAT warming and associated uncertainty ranges for 2090 to 2099 relative to 1980 to 1999 are B1: +1.8°C (1.1°C to 2.9°C), B2: +2.4°C (1.4°C to 3.8°C), A1B: +2.8°C (1.7°C to 4.4°C), A1T: 2.4°C (1.4°C to 3.8°C), A2: +3.4°C (2.0°C to 5.4°C) and A1FI: +4.0°C (2.4°C to 6.4°C). It is not appropriate to compare the lowest and highest values across these ranges against the single range given in the TAR, because the TAR range resulted only from projections using an SCM and covered all SRES scenarios, whereas here a number of different and independent modelling approaches are combined to estimate ranges for the six illustrative scenarios separately. Additionally, in contrast to the TAR, carbon cycle uncertainties are now included in these ranges. These uncertainty ranges include only anthropogenically forced changes.

Geographical patterns of projected SAT warming show greatest temperature increases over land (roughly twice the global average temperature increase) and at high northern latitudes, and less warming over the southern oceans and North Atlantic, consistent with observations during the latter part of the 20th century (see Chapter 3). The pattern of zonal mean warming in the atmosphere, with a maximum in the upper tropical troposphere and cooling throughout the stratosphere, is notable already early in the 21st century, while zonal mean warming in the ocean progresses from near the surface and in the northern mid-latitudes early in the 21st century, to gradual penetration downward during the course of the 21st century.

An expert assessment based on the combination of available constraints from observations (assessed in Chapter 9) and the strength of known feedbacks simulated in the models used to produce the climate change projections in this chapter indicates that the equilibrium global mean SAT warming for a doubling of atmospheric carbon dioxide (CO<sub>2</sub>), or ‘equilibrium climate sensitivity’, is *likely* to lie in the range 2°C to 4.5°C, with a most likely value of about 3°C. Equilibrium climate sensitivity is *very likely* larger than 1.5°C. For fundamental physical reasons, as well as data limitations, values substantially higher than 4.5°C still cannot be excluded, but agreement with observations and proxy data is generally worse for those high values than for values in the 2°C to 4.5°C range. The ‘transient climate response’ (TCR, defined as the globally averaged SAT change at the time of CO<sub>2</sub> doubling in the 1% yr<sup>-1</sup> transient CO<sub>2</sub> increase experiment) is better constrained than equilibrium climate sensitivity. The TCR is *very likely* larger than 1°C and *very unlikely* greater than 3°C based on climate models, in agreement with constraints from the observed surface warming.

## Temperature Extremes

It is *very likely* that heat waves will be more intense, more frequent and longer lasting in a future warmer climate. Cold episodes are projected to decrease significantly in a future warmer climate. Almost everywhere, daily minimum temperatures are projected to increase faster than daily maximum temperatures, leading to a decrease in diurnal temperature range. Decreases in frost days are projected to occur almost everywhere in the middle and high latitudes, with a comparable increase in growing season length.

## Mean Precipitation

For a future warmer climate, the current generation of models indicates that precipitation generally increases in the areas of regional tropical precipitation maxima (such as the monsoon regimes) and over the tropical Pacific in particular, with general decreases in the subtropics, and increases at high latitudes as a consequence of a general intensification of the global hydrological cycle. Globally averaged mean water vapour, evaporation and precipitation are projected to increase.

## Precipitation Extremes and Droughts

Intensity of precipitation events is projected to increase, particularly in tropical and high latitude areas that experience increases in mean precipitation. Even in areas where mean precipitation decreases (most subtropical and mid-latitude regions), precipitation intensity is projected to increase but there would be longer periods between rainfall events. There is a tendency for drying of the mid-continental areas during summer, indicating a greater risk of droughts in those regions. Precipitation extremes increase more than does the mean in most tropical and mid- and high-latitude areas.

## Snow and Ice

As the climate warms, snow cover and sea ice extent decrease; glaciers and ice caps lose mass owing to a dominance of summer melting over winter precipitation increases. This contributes to sea level rise as documented for the previous generation of models in the TAR. There is a projected reduction of sea ice in the 21st century in both the Arctic and Antarctic with a rather large range of model responses. The projected reduction is accelerated in the Arctic, where some models project summer sea ice cover to disappear entirely in the high-emission A2 scenario in the latter part of the 21st century. Widespread increases in thaw depth over much of the permafrost regions are projected to occur in response to warming over the next century.

## Carbon Cycle

There is unanimous agreement among the coupled climate-carbon cycle models driven by emission scenarios run so far that future climate change would reduce the efficiency of the Earth system (land and ocean) to absorb anthropogenic CO<sub>2</sub>. As a result, an increasingly large fraction of anthropogenic CO<sub>2</sub> would stay airborne in the atmosphere under a warmer climate. For the A2 emission scenario, this positive feedback leads to additional atmospheric CO<sub>2</sub> concentration varying between 20 and 220 ppm among the models by 2100. Atmospheric CO<sub>2</sub> concentrations simulated by these coupled climate-carbon cycle models range between 730 and 1,020 ppm by 2100. Comparing these values with the standard value of 836 ppm (calculated beforehand by the Bern carbon cycle-climate model without an interactive carbon cycle) provides an indication of the uncertainty in global warming due to future changes in the carbon cycle. In the context of atmospheric CO<sub>2</sub> concentration stabilisation scenarios, the positive climate-carbon cycle feedback reduces the land and ocean uptake of CO<sub>2</sub>, implying that it leads to a reduction of the compatible emissions required to achieve a given atmospheric CO<sub>2</sub> stabilisation. The higher the stabilisation scenario, the larger the climate change, the larger the impact on the carbon cycle, and hence the larger the required emission reduction.

## Ocean Acidification

Increasing atmospheric CO<sub>2</sub> concentrations lead directly to increasing acidification of the surface ocean. Multi-model projections based on SRES scenarios give reductions in pH of between 0.14 and 0.35 units in the 21st century, adding to the present decrease of 0.1 units from pre-industrial times. Southern Ocean surface waters are projected to exhibit undersaturation with regard to calcium carbonate for CO<sub>2</sub> concentrations higher than 600 ppm, a level exceeded during the second half of the century in most of the SRES scenarios. Low-latitude regions and the deep ocean will be affected as well. Ocean acidification would lead to dissolution of shallow-water carbonate sediments and could affect marine calcifying organisms. However, the net effect on the biological cycling of carbon in the oceans is not well understood.

## Sea Level

Sea level is projected to rise between the present (1980–1999) and the end of this century (2090–2099) under the SRES B1 scenario by 0.18 to 0.38 m, B2 by 0.20 to 0.43 m, A1B by 0.21 to 0.48 m, A1T by 0.20 to 0.45 m, A2 by 0.23 to 0.51 m, and A1FI by 0.26 to 0.59 m. These are 5 to 95% ranges based on the spread of AOGCM results, not including uncertainty in carbon cycle feedbacks. For each scenario, the midpoint of the range is within 10% of the TAR model average for 2090–2099. The ranges are narrower than in the TAR mainly because of improved information about some uncertainties in the projected contributions. In all scenarios, the average rate of rise during

the 21st century *very likely* exceeds the 1961 to 2003 average rate ( $1.8 \pm 0.5 \text{ mm yr}^{-1}$ ). During 2090 to 2099 under A1B, the central estimate of the rate of rise is  $3.8 \text{ mm yr}^{-1}$ . For an average model, the scenario spread in sea level rise is only 0.02 m by the middle of the century, and by the end of the century it is 0.15 m.

Thermal expansion is the largest component, contributing 70 to 75% of the central estimate in these projections for all scenarios. Glaciers, ice caps and the Greenland Ice Sheet are also projected to contribute positively to sea level. General Circulation Models indicate that the Antarctic Ice Sheet will receive increased snowfall without experiencing substantial surface melting, thus gaining mass and contributing negatively to sea level. Further accelerations in ice flow of the kind recently observed in some Greenland outlet glaciers and West Antarctic ice streams could substantially increase the contribution from the ice sheets. For example, if ice discharge from these processes were to scale up in future in proportion to global average surface temperature change (taken as a measure of global climate change), it would add 0.1 to 0.2 m to the upper bound of sea level rise by 2090 to 2099. In this example, during 2090 to 2099 the rate of scaled-up Antarctic discharge would roughly balance the expected increased rate of Antarctic accumulation, being under A1B a factor of 5 to 10 greater than in recent years. Understanding of these effects is too limited to assess their likelihood or to give a best estimate.

Sea level rise during the 21st century is projected to have substantial geographical variability. The model median spatial standard deviation is 0.08 m under A1B. The patterns from different models are not generally similar in detail, but have some common features, including smaller than average sea level rise in the Southern Ocean, larger than average in the Arctic, and a narrow band of pronounced sea level rise stretching across the southern Atlantic and Indian Oceans.

### Mean Tropical Pacific Climate Change

Multi-model averages show a weak shift towards average background conditions which may be described as ‘El Niño-like’, with sea surface temperatures in the central and east equatorial Pacific warming more than those in the west, weakened tropical circulations and an eastward shift in mean precipitation.

### El Niño

All models show continued El Niño-Southern Oscillation (ENSO) interannual variability in the future no matter what the change in average background conditions, but changes in ENSO interannual variability differ from model to model. Based on various assessments of the current multi-model data set, in which present-day El Niño events are now much better simulated than in the TAR, there is no consistent indication at this time of discernible changes in projected ENSO amplitude or frequency in the 21st century.

### Monsoons

An increase in precipitation is projected in the Asian monsoon (along with an increase in interannual season-averaged precipitation variability) and the southern part of the west African monsoon with some decrease in the Sahel in northern summer, as well as an increase in the Australian monsoon in southern summer in a warmer climate. The monsoonal precipitation in Mexico and Central America is projected to decrease in association with increasing precipitation over the eastern equatorial Pacific through Walker Circulation and local Hadley Circulation changes. However, the uncertain role of aerosols in general, and carbon aerosols in particular, complicates the nature of future projections of monsoon precipitation, particularly in the Asian monsoon.

### Sea Level Pressure

Sea level pressure is projected to increase over the subtropics and mid-latitudes, and decrease over high latitudes (order several millibars by the end of the 21st century) associated with a poleward expansion and weakening of the Hadley Circulation and a poleward shift of the storm tracks of several degrees latitude with a consequent increase in cyclonic circulation patterns over the high-latitude arctic and antarctic regions. Thus, there is a projected positive trend of the Northern Annular Mode (NAM) and the closely related North Atlantic Oscillation (NAO) as well as the Southern Annular Mode (SAM). There is considerable spread among the models for the NAO, but the magnitude of the increase for the SAM is generally more consistent across models.

### Tropical Cyclones (Hurricanes and Typhoons)

Results from embedded high-resolution models and global models, ranging in grid spacing from 100 km to 9 km, project a *likely* increase of peak wind intensities and notably, where analysed, increased near-storm precipitation in future tropical cyclones. Most recent published modelling studies investigating tropical storm frequency simulate a decrease in the overall number of storms, though there is less confidence in these projections and in the projected decrease of relatively weak storms in most basins, with an increase in the numbers of the most intense tropical cyclones.

### Mid-latitude Storms

Model projections show fewer mid-latitude storms averaged over each hemisphere, associated with the poleward shift of the storm tracks that is particularly notable in the Southern Hemisphere, with lower central pressures for these poleward-shifted storms. The increased wind speeds result in more extreme wave heights in those regions.

## Atlantic Ocean Meridional Overturning Circulation

Based on current simulations, it is *very likely* that the Atlantic Ocean Meridional Overturning Circulation (MOC) will slow down during the course of the 21st century. A multi-model ensemble shows an average reduction of 25% with a broad range from virtually no change to a reduction of over 50% averaged over 2080 to 2099. In spite of a slowdown of the MOC in most models, there is still warming of surface temperatures around the North Atlantic Ocean and Europe due to the much larger radiative effects of the increase in greenhouse gases. Although the MOC weakens in most model runs for the three SRES scenarios, none shows a collapse of the MOC by the year 2100 for the scenarios considered. No coupled model simulation of the Atlantic MOC shows a mean increase in the MOC in response to global warming by 2100. It is *very unlikely* that the MOC will undergo a large abrupt transition during the course of the 21st century. At this stage, it is too early to assess the likelihood of a large abrupt change of the MOC beyond the end of the 21st century. In experiments with the low (B1) and medium (A1B) scenarios, and for which the atmospheric greenhouse gas concentrations are stabilised beyond 2100, the MOC recovers from initial weakening within one to several centuries after 2100 in some of the models. In other models the reduction persists.

## Radiative Forcing

The radiative forcings by long-lived greenhouse gases computed with the radiative transfer codes in twenty of the AOGCMs used in the Fourth Assessment Report have been compared against results from benchmark line-by-line (LBL) models. The mean AOGCM forcing over the period 1860 to 2000 agrees with the mean LBL value to within  $0.1 \text{ W m}^{-2}$  at the tropopause. However, there is a range of 25% in longwave forcing due to doubling atmospheric  $\text{CO}_2$  from its concentration in 1860 across the ensemble of AOGCM codes. There is a 47% relative range in longwave forcing in 2100 contributed by all greenhouse gases in the A1B scenario across the ensemble of AOGCM simulations. These results imply that the ranges in climate sensitivity and climate response from models discussed in this chapter may be due in part to differences in the formulation and treatment of radiative processes among the AOGCMs.

## Climate Change Commitment (Temperature and Sea Level)

Results from the AOGCM multi-model climate change commitment experiments (concentrations stabilised for 100 years at year 2000 for 20th-century commitment, and at 2100 values for B1 and A1B commitment) indicate that if greenhouse gases were stabilised, then a further warming of  $0.5^\circ\text{C}$  would occur. This should not be confused with ‘unavoidable climate change’ over the next half century, which would be greater because forcing cannot be instantly stabilised. In the very long term, it is plausible that climate change could be less than in a

commitment run since forcing could be reduced below current levels. Most of this warming occurs in the first several decades after stabilisation; afterwards the rate of increase steadily declines. The globally averaged precipitation commitment 100 years after stabilising greenhouse gas concentrations amounts to roughly an additional increase of 1 to 2% compared to the precipitation values at the time of stabilisation.

If concentrations were stabilised at A1B levels in 2100, sea level rise due to thermal expansion in the 22nd century would be similar to that in the 21st, and would amount to 0.3 to 0.8 m (relative to 1980 to 1999) above present by 2300. The ranges of thermal expansion overlap substantially for stabilisation at different levels, since model uncertainty is dominant; A1B is given here because most model results are available for that scenario. Thermal expansion would continue over many centuries at a gradually decreasing rate, reaching an eventual level of 0.2 to 0.6 m per  $^\circ\text{C}$  of global warming relative to present. Under sustained elevated temperatures, some glacier volume may persist at high altitudes, but most could disappear over centuries.

If greenhouse gas concentrations could be reduced, global temperatures would begin to decrease within a decade, although sea level would continue to rise due to thermal expansion for at least another century. Earth System Models of Intermediate Complexity with coupled carbon cycle model components show that for a reduction to zero emissions at year 2100 the climate would take of the order of 1 kyr to stabilise. At year 3000, the model range for temperature increase is  $1.1^\circ\text{C}$  to  $3.7^\circ\text{C}$  and for sea level rise due to thermal expansion is 0.23 to 1.05 m. Hence, they are projected to remain well above their pre-industrial values.

The Greenland Ice Sheet is projected to contribute to sea level after 2100, initially at a rate of 0.03 to 0.21 m per century for stabilisation in 2100 at A1B concentrations. The contribution would be greater if dynamical processes omitted from current models increased the rate of ice flow, as has been observed in recent years. Except for remnant glaciers in the mountains, the Greenland Ice Sheet would largely be eliminated, raising sea level by about 7 m, if a sufficiently warm climate were maintained for millennia; it would happen more rapidly if ice flow accelerated. Models suggest that the global warming required lies in the range  $1.9^\circ\text{C}$  to  $4.6^\circ\text{C}$  relative to the pre-industrial temperature. Even if temperatures were to decrease later, it is possible that the reduction of the ice sheet to a much smaller extent would be irreversible.

The Antarctic Ice Sheet is projected to remain too cold for widespread surface melting, and to receive increased snowfall, leading to a gain of ice. Loss of ice from the ice sheet could occur through increased ice discharge into the ocean following weakening of ice shelves by melting at the base or on the surface. In current models, the net projected contribution to sea level rise is negative for coming centuries, but it is possible that acceleration of ice discharge could become dominant, causing a net positive contribution. Owing to limited understanding of the relevant ice flow processes, there is presently no consensus on the long-term future of the ice sheet or its contribution to sea level rise.

## 10.1 Introduction

Since the Third Assessment Report (TAR), the scientific community has undertaken the largest coordinated global coupled climate model experiment ever attempted in order to provide the most comprehensive multi-model perspective on climate change of any IPCC assessment, the World Climate Research Programme (WCRP) Coupled Model Intercomparison Project phase three (CMIP3), also referred to generically throughout this report as the ‘multi-model data set’ (MMD) archived at the Program for Climate Model Diagnosis and Intercomparison (PCMDI). This open process involves experiments with idealised climate change scenarios (i.e.,  $1\% \text{ yr}^{-1}$  carbon dioxide ( $\text{CO}_2$ ) increase, also included in the earlier WCRP model intercomparison projects CMIP2 and CMIP2+ (e.g., Covey et al., 2003; Meehl et al., 2005b), equilibrium  $2 \times \text{CO}_2$  experiments with atmospheric models coupled to non-dynamic slab oceans, and idealised stabilised climate change experiments at  $2 \times \text{CO}_2$  and  $4 \times$  atmospheric  $\text{CO}_2$  levels in the  $1\% \text{ yr}^{-1}$   $\text{CO}_2$  increase simulations).

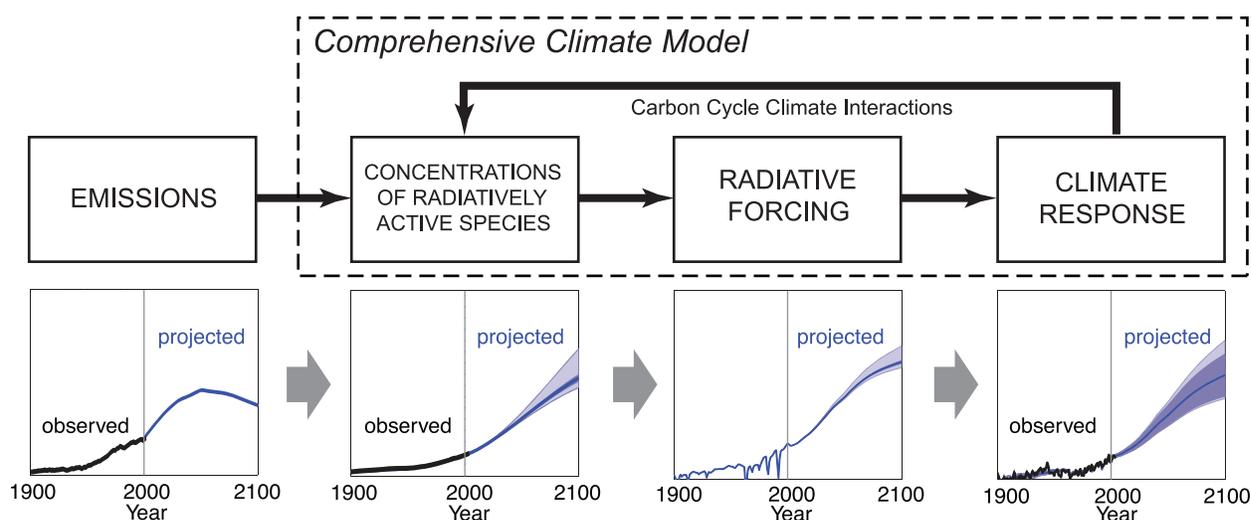
In the idealised  $1\% \text{ yr}^{-1}$   $\text{CO}_2$  increase experiments, there is no actual real year time line. Thus, the rate of climate change is not the issue in these experiments, but what is studied are the types of climate changes that occur at the time of doubling or quadrupling of atmospheric  $\text{CO}_2$  and the range of, and difference in, model responses. Simulations of 20th-century climate have been completed that include temporally evolving natural and anthropogenic forcings. For projected climate change in the 21st century, a subset of three IPCC Special Report on Emission Scenarios (SRES; Nakićenović and Swart, 2000) scenario simulations have been selected from the six commonly used marker scenarios. With respect to emissions, this subset (B1, A1B and A2) consists of a ‘low’, ‘medium’ and ‘high’ scenario

among the marker scenarios, and this choice is solely made by the constraints of available computer resources that did not allow for the calculation of all six scenarios. This choice, therefore, does not imply a qualification of, or preference over, the six marker scenarios. In addition, it is not within the scope of the Working Group I contribution to the Fourth Assessment Report (AR4) to assess the plausibility or likelihood of emission scenarios.

In addition to these non-mitigation scenarios, a series of idealised model projections is presented, each of which implies some form and level of intervention: (i) stabilisation scenarios in which greenhouse gas concentrations are stabilised at various levels, (ii) constant composition commitment scenarios in which greenhouse gas concentrations are fixed at year 2000 levels, (iii) zero emission commitment scenarios in which emissions are set to zero in the year 2100 and (iv) overshoot scenarios in which greenhouse gas concentrations are reduced after year 2150.

The simulations with the subset A1B, B1 and A2 were performed to the year 2100. Three different stabilisation scenarios were run, the first with all atmospheric constituents fixed at year 2000 values and the models run for an additional 100 years, and the second and third with constituents fixed at year 2100 values for A1B and B1, respectively, for another 100 to 200 years. Consequently, the concept of climate change commitment (for details and definitions see Section 10.7) is addressed in much wider scope and greater detail than in any previous IPCC assessment. Results based on this Atmosphere-Ocean General Circulation Model (AOGCM) multi-model data set are featured in Section 10.3.

Uncertainty in climate change projections has always been a subject of previous IPCC assessments, and a substantial amount of new work is assessed in this chapter. Uncertainty arises in various steps towards a climate projection (Figure 10.1). For



**Figure 10.1.** Several steps from emissions to climate response contribute to the overall uncertainty of a climate model projection. These uncertainties can be quantified through a combined effort of observation, process understanding, a hierarchy of climate models, and ensemble simulations. In a comprehensive climate model, physical and chemical representations of processes permit a consistent quantification of uncertainty. Note that the uncertainty associated with the future emission path is of an entirely different nature and not addressed in Chapter 10. Bottom row adapted from Figure 10.26, A1B scenario, for illustration only.

a given emissions scenario, various biogeochemical models are used to calculate concentrations of constituents in the atmosphere. Various radiation schemes and parametrizations are required to convert these concentrations to radiative forcing. Finally, the response of the different climate system components (atmosphere, ocean, sea ice, land surface, chemical status of atmosphere and ocean, etc.) is calculated in a comprehensive climate model. In addition, the formulation of, and interaction with, the carbon cycle in climate models introduces important feedbacks which produce additional uncertainties. In a comprehensive climate model, physical and chemical representations of processes permit a consistent quantification of uncertainty. Note that the uncertainties associated with the future emission path are of an entirely different nature and not considered in this chapter.

Many of the figures in Chapter 10 are based on the mean and spread of the multi-model ensemble of comprehensive AOGCMs. The reason to focus on the multi-model mean is that averages across structurally different models empirically show better large-scale agreement with observations, because individual model biases tend to cancel (see Chapter 8). The expanded use of multi-model ensembles of projections of future climate change therefore provides higher quality and more quantitative climate change information compared to the TAR. Even though the ability to simulate present-day mean climate and variability, as well as observed trends, differs across models, no weighting of individual models is applied in calculating the mean. Since the ensemble is strictly an ‘ensemble of opportunity’, without sampling protocol, the spread of models does not necessarily span the full possible range of uncertainty, and a statistical interpretation of the model spread is therefore problematic. However, attempts are made to quantify uncertainty throughout the chapter based on various other lines of evidence, including perturbed physics ensembles specifically designed to study uncertainty within one model framework, and Bayesian methods using observational constraints.

In addition to this coordinated international multi-model experiment, a number of entirely new types of experiments have been performed since the TAR to quantify uncertainty regarding climate model response to external forcings. The extent to which uncertainties in parametrizations translate into the uncertainty in climate change projections is addressed in much greater detail. New calculations of future climate change from the larger suite of SRES scenarios with simple models and Earth System Models of Intermediate Complexity (EMICs) provide additional information regarding uncertainty related to the choice of scenario. Such models also provide estimates of long-term evolution of global mean temperature, ocean heat uptake and sea level rise due to thermal expansion beyond the 21st century, and thus allow climate change commitments to be better constrained.

Climate sensitivity has always been a focus in the IPCC assessments, and this chapter assesses more quantitative estimates of equilibrium climate sensitivity and transient

climate response (TCR) in terms of not only ranges but also probabilities within these ranges. Some of these probabilities are now derived from ensemble simulations subject to various observational constraints, and no longer rely solely on expert judgement. This permits a much more complete assessment of model response uncertainties from these sources than ever before. These are now standard benchmark calculations with the global coupled climate models, and are useful to assess model response in the subsequent time-evolving climate change scenario experiments.

With regard to these time-evolving experiments simulating 21st-century climate, since the TAR increased computing capabilities now allow routine performance of multi-member ensembles in climate change scenario experiments with global coupled climate models. This provides the capability to analyse more multi-model results and multi-member ensembles, and yields more probabilistic estimates of time-evolving climate change in the 21st century.

Finally, while future changes in some weather and climate extremes (e.g., heat waves) were addressed in the TAR, there were relatively few studies on this topic available for assessment at that time. Since then, more analyses have been performed regarding possible future changes in a variety of extremes. It is now possible to assess, for the first time, multi-model ensemble results for certain types of extreme events (e.g., heat waves, frost days, etc.). These new studies provide a more complete range of results for assessment regarding possible future changes in these important phenomena with their notable impacts on human societies and ecosystems. A synthesis of results from studies of extremes from observations and model is provided in Chapter 11.

The use of multi-model ensembles has been shown in other modelling applications to produce simulated climate features that are improved over single models alone (see discussion in Chapters 8 and 9). In addition, a hierarchy of models ranging from simple to intermediate to complex allows better quantification of the consequences of various parametrizations and formulations. Very large ensembles (order hundreds) with single models provide the means to quantify parametrization uncertainty. Finally, observed climate characteristics are now being used to better constrain future climate model projections.

## 10.2 Projected Changes in Emissions, Concentrations and Radiative Forcing

The global projections discussed in this chapter are extensions of the simulations of the observational record discussed in Chapter 9. The simulations of the 19th and 20th centuries are based upon changes in long-lived greenhouse gases (LLGHGs) that are reasonably constrained by the observational record. Therefore, the models have qualitatively similar temporal evolutions of their radiative forcing time histories for LLGHGs (e.g., see Figure 2.23). However, estimates of future concentrations of LLGHGs and other radiatively active species are clearly subject to significant uncertainties. The evolution of these species is governed by a variety of factors that are difficult to predict, including changes in population, energy use, energy sources and emissions. For these reasons, a range of projections of future climate change has been conducted using coupled AOGCMs. The future concentrations of LLGHGs and the anthropogenic emissions of sulphur dioxide (SO<sub>2</sub>), a chemical precursor of sulphate aerosol, are obtained from several scenarios considered representative of low, medium and high emission trajectories. These basic scenarios and other forcing agents incorporated in the AOGCM projections, including several types of natural and anthropogenic aerosols, are discussed in Section 10.2.1. Developments in projecting radiatively active species and radiative forcing for the early 21st century are considered in Section 10.2.2.

### 10.2.1 Emissions Scenarios and Radiative Forcing in the Multi-Model Climate Projections

The temporal evolution of the LLGHGs, aerosols and other forcing agents are described in Sections 10.2.1.1 and 10.2.1.2. Typically, the future projections are based upon initial conditions extracted from the end of the simulations of the 20th century. Therefore, the radiative forcing at the beginning of the model projections should be approximately equal to the radiative forcing for present-day concentrations relative to pre-industrial conditions. The relationship between the modelled radiative forcing for the year 2000 and the estimates derived in Chapter 2 is evaluated in Section 10.2.1.3. Estimates of the radiative forcing in the multi-model integrations for one of the standard scenarios are also presented in this section. Possible explanations for the range of radiative forcings projected for 2100 are discussed in Section 10.2.1.4, including evidence for systematic errors in the formulations of radiative transfer used in AOGCMs. Possible implications of these findings for the range of global temperature change and other climate responses are summarised in Section 10.2.1.5.

#### 10.2.1.1 *The Special Report on Emission Scenarios and Constant-Concentration Commitment Scenarios*

The future projections discussed in this chapter are based upon the standard A2, A1B and B2 SRES scenarios (Nakićenović and Swart, 2000). The emissions of CO<sub>2</sub>, methane (CH<sub>4</sub>) and SO<sub>2</sub>, the concentrations of CO<sub>2</sub>, CH<sub>4</sub> and nitrous oxide (N<sub>2</sub>O) and the total radiative forcing for the SRES scenarios are illustrated in Figure 10.26 and summarised for the A1B scenario in Figure 10.1. The models have been integrated to year 2100 using the projected concentrations of LLGHGs and emissions of SO<sub>2</sub> specified by the A1B, B1 and A2 emissions scenarios. Some of the AOGCMs do not include sulphur chemistry, and the simulations from these models are based upon concentrations of sulphate aerosols from Boucher and Pham (2002; see Section 10.2.1.2). The simulations for the three scenarios were continued for another 100 to 200 years with all anthropogenic forcing agents held fixed at values applicable to the year 2100. There is also a new constant-concentration commitment scenario that assumes concentrations are held fixed at year 2000 levels (Section 10.7.1). In this idealised scenario, models are initialised from the end of the simulations for the 20th century, the concentrations of radiatively active species are held constant at year 2000 values from these simulations, and the models are integrated to 2100.

For comparison with this constant composition case, it is useful to note that constant emissions would lead to much larger radiative forcing. For example, constant CO<sub>2</sub> emissions at year 2000 values would lead to concentrations reaching about 520 ppm by 2100, close to the B1 case (Friedlingstein and Solomon, 2005; Hare and Munschhausen, 2006; see also FAQ 10.3).

#### 10.2.1.2 *Forcing by Additional Species and Mechanisms*

The forcing agents applied to each AOGCM used to make climate projections are summarised in Table 10.1. The radiatively active species specified by the SRES scenarios are CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, chlorofluorocarbons (CFCs) and SO<sub>2</sub>, which is listed in its aerosol form as sulphate (SO<sub>4</sub>) in the table. The inclusion, magnitude and temporal evolution of the remaining forcing agents listed in Table 10.1 were left to the discretion of the individual modelling groups. These agents include tropospheric and stratospheric ozone, all of the non-sulphate aerosols, the indirect effects of aerosols on cloud albedo and lifetime, the effects of land use and solar variability.

The scope of the treatments of aerosol effects in AOGCMs has increased markedly since the TAR. Seven of the AOGCMs include the first indirect effects and five include the second indirect effects of aerosols on cloud properties (Section 2.4.5). Under the more emissions-intensive scenarios considered in this chapter, the magnitude of the first indirect (Twomey) effect can saturate. Johns et al. (2003) parametrize the first indirect effect of anthropogenic sulphur (S) emissions as perturbations to the effective radii of cloud drops in simulations of the B1, B2, A2 and A1FI scenarios using UKMO-HadCM3. At 2100, the first indirect forcing ranges from -0.50 to

**Table 10.1.** Radiative forcing agents in the multi-model global climate projections. See Table 8.1 for descriptions of the models. Entries mean Y: forcing agent is included; C: forcing agent varies with time during the 20th Century Climate in Coupled Models (20C3M) simulations and is set to constant or annually cyclic distribution for scenario integrations; E: forcing agent represented using equivalent CO<sub>2</sub>; and n.a.: forcing agent is not specified in either the 20th-century or scenario integrations. Numeric codes indicate that the forcing agent is included using data described at 1: <http://www.cnrn.meteo.fr/ensembles/public/results/results.html>; 2: Boucher and Pham (2002); 3: Yukimoto et al. (2006); 4: Meehl, et al., 2006b; 5: <http://aom.giss.nasa.gov/IN/GHGA1B.LP>; and 6: [http://sres.ciesin.org/final\\_data.html](http://sres.ciesin.org/final_data.html).

Model	Forcing Agents										Other						
	Greenhouse Gases					Aerosols					Land Use	Solar					
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Stratospheric Ozone	Tropospheric Ozone	CFCs	SO <sub>4</sub>	Urban	Black carbon	Organic carbon	Nitrate	1st Indirect	2nd Indirect	Dust	Volcanic	Sea Salt	
BCC-CM1	Y	Y	Y	Y	C	4	4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	n.a.	C
BCCR-BCM2.0	1	1	1	C	C	1	2	C	n.a.	n.a.	n.a.	n.a.	n.a.	C	n.a.	C	C
CCSM3	4	4	4	4	4	4	4	n.a.	4	4	n.a.	n.a.	n.a.	Y	C	Y	C
CGCM3.1(T47)	Y	Y	Y	C	C	Y	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C
CGCM3.1(T63)	Y	Y	Y	C	C	Y	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C
CNRM-CM3	1	1	1	Y	Y	1	2	C	n.a.	n.a.	n.a.	n.a.	n.a.	C	n.a.	C	n.a.
CSIRO-MK3.0	Y	E	E	Y	Y	E	Y	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
ECHAM5/MP1-OM	1	1	1	Y	C	1	2	n.a.	n.a.	n.a.	n.a.	Y	n.a.	n.a.	n.a.	n.a.	n.a.
ECHO-G	1	1	1	C	Y	1	6	n.a.	n.a.	n.a.	n.a.	Y	n.a.	n.a.	C	n.a.	C
FGOALS-g1.0	4	4	4	C	C	4	4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
GFDL-CM2.0	Y	Y	Y	Y	Y	Y	Y	n.a.	Y	Y	n.a.	n.a.	n.a.	C	C	C	C
GFDL-CM2.1	Y	Y	Y	Y	Y	Y	Y	n.a.	Y	Y	n.a.	n.a.	n.a.	C	C	C	C
GISS-AOM	5	5	5	C	C	5	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Y	n.a.
GISS-EH	Y	Y	Y	Y	Y	Y	Y	n.a.	Y	Y	Y	n.a.	Y	C	Y	C	Y
GISS-ER	Y	Y	Y	Y	Y	Y	Y	n.a.	Y	Y	Y	n.a.	Y	C	Y	C	Y
INM-CM3.0	4	4	4	C	C	n.a.	4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	n.a.	n.a.
IPSL-CM4	1	1	1	n.a.	n.a.	1	2	n.a.	n.a.	n.a.	n.a.	Y	n.a.	n.a.	n.a.	n.a.	n.a.
MIROC3.2(H)	Y	Y	Y	Y	Y	Y	Y	n.a.	Y	Y	n.a.	Y	Y	Y	C	Y	C
MIROC3.2(M)	Y	Y	Y	Y	Y	Y	Y	n.a.	Y	Y	n.a.	Y	Y	Y	C	Y	C
MRI-CGCM2.3.2	3	3	3	C	C	3	3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	n.a.	C
PCM	Y	Y	Y	Y	Y	Y	Y	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	n.a.	C
UKMO-HadCM3	Y	Y	Y	Y	Y	Y	Y	n.a.	n.a.	n.a.	n.a.	Y	n.a.	n.a.	C	n.a.	C
UKMO-HadGEM1	Y	Y	Y	Y	Y	Y	Y	n.a.	Y	Y	n.a.	Y	Y	n.a.	C	Y	C

$-0.79 \text{ W m}^{-2}$ . The normalised indirect forcing (the ratio of the forcing ( $\text{W m}^{-2}$ ) to the mass burden of a species ( $\text{mg m}^{-2}$ ), leaving units of  $\text{W mg}^{-1}$ ) decreases by a factor of four, from approximately  $-7 \text{ W mg}^{-1}$  in 1860 to between  $-1$  and  $-2 \text{ W mg}^{-1}$  by the year 2100. Boucher and Pham (2002) and Pham et al. (2005) find a comparable projected decrease in forcing efficiency of the indirect effect, from  $-9.6 \text{ W mg}^{-1}$  in 1860 to between  $-2.1$  and  $-4.4 \text{ W mg}^{-1}$  in 2100. Johns et al. (2003) and Pham et al. (2005) attribute the projected decline to the decreased sensitivity of clouds to greater sulphate concentrations at sufficiently large aerosol burdens.

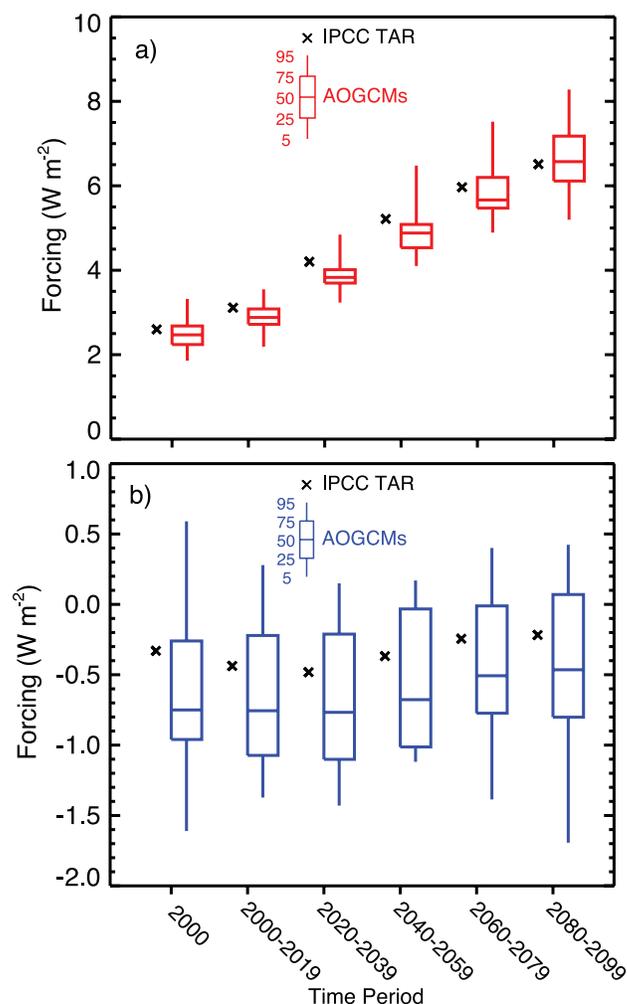
### 10.2.1.3 Comparison of Modelled Forcings to Estimates in Chapter 2

The forcings used to generate climate projections for the standard SRES scenarios are not necessarily uniform across the multi-model ensemble. Differences among models may be caused by different projections for radiatively active species (see Section 10.2.1.2) and by differences in the formulation of radiative transfer (see Section 10.2.1.4). The AOGCMs in the ensemble include many species that are not specified or constrained by the SRES scenarios, including ozone, tropospheric non-sulphate aerosols, and stratospheric volcanic aerosols. Other types of forcing that vary across the ensemble include solar variability, the indirect effects of aerosols on clouds and the effects of land use change on land surface albedo and other land surface properties (Table 10.1). While the time series of LLGHGs for the future scenarios are mostly identical across the ensemble, the concentrations of these gases in the 19th and early 20th centuries were left to the discretion of individual modelling groups. The differences in radiatively active species and the formulation of radiative transfer affect both the 19th- and 20th-century simulations and the scenario integrations initiated from these historical simulations. The resulting differences in the forcing complicate the separation of forcing and response across the multi-model ensemble. These differences can be quantified by comparing the range of shortwave and longwave forcings across the multi-model ensemble against standard estimates of radiative forcing over the historical record. Shortwave and longwave forcing refer to modifications of the solar and infrared atmospheric radiation fluxes, respectively, that are caused by external changes to the climate system (Section 2.2).

The longwave radiative forcings for the SRES A1B scenario from climate model simulations are compared against estimates using the TAR formulae (see Chapter 2) in Figure 10.2a. The graph shows the longwave forcings from the TAR and 20 AOGCMs in the multi-model ensemble from 2000 to 2100. The forcings from the models are diagnosed from changes in top-of-atmosphere fluxes and the forcing for doubled atmospheric  $\text{CO}_2$  (Forster and Taylor, 2006). The TAR and median model estimates of the longwave forcing are in very good agreement over the 21st century, with differences ranging from  $-0.37$  to  $+0.06 \text{ W m}^{-2}$ . For the year 2000, the global mean values from the TAR and median model differ by only  $-0.13 \text{ W m}^{-2}$ . However,

the 5th to 95th percentile range of the models for the period 2080 to 2099 is approximately  $3.1 \text{ W m}^{-2}$ , or approximately 47% of the median longwave forcing for that time period.

The corresponding time series of shortwave forcings for the SRES A1B scenario are plotted in Figure 10.2b. It is evident that the relative differences among the models and between the models and the TAR estimates are larger for the shortwave band. The TAR value is larger than the median model forcing by 0.2 to 0.3  $\text{W m}^{-2}$  for individual 20-year segments of the integrations. For the year 2000, the TAR estimate is larger by  $0.42 \text{ W m}^{-2}$ . In addition, the range of modelled forcings is sufficiently large that it includes positive and negative values



**Figure 10.2.** Radiative forcings for the period 2000 to 2100 for the SRES A1B scenario diagnosed from AOGCMs and from the TAR (IPCC, 2001) forcing formulas (Forster and Taylor, 2006). (a) Longwave forcing; (b) shortwave forcing. The AOGCM results are plotted with box-and-whisker diagrams representing percentiles of forcings computed from 20 models in the AR4 multi-model ensemble. The central line within each box represents the median value of the model ensemble. The top and bottom of each box shows the 75th and 25th percentiles, and the top and bottom of each whisker displays the 95th and 5th percentile values in the ensemble, respectively. The models included are CCSM3, CGCM3.1 (T47 and T63), CNRM-CM3, CSIRO-MK3, ECHAM5/MPI-OM, ECHO-G, FGOALS-g1.0, GFDL-CM2.0, GFDL-CM2.1, GISS-EH, GISS-ER, INM-CM3.0, IPSL-CM4, MIROC3.2 (medium and high resolution), MRI-CGCM2.3.2, PCM1, UKMO-HadCM3 and UKMO-HadGEM1 (see Table 8.1 for model details).

**Table 10.2.** All-sky radiative forcing for doubled atmospheric CO<sub>2</sub>. See Table 8.1 for model details.

Model <sup>Source</sup>	Longwave (W m <sup>-2</sup> )	Shortwave (W m <sup>-2</sup> )
CGCM 3.1 (T47/T63) <sup>a</sup>	3.39	-0.07
CSIRO-MK3.0 <sup>b</sup>	3.42	0.05
GISS-EH/ER <sup>a</sup>	4.21	-0.15
GFDL-CM2.0/2.1 <sup>b</sup>	3.62	-0.12
IPSL-CM4 <sup>c</sup>	3.50	-0.02
MIROC 3.2-hires <sup>d</sup>	3.06	0.08
MIROC 3.2-medres <sup>d</sup>	2.99	0.10
ECHAM5/MPI-OM <sup>a</sup>	3.98	0.03
MRI-CGCM2.3.2 <sup>b</sup>	3.75	-0.28
CCSM3 <sup>a</sup>	4.23	-0.28
UKMO-HadCM3 <sup>a</sup>	4.03	-0.22
UKMO-HadGEM1 <sup>a</sup>	4.02	-0.24
Mean ± standard deviation <sup>e</sup>	3.80 ± 0.33	-0.13 ± 0.11

## Notes:

<sup>a</sup> Forster and Taylor (2006) based upon forcing data from PCMDI for 200 hPa. Longwave forcing accounts for stratospheric adjustment; shortwave forcing does not.

<sup>b</sup> Forcings derived by individual modelling groups using the method of Gregory et al. (2004b).

<sup>c</sup> Based upon forcing data from PCMDI for 200 hPa. Longwave and shortwave forcing account for stratospheric adjustment.

<sup>d</sup> Forcings at diagnosed tropopause.

<sup>e</sup> Mean and standard deviation are calculated just using forcings at 200 hPa, with each model and model version counted once.

for every 20-year period. For the year 2100, the shortwave forcing from individual AOGCMs ranges from approximately -1.7 W m<sup>-2</sup> to +0.4 W m<sup>-2</sup> (5th to 95th percentile). The reasons for this large range include the variety of the aerosol treatments and parametrizations for the indirect effects of aerosols in the multi-model ensemble.

Since the large range in both longwave and shortwave forcings may be caused by a variety of factors, it is useful to determine the range caused just by differences in model formulation for a given (identical) change in radiatively active species. A standard metric is the global mean, annually averaged all-sky forcing at the tropopause for doubled atmospheric CO<sub>2</sub>. Estimates of

this forcing for 15 of the models in the ensemble are given in Table 10.2. The shortwave forcing is caused by absorption in the near-infrared bands of CO<sub>2</sub>. The range in the longwave forcing at 200 mb is 0.84 W m<sup>-2</sup>, and the coefficient of variation, or ratio of the standard deviation to mean forcing, is 0.09. These results suggest that up to 35% of the range in longwave forcing in the ensemble for the period 2080 to 2099 is due to the spread in forcing estimates for the specified increase in CO<sub>2</sub>. The findings also imply that it is not appropriate to use a single best value of the forcing from doubled atmospheric CO<sub>2</sub> to relate forcing and response (e.g., climate sensitivity) across a multi-model ensemble. The relationships for a given model should be derived using the radiative forcing produced by the radiative parametrizations in that model. Although the shortwave forcing has a coefficient of variation close to one, the range across the ensemble explains less than 17% of the range in shortwave forcing at the end of the 21st-century simulations. This suggests that species and forcing agents other than CO<sub>2</sub> cause the large variation among modelled shortwave forcings.

#### 10.2.1.4 Results from the Radiative-Transfer Model Intercomparison Project: Implications for Fidelity of Forcing Projections

Differences in radiative forcing across the multi-model ensemble illustrated in Table 10.2 have been quantified in the Radiative-Transfer Model Intercomparison Project (RTMIP, W.D. Collins et al., 2006). The basis of RTMIP is an evaluation of the forcings computed by 20 AOGCMs using five benchmark line-by-line (LBL) radiative transfer codes. The comparison is focused on the instantaneous clear-sky radiative forcing by the LLGHGs CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, CFC-11, CFC-12 and the increased water vapour expected in warmer climates. The results of this intercomparison are not directly comparable to the estimates of forcing at the tropopause (Chapter 2), since the latter include the effects of stratospheric adjustment. The effects of adjustment on forcing are approximately -2% for CH<sub>4</sub>, -4% for N<sub>2</sub>O, +5% for CFC-11, +8% for CFC-12 and -13% for CO<sub>2</sub> (IPCC, 1995; Hansen et al., 1997). The total (longwave plus shortwave) radiative forcings at 200 mb, a surrogate for the tropopause, are shown in Table 10.3 for climatological mid-latitude summer conditions.

**Table 10.3.** Total instantaneous forcing at 200 hPa (W m<sup>-2</sup>) from AOGCMs and LBL codes in RTMIP (W.D. Collins et al., 2006). Calculations are for cloud-free climatological mid-latitude summer conditions.

Radiative Species	CO <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub> O + CFCs	CH <sub>4</sub> + CFCs	All LLGHGs	Water Vapour
Forcing <sup>a</sup>	2000–1860	2x–1x	2000–1860	2000–1860	2000–1860	1.2x–1x
AOGCM mean	1.56	4.28	0.47	0.95	2.68	4.82
AOGCM std. dev.	0.23	0.66	0.15	0.30	0.30	0.34
LBL mean	1.69	4.75	0.38	0.73	2.58	5.08
LBL std. dev.	0.02	0.04	0.12	0.12	0.11	0.16

## Notes:

<sup>a</sup> 2000–1860 is the forcing due to an increase in the concentrations of radiative species between 1860 and 2000. 2x–1x and 1.2x–1x are forcings from increases in radiative species by 100% and 20% relative to 1860 concentrations.

Total forcings calculated from the AOGCM and LBL codes due to the increase in LLGHGs from 1860 to 2000 differ by less than 0.04, 0.49 and 0.10  $\text{W m}^{-2}$  at the top of model, surface and pseudo-tropopause at 200mb, respectively (Table 10.3). Based upon the Student t-test, none of the differences in mean forcings shown in Table 10.3 is statistically significant at the 0.01 level. This indicates that the ensemble mean forcings are in reasonable agreement with the LBL codes. However, the forcings from individual models, for example from doubled atmospheric  $\text{CO}_2$ , span a range at least 10 times larger than that exhibited by the LBL models.

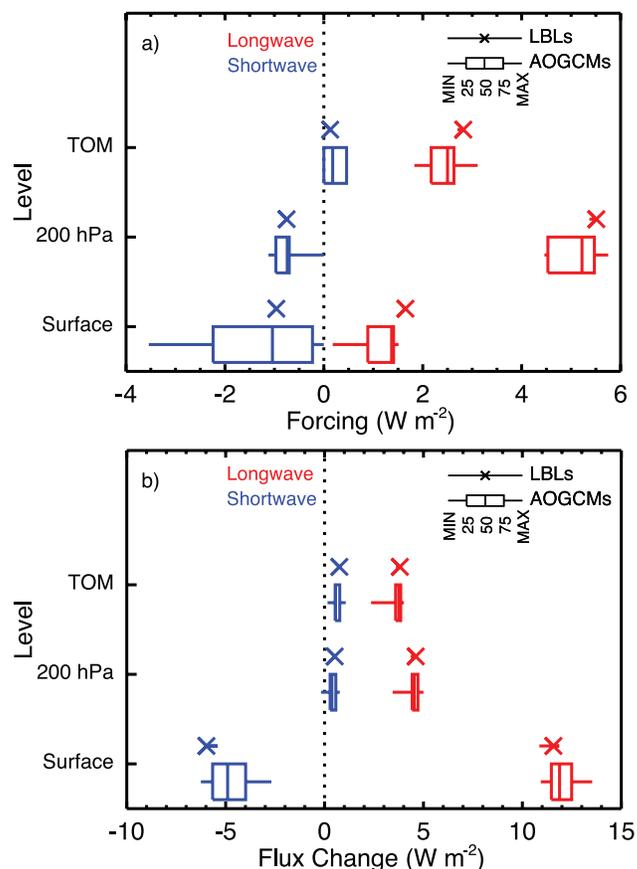
The forcings from doubling atmospheric  $\text{CO}_2$  from its concentration at 1860 AD are shown in Figure 10.3a at the top of the model (TOM), 200 hPa (Table 10.3), and the surface. The AOGCMs tend to underestimate the longwave forcing at these three levels. The relative differences in the mean forcings are less than 8% for the pseudo-tropopause at 200 hPa but increase to approximately 13% at the TOM and to 33% at the surface. In general, the mean shortwave forcings from the LBL and AOGCM codes are in good agreement at all three surfaces. However, the range in shortwave forcing at the surface from individual AOGCMs is quite large. The coefficient of variation (the ratio of the standard deviation to the mean) for the surface shortwave forcing from AOGCMs is 0.95. In response to a doubling in atmospheric  $\text{CO}_2$ , the specific humidity increases by approximately 20% through much of the troposphere. The changes in shortwave and longwave fluxes due to a 20% increase in water vapour are illustrated in Figure 10.3b. The mean longwave forcing from increasing water vapour is quite well simulated with the AOGCM codes. In the shortwave, the only significant difference between the AOGCM and LBL calculations occurs at the surface, where the AOGCMs tend to underestimate the magnitude of the reduction in insolation. In general, the biases in the AOGCM forcings are largest at the surface level.

### 10.2.1.5 Implications for Range in Climate Response

The results from RTMIP imply that the spread in climate response discussed in this chapter is due in part to the diverse representations of radiative transfer among the members of the multi-model ensemble. Even if the concentrations of LLGHGs were identical across the ensemble, differences in radiative transfer parametrizations among the ensemble members would lead to different estimates of radiative forcing by these species. Many of the climate responses (e.g., global mean temperature) scale linearly with the radiative forcing to first approximation. Therefore, systematic errors in the calculations of radiative forcing should produce a corresponding range in climate responses. Assuming that the RTMIP results (Table 10.3) are globally applicable, the range of forcings for 1860 to 2000 in the AOGCMs should introduce a  $\pm 18\%$  relative range (the 5 to 95% confidence interval) for 2000 in the responses that scale with forcing. The corresponding relative range for doubled atmospheric  $\text{CO}_2$ , which is comparable to the change in  $\text{CO}_2$  in the B1 scenario by 2100, is  $\pm 25\%$ .

## 10.2.2 Recent Developments in Projections of Radiative Species and Forcing for the 21st Century

Estimation of ozone forcing for the 21st century is complicated by the short chemical lifetime of ozone compared to atmospheric transport time scales and by the sensitivity of the radiative forcing to the vertical distribution of ozone. Gauss et al. (2003) calculate the forcing by anthropogenic increases



**Figure 10.3.** Comparison of shortwave and longwave instantaneous radiative forcings and flux changes computed from AOGCMs and line-by-line (LBL) radiative transfer codes (W.D. Collins et al., 2006). (a) Instantaneous forcing from doubling atmospheric  $\text{CO}_2$  from its concentration in 1860; (b) changes in radiative fluxes caused by the 20% increase in water vapour expected in the climate produced from doubling atmospheric  $\text{CO}_2$ . The forcings and flux changes are computed for clear-sky conditions in mid-latitude summer and do not include effects of stratospheric adjustment. No other well-mixed greenhouse gases are included. The minimum-to-maximum range and median are plotted for five representative LBL codes. The AOGCM results are plotted with box-and-whisker diagrams (see caption for Figure 10.2) representing percentiles of forcings from 20 models in the AR4 multi-model ensemble. The AOGCMs included are BCCR-BCM2.0, CCSM3, CGCM3.1 (T47 and T63), CNRM-CM3, ECHAM5/MPI-OM, ECHO-G, FGOALS-g1.0, GFDL-CM2.0, GFDL-CM2.1, GISS-EH, GISS-ER, INM-CM3.0, IPSL-CM4, MIROC3.2 (medium and high resolution), MRI-CGCM2.3.2, PCM, UKMO-HadCM3, and UKMO-HadGEM1 (see Table 8.1 for model details). The LBL codes are the Geophysical Fluid Dynamics Laboratory (GFDL) LBL, the Goddard Institute for Space Studies (GISS) LBL3, the National Center for Atmospheric Research (NCAR)/Imperial College of Science, Technology and Medicine (ICSTM) general LBL GENLN2, the National Aeronautics and Space Administration (NASA) Langley Research Center MRTA and the University of Reading Reference Forward Model (RFM).

of tropospheric ozone through 2100 from 11 different chemical transport models integrated with the SRES A2p scenario. The A2p scenario is the preliminary version of the marker A2 scenario and has nearly identical time series of LLGHGs and forcing. Since the emissions of CH<sub>4</sub>, carbon monoxide (CO), reactive nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs), which strongly affect the formation of ozone, are maximised in the A2p scenario, the modelled forcings should represent an upper bound for the forcing produced under more constrained emissions scenarios. The 11 models simulate an increase in tropospheric ozone of 11.4 to 20.5 Dobson units (DU) by 2100, corresponding to a range of radiative forcing from 0.40 to 0.78 W m<sup>-2</sup>. Under this scenario, stratospheric ozone increases by between 7.5 and 9.3 DU, which raises the radiative forcing by an additional 0.15 to 0.17 W m<sup>-2</sup>.

One aspect of future direct aerosol radiative forcing omitted from all but 2 (the GISS-EH and GISS-ER models) of the 23 AOGCMS analysed in AR4 (see Table 8.1 for list) is the role of nitrate aerosols. Rapid increases in NO<sub>x</sub> emissions could produce enough nitrate aerosol to offset the expected decline in sulphate forcing by 2100. Adams et al. (2001) compute the radiative forcing by sulphate and nitrate accounting for the interactions among sulphate, nitrate and ammonia. For 2000, the sulphate and nitrate forcing are -0.95 and -0.19 W m<sup>-2</sup>, respectively. Under the SRES A2 scenario, by 2100 declining SO<sub>2</sub> emissions cause the sulphate forcing to drop to -0.85 W m<sup>-2</sup>, while the nitrate forcing rises to -1.28 W m<sup>-2</sup>. Hence, the total sulphate-nitrate forcing increases in magnitude from -1.14 W m<sup>-2</sup> to -2.13 W m<sup>-2</sup> rather than declining as models that omit nitrates would suggest. This projection is consistent with the large increase in coal burning forecast as part of the A2 scenario.

Recent field programs focused on Asian aerosols have demonstrated the importance of black carbon (BC) and organic carbon (OC) for regional climate, including potentially significant perturbations of the surface energy budget and hydrological cycle (Ramanathan et al., 2001). Modelling groups have developed a multiplicity of projections for the concentrations of these aerosol species. For example, Takemura et al. (2001) use data sets for BC released by fossil fuel and biomass burning (Cooke and Wilson, 1996) under current conditions and scale them by the ratio of future to present-day CO<sub>2</sub>. The emissions of OC are derived using OC:BC ratios estimated for each source and fuel type. Koch (2001) models the future radiative forcing of BC by scaling a different set of present-day emission inventories by the ratio of future to present-day CO<sub>2</sub> emissions. There are still large uncertainties associated with current inventories of BC and OC (Bond et al., 2004), the ad hoc scaling methods used to produce future emissions, and considerable variation among estimates of the optical properties of carbonaceous aerosols (Kinne et al., 2006). Given these uncertainties, future projections of forcing by BC and OC should be quite model dependent.

Recent evidence suggests that there are detectable anthropogenic increases in stratospheric sulphate (e.g., Myhre et al., 2004), water vapour (e.g., Forster and Shine, 2002), and

condensed water in the form of aircraft contrails. However, recent modelling studies suggest that these forcings are relatively minor compared to the major LLGHGs and aerosol species. Marquart et al. (2003) estimate that the radiative forcing by contrails will increase from 0.035 W m<sup>-2</sup> in 1992 to 0.094 W m<sup>-2</sup> in 2015 and to 0.148 W m<sup>-2</sup> in 2050. The rise in forcing is due to an increase in subsonic aircraft traffic following estimates of future fuel consumption (Penner et al., 1999). These estimates are still subject to considerable uncertainties related to poor constraints on the microphysical properties, optical depths and diurnal cycle of contrails (Myhre and Stordal, 2001, 2002; Marquart et al., 2003). Pitari et al. (2002) examine the effect of future emissions under the A2 scenario on stratospheric concentrations of sulphate aerosol and ozone. By 2030, the mass of stratospheric sulphate increases by approximately 33%, with the majority of the increase contributed by enhanced upward fluxes of anthropogenic SO<sub>2</sub> through the tropopause. The increase in direct shortwave forcing by stratospheric aerosols in the A2 scenario during 2000 to 2030 is -0.06 W m<sup>-2</sup>.

Some recent studies have suggested that the global atmospheric burden of soil dust aerosols could decrease by between 20 and 60% due to reductions in desert areas associated with climate change (Mahowald and Luo, 2003). Tegen et al. (2004a,b) compared simulations by the European Centre for Medium Range Weather Forecasts/Max Planck Institute for Meteorology Atmospheric GCM (ECHAM4) and UKMO-HadCM3 that included the effects of climate-induced changes in atmospheric conditions and vegetation cover and the effects of increased CO<sub>2</sub> concentrations on vegetation density. These simulations are forced with identical (IS92a) time series for LLGHGs. Their findings suggest that future projections of changes in dust loading are quite model dependent, since the net changes in global atmospheric dust loading produced by the two models have opposite signs. They also conclude that dust from agriculturally disturbed soils is less than 10% of the current burden, and that climate-induced changes in dust concentrations would dominate land use changes under both minimum and maximum estimates of increased agricultural area by 2050.

### 10.3 Projected Changes in the Physical Climate System

The context for the climate change results presented here is set in Chapter 8 (evaluation of simulation skill of the control runs and inherent natural variability of the global coupled climate models), and in Chapter 9 (evaluation of the simulations of 20th-century climate using the global coupled climate models). Table 8.1 describes the characteristics of the models, and Table 10.4 summarises the climate change experiments that have been performed with the AOGCMs and other models that are assessed in this chapter.

**Table 10.4.** Summary of climate change model experiments produced with AOGCMs. Numbers in each scenario column indicate how many ensemble members were produced for each model. Coloured fields indicate that some but not necessarily all variables of the specific data type (separated by climate system component and time interval) were available for download at the PCMDI to be used in this report; ISCCP is the International Satellite Cloud Climatology Project. Additional data has been submitted for some models and may subsequently become available. Where different colour shadings are given in the legend, the colour indicates whether data from a single or from multiple ensemble members is available. Details on the scenarios, variables and models can be found at the PCMDI webpage ([http://www-pcmdi.llnl.gov/ipcc/about\\_ipcc.php](http://www-pcmdi.llnl.gov/ipcc/about_ipcc.php)). Model IDs are the same as in Table 8.1, which provides details of the models.

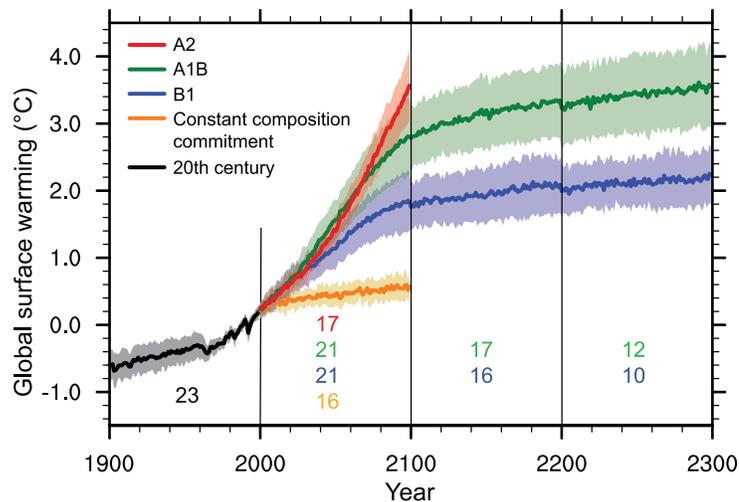
Model ID	Model, Country	Pre industr. control	Present day control	20th century	Commitment	SRES A2	SRES A1B	SRES B1	1% to 2xCO <sub>2</sub>	1% to 4xCO <sub>2</sub>	Slab ocean control	2XCO <sub>2</sub>	AMIP
1	BCC-CM1, China	1	2	4	1	2	1	2	1	1			4
2	BCCR-BCM2.0, Norway	1	1	1	1	1	1	1	1	1			
3	CCSM3, USA *	2	1	9	5	5	7	8	1	1	1	1	1
4	CGCM3.1(T47), Canada	1		5	5	5	5	4	1	1		1	
5	CGCM3.1(T63), Canada	1		1	1	1	1	1	1	1		1	
6	CNRM-CM3, France	1		1	1	1	1	1	1	1		1	1
7	CSIRO-Mk3.0, Australia	2		3	3	3	3	1	1	1		1	1
8	ECHAM5/MPI-OM, Germany	1	4	4	3	3	4	3	1	1	1	1	3
9	ECHO-G, Germany/Korea	1	1	5	4	3	3	3	1	1		1	
10	FGOALS-g1.0, China	3		3	3	3	3	3	3	3			3
11	GFDL-CM2.0, USA	1		3	1	1	1	1	1	1			
12	GFDL-CM2.1, USA	1		3	1	1	1	1	1	1			
13	GISS-AOM, USA	2		2		2	2	2	1	1			
14	GISS-EH, USA	1		5		5	4	2	1	1			
15	GISS-ER, USA	1		9	1	1	5	1	1	1	1	1	4
16	INM-CM3.0, Russia	1		1	1	1	1	1	1	1	1	1	1
17	IPSL-CM4, France	1	1	2	1	1	1	1	1	1		1	6
18	MIROC3.2(hires), Japan	1		1		1	1	1	1	1	1	1	1
19	MIROC3.2(medres), Japan	1		3	1	3	3	3	3	3	1	1	3
20	MRI-CGCM2.3.2, Japan	1	1	5	3	5	5	3	1	1	1	1	1
21	PCM, USA	1		4	3	4	4	4	5	1			1
22	UKMO-HadCM3, UK	2		2	1	1	1	1	1	1			1
23	UKMO-HadGEM1, UK	1		1	1	1	1	1	1	1	1	1	1

\* Some of the ensemble members using the CCSM3 were run on the Earth Simulator in Japan in collaboration with the Central Research Institute of Electric Power Industry (CRIEPI).

The TAR showed multi-model results for future changes in climate from simple 1% yr<sup>-1</sup> CO<sub>2</sub> increase experiments, and from several scenarios including the older IS92a, and, new to the TAR, two SRES scenarios (A2 and B2). For the latter, results from nine models were shown for globally averaged temperature change and regional changes. As noted in Section 10.1, since the TAR, an unprecedented internationally coordinated climate change experiment has been performed by 23 models from around the world, listed in Table 10.4 along with the results submitted. This larger number of models running the same experiments allows better quantification of the multi-model signal as well as uncertainty regarding spread across the models (in this section), and also points the way to probabilistic estimates of future climate change (Section 10.5). The emission scenarios considered here include one of the SRES scenarios from the TAR, scenario A2, along with two additional scenarios, A1B and B1 (see Section 10.2 for details regarding the scenarios). This is a subset of the SRES marker scenarios used in the TAR, and they represent ‘low’ (B1), ‘medium’ (A1B) and ‘high’ (A2) scenarios with respect to the prescribed concentrations and the resulting radiative forcing, relative to the SRES range. This choice was made solely due to the limited computational resources for multi-model simulations using comprehensive AOGCMs and does not imply any preference or qualification of these three scenarios over the others. Qualitative conclusions derived from those three scenarios are in most cases also valid for other SRES scenarios.

Additionally, three climate change commitment experiments were performed, one where concentrations of greenhouse gases were held fixed at year 2000 values (constant composition commitment) and the models were run to 2100 (termed 20th-century stabilisation here), and two where concentrations were held fixed at year 2100 values for A1B and B1, and the models were run for an additional 100 to 200 years (see Section 10.7). The span of the experiments is shown in Figure 10.4.

This section considers the basic changes in climate over the next hundred years simulated by current climate models under non-mitigation anthropogenic forcing scenarios. While we assess all studies in this field, the focus is on results derived by the authors from the new data set for the three SRES scenarios. Following the TAR, means across the multi-model ensemble are used to illustrate representative changes. Means are able to simulate the contemporary climate more accurately than individual models, due to biases tending to compensate each other (Phillips and Gleckler, 2006). It is anticipated that this holds for changes in climate also (Chapter 9). The mean temperature trends from the 20th-century simulations are included in Figure 10.4. While the range of model results is indicated here, the consideration of uncertainty resulting from this range is addressed more completely in Section 10.5. The use of means has the additional advantage of reducing the ‘noise’ associated with internal or unforced variability in the simulations. Models are equally weighted here, but other options are noted in Section 10.5. Lists of the models used in the results are provided in the Supplementary Material for this Chapter.



**Figure 10.4.** Multi-model means of surface warming (relative to 1980–1999) for the scenarios A2, A1B and B1, shown as continuations of the 20th-century simulation. Values beyond 2100 are for the stabilisation scenarios (see Section 10.7). Linear trends from the corresponding control runs have been removed from these time series. Lines show the multi-model means, shading denotes the  $\pm 1$  standard deviation range of individual model annual means. Discontinuities between different periods have no physical meaning and are caused by the fact that the number of models that have run a given scenario is different for each period and scenario, as indicated by the coloured numbers given for each period and scenario at the bottom of the panel. For the same reason, uncertainty across scenarios should not be interpreted from this figure (see Section 10.5.4.6 for uncertainty estimates).

Standard metrics for response of global coupled models are the equilibrium climate sensitivity, defined as the equilibrium globally averaged surface air temperature change for a doubling of  $\text{CO}_2$  for the atmosphere coupled to a non-dynamic slab ocean, and the TCR, defined as the globally averaged surface air temperature change at the time of  $\text{CO}_2$  doubling in the  $1\% \text{ yr}^{-1}$  transient  $\text{CO}_2$  increase experiment. The TAR showed results for these  $1\%$  simulations, and Section 10.5.2 discusses equilibrium climate sensitivity, TCR and other aspects of response. Chapter 8 includes processes and feedbacks involved with these metrics.

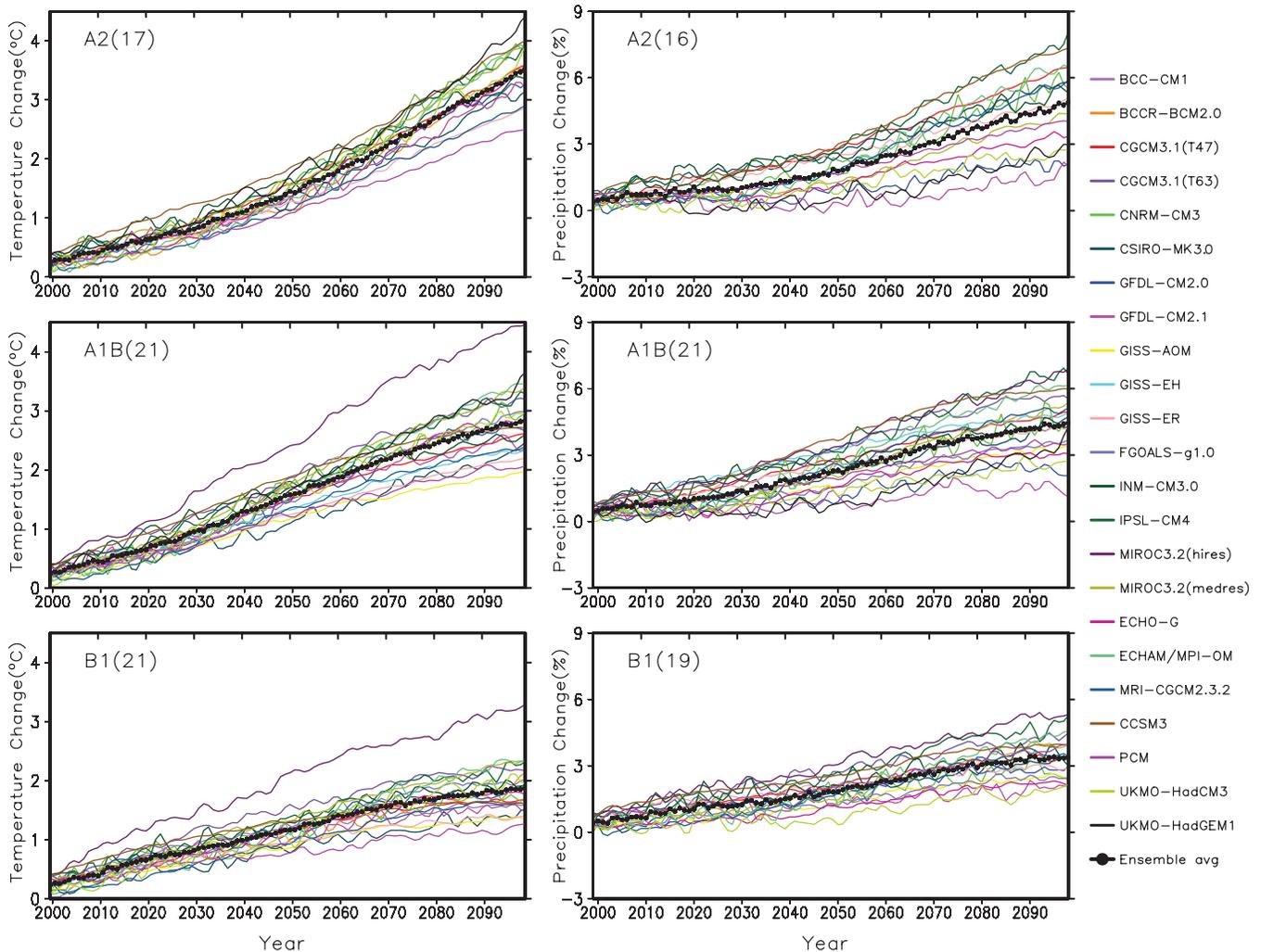
### 10.3.1 Time-Evolving Global Change

The globally averaged surface warming time series from each model in the MMD is shown in Figure 10.5, either as a single member (if that was all that was available) or a multi-member ensemble mean, for each scenario in turn. The multi-model ensemble mean warming is also plotted for each case. The surface air temperature is used, averaged over each year, shown as an anomaly relative to the 1980 to 1999 period and offset by any drift in the corresponding control runs in order to extract the forced response. The base period was chosen to match the contemporary climate simulation that is the focus of previous chapters. Similar results have been shown in studies of these models (e.g., Xu et al., 2005; Meehl et al., 2006b; Yukimoto et al., 2006). Interannual variability is evident in each single-model series, but little remains in the ensemble mean because most of this is unforced and is a result of internal variability, as was presented in detail in Section 9.2.2 of TAR. Clearly, there is a range of model results for each year, but over time this

range due to internal variability becomes smaller as a fraction of the mean warming. The range is somewhat smaller than the range of warming at the end of the 21st century for the A2 scenario in the comparable Figure 9.6 of the TAR, despite the larger number of models here (the ensemble mean warming is comparable,  $+3.0^\circ\text{C}$  in the TAR for 2071 to 2100 relative to 1961 to 1990, and  $+3.13^\circ\text{C}$  here for 2080 to 2099 relative to 1980 to 1999, Table 10.5). Consistent with the range of forcing presented in Section 10.2, the warming by 2100 is largest in the high greenhouse gas growth scenario A2, intermediate in the moderate growth A1B, and lowest in the low growth B1. Naturally, models with high sensitivity tend to simulate above-average warming in each scenario. The trends of the multi-model mean temperature vary somewhat over the century because of the varying forcings, including that of aerosols (see Section 10.2). This is illustrated in Figure 10.4, which shows the mean for A1B exceeding that for A2 around 2040. The time series beyond 2100 are derived from the extensions of the simulations (those available) under the idealised constant composition commitment experiments (Section 10.7.1).

Internal variability in the model response is reduced by averaging over 20-year time periods. This span is shorter than the traditional 30-year climatological period, in recognition of the transient nature of the simulations, and of the larger size of the ensemble. This analysis focuses on three periods over the coming century: an early-century period 2011 to 2030, a mid-century period 2046 to 2065 and the late-century period 2080 to 2099, all relative to the 1980 to 1999 means. The multi-model ensemble mean warmings for the three future periods in the different experiments are given in Table 10.5, among other results. The close agreement of warming for the early century, with a range of only  $0.05^\circ\text{C}$  among the SRES cases, shows that no matter which of these non-mitigation scenarios is followed, the warming is similar on the time scale of the next decade or two. Note that the precision given here is only relevant for comparison between these means. As evident in Figure 10.4 and discussed in Section 10.5, uncertainties in the projections are larger. It is also worth noting that half of the early-century climate change arises from warming that is already committed to under constant composition ( $0.37^\circ\text{C}$  for the early century). By mid-century, the choice of scenario becomes more important for the magnitude of warming, with a range of  $0.46^\circ\text{C}$ , and with about one-third of that warming due to climate change that is already committed to. By the late century, there are clear consequences for which scenario is followed, with a range of  $1.3^\circ\text{C}$  in these results, with as little as 18% of that warming coming from climate change that is already committed to.

Global mean precipitation increases in all scenarios (Figure 10.5, right column), indicating an intensification of the hydrological cycle. Douville et al. (2002) show that this is associated with increased water-holding capacity of the atmosphere in addition to other processes. The multi-model



**Figure 10.5.** Time series of globally averaged (left) surface warming (surface air temperature change, °C) and (right) precipitation change (%) from the various global coupled models for the scenarios A2 (top), A1B (middle) and B1 (bottom). Numbers in parentheses following the scenario name represent the number of simulations shown. Values are annual means, relative to the 1980 to 1999 average from the corresponding 20th-century simulations, with any linear trends in the corresponding control run simulations removed. A three-point smoothing was applied. Multi-model (ensemble) mean series are marked with black dots. See Table 8.1 for model details.

**Table 10.5.** Global mean warming (annual mean surface air temperature change) from the multi-model ensemble mean for four time periods relative to 1980 to 1999 for each of the available scenarios. (The mean for the base period is 13.6°C). Also given are two measures of agreement of the geographic scaled patterns of warming (the fields in Figure 10.8 normalised by the global mean), relative to the A1B 2080 to 2099 case. First the non-dimensional M value (see Section 10.3.2.1) and second (in italics) the global mean absolute error (mae, or difference, in °C/°C) between the fields, both multiplied by 100 for brevity. Here  $M = (2/\pi) \arcsin[1 - \text{mse} / (V_x + V_y + (G_x - G_y)^2)]$ , with mse the mean square error between the two fields X and Y, and V and G are variance and global mean of the fields (as subscripted). Values of 1 for M and 0 for mae indicate perfect agreement with the standard pattern. ‘Commit’ refers to the constant composition commitment experiment. Note that warming values for the end of the 21st century, given here as the average of years 2080 to 2099, are for a somewhat different averaging period than used in Figure 10.29 (2090–2099); the longer averaging period here is consistent with the comparable averaging period for the geographic plots in this section and is intended to smooth spatial noise.

	Global mean warming (°C)				Measures of agreement (M × 100, mae × 100)			
	2011–2030	2046–2065	2080–2099	2180–2199	2011–2030	2046–2065	2080–2099	2180–2199
A2	0.64	1.65	3.13		83, 8	91, 4	93, 3	
A1B	0.69	1.75	2.65	3.36	88, 5	94, 4	100, 0	90, 5
B1	0.66	1.29	1.79	2.10	86, 6	89, 4	92, 3	86, 6
Commit <sup>a</sup>	0.37	0.47	0.56		74, 11	66, 13	68, 13	

Notes:

<sup>a</sup> Committed warming values are given relative to the 1980 to 1999 base period, whereas the commitment experiments started with stabilisation at year 2000. The committed warming trend is about 0.1°C per decade over the next two decades with a reduced rate after that (see Figure 10.4).

mean varies approximately in proportion to the mean warming, though uncertainties in future hydrological cycle behaviour arise due in part to the different responses of tropical precipitation across models (Douville et al., 2005). Expressed as a percentage of the mean simulated change for 1980 to 1999 (2.83 mm day<sup>-1</sup>), the rate varies from about 1.4% °C<sup>-1</sup> in A2 to 2.3% °C<sup>-1</sup> in the constant composition commitment experiment (for a table corresponding to Table 10.5 but for precipitation, see the Supplementary Material, Table S10.1). These increases are less than increases in extreme precipitation events, consistent with energetic constraints (see Sections 9.5.4.2 and 10.3.6.1)

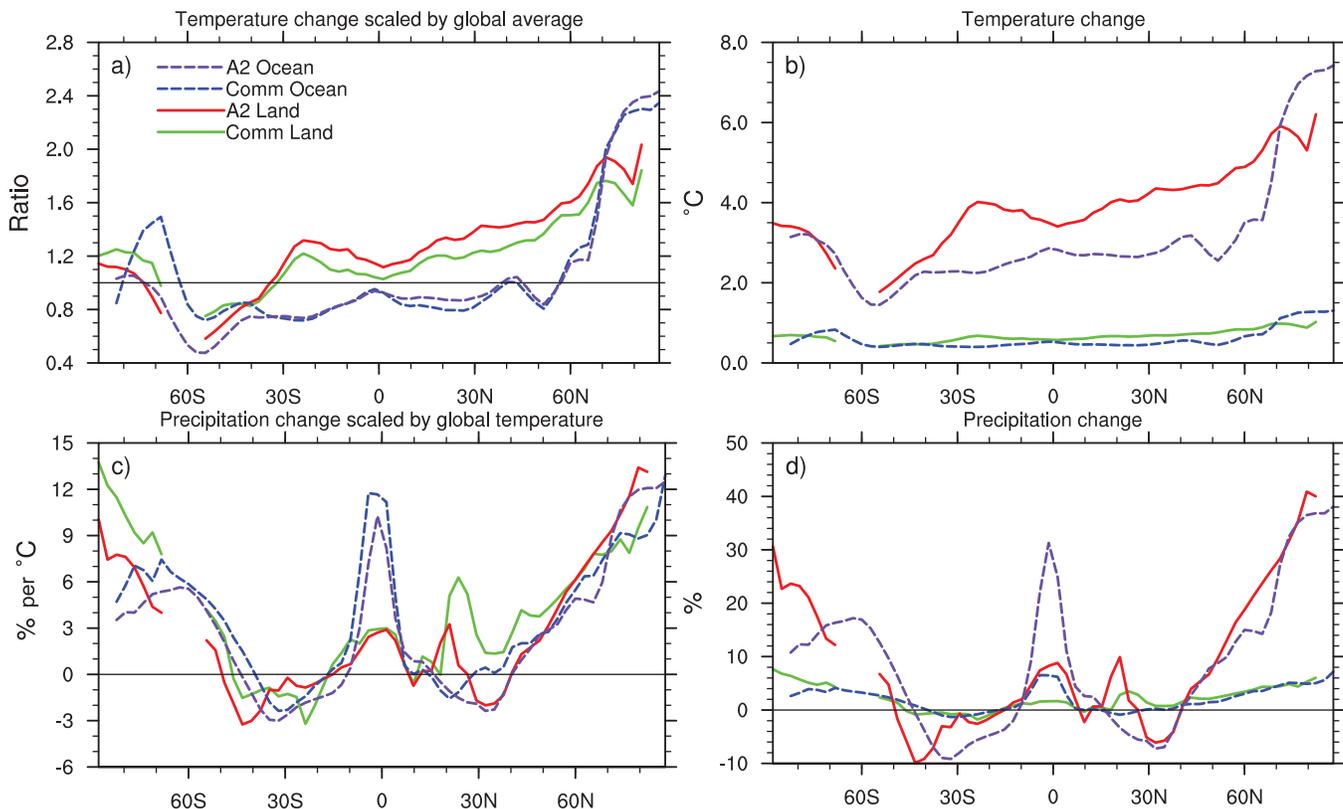
### 10.3.2 Patterns of Change in the 21st Century

#### 10.3.2.1 Warming

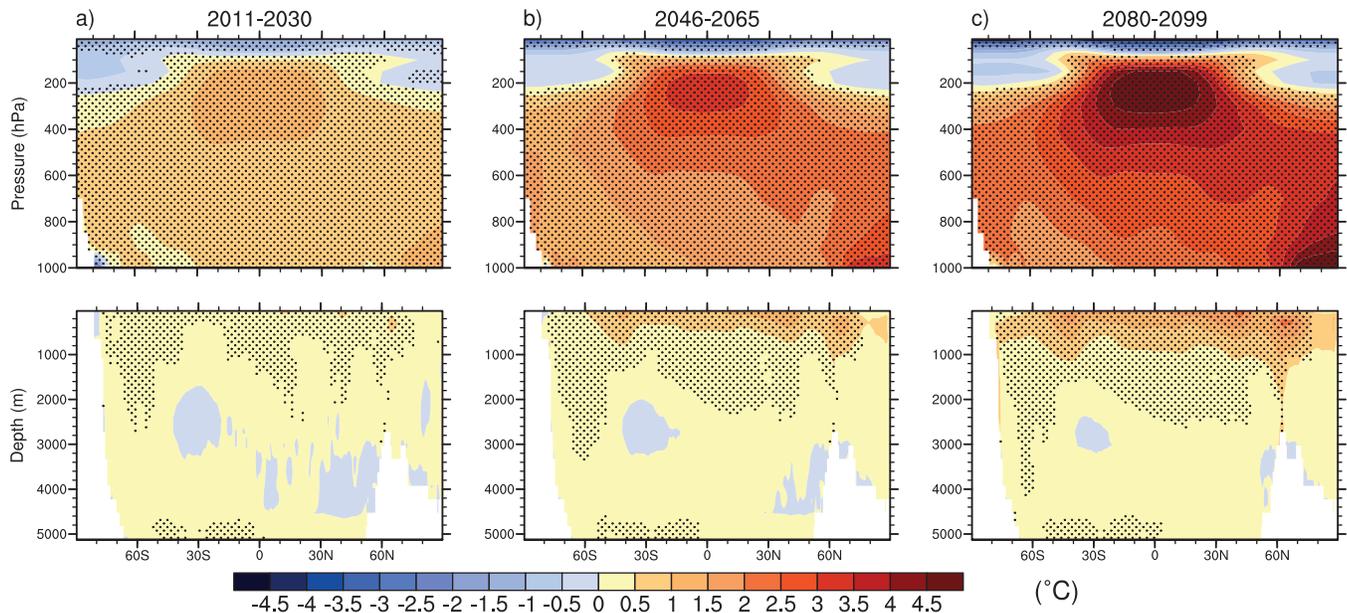
The TAR noted that much of the regional variation of the annual mean warming in the multi-model means is associated with high- to low-latitude contrast. This can be better quantified from the new multi-model mean in terms of zonal averages. A further contrast is provided by partitioning the land and ocean values based on model data interpolated to a standard grid. Figure 10.6 illustrates the late-century A2 case, with all values shown both in absolute terms and relative to the global mean warming. Warming over land is greater than the mean except in the southern mid-latitudes, where the warming over ocean is a

minimum. Warming over ocean is smaller than the mean except at high latitudes, where sea ice changes have an influence. This pattern of change illustrated by the ratios is quite similar across the scenarios. The commitment case (shown), discussed in Section 10.7.1, has relatively smaller warming of land, except in the far south, which warms closer to the global rate. At nearly all latitudes, the A1B and B1 warming ratios lie between A2 and commitment, with A1B particularly close to the A2 results. Aside from the commitment case, the ratios for the other time periods are also quite similar to those for A2. Regional patterns and precipitation contrasts are discussed in Section 10.3.2.3.

Figure 10.7 shows the zonal mean warming for the A1B scenario at each latitude from the bottom of the ocean to the top of the atmosphere for the three 21st-century periods used in Table 10.5. To produce this ensemble mean, the model data were first interpolated to standard ocean depths and atmospheric pressures. Consistent with the global transfer of excess heat from the atmosphere to the ocean, and the difference between warming over land and ocean, there is some discontinuity between the plotted means of the lower atmosphere and the upper ocean. The relatively uniform warming of the troposphere and cooling of the stratosphere in this multi-model mean are consistent with the changes shown in Figure 9.8 of the TAR, but now its evolution during the 21st century under this scenario can also be seen. Upper-tropospheric warming reaches a maximum in the tropics and is seen even in the early-century



**Figure 10.6.** Zonal means over land and ocean separately, for annual mean surface warming (a, b) and precipitation (c, d), shown as ratios scaled with the global mean warming (a, c) and not scaled (b, d). Multi-model mean results are shown for two scenarios, A2 and Commitment (see Section 10.7), for the period 2080 to 2099 relative to the zonal means for 1980 to 1999. Results for individual models can be seen in the Supplementary Material for this chapter.



**Figure 10.7.** Zonal means of change in atmospheric (top) and oceanic (bottom) temperatures ( $^{\circ}\text{C}$ ), shown as cross sections. Values are the multi-model means for the A1B scenario for three periods (a–c). Stippling denotes regions where the multi-model ensemble mean divided by the multi-model standard deviation exceeds 1.0 (in magnitude). Anomalies are relative to the average of the period 1980 to 1999. Results for individual models can be seen in the Supplementary Material for this chapter.

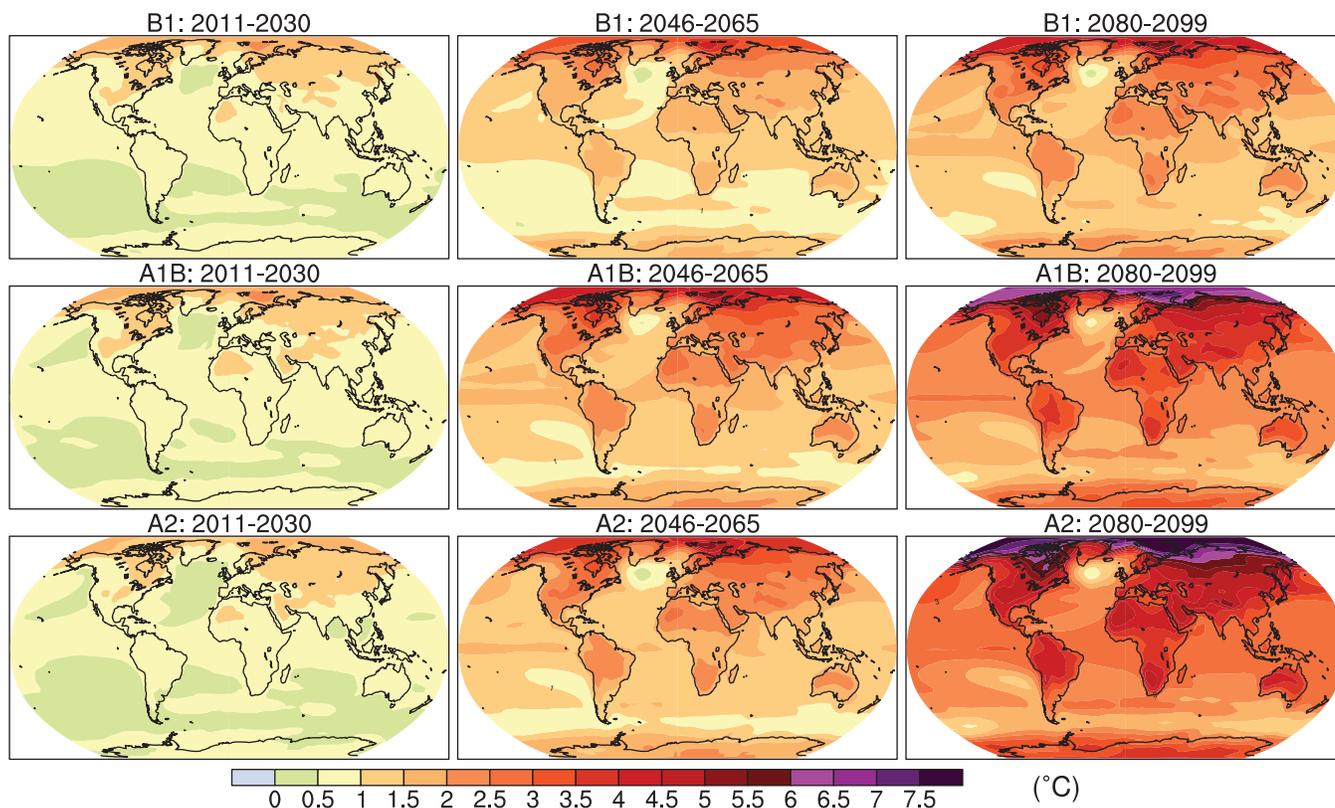
time period. The pattern is very similar over the three periods, consistent with the rapid adjustment of the atmosphere to the forcing. These changes are simulated with good consistency among the models. The larger values of both signs are stippled, indicating that the ensemble mean is larger in magnitude than the inter-model standard deviation. The ratio of mean to standard deviation can be related to formal tests of statistical significance and confidence intervals, if the individual model results were to be considered a sample.

The ocean warming evolves more slowly. There is initially little warming below the mixed layer, except at some high latitudes. Even as a ratio with mean surface warming, later in the century the temperature increases more rapidly in the deep ocean, consistent with results from individual models (e.g., Watterson, 2003; Stouffer, 2004). This rapid warming of the atmosphere and the slow penetration of the warming into the ocean has implications for the time scales of climate change commitment (Section 10.7). It has been noted in a five-member multi-model ensemble analysis that, associated with the changes in temperature of the upper ocean in Figure 10.7, the tropical Pacific Ocean heat transport remains nearly constant with increasing greenhouse gases due to the compensation of the subtropical cells and the horizontal gyre variations, even as the subtropical cells change in response to changes in the trade winds (Hazeleger, 2005). Additionally, a southward shift of the Antarctic Circumpolar Current is projected to occur in a 15-member multi-model ensemble, due to changes in surface winds in a future warmer climate (Fyfe and Saenko, 2005). This is associated with a poleward shift of the westerlies at the surface (see Section 10.3.6) and in the upper troposphere particularly notable in the Southern Hemisphere (SH) (Stone and Fyfe, 2005), and increased relative angular momentum from stronger

westerlies (Räisänen, 2003) and westerly momentum flux in the lower stratosphere particularly in the tropics and southern mid-latitudes (Watanabe et al., 2005). The surface wind changes are associated with corresponding changes in wind stress curl and horizontal mass transport in the ocean (Saenko et al., 2005).

Global-scale patterns for each of the three scenarios and time periods are given in Figure 10.8. In each case, greater warming over most land areas is evident (e.g., Kunkel and Liang, 2005). Over the ocean, warming is relatively large in the Arctic and along the equator in the eastern Pacific (see Sections 10.3.5.2 and 10.3.5.3), with less warming over the North Atlantic and the Southern Ocean (e.g., Xu et al., 2005). Enhanced oceanic warming along the equator is also evident in the zonal means of Figure 10.6, and can be associated with oceanic heat flux changes (Watterson, 2003) and forced by the atmosphere (Liu et al., 2005).

Fields of temperature change have a similar structure, with the linear correlation coefficient as high as 0.994 between the late-century A2 and A1B cases. As for the zonal means, the fields normalised by the mean warming are very similar. The strict agreement between the A1B field, as a standard, and the others is quantified in Table 10.5, by the absolute measure  $M$  (Watterson, 1996; a transformation of a measure of Mielke, 1991), with unity meaning identical fields and zero meaning no similarity (the expected value under random rearrangement of the data on the grid of the measure prior to the arcsin transformation). Values of  $M$  become progressively larger later in the 21st century, with values of 0.9 or larger for the late 21st century, thus confirming the closeness of the scaled patterns in the late-century cases. The deviation from unity is approximately proportional to the mean absolute difference. The earlier warming patterns are also similar to the standard case,



**Figure 10.8.** Multi-model mean of annual mean surface warming (surface air temperature change, °C) for the scenarios B1 (top), A1B (middle) and A2 (bottom), and three time periods, 2011 to 2030 (left), 2046 to 2065 (middle) and 2080 to 2099 (right). Stippling is omitted for clarity (see text). Anomalies are relative to the average of the period 1980 to 1999. Results for individual models can be seen in the Supplementary Material for this chapter.

particularly for the same scenario A1B. Furthermore, the zonal means over land and ocean considered above are representative of much of the small differences in warming ratio. While there is some influence of differences in forcing patterns among the scenarios, and of effects of oceanic uptake and heat transport in modifying the patterns over time, there is also support for the role of atmospheric heat transport in offsetting such influences (e.g., Boer and Yu, 2003b; Watterson and Dix, 2005). Dufresne et al. (2005) show that aerosol contributes a modest cooling of the Northern Hemisphere (NH) up to the mid-21st century in the A2 scenario.

Such similarities in patterns of change have been described by Mitchell (2003) and Harvey (2004). They aid the efficient presentation of the broad scale multi-model results, as patterns depicted for the standard A1B 2080 to 2099 case are usually typical of other cases. This largely applies to other seasons and also other variables under consideration here. Where there is similarity of normalised changes, values for other cases can be estimated by scaling by the appropriate ratio of global means from Table 10.5. Note that for some quantities like variability and extremes, such scaling is unlikely to work. The use of such scaled results in combination with global warmings from simple models is discussed in Section 11.10.1.

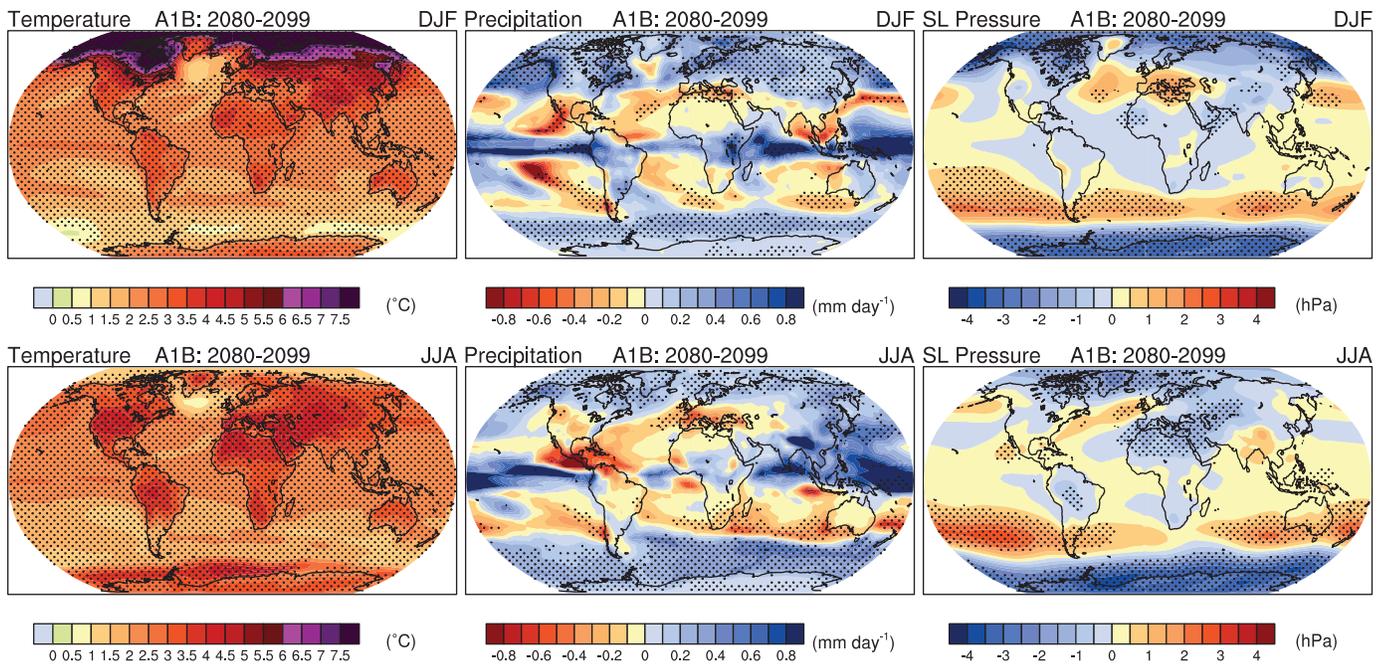
As for the zonal means (aside from the Arctic Ocean), consistency in local warmings among the models is high (stippling is omitted in Figure 10.8 for clarity). Only in the

central North Atlantic and the far south Pacific in 2011 to 2030 is the mean change less than the standard deviation, in part a result of ocean model limitations there (Section 8.3.2). Some regions of high-latitude surface cooling occur in individual models.

The surface warming fields for the extratropical winter and summer seasons, December to February (DJF) and June to August (JJA), are shown for scenario A1B in Figure 10.9. The high-latitude warming is rather seasonal, being larger in winter as a result of sea ice and snow, as noted in Chapter 9 of the TAR. However, the relatively small warming in southern South America is more extensive in southern winter. Similar patterns of change in earlier model simulations are described by Giorgi et al. (2001).

### 10.3.2.2 Cloud and Diurnal Cycle

In addition to being an important link to humidity and precipitation, cloud cover plays an important role for the sensitivity of the general circulation models (GCMs; e.g., Soden and Held, 2006) and for the diurnal temperature range (DTR) over land (e.g., Dai and Trenberth, 2004 and references therein) so this section considers the projection of these variables now made possible by multi-model ensembles. Cloud radiative feedbacks to greenhouse gas forcing are sensitive to the elevation, latitude and hence temperature of the clouds, in addition to their optical

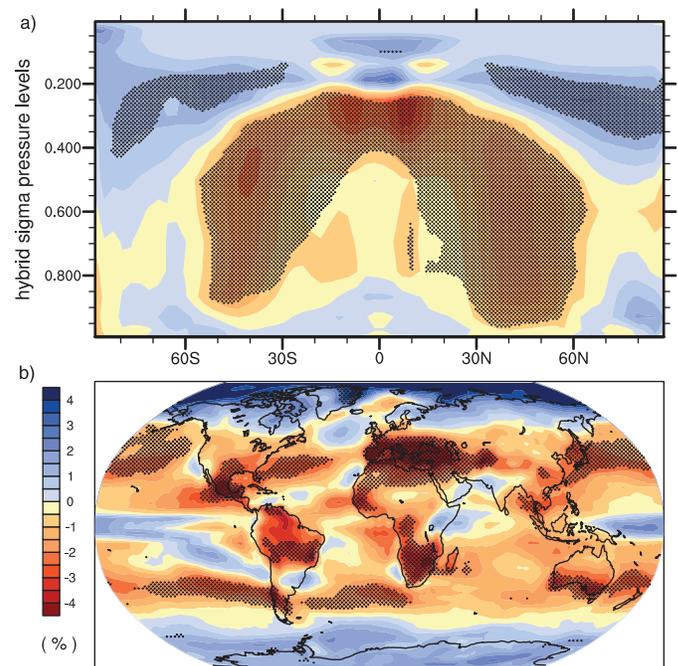


**Figure 10.9.** Multi-model mean changes in surface air temperature (°C, left), precipitation (mm day<sup>-1</sup>, middle) and sea level pressure (hPa, right) for boreal winter (DJF, top) and summer (JJA, bottom). Changes are given for the SRES A1B scenario, for the period 2080 to 2099 relative to 1980 to 1999. Stippling denotes areas where the magnitude of the multi-model ensemble mean exceeds the inter-model standard deviation. Results for individual models can be seen in the Supplementary Material for this chapter.

depth and their atmospheric environment (see Section 8.6.3.2). Current GCMs simulate clouds through various complex parametrizations (see Section 8.2.1.3) to produce cloud cover quantified by an area fraction within each grid square and each atmospheric layer. Taking multi-model ensemble zonal means of this quantity interpolated to standard pressure levels and latitudes shows increases in cloud cover at all latitudes in the vicinity of the tropopause, and mostly decreases below, indicating an increase in the altitude of clouds overall (Figure 10.10a). This shift occurs consistently across models. Outside the tropics the increases aloft are rather consistent, as indicated by the stippling in the figure. Near-surface amounts increase at some latitudes. The mid-level mid-latitude decreases are very consistent, amounting to as much as one-fifth of the average cloud fraction simulated for 1980 to 1999.

The total cloud area fraction from an individual model represents the net coverage over all the layers, after allowance for the overlap of clouds, and is an output included in the data set. The change in the ensemble mean of this field is shown in Figure 10.10b. Much of the low and middle latitudes experience a decrease in cloud cover, simulated with some consistency. There are a few low-latitude regions of increase, as well as substantial increases at high latitudes. The larger changes relate well to changes in precipitation discussed in Section 10.3.2.3. While clouds need not be precipitating, moderate spatial correlation between cloud cover and precipitation holds for seasonal means of both the present climate and future changes.

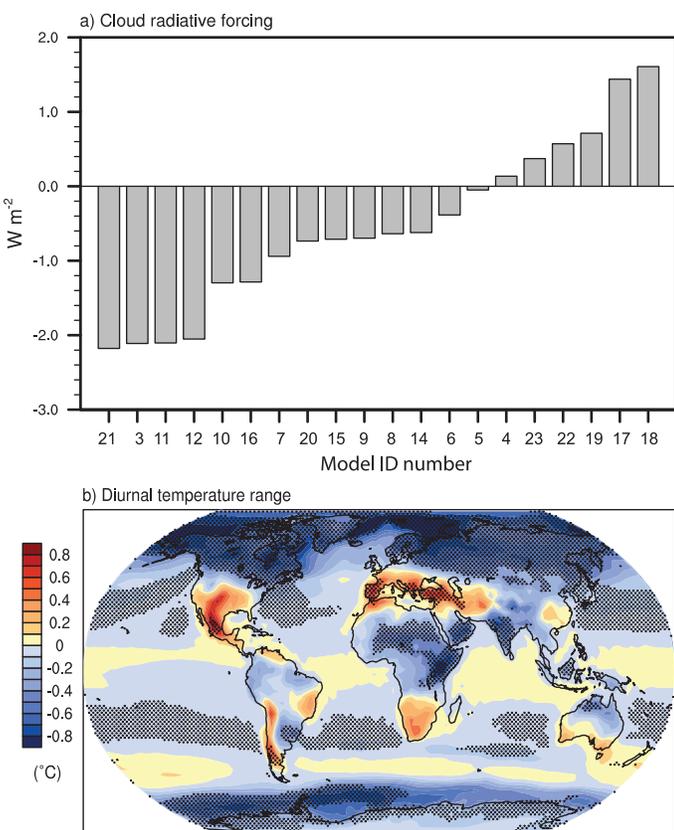
The radiative effect of clouds is represented by the cloud radiative forcing diagnostic (see Section 8.6.3.2). This can be



**Figure 10.10.** Multi-model mean changes in (a) zonal mean cloud fraction (%), shown as a cross section through the atmosphere, and (b) total cloud area fraction (percent cover from all models). Changes are given as annual means for the SRES A1B scenario for the period 2080 to 2099 relative to 1980 to 1999. Stippling denotes areas where the magnitude of the multi-model ensemble mean exceeds the inter-model standard deviation. Results for individual models can be seen in the Supplementary Material for this chapter.

evaluated from radiative fluxes at the top of the atmosphere calculated with or without the presence of clouds that are output by the GCMs. In the multi-model mean (not shown) values vary in sign over the globe. The global and annual mean averaged over the models, for 1980 to 1999, is  $-22.3 \text{ W m}^{-2}$ . The change in mean cloud radiative forcing has been shown to have different signs in a limited number of previous modelling studies (Meehl et al., 2004b; Tsushima et al., 2006). Figure 10.11a shows globally averaged cloud radiative forcing changes for 2080 to 2099 under the A1B scenario for individual models of the data set, which have a variety of different magnitudes and even signs. The ensemble mean change is  $-0.6 \text{ W m}^{-2}$ . This range indicates that cloud feedback is still an uncertain feature of the global coupled models (see Section 8.6.3.2.2).

The DTR has been shown to be decreasing in several land areas of the globe in 20th-century observations (see Section 3.2.2.7), together with increasing cloud cover (see also Section 9.4.2.3). In the multi-model mean of present climate, DTR over land is indeed closely spatially anti-correlated with the total cloud cover field. This is true also of the 21st-century changes in the fields under the A1B scenario, as can be seen by comparing



**Figure 10.11.** Changes in (a) global mean cloud radiative forcing ( $\text{W m}^{-2}$ ) from individual models (see Table 10.4 for the list of models) and (b) multi-model mean diurnal temperature range ( $^{\circ}\text{C}$ ). Changes are annual means for the SRES A1B scenario for the period 2080 to 2099 relative to 1980 to 1999. Stippling denotes areas where the magnitude of the multi-model ensemble mean exceeds the inter-model standard deviation. Results for individual models can be seen in the Supplementary Material for this chapter.

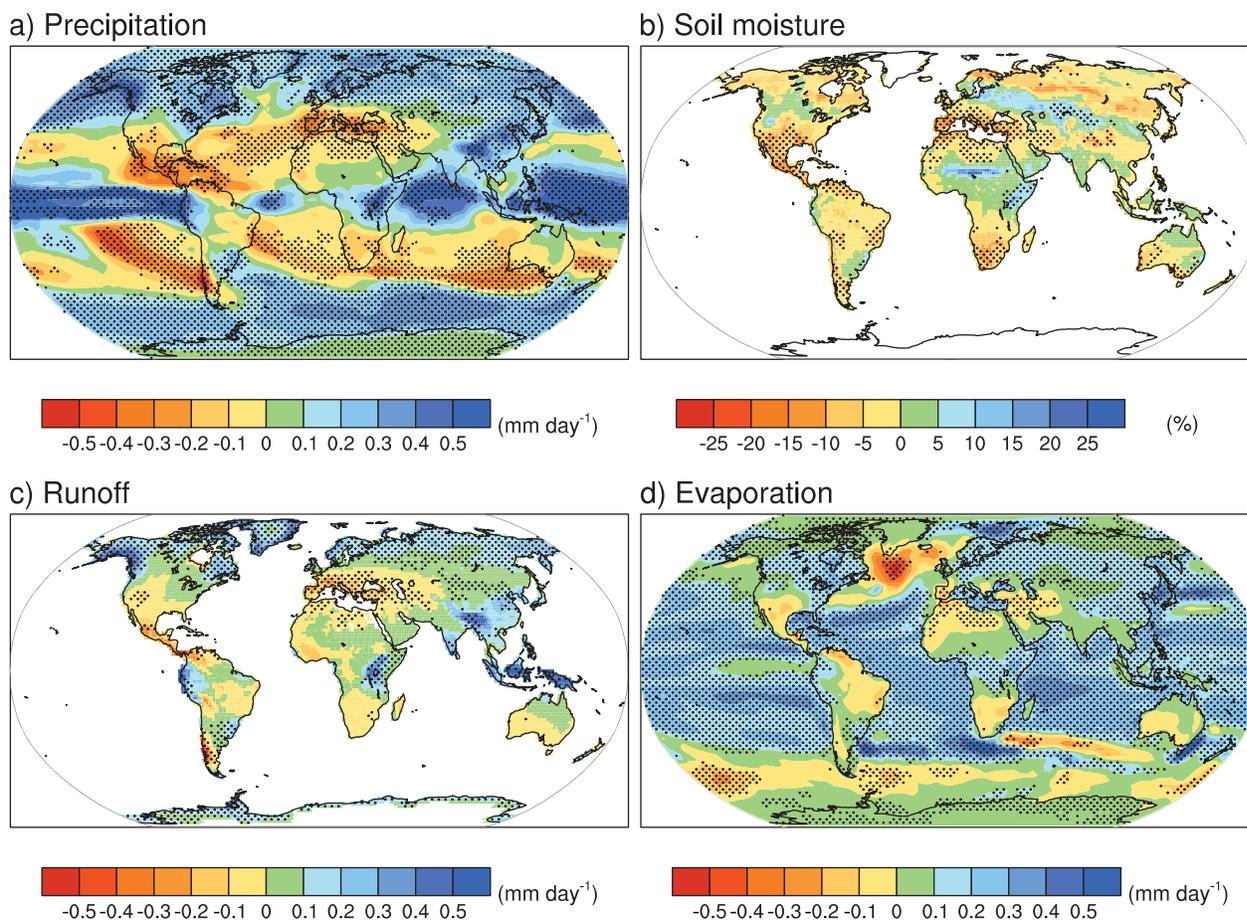
the change in DTR shown in Figure 10.11b with the cloud area fraction shown in Figure 10.10b. Changes in DTR reach a magnitude of  $0.5^{\circ}\text{C}$  in some regions, with some consistency among the models. Smaller widespread decreases are likely due to the radiative effect of the enhanced greenhouse gases including water vapour (see also Stone and Weaver, 2002). Further discussion of DTR is provided in Section 10.3.6.2.

In addition to the DTR, Kitoh and Arakawa (2005) document changes in the regional patterns of diurnal precipitation over the Indonesian region, and show that over ocean, nighttime precipitation decreases and daytime precipitation increases, while over land the opposite is the case, thus producing a decrease in the diurnal precipitation amplitude over land and ocean. They attribute these changes to a larger nighttime temperature increase over land due to increased greenhouse gases.

### 10.3.2.3 Precipitation and Surface Water

Models simulate that global mean precipitation increases with global warming. However, there are substantial spatial and seasonal variations in this field even in the multi-model means depicted in Figure 10.9. There are fewer areas stippled for precipitation than for the warming, indicating more variation in the magnitude of change among the ensemble of models. Increases in precipitation at high latitudes in both seasons are very consistent across models. The increases in precipitation over the tropical oceans and in some of the monsoon regimes (e.g., South Asian monsoon in JJA, Australian monsoon in DJF) are notable, and while not as consistent locally, considerable agreement is found at the broader scale in the tropics (Neelin et al., 2006). There are widespread decreases in mid-latitude summer precipitation, except for increases in eastern Asia. Decreases in precipitation over many subtropical areas are evident in the multi-model ensemble mean, and consistency in the sign of change among the models is often high (Wang, 2005), particularly in some regions like the tropical Central American-Caribbean (Neelin et al., 2006). Further discussion of regional changes is presented in Chapter 11.

The global map of the A1B 2080 to 2099 change in annual mean precipitation is shown in Figure 10.12, along with other hydrological quantities from the multi-model ensemble. Emori and Brown (2005) show percentage changes of annual precipitation from the ensemble. Increases of over 20% occur at most high latitudes, as well as in eastern Africa, central Asia and the equatorial Pacific Ocean. The change over the ocean between  $10^{\circ}\text{S}$  and  $10^{\circ}\text{N}$  accounts for about half the increase in the global mean (Figure 10.5). Substantial decreases, reaching 20%, occur in the Mediterranean region (Rowell and Jones, 2006), the Caribbean region (Neelin et al., 2006) and the subtropical western coasts of each continent. Overall, precipitation over land increases by about 5%, while precipitation over ocean increases 4%, but with regional changes of both signs. The net change over land accounts for 24% of the global mean increase in precipitation, a little less than the areal proportion of land (29%). In Figure 10.12, stippling indicates that the sign of the



**Figure 10.12.** Multi-model mean changes in (a) precipitation ( $\text{mm day}^{-1}$ ), (b) soil moisture content (%), (c) runoff ( $\text{mm day}^{-1}$ ) and (d) evaporation ( $\text{mm day}^{-1}$ ). To indicate consistency in the sign of change, regions are stippled where at least 80% of models agree on the sign of the mean change. Changes are annual means for the SRES A1B scenario for the period 2080 to 2099 relative to 1980 to 1999. Soil moisture and runoff changes are shown at land points with valid data from at least 10 models. Details of the method and results for individual models can be found in the Supplementary Material for this chapter.

local change is common to at least 80% of the models (with the alternative test shown in the Supplementary Material). This simpler test for consistency is of particular interest for quantities where the magnitudes for the base climate vary across models.

These patterns of change occur in the other scenarios, although with agreement (by the metric M) a little lower than for the warming. The predominance of increases near the equator and at high latitudes, for both land and ocean, is clear from the zonal mean changes of precipitation included in Figure 10.6. The results for change scaled by global mean warming are rather similar across the four scenarios, an exception being a relatively large increase over the equatorial ocean for the commitment case. As with surface temperature, the A1B and B1 scaled values are always close to the A2 results. The zonal means of the percentage change map (shown in Figure 10.6) feature substantial decreases in the subtropics and lower mid-latitudes of both hemispheres in the A2 case, even if increases occur over some regions.

Wetherald and Manabe (2002) provide a good description of the mechanism of hydrological change simulated by GCMs. In GCMs, the global mean evaporation changes closely

balance the precipitation change, but not locally because of changes in the atmospheric transport of water vapour. Annual average evaporation (Figure 10.12) increases over much of the ocean, with spatial variations tending to relate to those in the surface warming (Figure 10.8). As found by Kutzbach et al. (2005) and Bosilovich et al. (2005), atmospheric moisture convergence increases over the equatorial oceans and over high latitudes. Over land, rainfall changes tend to be balanced by both evaporation and runoff. Runoff (Figure 10.12) is notably reduced in southern Europe and increased in Southeast Asia and at high latitudes, where there is consistency among models in the sign of change (although less consistency in the magnitude of change). The larger changes reach 20% or more of the simulated 1980 to 1999 values, which range from 1 to 5  $\text{mm day}^{-1}$  in wetter regions to below 0.2  $\text{mm day}^{-1}$  in deserts. Runoff from the melting of ice sheets (Section 10.3.3) is not included here. Nohara et al. (2006) and Milly et al. (2005) assess the impacts of these changes in terms of river flow, and find that discharges from high-latitude rivers increase, while those from major rivers in the Middle East, Europe and Central America tend to decrease.

Models simulate the moisture in the upper few metres of the land surface in varying ways, and evaluation of the soil moisture content is still difficult (See Section 8.2.3.2; Wang, 2005; Gao and Dirmeyer, 2006 for multi-model analyses). The average of the total soil moisture content quantity submitted to the data set is presented here to indicate typical trends. In the annual mean (Figure 10.12), decreases are common in the subtropics and the Mediterranean region. There are increases in east Africa, central Asia, and some other regions with increased precipitation. Decreases also occur at high latitudes, where snow cover diminishes (Section 10.3.3). While the magnitudes of change are quite uncertain, there is good consistency in the signs of change in many of these regions. Similar patterns of change occur in seasonal results (Wang, 2005). Regional hydrological changes are considered in Chapter 11 and in the IPCC Working Group II report.

#### 10.3.2.4 Sea Level Pressure and Atmospheric Circulation

As a basic component of the mean atmospheric circulations and weather patterns, projections of the mean sea level pressure for the medium scenario A1B are considered. Seasonal mean changes for DJF and JJA are shown in Figure 10.9 (matching results in Wang and Swail, 2006b). Sea level pressure differences show decreases at high latitudes in both seasons in both hemispheres. The compensating increases are predominantly over the mid-latitude and subtropical ocean regions, extending across South America, Australia and southern Asia in JJA, and the Mediterranean in DJF. Many of these increases are consistent across the models. This pattern of change, discussed further in Section 10.3.5.3, has been linked to an expansion of the Hadley Circulation and a poleward shift of the mid-latitude storm tracks (Yin, 2005). This helps explain, in part, the increases in precipitation at high latitudes and decreases in the subtropics and parts of the mid-latitudes. Further analysis of the regional details of these changes is given in Chapter 11. The pattern of pressure change implies increased westerly flows across the western parts of the continents. These contribute to increases in mean precipitation (Figure 10.9) and increased precipitation intensity (Meehl et al., 2005a).

### 10.3.3 Changes in Ocean/Ice and High-Latitude Climate

#### 10.3.3.1 Changes in Sea Ice Cover

Models of the 21st century project that future warming is amplified at high latitudes resulting from positive feedbacks involving snow and sea ice, and other processes (Section 8.6.3.3). The warming is particularly large in autumn and early winter (Manabe and Stouffer, 1980; Holland and Bitz, 2003) when sea ice is thinnest and the snow depth is insufficient to blur the relationship between surface air temperature and sea ice thickness (Maykut and Untersteiner, 1971). As shown by Zhang and Walsh (2006), the coupled models show a range of responses in NH sea ice areal extent ranging from very little

change to a strong and accelerating reduction over the 21st century (Figure 10.13a,b).

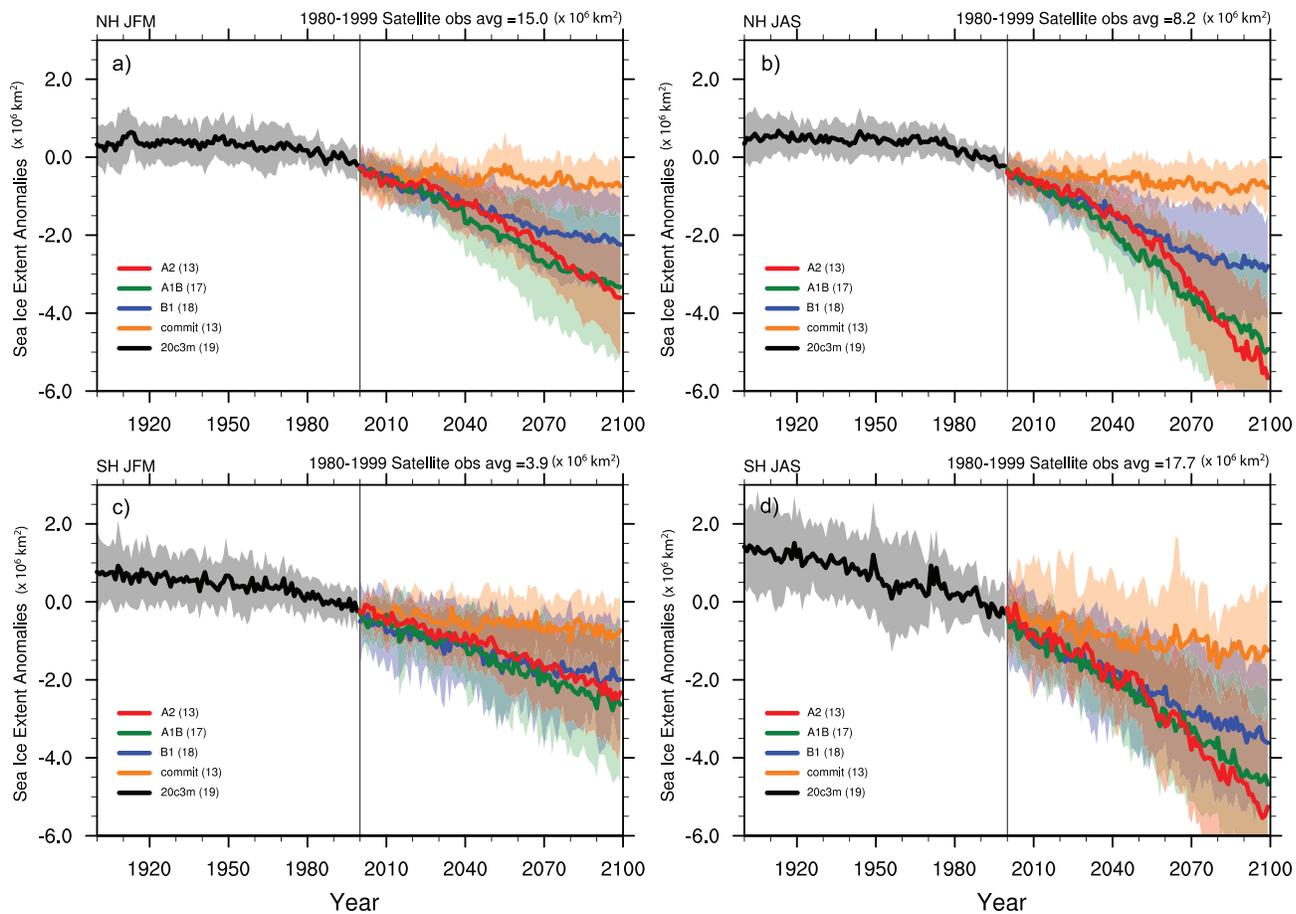
An important characteristic of the projected change is for summer ice area to decline far more rapidly than winter ice area (Gordon and O'Farrell, 1997), and hence sea ice rapidly approaches a seasonal ice cover in both hemispheres (Figures 10.13b and 10.14). Seasonal ice cover is, however, rather robust and persists to some extent throughout the 21st century in most (if not all) models. Bitz and Roe (2004) note that future projections show that arctic sea ice thins fastest where it is initially thickest, a characteristic that future climate projections share with sea ice thinning observed in the late 20th century (Rothrock et al., 1999). Consistent with these results, a projection by Gregory et al. (2002b) shows that arctic sea ice volume decreases more quickly than sea ice area (because trends in winter ice area are low) in the 21st century.

In 20th- and 21st-century simulations, antarctic sea ice cover is projected to decrease more slowly than in the Arctic (Figures 10.13c,d and 10.14), particularly in the vicinity of the Ross Sea where most models predict a local minimum in surface warming. This is commensurate with the region with the greatest reduction in ocean heat loss, which results from reduced vertical mixing in the ocean (Gregory, 2000). The ocean stores much of its increased heat below 1 km depth in the Southern Ocean. In contrast, horizontal heat transport poleward of about 60°N increases in many models (Holland and Bitz, 2003), but much of this heat remains in the upper 1 km of the northern subpolar seas and Arctic Ocean (Gregory, 2000; Bitz et al., 2006). Bitz et al. (2006) argue that these differences in the depth where heat is accumulating in the high-latitude oceans have consequences for the relative rates of sea ice decay in the Arctic and Antarctic.

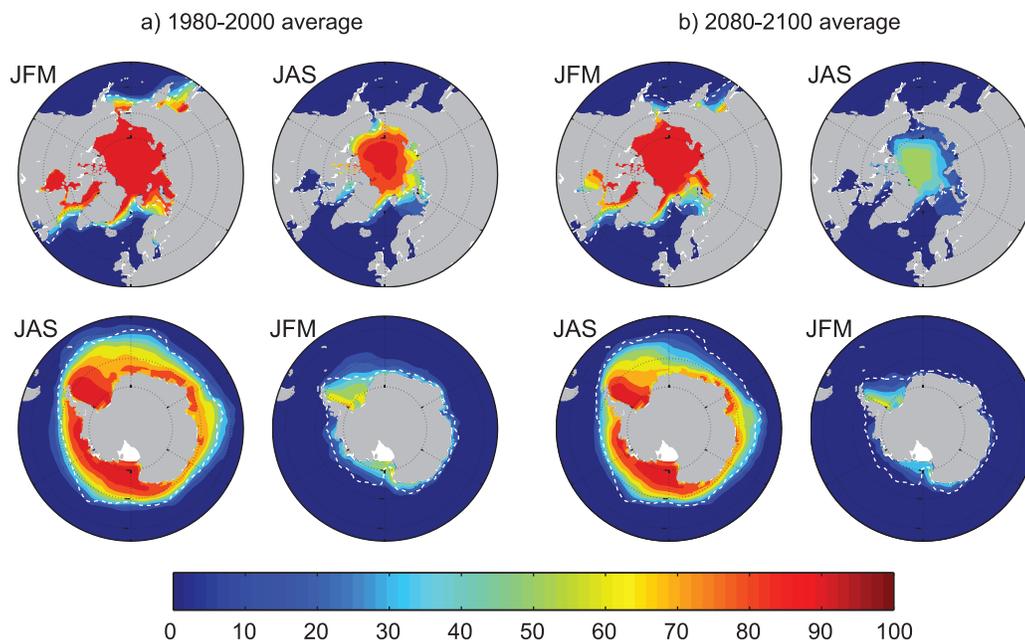
While most climate models share these common characteristics (peak surface warming in autumn and early winter, sea ice rapidly becomes seasonal, arctic ice decays faster than antarctic ice, and northward ocean heat transport increases into the northern high latitudes), models have poor agreement on the amount of thinning of sea ice (Flato and Participating CMIP Modeling Groups, 2004; Arzel et al., 2006) and the overall climate change in the polar regions (IPCC, 2001; Holland and Bitz, 2003). Flato (2004) shows that the basic state of the sea ice and the reduction in thickness and/or extent have little to do with sea ice model physics among CMIP2 models. Holland and Bitz (2003) and Arzel et al. (2006) find serious biases in the basic state of simulated sea ice thickness and extent. Further, Rind et al. (1995), Holland and Bitz (2003) and Flato (2004) show that the basic state of the sea ice thickness and extent have a significant influence on the projected change in sea ice thickness in the Arctic and extent in the Antarctic.

#### 10.3.3.2 Changes in Snow Cover and Frozen Ground

Snow cover is an integrated response to both temperature and precipitation and exhibits strong negative correlation with air temperature in most areas with a seasonal snow cover (see Section 8.6.3.3 for an evaluation of model-simulated



**Figure 10.13.** Multi-model simulated anomalies in sea ice extent for the 20th century (20c3m) and 21st century using the SRES A2, A1B and B1 as well as the commitment scenario for (a) Northern Hemisphere January to March (JFM), (b) Northern Hemisphere July to September (JAS). Panels (c) and (d) are as for (a) and (b) but for the Southern Hemisphere. The solid lines show the multi-model mean, shaded areas denote  $\pm 1$  standard deviation. Sea ice extent is defined as the total area where sea ice concentration exceeds 15%. Anomalies are relative to the period 1980 to 2000. The number of models is given in the legend and is different for each scenario.



**Figure 10.14.** Multi-model mean sea ice concentration (%) for January to March (JFM) and June to September (JAS), in the Arctic (top) and Antarctic (bottom) for the periods (a) 1980 to 2000 and (b) 2080 to 2100 for the SRES A1B scenario. The dashed white line indicates the present-day 15% average sea ice concentration limit. Modified from Flato et al. (2004).

present-day snow cover). Because of this temperature association, the simulations project widespread reductions in snow cover over the 21st century (Supplementary Material, Figure S10.1). For the Arctic Climate Impact Assessment (ACIA) model mean, at the end of the 21st century the projected reduction in the annual mean NH snow cover is 13% under the B2 scenario (ACIA, 2004). The individual model projections range from reductions of 9 to 17%. The actual reductions are greatest in spring and late autumn/early winter, indicating a shortened snow cover season (ACIA, 2004). The beginning of the snow accumulation season (the end of the snowmelt season) is projected to be later (earlier), and the fractional snow coverage is projected to decrease during the snow season (Hosaka et al., 2005).

Warming at high northern latitudes in climate model simulations is also associated with large increases in simulated thaw depth over much of the permafrost regions (Lawrence and Slater, 2005; Yamaguchi et al., 2005; Kitabata et al., 2006). Yamaguchi et al. (2005) show that initially soil moisture increases during the summer. In the late 21st century when the thaw depth has increased substantially, a reduction in summer soil moisture eventually occurs (Kitabata et al., 2006). Stendel and Christensen (2002) show poleward movement of permafrost extent, and a 30 to 40% increase in active layer thickness for most of the permafrost area in the NH, with the largest relative increases concentrated in the northernmost locations.

Regionally, the changes are a response to both increased temperature and increased precipitation (changes in circulation patterns) and are complicated by the competing effects of warming and increased snowfall in those regions that remain below freezing (see Section 4.2 for a further discussion of processes that affect snow cover). In general, snow amount and snow coverage decreases in the NH (Supplementary Material, Figure S10.1). However, in a few regions (e.g., Siberia), snow amount is projected to increase. This is attributed to the increase in precipitation (snowfall) from autumn to winter (Meleshko et al., 2004; Hosaka et al., 2005).

### 10.3.3.3 Changes in Greenland Ice Sheet Mass Balance

As noted in Section 10.6, modelling studies (e.g., Hanna et al., 2002; Kiilsholm et al., 2003; Wild et al., 2003) as well as satellite observations, airborne altimeter surveys and other studies (Abdalati et al., 2001; Thomas et al., 2001; Krabill et al., 2004; Johannessen et al., 2005; Zwally et al., 2005; Rignot and Kanagaratnam, 2006) suggest a slight inland thickening and strong marginal thinning resulting in an overall negative Greenland Ice Sheet mass balance which has accelerated recently (see Section 4.6.2.2.). A consistent feature of all climate models is that projected 21st-century warming is amplified in northern latitudes. This suggests continued melting of the Greenland Ice Sheet, since increased summer melting dominates over increased winter precipitation in model projections of future climate. Ridley et al. (2005) coupled UKMO-HadCM3 to an ice sheet model to explore the melting of the Greenland Ice Sheet under elevated (four times pre-industrial) levels of atmospheric CO<sub>2</sub> (see Section 10.7.4.3, Figure 10.38). While the entire Greenland

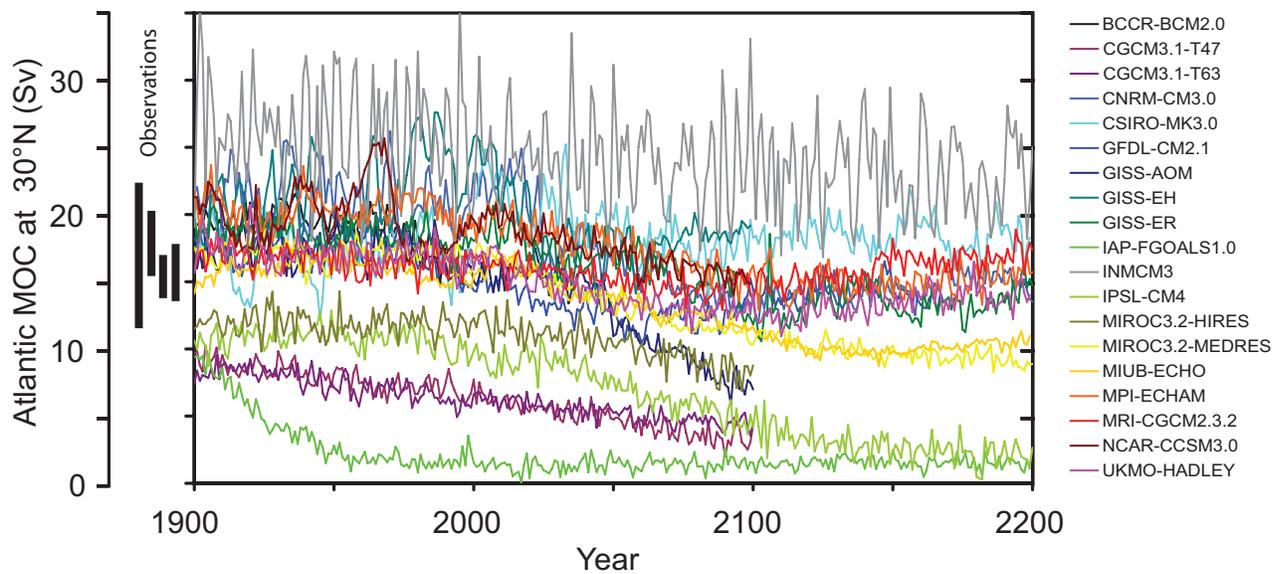
Ice Sheet eventually completely ablated (after 3 kyr), the peak rate of melting was 0.06 Sv (1 Sv = 10<sup>6</sup> m<sup>3</sup> s<sup>-1</sup>) corresponding to about 5.5 mm yr<sup>-1</sup> global sea level rise (see Sections 10.3.4 and 10.6.6). Toniazzi et al. (2004) further show that in UKMO-HadCM3, the complete melting of the Greenland Ice sheet is an irreversible process even if pre-industrial levels of atmospheric CO<sub>2</sub> are re-established after it melts.

### 10.3.4 Changes in the Atlantic Meridional Overturning Circulation

A feature common to all climate model projections is the increase in high-latitude temperature as well as an increase in high-latitude precipitation. This was reported in the TAR and is confirmed by the projections using the latest versions of comprehensive climate models (see Section 10.3.2). Both of these effects tend to make the high-latitude surface waters less dense and hence increase their stability, thereby inhibiting convective processes. As more coupled models have become available since the TAR, the evolution of the Atlantic Meridional Overturning Circulation (MOC) can be more thoroughly assessed. Figure 10.15 shows simulations from 19 coupled models integrated from 1850 to 2100 under SRES A1B atmospheric CO<sub>2</sub> and aerosol scenarios up to year 2100, and constant concentrations thereafter (see Figure 10.5). All of the models, except CGCM3.1, INM-CM3.0 and MRI-CGCM2.3.2, were run without flux adjustments (see Table 8.1). The MOC is influenced by the density structure of the Atlantic Ocean, small-scale mixing and the surface momentum and buoyancy fluxes. Some models simulate a MOC strength that is inconsistent with the range of present-day estimates (Smethie and Fine, 2001; Ganachaud, 2003; Lumpkin and Speer, 2003; Talley, 2003). The MOC for these models is shown for completeness but is not used in assessing potential future changes in the MOC in response to various emissions scenarios.

Fewer studies have focused on projected changes in the Southern Ocean resulting from future climate warming. A common feature of coupled model simulations is the projected poleward shift and strengthening of the SH westerlies (Yin, 2005; Fyfe and Saenko, 2006). This in turn leads to a strengthening, poleward shift and narrowing of the Antarctic Circumpolar Current. Fyfe and Saenko (2006) further note that the enhanced equatorward surface Ekman transport, associated with the intensified westerlies, is balanced by an enhanced deep geostrophic poleward return flow below 2,000 m.

Generally, the simulated late-20th century Atlantic MOC shows a spread ranging from a weak MOC of about 12 Sv to over 20 Sv (Figure 10.15; Schmittner et al., 2005). When forced with the SRES A1B scenario, the models show a reduction in the MOC of up to 50% or more, but in one model, the changes are not distinguishable from the simulated natural variability. The reduction in the MOC proceeds on the time scale of the simulated warming because it is a direct response to the increase in buoyancy at the ocean surface. A positive North Atlantic Oscillation (NAO) trend might delay this response by a few decades but not prevent it (Delworth and Dixon, 2000). Such



**Figure 10.15.** Evolution of the Atlantic meridional overturning circulation (MOC) at 30°N in simulations with the suite of comprehensive coupled climate models (see Table 8.1 for model details) from 1850 to 2100 using 20th Century Climate in Coupled Models (20C3M) simulations for 1850 to 1999 and the SRES A1B emissions scenario for 1999 to 2100. Some of the models continue the integration to year 2200 with the forcing held constant at the values of year 2100. Observationally based estimates of late-20th century MOC are shown as vertical bars on the left. Three simulations show a steady or rapid slow down of the MOC that is unrelated to the forcing; a few others have late-20th century simulated values that are inconsistent with observational estimates. Of the model simulations consistent with the late-20th century observational estimates, no simulation shows an increase in the MOC during the 21st century; reductions range from indistinguishable within the simulated natural variability to over 50% relative to the 1960 to 1990 mean; and none of the models projects an abrupt transition to an off state of the MOC. Adapted from Schmittner et al. (2005) with additions.

a weakening of the MOC in future climate causes reduced sea surface temperature (SST) and salinity in the region of the Gulf Stream and North Atlantic Current (Dai et al., 2005). This can produce a decrease in northward heat transport south of 60°N, but increased northward heat transport north of 60°N (A. Hu et al., 2004). No model shows an increase in the MOC in response to the increase in greenhouse gases, and no model simulates an abrupt shut-down of the MOC within the 21st century. One study suggests that inherent low-frequency variability in the Atlantic region, the Atlantic Multidecadal Oscillation, may produce a natural weakening of the MOC over the next few decades that could further accentuate the decrease due to anthropogenic climate change (Knight et al., 2005; see Section 8.4.6).

In some of the older models (e.g., Dixon et al., 1999), increased high-latitude precipitation dominates over increased high-latitude warming in causing the weakening, while in others (e.g., Mikolajewicz and Voss, 2000), the opposite is found. In a recent model intercomparison, Gregory et al. (2005) find that for all 11 models analysed, the MOC reduction is caused more by changes in surface heat flux than changes in surface freshwater flux. In addition, simulations using models of varying complexity (Stocker et al., 1992b; Saenko et al., 2003; Weaver et al., 2003) show that freshening or warming in the Southern Ocean acts to increase or stabilise the Atlantic MOC. This is likely a consequence of the complex coupling of Southern Ocean processes with North Atlantic Deep Water production.

A few simulations using coupled models are available that permit the assessment of the long-term stability of the MOC (Stouffer and Manabe, 1999; Voss and Mikolajewicz, 2001;

Stouffer and Manabe, 2003; Wood et al., 2003; Yoshida et al., 2005; Bryan et al., 2006). Most of these simulations assume an idealised increase in atmospheric CO<sub>2</sub> by 1% yr<sup>-1</sup> to various levels ranging from two to four times pre-industrial levels. One study also considers slower increases (Stouffer and Manabe, 1999), or a reduction in CO<sub>2</sub> (Stouffer and Manabe, 2003). The more recent models are not flux adjusted and have higher resolution (about 1.0°) (Yoshida et al., 2005; Bryan et al., 2006). A common feature of all simulations is a reduction in the MOC in response to the warming and a stabilisation or recovery of the MOC when the concentration is kept constant after achieving a level of two to four times the pre-industrial atmospheric CO<sub>2</sub> concentration. None of these models shows a shutdown of the MOC that continues after the forcing is kept constant. But such a long-term shutdown cannot be excluded if the amount of warming and its rate exceed certain thresholds as shown using an EMIC (Stocker and Schmittner, 1997). Complete shut-downs, although not permanent, were also simulated by a flux-adjusted coupled model (Manabe and Stouffer, 1994; Stouffer and Manabe, 2003; see also Chan and Motoi, 2005). In none of these AOGCM simulations were the thresholds, as determined by the EMIC, passed (Stocker and Schmittner, 1997). As such, the long-term stability of the MOC found in the present AOGCM simulations is consistent with the results from the simpler models.

The reduction in MOC strength associated with increasing greenhouse gases represents a negative feedback for the warming in and around the North Atlantic. That is, through reducing the transport of heat from low to high latitudes, SSTs are cooler than they would otherwise be if the MOC was unchanged. As

such, warming is reduced over and downstream of the North Atlantic. It is important to note that in models where the MOC weakens, warming still occurs downstream over Europe due to the overall dominant role of the radiative forcing associated with increasing greenhouse gases (Gregory et al., 2005). Many future projections show that once the radiative forcing is held fixed, re-establishment of the MOC occurs to a state similar to that of the present day. The partial or complete re-establishment of the MOC is slow and causes additional warming in and around the North Atlantic. While the oceanic meridional heat flux at low latitudes is reduced upon a slowdown of the MOC, many simulations show increasing meridional heat flux into the Arctic which contributes to accelerated warming and sea ice melting there. This is due to both the advection of warmer water and an intensification of the influx of North Atlantic water into the Arctic (A. Hu et al., 2004).

Climate models that simulated a complete shutdown of the MOC in response to sustained warming were flux-adjusted coupled GCMs or EMICs. A robust result from such simulations is that the shutdown of the MOC takes several centuries after the forcing is kept fixed (e.g., at  $4 \times$  atmospheric  $\text{CO}_2$  concentration). Besides the forcing amplitude and rate (Stocker and Schmitner, 1997), the amount of mixing in the ocean also appears to determine the stability of the MOC: increased vertical and horizontal mixing tends to stabilise the MOC and to eliminate the possibility of a second equilibrium state (Manabe and Stouffer, 1999; Knutti and Stocker, 2000; Longworth et al., 2005). Random internal variability or noise, often not present in simpler models, may also be important in determining the effective MOC stability (Knutti and Stocker, 2002; Monahan, 2002).

The MOC is not necessarily a comprehensive indicator of ocean circulation changes in response to global warming. In a transient  $2 \times$  atmospheric  $\text{CO}_2$  experiment using a coupled AOGCM, the MOC changes were small, but convection in the Labrador Sea stopped due to warmer and hence less dense waters that inflow from the Greenland-Iceland-Norwegian Sea (GIN Sea) (Wood et al., 1999; Stouffer et al., 2006a). Similar results were found by A. Hu et al. (2004), who also report an increase in convection in the GIN Sea due to the influx of more saline waters from the North Atlantic. Various simulations using coupled models of different complexity find significant reductions in convection in the GIN Sea in response to warming (Schaeffer et al., 2004; Bryan et al., 2006). Presumably, a delicate balance exists in the GIN Sea between the circum-arctic river runoff, sea ice production and advection of saline waters from the North Atlantic, and on a longer time scale, the inflow

of freshwater through Bering Strait. The projected increases in circum-arctic river runoff (Wu et al., 2005) may enhance the tendency towards a reduction in GIN Sea convection (Stocker and Raible, 2005; Wu et al., 2005). Cessation of convection in the Labrador Sea in the next few decades is also simulated in a high-resolution model of the Atlantic Ocean driven by surface fluxes from two AOGCMs (Schweckendiek and Willebrand, 2005). The large-scale responses of the high-resolution ocean model (e.g., MOC, Labrador Seas) agree with those from the AOGCMs. The grid resolution of the ocean components in the coupled AOGCMs has significantly increased since the TAR, and some consistent patterns of changes in convection and water mass properties in the Atlantic Ocean emerge in response to the warming, but models still show a variety of responses in the details.

The best estimate of sea level from 1993 to 2003 (see Section 5.5.5.2) associated with the slight net negative mass balance from Greenland is  $0.1$  to  $0.3 \text{ mm yr}^{-1}$  over the total ocean surface. This converts to only about  $0.002$  to  $0.003 \text{ Sv}$  of freshwater forcing. Such an amount, even when added directly and exclusively to the North Atlantic, has been suggested to be too small to affect the North Atlantic MOC (see Weaver and Hillaire-Marcel, 2004a). While one model exhibits a MOC weakening in the later part of the 21st century due to Greenland Ice Sheet melting (Fichefet et al., 2003), this same model had a very large downward drift of its overturning in the control climate, making it difficult to actually attribute the model MOC changes to the ice sheet melting. As noted in Section 10.3.3.3, Ridley et al. (2005) find the peak rate of Greenland Ice Sheet melting is about  $0.1 \text{ Sv}$  when they instantaneously elevate greenhouse gas levels in UKMO-HadCM3. They further note that this has little effect on the North Atlantic meridional overturning, although  $0.1 \text{ Sv}$  is sufficiently large to cause more dramatic transient changes in the strength of the MOC in other models (Stouffer et al., 2006b).

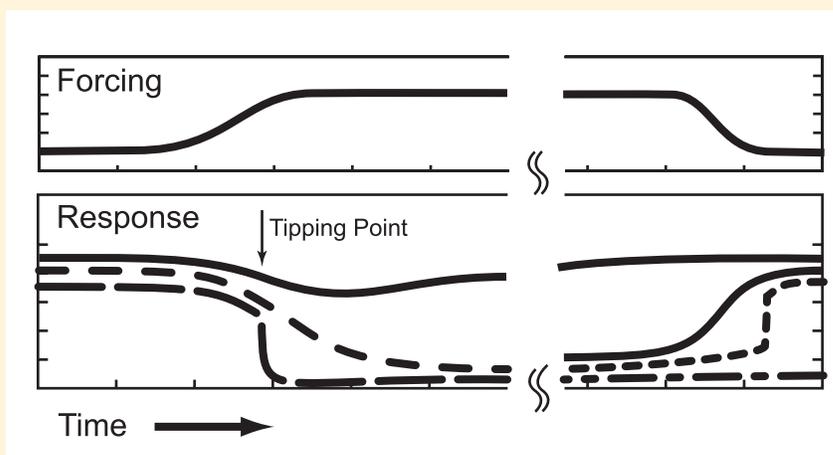
Taken together, it is very likely that the MOC, based on currently available simulations, will decrease, perhaps associated with a significant reduction in Labrador Sea Water formation, but very unlikely that the MOC will undergo an abrupt transition during the course of the 21st century. At this stage, it is too early to assess the likelihood of an abrupt change of the MOC beyond the end of the 21st century, but the possibility cannot be excluded (see Box 10.1). The few available simulations with models of different complexity instead suggest a centennial slowdown. Recovery of the MOC is simulated in some models if the radiative forcing is stabilised but would take several centuries; in other models, the reduction persists.

## Box 10.1: Future Abrupt Climate Change, 'Climate Surprises', and Irreversible Changes

Theory, models and palaeoclimatic reconstructions (see Chapter 6) have established the fact that changes in the climate system can be abrupt and widespread. A working definition of 'abrupt climate change' is given in Alley et al. (2002): 'Technically, an abrupt climate change occurs when the climate system is forced to cross some threshold, triggering a transition to a new state at a rate determined by the climate system itself and faster than the cause'. More generally, a gradual change in some determining quantity of the climate system (e.g., radiation balance, land surface properties, sea ice, etc.) can cause a variety of structurally different responses (Box 10.1, Figure 1). The response of a purely linear system scales with the forcing, and at stabilisation of the forcing, a new equilibrium is achieved which is structurally similar, but not necessarily close to the original state. However, if the system contains more than one equilibrium state, transitions to structurally different states are possible. Upon the crossing of a tipping point (bifurcation point), the evolution of the system is no longer controlled by the time scale of the forcing, but rather determined by its internal dynamics, which can either be much faster than the forcing, or significantly slower. Only the former case would be termed 'abrupt climate change', but the latter case is of equal importance. For the long-term evolution of a climate variable one must distinguish between reversible and irreversible changes. The notion of 'climate surprises' usually refers to abrupt transitions and temporary or permanent transitions to a different state in parts of the climate system such as, for example, the 8.2 kyr event (see Section 6.5.2.1).

### Atlantic Meridional Overturning Circulation and other ocean circulation changes:

The best-documented type of abrupt climate change in the palaeoclimatic archives is that associated with changes in the ocean circulation (Stocker, 2000). Since the TAR, many new results from climate models of different complexity have provided a more detailed view on the anticipated changes in the Atlantic MOC in response to global warming. Most models agree that the MOC weakens over the next 100 years and that this reduction ranges from indistinguishable from natural variability to over 50% by 2100 (Figure 10.15). None of the AOGCM simulations shows an abrupt change when forced with the SRES emissions scenarios until 2100, but some long-term model simulations suggest that a complete cessation can result for large forcings (Stouffer and Manabe, 2003). Models of intermediate complexity indicate that thresholds in the MOC may be present but that they depend on the amount and rate of warming for a given model (Stocker and Schmittner, 1997). The few long-term simulations from AOGCMs indicate that even complete shutdowns of the MOC may be reversible (Stouffer and Manabe, 2003; Yoshida et al., 2005; Stouffer et al., 2006b). However, until millennial simulations with AOGCMs are available, the important question of potential irreversibility of an MOC shutdown remains unanswered. Both simplified models and AOGCMs agree, however, that a potentially complete shut-down of the MOC, induced by global warming, would take many decades to more than a century. There is no direct model evidence that the MOC could collapse within a few decades in response to global warming. However, a few studies do show the potential for rapid changes in the MOC (Manabe and Stouffer, 1999), and the processes concerned are poorly understood (see Section 8.7). This is not inconsistent with the palaeoclimate records. The cooling events during the last ice ages registered in the Greenland ice cores developed over a couple of centuries to millennia. In contrast, there were also a number of very rapid warmings, the so-called Dansgaard-Oeschger events (NorthGRIP Members, 2004), or rapid cooling (LeGrande et al., 2006), which evolved over decades or less, most probably associated with rapid latitudinal shifts in ocean convection sites and changes in strength of the MOC (see Section 6.3.2).



**Box 10.1, Figure 1.** Schematic illustration of various responses of a climate variable to forcing. The forcing (top panels) reaches a new stable level (left part of figure), and later approaches the original level on very long time scales (right part of the figure). The response of the climate variable (bottom panels) can be smooth (solid line) or cross a tipping point inducing a transition to a structurally different state (dashed lines). That transition can be rapid (abrupt change, long-dashed), or gradual (short-dashed), but is usually dictated by the internal dynamics of the climate system rather than the forcing. The long-term behaviour (right part) also exhibits different possibilities. Changes can be irreversible (dash-dotted) with the system settling at a different stable state, or reversible (solid, dotted) when the forcing is set back to its original value. In the latter case, the transition again can be gradual or abrupt. An example for illustration, but not the only one, is the response of the Atlantic meridional overturning circulation to a gradual change in radiative forcing.

(continued)

Recent simulations with models with ocean components that resolve topography in sufficient detail obtain a consistent pattern of a strong to complete reduction of convection in the Labrador Sea (Wood et al., 1999; Schweckendiek and Willebrand, 2005). Such changes in the convection, with implications for the atmospheric circulation, can develop within a few years (Schaeffer et al., 2002). The long-term and regional-to-hemispheric scale effects of such changes in water mass properties have not yet been investigated.

With a reduction in the MOC, the meridional heat flux also decreases in the subtropical and mid-latitudes with large-scale effects on the atmospheric circulation. In consequence, the warming of the North Atlantic surface proceeds more slowly. Even for strong reductions in MOC towards the end of the 21st century, no cooling is observed in the regions around the North Atlantic because it is overcompensated by the radiative forcing that caused the ocean response in the first place.

At high latitudes, an increase in the oceanic meridional heat flux is simulated by these models. This increase is due to both an increase in the overturning circulation in the Arctic and the advection of warmer waters from lower latitudes and thus contributes significantly to continuing sea ice reduction in the Atlantic sector of the Arctic (A. Hu et al., 2004). Few simulations have also addressed the changes in overturning in the South Atlantic and Southern Ocean. In addition to water mass modifications, this also has an effect on the transport by the Antarctic Circumpolar Current, but results are not yet conclusive.

Current understanding of the processes responsible for the initiation of an ice age indicate that a reduction or collapse of the MOC in response to global warming could not start an ice age (Berger and Loutre, 2002; Crucifix and Loutre, 2002; Yoshimori et al., 2002; Weaver and Hillaire-Marcel, 2004b).

#### **Arctic sea ice:**

Arctic sea ice is responding sensitively to global warming. While changes in winter sea ice cover are moderate, late summer sea ice is projected to disappear almost completely towards the end of the 21st century. A number of positive feedbacks in the climate system accelerate the melt back of sea ice. The ice-albedo feedback allows open water to receive more heat from the Sun during summer, and the increase in ocean heat transport to the Arctic through the advection of warmer waters and stronger circulation further reduces ice cover. Minimum arctic sea ice cover is observed in September. Model simulations indicate that the September sea ice cover decreases substantially in response to global warming, generally evolving on the time scale of the warming. With sustained warming, the late summer disappearance of a major fraction of arctic sea ice is permanent.

#### **Glaciers and ice caps:**

Glaciers and ice caps are sensitive to changes in temperature and precipitation. Observations point to a reduction in volume over the last 20 years (see Section 4.5.2), with a rate during 1993 to 2003 corresponding to  $0.77 \pm 0.22$  mm yr<sup>-1</sup> sea level equivalent, with a larger mean central estimate than that for 1961 to 1998 (corresponding to  $0.50 \pm 0.18$  mm yr<sup>-1</sup> sea level equivalent). Rapid changes are therefore already underway and enhanced by positive feedbacks associated with the surface energy balance of shrinking glaciers and newly exposed land surface in periglacial areas. Acceleration of glacier loss over the next few decades is likely (see Section 10.6.3). Based on simulations of 11 glaciers in various regions, a volume loss of 60% of these glaciers is projected by the year 2050 (Schneeberger et al., 2003). Glaciated areas in the Americas are also affected. A comparative study including seven GCM simulations at  $2 \times$  atmospheric CO<sub>2</sub> conditions inferred that many glaciers may disappear completely due to an increase in the equilibrium line altitude (Bradley et al., 2004). The disappearance of these ice bodies is much faster than a potential re-glaciation several centuries hence, and may in some areas be irreversible.

#### **Greenland and West Antarctic Ice Sheets:**

Satellite and *in situ* measurement networks have demonstrated increasing melting and accelerated ice flow around the periphery of the Greenland Ice Sheet (GIS) over the past 25 years (see Section 4.6.2). The few simulations of long-term ice sheet simulations suggest that the GIS will significantly decrease in volume and area over the coming centuries if a warmer climate is maintained (Gregory et al., 2004a; Huybrechts et al., 2004; Ridley et al., 2005). A threshold of annual mean warming of 1.9°C to 4.6°C in Greenland has been estimated for elimination of the GIS (Gregory and Huybrechts, 2006; see section 10.7.3.3), a process which would take many centuries to complete. Even if temperatures were to decrease later, the reduction of the GIS to a much smaller extent might be irreversible, because the climate of an ice-free Greenland could be too warm for accumulation; however, this result is model dependent (see Section 10.7.3.3). The positive feedbacks involved here are that once the ice sheet gets thinner, temperatures in the accumulation region are higher, increasing the melting and causing more precipitation to fall as rain rather than snow; that the lower albedo of the exposed ice-free land causes a local climatic warming; and that surface melt water might accelerate ice flow (see Section 10.6.4.2).

A collapse of the West Antarctic Ice Sheet (WAIS) has been discussed as a potential response to global warming for many years (Bindschadler, 1998; Oppenheimer, 1998; Vaughan, 2007). A complete collapse would cause a global sea level rise of about 5 m. The observed acceleration of ice streams in the Amundsen Sea sector of the WAIS, the rapidity of propagation of this signal upstream and the acceleration of glaciers that fed the Larsen B Ice Shelf after its collapse have renewed these concerns (see Section 10.6.4.2).

(continued)

It is possible that the presence of ice shelves tends to stabilise the ice sheet, at least regionally. Therefore, a weakening or collapse of ice shelves, caused by melting on the surface or by melting at the bottom by a warmer ocean, might contribute to a potential destabilisation of the WAIS, which could proceed through the positive feedback of grounding-line retreat. Present understanding is insufficient for prediction of the possible speed or extent of such a collapse (see Box 4.1 and Section 10.7.3.4).

#### **Vegetation cover:**

Irreversible and relatively rapid changes in vegetation cover and composition have occurred frequently in the past. The most prominent example is the desertification of the Sahara region about 4 to 6 ka (Claussen et al., 1999). The reason for this behaviour is believed to lie in the limits of plant communities with respect to temperature and precipitation. Once critical levels are crossed, certain species can no longer compete within their ecosystem. Areas close to vegetation boundaries will experience particularly large and rapid changes due to the slow migration of these boundaries induced by global warming. A climate model simulation into the future shows that drying and warming in South America leads to a continuous reduction in the forest of Amazonia (Cox et al., 2000, 2004). While evolving continuously over the 21st century, such a change and ultimate disappearance could be irreversible, although this result could be model dependent since an analysis of 11 AOGCMs shows a wide range of future possible rainfall changes over the Amazon (Li et al., 2006).

One of the possible 'climate surprises' concerns the role of the soil in the global carbon cycle. As the concentration of CO<sub>2</sub> is increasing, the soil is acting, in the global mean, as a carbon sink by assimilating carbon due to accelerated growth of the terrestrial biosphere (see also Section 7.3.3.1.1). However, by about 2050, a model simulation suggests that the soil changes to a source of carbon by releasing previously accumulated carbon due to increased respiration (Cox et al., 2000) induced by increasing temperature and precipitation. This represents a positive feedback to the increase in atmospheric CO<sub>2</sub>. While different models agree regarding the sign of the feedback, large uncertainties exist regarding the strength (Cox et al., 2000; Dufresne et al., 2002; Friedlingstein et al., 2006). However, the respiration increase is caused by a warmer and wetter climate. The switch from moderate sink to strong source of atmospheric carbon is rather rapid and occurs within two decades (Cox et al., 2004), but the timing of the onset is uncertain (Huntingford et al., 2004). A model intercomparison reveals that once set in motion, the increase in respiration continues even after the CO<sub>2</sub> levels are held constant (Cramer et al., 2001). Although considerable uncertainties still exist, it is clear that feedback mechanisms between the terrestrial biosphere and the physical climate system exist which can qualitatively and quantitatively alter the response to an increase in radiative forcing.

#### **Atmospheric and ocean-atmosphere regimes:**

Changes in weather patterns and regimes can be abrupt processes that might occur spontaneously due to dynamical interactions in the atmosphere-ice-ocean system, or manifest as the crossing of a threshold in the system due to slow external forcing. Such shifts have been reported in SST in the tropical Pacific, leading to a more positive ENSO phase (Trenberth, 1990), in the stratospheric polar vortex (Christiansen, 2003), in a shut-down of deep convection in the Greenland Sea (Bönisch et al., 1997; Ronski and Budeus, 2005) and in an abrupt freshening of the Labrador Sea (Dickson et al., 2002). In the latter, the freshening evolved throughout the entire depth but the shift in salinity was particularly rapid: the 34.87 psu isohaline plunged from seasonally surface to 1,600 metres within 2 years with no return since 1973.

In a long, unforced model simulation, a period of a few decades with anomalously cold temperatures (up to 10 standard deviations below average) in the region south of Greenland was found (Hall and Stouffer, 2001). It was caused by persistent winds that changed the stratification of the ocean and inhibited convection, thereby reducing heat transfer from the ocean to the atmosphere. Similar results were found in a different model in which the major convection site in the North Atlantic spontaneously switched to a more southerly location for several decades to centuries (Goosse et al., 2002). Other simulations show that the slowly increasing radiative forcing is able to cause transitions in the convective activity in the Greenland-Iceland-Norwegian Sea that have an influence on the atmospheric circulation over Greenland and Western Europe (Schaeffer et al., 2002). The changes unfold within a few years and indicate that the system has crossed a threshold.

A multi-model analysis of regimes of polar variability (NAO, Arctic and Antarctic Oscillations) reveals that the simulated trends in the 21st century influence the Arctic and Antarctic Oscillations and point towards more zonal circulation (Rauthe et al., 2004). Temperature changes associated with changes in atmospheric circulation regimes such as the NAO can exceed in certain regions (e.g., Northern Europe) the long-term global warming that causes such inter-decadal regime shifts (Dorn et al., 2003).

### 10.3.5 Changes in Properties of Modes of Variability

#### 10.3.5.1 *Interannual Variability in Surface Air Temperature and Precipitation*

Future changes in anthropogenic forcing will result not only in changes in the mean climate state but also in the variability of climate. Addressing the interannual variability in monthly mean surface air temperature and precipitation of 19 AOGCMs in CMIP2, Räisänen (2002) finds a decrease in temperature variability during the cold season in the extratropical NH and a slight increase in temperature variability in low latitudes and in warm season northern mid-latitudes. The former is likely due to the decrease of sea ice and snow with increasing temperature. The summer decrease in soil moisture over the mid-latitude land surfaces contributes to the latter. Räisänen (2002) also finds an increase in monthly mean precipitation variability in most areas, both in absolute value (standard deviation) and in relative value (coefficient of variation). However, the significance level of these variability changes is markedly lower than that for time mean climate change. Similar results were obtained from 18 AOGCM simulations under the SRES A2 scenario (Giorgi and Bi, 2005).

#### 10.3.5.2 *Monsoons*

In the tropics, an increase in precipitation is projected by the end of the 21st century in the Asian monsoon and the southern part of the West African monsoon with some decreases in the Sahel in northern summer (Cook and Vizy, 2006), as well as increases in the Australian monsoon in southern summer in a warmer climate (Figure 10.9). The monsoonal precipitation in Mexico and Central America is projected to decrease in association with increasing precipitation over the eastern equatorial Pacific that affects Walker Circulation and local Hadley Circulation changes (Figure 10.9). A more detailed assessment of regional monsoon changes is provided in Chapter 11.

As a projected global warming will be more rapid over land than over the oceans, the continental-scale land-sea thermal contrast will become larger in summer and smaller in winter. Based on this, a simple idea is that the summer monsoon will be stronger and the winter monsoon will be weaker in the future than the present. However, model results are not as straightforward as this simple consideration. Tanaka et al. (2005) define the intensities of Hadley, Walker and monsoon circulations using the velocity potential fields at 200 hPa. Using 15 AOGCMs, they show a weakening of these tropical circulations by 9%, 8% and 14%, respectively, by the late 21st century compared to the late 20th century. Using eight AOGCMs, Ueda et al. (2006) demonstrate that pronounced warming over the tropics results in a weakening of the Asian summer monsoon circulations in relation to a reduction in the meridional thermal gradients between the Asian continent and adjacent oceans.

Despite weakening of the dynamical monsoon circulation, atmospheric moisture buildup due to increased greenhouse

gases and consequent temperature increase results in a larger moisture flux and more precipitation for the Indian monsoon (Douville et al., 2000; IPCC, 2001; Ashrit et al., 2003; Meehl and Arblaster, 2003; May, 2004; Ashrit et al., 2005). For the South Asian summer monsoon, models suggest a northward shift of lower-tropospheric monsoon wind systems with a weakening of the westerly flow over the northern Indian Ocean (Ashrit et al., 2003, 2005). Over Africa in northern summer, multi-model analysis projects an increase in rainfall in East and Central Africa, a decrease in the Sahel, and increases along the Gulf of Guinea coast (Figure 10.9). However, some individual models project an increase of rainfall in more extensive areas of West Africa related to a projected northward movement of the Sahara and the Sahel (Liu et al., 2002; Haarsma et al., 2005). Whether the Sahel will be more or less wet in the future is thus uncertain, although a multi-model assessment of the West African monsoon indicates that the Sahel could become marginally more dry (Cook and Vizy, 2006). This inconsistency of the rainfall projections may be related to AOGCM biases, or an unclear relationship between Gulf of Guinea and Indian Ocean warming, land use change and the West African monsoon. Nonlinear feedbacks that may exist within the West African climate system should also be considered (Jenkins et al., 2005).

Most model results project increased interannual variability in season-averaged Asian monsoon precipitation associated with an increase in its long-term mean value (e.g., Hu et al., 2000b; Räisänen, 2002; Meehl and Arblaster, 2003). Hu et al. (2000a) relate this to increased variability in the tropical Pacific SST (El Niño variability) in their model. Meehl and Arblaster (2003) relate the increased monsoon precipitation variability to increased variability in evaporation and precipitation in the Pacific due to increased SSTs. Thus, the South Asian monsoon variability is affected through the Walker Circulation such that the role of the Pacific Ocean dominates and that of the Indian Ocean is secondary.

Atmospheric aerosol loading affects regional climate and its future changes (see Chapter 7). If the direct effect of the aerosol increase is considered, surface temperatures will not get as warm because the aerosols reflect solar radiation. For this reason, land-sea temperature contrast becomes smaller than in the case without the direct aerosol effect, and the summer monsoon becomes weaker. Model simulations of the Asian monsoon project that the sulphate aerosols' direct effect reduces the magnitude of precipitation change compared with the case of only greenhouse gas increases (Emori et al., 1999; Roeckner et al., 1999; Lal and Singh, 2001). However, the relative cooling effect of sulphate aerosols is dominated by the effects of increasing greenhouse gases by the end of the 21st century in the SRES marker scenarios (Figure 10.26), leading to the increased monsoon precipitation at the end of the 21st century in these scenarios (see Section 10.3.2.3). Furthermore, it is suggested that aerosols with high absorptivity such as black carbon absorb solar radiation in the lower atmosphere, cool the surface, stabilise the atmosphere and reduce precipitation (Ramanathan et al., 2001). The solar

radiation reaching the surface decreases as much as 50% locally, which could reduce the surface warming by greenhouse gases (Ramanathan et al., 2005). These atmospheric brown clouds could cause precipitation to increase over the Indian Ocean in winter and decrease in the surrounding Indonesia region and the western Pacific Ocean (Chung et al., 2002), and could reduce the summer monsoon precipitation in South and East Asia (Menon et al., 2002; Ramanathan et al., 2005). However, the total influence on monsoon precipitation of temporally varying direct and indirect effects of various aerosol species is still not resolved and the subject of active research.

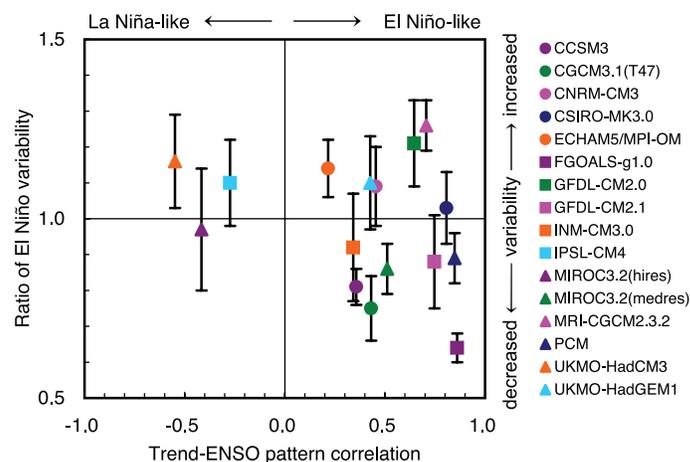
### 10.3.5.3 Mean Tropical Pacific Climate Change

This subsection assesses changes in mean tropical Pacific climate. Enhanced greenhouse gas concentrations result in a general increase in SST, which will not be spatially uniform in association with a general reduction in tropical circulations in a warmer climate (see Section 10.3.5.2). Figures 10.8 and 10.9 indicate that SST increases more over the eastern tropical Pacific than over the western tropical Pacific, together with a decrease in the sea level pressure (SLP) gradient along the equator and an eastward shift of the tropical Pacific rainfall distribution. These background tropical Pacific changes can be called an El Niño-like mean state change (upon which individual El Niño-Southern Oscillation (ENSO) events occur). Although individual models show a large scatter of ‘ENSO-ness’ (Collins and The CMIP Modelling Groups, 2005; Yamaguchi and Noda, 2006), an ENSO-like global warming pattern with positive polarity (i.e., El Niño-like mean state change) is simulated based on the spatial anomaly patterns of SST, SLP and precipitation (Figure 10.16; Yamaguchi and Noda, 2006). The El Niño-like change may be attributable to the general reduction in tropical circulations resulting from the increased dry static stability in the tropics in a warmer climate (Knutson and Manabe, 1995; Sugi et al., 2002; Figure 10.7). An eastward displacement of precipitation in the tropical Pacific accompanies an intensified and south-westward displaced subtropical anticyclone in the western Pacific, which can be effective in transporting moisture from the low latitudes to the Meiyu/Baiu region, thus generating more precipitation in the East Asian summer monsoon (Kitoh and Uchiyama, 2006).

In summary, the multi-model mean projects a weak shift towards conditions which may be described as ‘El Niño-like’, with SSTs in the central and eastern equatorial Pacific warming more than those in the west, and with an eastward shift in mean precipitation, associated with weaker tropical circulations.

### 10.3.5.4 El Niño

This subsection addresses the projected change in the amplitude, frequency and spatial pattern of El Niño. Guilyardi (2006) assessed mean state, coupling strength and modes (SST mode resulting from local SST-wind interaction or thermocline mode resulting from remote wind-thermocline feedbacks), using the pre-industrial control and stabilised  $2 \times$  and  $4 \times$  atmospheric



**Figure 10.16.** Base state change in average tropical Pacific SSTs and change in El Niño variability simulated by AOGCMs (see Table 8.1 for model details). The base state change (horizontal axis) is denoted by the spatial anomaly pattern correlation coefficient between the linear trend of SST in the  $1\% \text{ yr}^{-1} \text{ CO}_2$  increase climate change experiment and the first Empirical Orthogonal Function (EOF) of SST in the control experiment over the area  $10^\circ\text{S}$  to  $10^\circ\text{N}$ ,  $120^\circ\text{E}$  to  $80^\circ\text{W}$  (reproduced from Yamaguchi and Noda, 2006). Positive correlation values indicate that the mean climate change has an El Niño-like pattern, and negative values are La Niña-like. The change in El Niño variability (vertical axis) is denoted by the ratio of the standard deviation of the first EOF of sea level pressure (SLP) between the current climate and the last 50 years of the SRES A2 experiments (2051–2100), except for FGOALS-g1.0 and MIROC3.2(hires), for which the SRES A1B was used, and UKMO-HadGEM1 for which the  $1\% \text{ yr}^{-1} \text{ CO}_2$  increase climate change experiment was used, in the region  $30^\circ\text{S}$  to  $30^\circ\text{N}$ ,  $30^\circ\text{E}$  to  $60^\circ\text{W}$  with a five-month running mean (reproduced from van Oldenborgh et al., 2005). Error bars indicate the 95% confidence interval. Note that tropical Pacific base state climate changes with either El Niño-like or La Niña-like patterns are not permanent El Niño or La Niña events, and all still have ENSO inter-annual variability superimposed on that new average climate state in a future warmer climate.

$\text{CO}_2$  simulations in a multi-model ensemble. The models that exhibit the largest El Niño amplitude change in scenario experiments are those that shift towards a thermocline mode. The observed 1976 climate shift in the tropical Pacific actually involved such a mode shift (Fedorov and Philander, 2001). The mean state change, through change in the sensitivity of SST variability to surface wind stress, plays a key role in determining the ENSO variance characteristics (Z. Hu et al., 2004; Zelle et al., 2005). For example, a more stable ENSO system is less sensitive to changes in the background state than one that is closer to instability (Zelle et al., 2005). Thus, GCMs with an improper simulation of present-day climate mean state and air-sea coupling strength are not suitable for ENSO amplitude projections. Van Oldenborgh et al. (2005) calculate the change in ENSO variability by the ratio of the standard deviation of the first Empirical Orthogonal Function (EOF) of SLP between the current climate and in the future (Figure 10.16), which shows that changes in ENSO interannual variability differ from model to model. They categorised 19 models based on their skill in the present-day ENSO simulations. Using the most realistic 6 out of 19 models, they find no statistically significant changes in the amplitude of ENSO variability in the future. Large uncertainty in the skewness of the variability limits the assessment of the future relative strength of El Niño and La Niña events.

Merryfield (2006) also analysed a multi-model ensemble and finds a wide range of behaviour for future El Niño amplitude, ranging from little change to larger El Niño events to smaller El Niño events, although several models that simulated some observed aspects of present-day El Niño events showed future increases in El Niño amplitude. However, significant multi-decadal fluctuations in El Niño amplitude in observations and in long coupled model control runs add another complicating factor to attempting to discern whether any future changes in El Niño amplitude are due to external forcing or are simply a manifestation of internal multi-decadal variability (Meehl et al., 2006a). Even with the larger warming scenario under  $4 \times$  atmospheric CO<sub>2</sub> climate, Yeh and Kirtman (2005) find that despite the large changes in the tropical Pacific mean state, the changes in ENSO amplitude are highly model dependent. Therefore, there are no clear indications at this time regarding future changes in El Niño amplitude in a warmer climate. However, as first noted in the TAR, ENSO teleconnections over North America appear to weaken due at least in part to the mean change of base state mid-latitude atmospheric circulation (Meehl et al., 2006a).

In summary, all models show continued ENSO interannual variability in the future no matter what the change in average background conditions, but changes in ENSO interannual variability differ from model to model. Based on various assessments of the current multi-model archive, in which present-day El Niño events are now much better simulated than in the TAR, there is no consistent indication at this time of discernible future changes in ENSO amplitude or frequency.

### 10.3.5.5 ENSO-Monsoon Relationship

The El Niño-Southern Oscillation affects interannual variability throughout the tropics through changes in the Walker Circulation. Analysis of observational data finds a significant correlation between ENSO and tropical circulation and precipitation such that there is a tendency for less Indian summer monsoon rainfall in El Niño years and above normal rainfall in La Niña years. Recent analyses have revealed that the correlation between ENSO and the Indian summer monsoon has decreased recently, and many hypotheses have been put forward (see Chapter 3). With respect to global warming, one hypothesis is that the Walker Circulation (accompanying ENSO) shifted south-eastward, reducing downward motion in the Indian monsoon region, which originally suppressed precipitation in that region at the time of El Niño, but now produces normal precipitation as a result (Krishna Kumar et al., 1999). Another explanation is that as the ground temperature of the Eurasian continent has risen in the winter-spring season, the temperature difference between the continent and the ocean has increased, thereby causing more precipitation, and the Indian monsoon is normal in spite of the occurrence of El Niño (Ashrit et al., 2001).

An earlier version of an AOGCM developed at the Max Planck Institute (MPI) (Ashrit et al., 2001) and the Action de Recherche Petite Echelle Grande Echelle/Océan Parallélisé

(ARPEGE/OPA) model (Ashrit et al., 2003) simulated no global-warming related change in the ENSO-monsoon relationship, although a decadal-scale fluctuation is seen, suggesting that a weakening of the relationship might be part of the natural variability. However, Ashrit et al. (2001) show that while the impact of La Niña does not change, the influence of El Niño on the monsoon becomes small, suggesting the possibility of asymmetric behaviour of the changes in the ENSO-monsoon relationship. On the other hand, the MRI-CGCM2 (see Table 8.1 for model details) indicates a weakening of the correlation into the 21st century, particularly after 2050 (Ashrit et al., 2005). The MRI-CGCM2 model results support the above hypothesis that the Walker Circulation shifts eastward and no longer influences India at the time of El Niño in a warmer climate. Camberlin et al. (2004) and van Oldenborgh and Burgers (2005) find decadal fluctuations in the effect of ENSO on regional precipitation. In most cases, these fluctuations may reflect natural variability in the ENSO teleconnection, and long-term correlation trends may be comparatively weaker.

The Tropospheric Biennial Oscillation (TBO) has been suggested as a fundamental set of coupled interactions in the Indo-Pacific region that encompasses ENSO and the Asian-Australian monsoon, and the TBO has been shown to be simulated by current AOGCMs (see Chapter 8). Nanjundiah et al. (2005) analyse a multi-model data set to show that, for models that successfully simulate the TBO for present-day climate, the TBO becomes more prominent in a future warmer climate due to changes in the base state climate, although, as with ENSO, there is considerable inherent decadal variability in the relative dominance of TBO and ENSO.

In summary, the ENSO-monsoon relationship can vary due to natural variability. Model projections suggest that a future weakening of the ENSO-monsoon relationship could occur in a future warmer climate.

### 10.3.5.6 Annular Modes and Mid-Latitude Circulation Changes

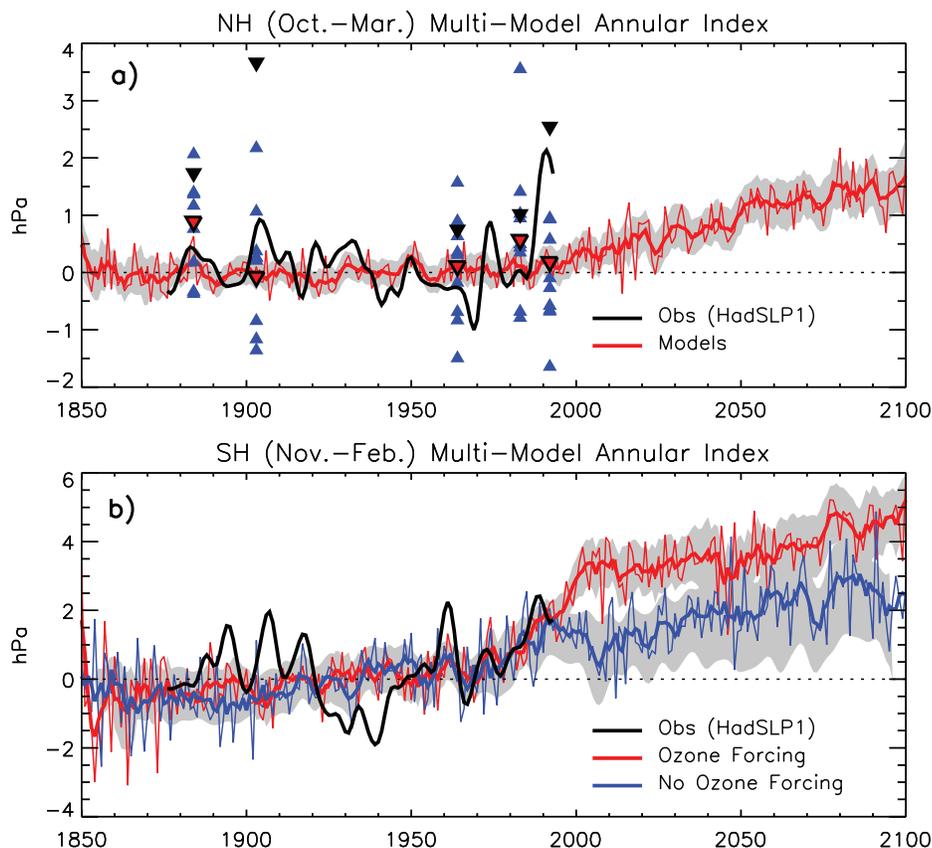
Many simulations project some decrease in the arctic surface pressure in the 21st century, as seen in the multi-model average (see Figure 10.9). This contributes to an increase in indices of the Northern Annular Mode (NAM) or the Arctic Oscillation (AO), as well as the NAO, which is closely related to the NAM in the Atlantic sector (see Chapter 8). In the recent multi-model analyses, more than half of the models exhibit a positive trend in the NAM (Rauthe et al., 2004; Miller et al., 2006) and/or NAO (Osborn, 2004; Kuzmina et al., 2005). Although the magnitude of the trends shows a large variation among different models, Miller et al. (2006) find that none of the 14 models exhibits a trend towards a lower NAM index and higher arctic SLP. In another multi-model analysis, Stephenson et al. (2006) show that of the 15 models able to simulate the NAO pressure dipole, 13 predict a positive increase in the NAO index with increasing CO<sub>2</sub> concentrations, although the magnitude of the response is generally small and model dependent. However, the multi-model average from the larger number (21) of models shown in

Figure 10.9 indicates that it is likely that the NAM index would not notably decrease in a future warmer climate. The average of IPCC-AR4 simulations from 13 models suggests the increase of the NAM index becomes statistically significant early in the 21st century (Figure 10.17a, Miller et al., 2006).

The spatial patterns of the simulated SLP trends vary among different models, in spite of close correlations of the models' leading patterns of interannual (or internal) variability with the observations (Osborn, 2004; Miller et al., 2006). However, at the hemispheric scale of SLP change, the reduction in the Arctic is seen in the multi-model mean (Figure 10.9), although the change is smaller than the inter-model standard deviation. Besides the decrease in the arctic region, increases over the North Pacific and the Mediterranean Sea exceed the inter-model standard deviation; the latter suggests an association with a north-eastward shift of the NAO's centre of action (Hu and Wu, 2004). The diversity of the patterns seems to reflect different responses in the Aleutian Low (Rauthe et al., 2004) in the North Pacific. Yamaguchi and Noda (2006) discuss the modelled response of ENSO versus AO, and find that many models project a positive AO-like change. In the North Pacific at high latitudes, however, the SLP anomalies are incompatible between the El Niño-like change and the positive AO-like

change, because models that project an El Niño-like change over the Pacific simulate a non-AO-like pattern in the polar region. As a result, the present models cannot fully determine the relative importance of the mechanisms inducing the positive AO-like change and those inducing the ENSO-like change, leading to scatter in global warming patterns at regional scales over the North Pacific. Rauthe et al. (2004) suggest that the effects of sulphate aerosols contribute to a deepening of the Aleutian Low resulting in a slower or smaller increase in the AO index.

Analyses of results from various models indicate that the NAM can respond to increasing greenhouse gas concentrations through tropospheric processes (Fyfe et al., 1999; Gillett et al., 2003; Miller et al., 2006). Greenhouse gases can also drive a positive NAM trend through changes in the stratospheric circulation, similar to the mechanism by which volcanic aerosols in the stratosphere force positive annular changes (Shindell et al., 2001). Models with their upper boundaries extending farther into the stratosphere exhibit, on average, a relatively larger increase in the NAM index and respond consistently to the observed volcanic forcing (Figure 10.17a, Miller et al., 2006), implying the importance of the connection between the troposphere and the stratosphere.



**Figure 10.17.** (a) Multi-model mean of the regression of the leading EOF of ensemble mean Northern Hemisphere sea level pressure (NH SLP, thin red line). The time series of regression coefficients has zero mean between year 1900 and 1970. The thick red line is a 10-year low-pass filtered version of the mean. The grey shading represents the inter-model spread at the 95% confidence level and is filtered. A filtered version of the observed SLP from the Hadley Centre (HadSLP1) is shown in black. The regression coefficient for the winter following a major tropical eruption is marked by red, blue and black triangles for the multi-model mean, the individual model mean and observations, respectively. (b) As in (a) for Southern Hemisphere SLP for models with (red) and without (blue) ozone forcing. Adapted from Miller et al. (2006).

A plausible explanation for the cause of the upward NAM trend simulated by the models is an intensification of the polar vortex resulting from both tropospheric warming and stratospheric cooling mainly due to the increase in greenhouse gases (Shindell et al., 2001; Sigmond et al., 2004; Rind et al., 2005a). The response may not be linear with the magnitude of radiative forcing (Gillett et al., 2002) since the polar vortex response is attributable to an equatorward refraction of planetary waves (Eichelberger and Holton, 2002) rather than radiative forcing itself. Since the long-term variation in the NAO is closely related to SST variations (Rodwell et al., 1999), it is considered essential that the projection of the changes in the tropical SST (Hoerling et al., 2004; Hurrell et al., 2004) and/or meridional gradient of the SST change (Rind et al., 2005b) is reliable.

The future trend in the Southern Annular Mode (SAM) or the Antarctic Oscillation (AAO) has been projected in a number of model simulations (Gillett and Thompson, 2003; Shindell and Schmidt, 2004; Arblaster and Meehl, 2006; Miller et al., 2006). According to the latest multi-model analysis (Miller et al., 2006), most models indicate a positive trend in the SAM index, and a declining trend in the antarctic SLP (as seen in Figure 10.9), with a higher likelihood than for the future NAM trend. On average, a larger positive trend is projected during the late 20th century by models that include stratospheric ozone changes than those that do not (Figure 10.17b), although during the 21st century, when ozone changes are smaller, the SAM trends of models with and without ozone are similar. The cause of the positive SAM trend in the second half of the 20th century is mainly attributed to stratospheric ozone depletion, evidenced by the fact that the signal is largest in the lower stratosphere in austral spring through summer (Thompson and Solomon, 2002; Arblaster and Meehl, 2006). However, increases in greenhouse gases are also important factors (Shindell and Schmidt, 2004; Arblaster and Meehl, 2006) for the year-round positive SAM trend induced by meridional temperature gradient changes (Brandefelt and Källén, 2004). During the 21st century, although the ozone amount is expected to stabilise or recover, the polar vortex intensification is likely to continue due to the increases in greenhouse gases (Arblaster and Meehl, 2006).

It is implied that the future change in the annular modes leads to modifications of the future change in various fields such as surface temperatures, precipitation and sea ice with regional features similar to those for the modes of natural variability (e.g., Hurrell et al., 2003). For instance, the surface warming in winter would be intensified in northern Eurasia and most of North America while weakened in the western North Atlantic, and winter precipitation would increase in northern Europe while decreasing in southern Europe. The atmospheric circulation change would also affect the ocean circulations. Sakamoto et al. (2005) simulate an intensification of the Kuroshio Current but no shift in the Kuroshio Extension in response to an AO-like circulation change for the 21st century. However, Sato et al. (2006) simulate a northward shift of the Kuroshio Extension, which leads to a strong warming off the eastern coast of Japan.

In summary, the future changes in the extratropical circulation variability are likely to be characterised by increases in positive phases of both the NAM and the SAM. The response in the NAM to anthropogenic forcing might not be distinct from the larger multi-decadal internal variability in the first half of the 21st century. The change in the SAM would appear earlier than in the NAM since stratospheric ozone depletion acts as an additional forcing. The positive trends in annular modes would influence the regional changes in temperature, precipitation and other fields, similar to those that accompany the NAM and the SAM in the present climate, but would be superimposed on the global-scale changes in a future warmer climate.

### 10.3.6 Future Changes in Weather and Climate Extremes

Projections of future changes in extremes rely on an increasingly sophisticated set of models and statistical techniques. Studies assessed in this section rely on multi-member ensembles (three to five members) from single models, analyses of multi-model ensembles ranging from 8 to 15 or more AOGCMs, and a perturbed physics ensemble with a single mixed-layer model with over 50 members. The discussion here is intended to identify general characteristics of changes in extremes in a global context. Chapter 3 provides a definition of weather and climate extremes, and Chapter 11 addresses changes in extremes for specific regions.

#### 10.3.6.1 Precipitation Extremes

A long-standing result from global coupled models noted in the TAR is a projected increase in the chance of summer drying in the mid-latitudes in a future warmer climate with associated increased risk of drought. This is shown in Figure 10.12, and has been documented in the more recent generation of models (Burke et al., 2006; Meehl et al., 2006b; Rowell and Jones, 2006). For example, Wang (2005) analyse 15 recent AOGCMs and show that in a future warmer climate, the models simulate summer dryness in most parts of the northern subtropics and mid-latitudes, but with a large range in the amplitude of summer dryness across models. Droughts associated with this summer drying could result in regional vegetation die-offs (Breshears et al., 2005) and contribute to an increase in the percentage of land area experiencing drought at any one time, for example, extreme drought increasing from 1% of present-day land area to 30% by the end of the century in the A2 scenario (Burke et al., 2006). Drier soil conditions can also contribute to more severe heat waves as discussed in Section 10.3.6.2 (Brabson et al., 2005).

Associated with the risk of drying is a projected increase in the chance of intense precipitation and flooding. Although somewhat counter-intuitive, this is because precipitation is projected to be concentrated into more intense events, with longer periods of little precipitation in between. Therefore, intense and heavy episodic rainfall events with high runoff amounts are interspersed with longer relatively dry periods with increased evapotranspiration, particularly in the subtropics

## Frequently Asked Question 10.1

# Are Extreme Events, Like Heat Waves, Droughts or Floods, Expected to Change as the Earth's Climate Changes?

*Yes; the type, frequency and intensity of extreme events are expected to change as Earth's climate changes, and these changes could occur even with relatively small mean climate changes. Changes in some types of extreme events have already been observed, for example, increases in the frequency and intensity of heat waves and heavy precipitation events (see FAQ 3.3).*

In a warmer future climate, there will be an increased risk of more intense, more frequent and longer-lasting heat waves. The European heat wave of 2003 is an example of the type of extreme heat event lasting from several days to over a week that is likely to become more common in a warmer future climate. A related aspect of temperature extremes is that there is likely to be a decrease in the daily (diurnal) temperature range in most regions. It is also likely that a warmer future climate would have fewer frost days (i.e., nights where the temperature dips below freezing). Growing season length is related to number of frost days, and has been projected to increase as climate warms. There is likely to be a decline in the frequency of cold air outbreaks (i.e., periods of extreme cold lasting from several days to over a week) in NH winter in most areas. Exceptions could occur in areas with the smallest reductions of extreme cold in western North America, the North Atlantic and southern Europe and Asia due to atmospheric circulation changes.

In a warmer future climate, most Atmosphere–Ocean General Circulation Models project increased summer dryness and winter wetness in most parts of the northern middle and high latitudes. Summer dryness indicates a greater risk of drought. Along with the risk of drying, there is an increased chance of intense precipitation and flooding due to the greater water-holding capacity of a warmer atmosphere. This has already been observed and is projected to continue because in a warmer world, precipitation tends to be concentrated into more intense events, with longer periods of little precipitation in between. Therefore, intense and heavy downpours would be interspersed with longer relatively dry periods. Another aspect of these projected changes is that wet extremes are projected to become more severe in many areas

where mean precipitation is expected to increase, and dry extremes are projected to become more severe in areas where mean precipitation is projected to decrease.

In concert with the results for increased extremes of intense precipitation, even if the wind strength of storms in a future climate did not change, there would be an increase in extreme rainfall intensity. In particular, over NH land, an increase in the likelihood of very wet winters is projected over much of central and northern Europe due to the increase in intense precipitation during storm events, suggesting an increased chance of flooding over Europe and other mid-latitude regions due to more intense rainfall and snowfall events producing more runoff. Similar results apply for summer precipitation, with implications for more flooding in the Asian monsoon region and other tropical areas. The increased risk of floods in a number of major river basins in a future warmer climate has been related to an increase in river discharge with an increased risk of future intense storm-related precipitation events and flooding. Some of these changes would be extensions of trends already underway.

There is evidence from modelling studies that future tropical cyclones could become more severe, with greater wind speeds and more intense precipitation. Studies suggest that such changes may already be underway; there are indications that the average number of Category 4 and 5 hurricanes per year has increased over the past 30 years. Some modelling studies have projected a decrease in the number of tropical cyclones globally due to the increased stability of the tropical troposphere in a warmer climate, characterised by fewer weak storms and greater numbers of intense storms. A number of modelling studies have also projected a general tendency for more intense but fewer storms outside the tropics, with a tendency towards more extreme wind events and higher ocean waves in several regions in association with those deepened cyclones. Models also project a poleward shift of storm tracks in both hemispheres by several degrees of latitude.

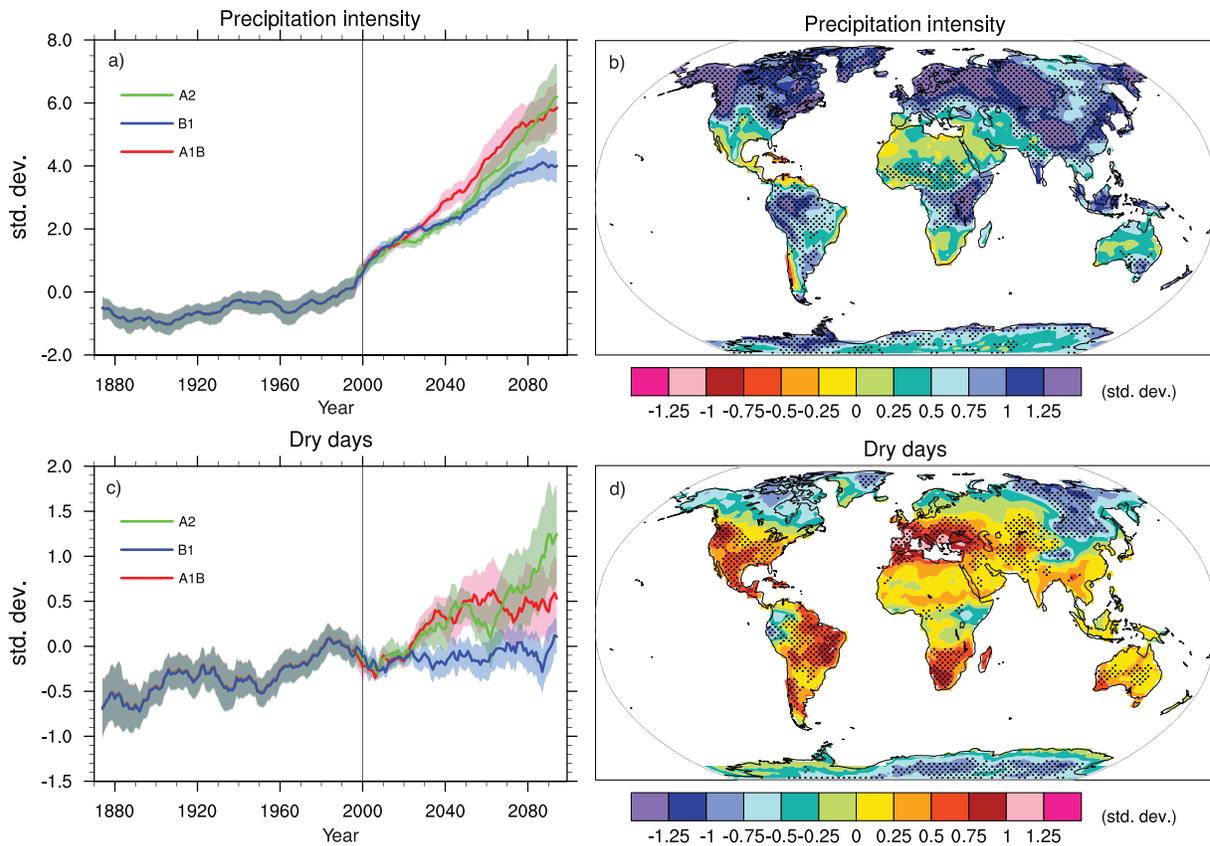
as discussed in Section 10.3.6.2 in relation to Figure 10.19 (Frei et al., 1998; Allen and Ingram, 2002; Palmer and Räisänen, 2002; Christensen and Christensen, 2003; Beniston, 2004; Christensen and Christensen, 2004; Pal et al., 2004; Meehl et al., 2005a). However, increases in the frequency of dry days do not necessarily mean a decrease in the frequency of extreme high rainfall events depending on the threshold used to define such events (Barnett et al., 2006). Another aspect of these changes has been related to the mean changes in precipitation, with wet extremes becoming more severe in many areas where mean precipitation increases, and dry extremes where the mean precipitation decreases (Kharin and Zwiers, 2005; Meehl et al., 2005a; Räisänen, 2005a; Barnett et al., 2006). However, analysis of the 53-member perturbed physics ensemble indicates that the change in the frequency of extreme precipitation at an individual location can be difficult to estimate definitively due to model parametrization uncertainty (Barnett et al., 2006). Some specific regional aspects of these changes in precipitation extremes are discussed further in Chapter 11.

Climate models continue to confirm the earlier results that in a future climate warmed by increasing greenhouse gases, precipitation intensity (e.g., proportionately more precipitation per precipitation event) is projected to increase over most regions (Wilby and Wigley, 2002; Kharin and Zwiers, 2005; Meehl et al., 2005a; Barnett et al., 2006), and the increase in precipitation extremes is greater than changes in mean precipitation (Kharin and Zwiers, 2005). As discussed in Chapter 9, this is related to the fact that the energy budget of the atmosphere constrains increases in large-scale mean precipitation, but extreme precipitation relates to increases in moisture content and thus the nonlinearities involved with the Clausius-Clapeyron relationship such that, for a given increase in temperature, increases in extreme precipitation can be more than the mean precipitation increase (e.g., Allen and Ingram, 2002). Additionally, time scale can play a role whereby increases in the frequency of seasonal mean rainfall extremes can be greater than the increases in the frequency of daily extremes (Barnett et al., 2006). The increase in mean and extreme precipitation in various regions has been attributed to contributions from both dynamic and thermodynamic processes associated with global warming (Emori and Brown, 2005). The greater increase in extreme precipitation compared to the mean is attributed to the greater thermodynamic effect on the extremes due to increases in water vapour, mainly over subtropical areas. The thermodynamic effect is important nearly everywhere, but changes in circulation also contribute to the pattern of precipitation intensity changes at middle and high latitudes (Meehl et al., 2005a). Kharin and Zwiers (2005) show that changes in both the location and scale of the extreme value distribution produce increases in precipitation extremes substantially greater than increases in annual mean precipitation. An increase in the scale parameter from the gamma distribution represents an increase in precipitation intensity, and various regions such as the NH land areas in winter showed particularly high values of increased scale parameter (Semenov and Bengtsson, 2002; Watterson and Dix, 2003). Time-slice

simulations with a higher-resolution model ( $\sim 1^\circ$ ) show similar results using changes in the gamma distribution, namely increased extremes in the hydrological cycle (Voss et al., 2002). However, some regional decreases are also projected such as over the subtropical oceans (Semenov and Bengtsson, 2002).

A number of studies have noted the connection between increased rainfall intensity and an implied increase in flooding. McCabe et al. (2001) and Watterson (2005) show a projected increase in extreme rainfall intensity with the extra-tropical surface lows, particularly over NH land, with an implied increase in flooding. In a multi-model analysis of the CMIP models, Palmer and Räisänen (2002) show an increased likelihood of very wet winters over much of central and northern Europe due to an increase in intense precipitation associated with mid-latitude storms, suggesting more floods across Europe (see also Chapter 11). They found similar results for summer precipitation with implications for greater flooding in the Asian monsoon region in a future warmer climate. Similarly, Milly et al. (2002), Arora and Boer (2001) and Voss et al. (2002) relate the increased risk of floods in a number of major river basins in a future warmer climate to an increase in spring river discharge related to increased winter snow depth in some regions. Christensen and Christensen (2003) conclude that there could be an increased risk of summer flooding in Europe.

Globally averaged time series of the Frich et al. (2002) indices in the multi-model analysis of Tebaldi et al. (2006) show simulated increases in precipitation intensity during the 20th century continuing through the 21st century (Figure 10.18a,b), along with a somewhat weaker and less consistent trend of increasing dry periods between rainfall events for all scenarios (Figure 10.18c,d). Part of the reason for these results is shown in the geographic maps for these quantities, where precipitation intensity increases almost everywhere, but particularly at middle and high latitudes where mean precipitation also increases (Meehl et al., 2005a; compare Figure 10.18b to Figure 10.9). However, in Figure 10.18d, there are regions of increased runs of dry days between precipitation events in the subtropics and lower mid-latitudes, but decreased runs of dry days at higher mid-latitudes and high latitudes where mean precipitation increases (compare Figure 10.9 with Figure 10.18d). Since there are areas of both increases and decreases in consecutive dry days between precipitation events in the multi-model average (Figure 10.9), the global mean trends are smaller and less consistent across models as shown in Figure 10.18. Consistency of response in a perturbed physics ensemble with one model shows only limited areas of increased frequency of wet days in July, and a larger range of changes in precipitation extremes relative to the control ensemble mean in contrast to the more consistent response of temperature extremes (Section 10.6.3.2), indicating a less consistent response for precipitation extremes in general compared to temperature extremes (Barnett et al., 2006). Analysis of the Frich et al. (2002) precipitation indices in a 20-km resolution global model shows similar results to those in Figure 10.18, with particularly large increases in precipitation intensity in South Asia and West Africa (Kamiguchi et al., 2005).



**Figure 10.18.** Changes in extremes based on multi-model simulations from nine global coupled climate models, adapted from Tebaldi et al. (2006). (a) Globally averaged changes in precipitation intensity (defined as the annual total precipitation divided by the number of wet days) for a low (SRES B1), middle (SRES A1B) and high (SRES A2) scenario. (b) Changes in spatial patterns of simulated precipitation intensity between two 20-year means (2080–2099 minus 1980–1999) for the A1B scenario. (c) Globally averaged changes in dry days (defined as the annual maximum number of consecutive dry days). (d) Changes in spatial patterns of simulated dry days between two 20-year means (2080–2099 minus 1980–1999) for the A1B scenario. Solid lines in (a) and (c) are the 10-year smoothed multi-model ensemble means; the envelope indicates the ensemble mean standard deviation. Stippling in (b) and (d) denotes areas where at least five of the nine models concur in determining that the change is statistically significant. Extreme indices are calculated only over land following Frich et al. (2002). Each model's time series was centred on its 1980 to 1999 average and normalised (rescaled) by its standard deviation computed (after de-trending) over the period 1960 to 2099. The models were then aggregated into an ensemble average, both at the global and at the grid-box level. Thus, changes are given in units of standard deviations.

### 10.3.6.2 Temperature Extremes

The TAR concluded that there was a very likely risk of increased high temperature extremes (and reduced risk of low temperature extremes) with more extreme heat episodes in a future climate. The latter result has been confirmed in subsequent studies (Yonetani and Gordon, 2001). Kharin and Zwiers (2005) show in a single model that future increases in temperature extremes follow increases in mean temperature over most of the world except where surface properties change (melting snow, drying soil). Furthermore, they show that in most instances warm extremes correspond to increases in daily maximum temperature, but cold extremes warm up faster than daily minimum temperatures, although this result is less consistent when model parameters are varied in a perturbed physics ensemble where there are increased daily temperature maxima for nearly the entire land surface. However, the range in magnitude of increases was substantial indicating a sensitivity to model formulations (Clark et al., 2006).

Weisheimer and Palmer (2005) examine changes in extreme seasonal (DJF and JJA) temperatures in 14 models for three scenarios. They show that by the end of 21st century, the probability of such extreme warm seasons is projected to rise in many areas. This result is consistent with the perturbed physics ensemble where, for nearly all land areas, extreme JJA temperatures were at least 20 times and in some areas 100 times more frequent compared to the control ensemble mean, making these changes greater than the ensemble spread.

Since the TAR, possible future cold air outbreaks have been studied. Vavrus et al. (2006) analyse seven AOGCMs run with the A1B scenario, and define a cold air outbreak as two or more consecutive days when the daily temperatures are at least two standard deviations below the present-day winter mean. For a future warmer climate, they document a 50 to 100% decline in the frequency of cold air outbreaks in NH winter in most areas compared to the present, with the smallest reductions occurring in western North America, the North Atlantic and southern Europe and Asia due to atmospheric circulation changes associated with the increase in greenhouse gases.

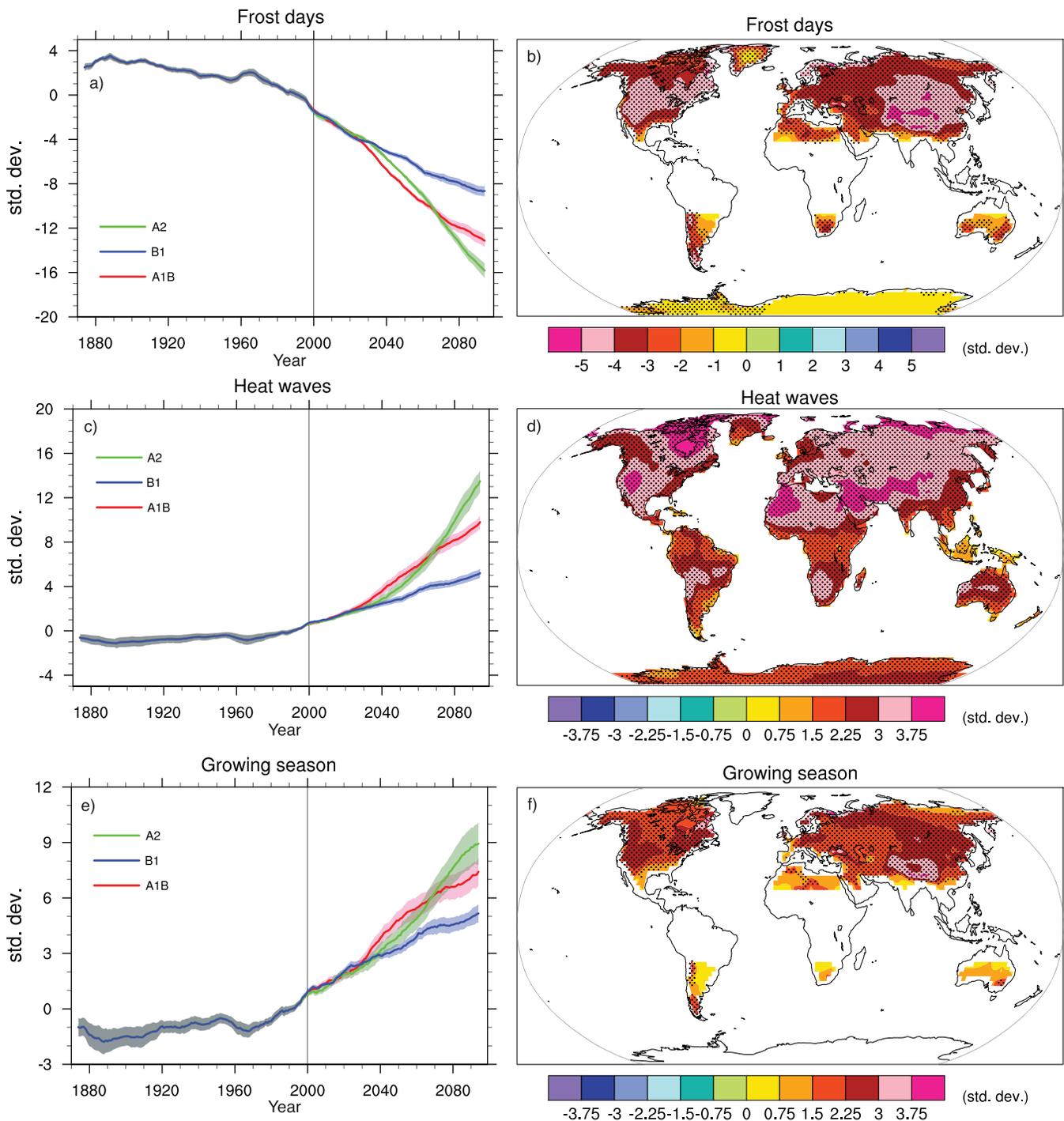
No studies at the time of the TAR specifically documented changes in heat waves (very high temperatures over a sustained period of days, see Chapter 3). Several recent studies address possible future changes in heat waves explicitly, and find an increased risk of more intense, longer-lasting and more frequent heat waves in a future climate (Meehl and Tebaldi, 2004; Schär et al., 2004; Clark et al., 2006). Meehl and Tebaldi (2004) show that the pattern of future changes in heat waves, with greatest intensity increases over western Europe, the Mediterranean and the southeast and western USA, is related in part to base state circulation changes due to the increase in greenhouse gases. An additional factor leading to extreme heat is drier soils in a future warmer climate (Brabson et al., 2005; Clark et al., 2006). Schär et al. (2004), Stott et al. (2004) and Beniston (2004) use the European 2003 heat wave as an example of the types of heat waves that are likely to become more common in a future warmer climate. Schär et al. (2004) note that the increase in the frequency of extreme warm conditions is also associated with a change in interannual variability, such that the statistical distribution of mean summer temperatures is not merely shifted towards warmer conditions but also becomes wider. A multi-model ensemble shows that heat waves are simulated to have been increasing over the latter part of the 20th century, and are projected to increase globally and over most regions (Figure 10.19; Tebaldi et al., 2006), although different model parameters can contribute to the range in the magnitude of this response (Clark et al., 2006).

A decrease in DTR in most regions in a future warmer climate was reported in the TAR, and is substantiated by more recent studies (e.g., Stone and Weaver, 2002; also discussed in relation to Figure 10.11b and in Chapter 11). For a quantity related to the DTR, the TAR concluded that it would be likely that a future warmer climate would also be characterised by a decrease in the number of frost days, although there were no studies at that time from global coupled climate models that addressed this issue explicitly. It has since been shown that there would indeed be decreases in frost days in a future warmer climate in the extratropics (Meehl et al., 2004a), with the pattern of the decreases dictated by the changes in atmospheric circulation due to the increase in greenhouse gases (Meehl et al., 2004a). Results from a nine-member multi-model ensemble show simulated decreases in frost days for the 20th century continuing into the 21st century globally and in most regions (Figure 10.19). A quantity related to frost days in many mid- and high-latitude areas, particularly in the NH, is growing season length as defined by Frich et al. (2002), and this has been projected to increase in future climate (Tebaldi et al., 2006). This result is also shown in a nine-member multi-model ensemble where the simulated increase in growing season length in the 20th century continues into the 21st century globally and in most regions (Figure 10.19). The globally averaged extremes indices in Figures 10.18 and 10.19 have non-uniform changes across the scenarios compared to the more consistent relative increases in Figure 10.5 for globally averaged temperature. This indicates that patterns that scale well by radiative forcing for temperature (e.g., Figure 10.8) would not scale for extremes.

### 10.3.6.3 Tropical Cyclones (Hurricanes)

Earlier studies assessed in the TAR showed that future tropical cyclones would likely become more severe with greater wind speeds and more intense precipitation. More recent modelling experiments have addressed possible changes in tropical cyclones in a warmer climate and generally confirmed those earlier results. These studies fall into two categories: those with model grid resolutions that only roughly represent some aspects of individual tropical cyclones, and those with model grids of sufficient resolution to reasonably simulate individual tropical cyclones.

In the first category, a number of climate change experiments with global models have started to simulate some characteristics of individual tropical cyclones, although classes of models with 50 to 100 km resolution or lower cannot accurately simulate observed tropical cyclone intensities due to the limitations of the relatively coarse grid spacing (e.g., Yoshimura et al., 2006). A study with roughly 100-km grid spacing shows a decrease in tropical cyclone frequency globally and in the North Pacific but a regional increase over the North Atlantic and no significant changes in maximum intensity (Sugi et al., 2002). Yoshimura et al. (2006) use the same model but different SST patterns and two different convection schemes, and show a decrease in the global frequency of relatively weak tropical cyclones but no significant change in the frequency of intense storms. They also show that the regional changes are dependent on the SST pattern, and precipitation near the storm centres could increase in the future. Another study using a 50 km resolution model confirms this dependence on SST pattern, and also shows a consistent increase in precipitation intensity in future tropical cyclones (Chauvin et al., 2006). Another global modelling study with roughly a 100-km grid spacing finds a 6% decrease in tropical storms globally and a slight increase in intensity, with both increases and decreases regionally related to the El Niño-like base state response in the tropical Pacific to increased greenhouse gases (McDonald et al., 2005). Another study with the same resolution model indicates decreases in tropical cyclone frequency and intensity but more mean and extreme precipitation from the tropical cyclones simulated in the future in the western north Pacific (Hasegawa and Emori, 2005). An AOGCM analysis with a coarser-resolution atmospheric model (T63, or about 200-km grid spacing) shows little change in overall numbers of tropical storms in that model, but a slight decrease in medium-intensity storms in a warmer climate (Bengtsson et al., 2006). In a global warming simulation with a coarse-resolution atmospheric model (T42, or about 300-km grid spacing), the frequency of global tropical cyclone occurrence did not change significantly, but the mean intensity of the global tropical cyclones increased significantly (Tsutsui, 2002). Thus, from this category of coarser-grid models that can only represent rudimentary aspects of tropical cyclones, there is no consistent evidence for large changes in either frequency or intensity of these models' representation of tropical cyclones, but there is a consistent response of more intense precipitation from future storms in a warmer climate. Also note that the



**Figure 10.19.** Changes in extremes based on multi-model simulations from nine global coupled climate models, adapted from Tebaldi et al. (2006). (a) Globally averaged changes in the frost day index (defined as the total number of days in a year with absolute minimum temperature below  $0^{\circ}\text{C}$ ) for a low (SRES B1), middle (SRES A1B) and high (SRES A2) scenario. (b) Changes in spatial patterns of simulated frost days between two 20-year means (2080–2099 minus 1980–1999) for the A1B scenario. (c) Globally averaged changes in heat waves (defined as the longest period in the year of at least five consecutive days with maximum temperature at least  $5^{\circ}\text{C}$  higher than the climatology of the same calendar day). (d) Changes in spatial patterns of simulated heat waves between two 20-year means (2080–2099 minus 1980–1999) for the A1B scenario. (e) Globally averaged changes in growing season length (defined as the length of the period between the first spell of five consecutive days with mean temperature above  $5^{\circ}\text{C}$  and the last such spell of the year). (f) Changes in spatial patterns of simulated growing season length between two 20-year means (2080–2099 minus 1980–1999) for the A1B scenario. Solid lines in (a), (c) and (e) show the 10-year smoothed multi-model ensemble means; the envelope indicates the ensemble mean standard deviation. Stippling in (b), (d) and (f) denotes areas where at least five of the nine models concur in determining that the change is statistically significant. Extreme indices are calculated only over land. Frost days and growing season are only calculated in the extratropics. Extremes indices are calculated following Frich et al. (2002). Each model's time series was centred around its 1980 to 1999 average and normalised (rescaled) by its standard deviation computed (after de-trending) over the period 1960 to 2099. The models were then aggregated into an ensemble average, both at the global and at the grid-box level. Thus, changes are given in units of standard deviations.

decreasing tropical precipitation in future climate in Yoshimura et al. (2006) is for SSTs held fixed as atmospheric CO<sub>2</sub> is increased, a situation that does not occur in any global coupled model.

In the second category, studies have been performed with models that have been able to credibly simulate many aspects of tropical cyclones. For example, Knutson and Tuleya (2004) use a high-resolution (down to 9 km) mesoscale hurricane model to simulate hurricanes with intensities reaching about 60 to 70 m s<sup>-1</sup>, depending on the treatment of moist convection in the model. They use mean tropical conditions from nine global climate models with increased CO<sub>2</sub> to simulate tropical cyclones with 14% more intense central pressure falls, 6% higher maximum surface wind speeds and about 20% greater near-storm rainfall after an idealised 80-year buildup of CO<sub>2</sub> at 1% yr<sup>-1</sup> compounded (warming given by TCR shown for models in Chapter 8). Using a multiple nesting technique, an AOGCM was used to force a regional model over Australasia and the western Pacific with 125-km grid resolution, with an embedded 30-km resolution model over the south-western Pacific (Walsh et al., 2004). At that 30-km resolution, the model is able to closely simulate the climatology of the observed tropical cyclone lower wind speed threshold of 17 m s<sup>-1</sup>. Tropical cyclone occurrence (in terms of days of tropical cyclone activity) is slightly greater than observed, and the somewhat weaker than observed pressure gradients near the storm centres are associated with lower than observed maximum wind speeds, likely due to the 30-km grid spacing that is too coarse to capture extreme pressure gradients and winds. For 3 × atmospheric CO<sub>2</sub> in that model configuration, the simulated tropical cyclones experienced a 56% increase in the number of storms with maximum wind speed greater than 30 m s<sup>-1</sup> and a 26% increase in the number of storms with central pressures less than 970 hPa, with no large changes in frequency and movement of tropical cyclones for that southwest Pacific region. It should also be noted that ENSO fluctuations have a strong impact on patterns of tropical cyclone occurrence in the southern Pacific (Nguyen and Walsh, 2001), and that uncertainty with respect future ENSO behaviour (Section 10.3.5.1) contributes to uncertainty with respect to tropical cyclones (Walsh, 2004).

In another experiment with a high resolution global model that is able to generate tropical cyclones that begin to approximate real storms, a global 20-km grid atmospheric model was run in time slice experiments for a present-day 10-year period and a 10-year period at the end of the 21st century for the A1B scenario to examine changes in tropical cyclones. Observed climatological SSTs were used to force the atmospheric model for the 10-year period at the end of the 20th century, time-mean SST anomalies from an AOGCM simulation for the future climate were added to the observed SSTs and atmospheric composition was changed in the model to be consistent with the A1B scenario. At that resolution, tropical cyclone characteristics, numbers and tracks were relatively well simulated for present-day climate, although simulated wind speed intensities were somewhat weaker than observed intensities (Oouchi et al., 2006). In that study, tropical

cyclone frequency decreased 30% globally (but increased about 34% in the North Atlantic). The strongest tropical cyclones with extreme surface winds increased in number while weaker storms decreased. The tracks were not appreciably altered, and maximum peak wind speeds in future simulated tropical cyclones increased by about 14% in that model, although statistically significant increases were not found in all basins. As noted above, the competing effects of greater stabilisation of the tropical troposphere (less storms) and greater SSTs (the storms that form are more intense) likely contribute to these changes except for the tropical North Atlantic where there are greater SST increases than in the other basins in that model. Therefore, the SST warming has a greater effect than the vertical stabilisation in the Atlantic and produces not only more storms but also more intense storms there. However, these regional changes are largely dependent on the spatial pattern of future simulated SST changes (Yoshimura et al., 2006).

Sugi et al. (2002) show that the global-scale reduction in tropical cyclone frequency is closely related to weakening of tropospheric circulation in the tropics in terms of vertical mass flux. They note that a significant increase in dry static stability in the tropical troposphere and little increase in tropical precipitation (or convective heating) are the main factors contributing to the weakening of the tropospheric circulation. Sugi and Yoshimura (2004) investigate a mechanism of this tropical precipitation change. They show that the effect of CO<sub>2</sub> enhancement (without changing SST conditions, which is not realistic as noted above) is a decrease in mean precipitation (Sugi and Yoshimura, 2004) and a decrease in the number of tropical cyclones as simulated in an atmospheric model with about 100 km resolution (Yoshimura and Sugi, 2005). Future changes in the large-scale steering flow as a mechanism to deduce possible changes in tropical cyclone tracks in the western North Pacific (Wu and Wang, 2004) were analysed to show different shifts at different times in future climate change experiments along with a dependence of such shifts on the degree of El Niño-like mean climate change in the Pacific (see Section 10.3.5).

A synthesis of the model results to date indicates that, for a future warmer climate, coarse-resolution models show few consistent changes in tropical cyclones, with results dependent on the model, although those models do show a consistent increase in precipitation intensity in future storms. Higher-resolution models that more credibly simulate tropical cyclones project some consistent increase in peak wind intensities, but a more consistent projected increase in mean and peak precipitation intensities in future tropical cyclones. There is also a less certain possibility of a decrease in the number of relatively weak tropical cyclones, increased numbers of intense tropical cyclones and a global decrease in total numbers of tropical cyclones.

#### 10.3.6.4 Extratropical Storms and Ocean Wave Height

The TAR noted that there could be a future tendency for more intense extratropical storms, although the number of storms could be less. A more consistent result that has emerged more

recently, in agreement with earlier results (e.g., Schubert et al., 1998), is a tendency for a poleward shift of several degrees latitude in mid-latitude storm tracks in both hemispheres (Geng and Sugi, 2003; Fischer-Bruns et al., 2005; Yin, 2005; Bengtsson et al., 2006). Consistent with these shifts in storm track activity, Cassano et al. (2006), using a 10-member multi-model ensemble, show a future change to a more cyclonically dominated circulation pattern in winter and summer over the Arctic, and increasing cyclonicity and stronger westerlies in the same multi-model ensemble for the Antarctic (Lynch et al., 2006).

Some studies have shown little change in extratropical cyclone characteristics (Kharin and Zwiers, 2005; Watterson, 2005). But a regional study showed a tendency towards more intense systems, particularly in the A2 scenario in another global coupled climate model analysis (Leckebusch and Ulbrich, 2004), with more extreme wind events in association with those deepened cyclones for several regions of Western Europe, with similar changes in the B2 simulation although less pronounced in amplitude. Geng and Sugi (2003) use a higher-resolution (about 100 km resolution) atmospheric GCM (AGCM) with time-slice experiments and find a decrease in cyclone density (number of cyclones in a 4.5° by 4.5° area per season) in the mid-latitudes of both hemispheres in a warmer climate in both the DJF and JJA seasons, associated with the changes in the baroclinicity in the lower troposphere, in general agreement with earlier results and coarser GCM results (e.g., Dai et al., 2001b). They also find that the density of strong cyclones increases while the density of weak and medium-strength cyclones decreases. Several studies have shown a possible reduction in mid-latitude storms in the NH but a decrease in central pressures in these storms (Lambert and Fyfe, 2006, for a 15-member multi-model ensemble) and in the SH (Fyfe, 2003, with a possible 30% reduction in sub-antarctic cyclones). The latter two studies did not definitively identify a poleward shift of storm tracks, but their methodologies used a relatively coarse grid that may not have been able to detect shifts of several degrees latitude and they used only identification of central pressures which could imply an identification of semi-permanent features like the sub-antarctic trough. More regional aspects of these changes were addressed for the NH in a single model study by Inatsu and Kimoto (2005), who show a more active storm track in the western Pacific in the future but weaker elsewhere. Fischer-Bruns et al. (2005) document storm activity increasing over the North Atlantic and Southern Ocean and decreasing over the Pacific Ocean.

By analysing stratosphere-troposphere exchanges using time-slice experiments with the middle atmosphere version of ECHAM4, Land and Feichter (2003) suggest that cyclonic and blocking activity becomes weaker poleward of 30°N in a warmer climate at least in part due to decreased baroclinicity below 400 hPa, while cyclonic activity becomes stronger in the SH associated with increased baroclinicity above 400 hPa. The atmospheric circulation variability on inter-decadal time scales may also change due to increasing greenhouse gases and aerosols. One model result (Hu et al., 2001) showed that

inter-decadal variability of the SLP and 500 hPa height fields increased over the tropics and decreased at high latitudes due to global warming.

In summary, the most consistent results from the majority of the current generation of models show, for a future warmer climate, a poleward shift of storm tracks in both hemispheres that is particularly evident in the SH, with greater storm activity at higher latitudes.

A new feature that has been studied related to extreme conditions over the oceans is wave height. Studies by Wang et al. (2004), Wang and Swail (2006a,b) and Caires et al. (2006) have shown that for many regions of the mid-latitude oceans, an increase in extreme wave height is likely to occur in a future warmer climate. This is related to increased wind speed associated with mid-latitude storms, resulting in higher waves produced by these storms, and is consistent with the studies noted above that showed decreased numbers of mid-latitude storms but more intense storms.

## 10.4 Changes Associated with Biogeochemical Feedbacks and Ocean Acidification

### 10.4.1 Carbon Cycle/Vegetation Feedbacks

As a parallel activity to the standard IPCC AR4 climate projection simulations described in this chapter, the Coupled Climate-Carbon Cycle Model Intercomparison Project (C<sup>4</sup>MIP) supported by WCRP and the International Geosphere-Biosphere Programme (IGBP) was initiated. Eleven climate models with a representation of the land and ocean carbon cycle (see Chapter 7) performed simulations where the model was driven by an anthropogenic CO<sub>2</sub> emissions scenario for the 1860 to 2100 time period (instead of an atmospheric CO<sub>2</sub> concentration scenario as in the standard IPCC AR4 simulations). Each C<sup>4</sup>MIP model performed two simulations, a ‘coupled’ simulation where the growth of atmospheric CO<sub>2</sub> induces a climate change which affects the carbon cycle, and an ‘uncoupled’ simulation, where atmospheric CO<sub>2</sub> radiative forcing is held fixed at pre-industrial levels, in order to estimate the atmospheric CO<sub>2</sub> growth rate that would occur if the carbon cycle was unperturbed by the climate. Emissions were taken from the observations for the historical period (Houghton and Hackler, 2000; Marland et al., 2005) and from the SRES A2 scenario for the future (Leemans et al., 1998).

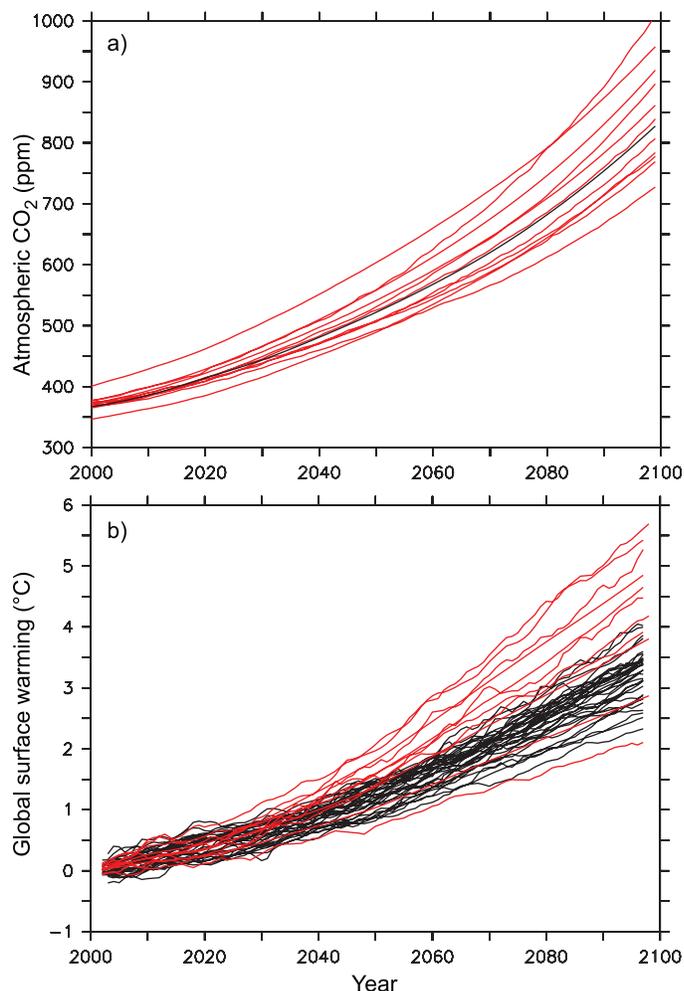
Chapter 7 describes the major results of the C<sup>4</sup>MIP models in terms of climate impact on the carbon cycle. This section starts from these impacts to infer the feedback effect on atmospheric CO<sub>2</sub> and therefore on the climate system. There is unanimous agreement among the models that future climate change will reduce the efficiency of the land and ocean carbon cycle to absorb anthropogenic CO<sub>2</sub>, essentially owing to a reduction in land carbon uptake. The latter is driven by a combination of

reduced net primary productivity and increased soil respiration of CO<sub>2</sub> under a warmer climate. As a result, a larger fraction of anthropogenic CO<sub>2</sub> will stay airborne if climate change controls the carbon cycle. By the end of the 21st century, this additional CO<sub>2</sub> varies between 20 and 220 ppm for the two extreme models, with most of the models lying between 50 and 100 ppm (Friedlingstein et al., 2006). This additional CO<sub>2</sub> leads to an additional radiative forcing of between 0.1 and 1.3 W m<sup>-2</sup> and hence an additional warming of between 0.1°C and 1.5°C.

All of the C<sup>4</sup>MIP models simulate a higher atmospheric CO<sub>2</sub> growth rate in the coupled runs than in the uncoupled runs. For the A2 emission scenario, this positive feedback leads to a greater atmospheric CO<sub>2</sub> concentration (Friedlingstein et al., 2006) as noted above, which is in addition to the concentrations in the standard coupled models assessed in the AR4 (e.g., Meehl et al., 2005b). By 2100, atmospheric CO<sub>2</sub> varies between 730 and 1,020 ppm for the C<sup>4</sup>MIP models, compared with 836 ppm for the standard SRES A2 concentration in the multi-model data set (e.g., Meehl et al., 2005b). This uncertainty due to future changes in the carbon cycle is illustrated in Figure 10.20a where the CO<sub>2</sub> concentration envelope of the C<sup>4</sup>MIP uncoupled simulations is centred on the standard SRES A2 concentration value. The range reflects the uncertainty in the carbon cycle. It should be noted that the standard SRES A2 concentration value of 836 ppm was calculated in the TAR with the Bern carbon cycle-climate model (BERN-CC; Joos et al., 2001) that accounted for the climate-carbon cycle feedback. Parameter sensitivity studies were performed with the BERN-CC model at that time and gave a range of 735 ppm to 1,080 ppm, comparable to the range of the C<sup>4</sup>MIP study. The effects of climate feedback uncertainties on the carbon cycle have also been considered probabilistically by Wigley and Raper (2001). A later paper (Wigley, 2004) considers individual emissions scenarios, accounting for carbon cycle feedbacks in the same way as Wigley and Raper (2001). The results of these studies are consistent with the more recent C<sup>4</sup>MIP results. For the A2 scenario considered in C<sup>4</sup>MIP, the CO<sub>2</sub> concentration range in 2100 using the Wigley and Raper model is 769 to 1,088 ppm, compared with 730 to 1,020 ppm in the C<sup>4</sup>MIP study (which ignored the additional warming effect due to non-CO<sub>2</sub> gases). Similarly, using neural networks, Knutti et al. (2003) show that the climate-carbon cycle feedback leads to an increase of about 0.6°C over the central estimate for the SRES A2 scenario and an increase of about 1.5°C for the upper bound of the uncertainty range.

Further uncertainties regarding carbon uptake were addressed with a 14-member multi-model ensemble using the CMIP2 models to quantify contributions to uncertainty from inter-model variability as opposed to internal variability (Berthelot et al., 2002). They found that the AOGCMs with the largest climate sensitivity also had the largest drying of soils in the tropics and thus the largest reduction in carbon uptake.

The C<sup>4</sup>MIP protocol did not account for the evolution of non-CO<sub>2</sub> greenhouse gases and aerosols. In order to compare the C<sup>4</sup>MIP simulated warming with the IPCC AR4 climate models, the SRES A2 radiative forcings of CO<sub>2</sub> alone and total forcing (CO<sub>2</sub> plus non-CO<sub>2</sub> greenhouse gases and aerosols) as given



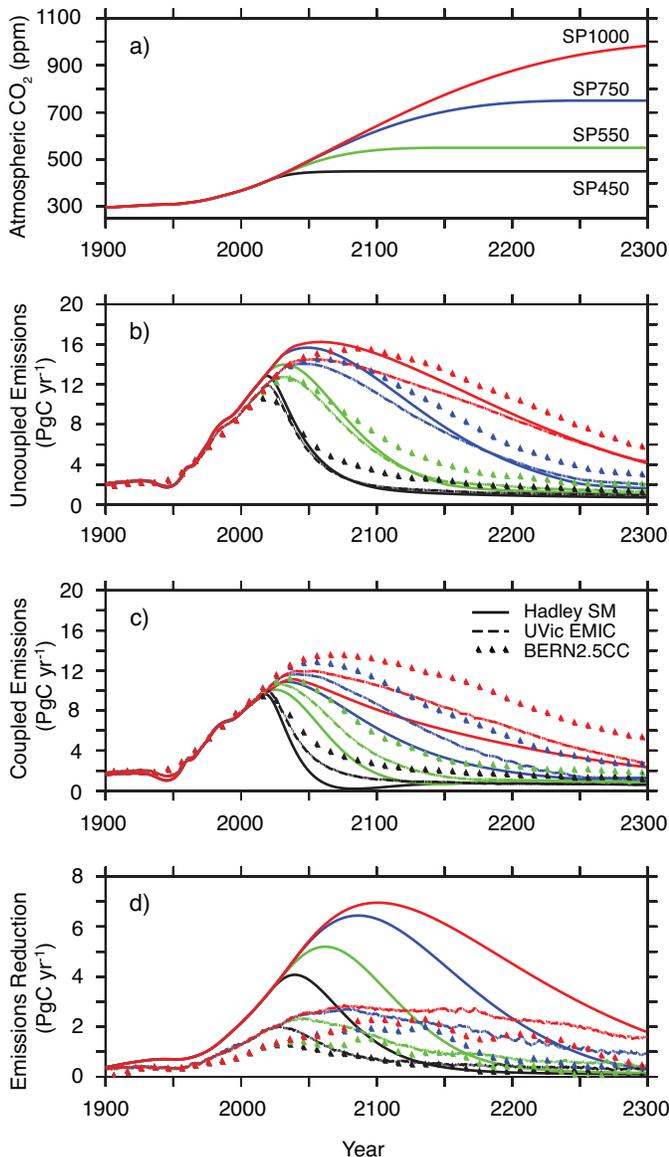
**Figure 10.20.** (a) 21st-century atmospheric CO<sub>2</sub> concentration as simulated by the 11 C<sup>4</sup>MIP models for the SRES A2 emission scenario (red) compared with the standard atmospheric CO<sub>2</sub> concentration used as a forcing for many IPCC AR4 climate models (black). The standard CO<sub>2</sub> concentration values were calculated by the BERN-CC model and are identical to those used in the TAR. For some IPCC-AR4 models, different carbon cycle models were used to convert carbon emissions to atmospheric concentrations. (b) Globally averaged surface temperature change (relative to 2000) simulated by the C<sup>4</sup>MIP models forced by CO<sub>2</sub> emissions (red) compared to global warming simulated by the IPCC AR4 models forced by CO<sub>2</sub> concentration (black). The C<sup>4</sup>MIP global temperature change has been corrected to account for the non-CO<sub>2</sub> radiative forcing used by the standard IPCC AR4 climate models.

in Appendix II of the TAR were used. Using these numbers and knowing the climate sensitivity of each C<sup>4</sup>MIP model, the warming that would have been simulated by the C<sup>4</sup>MIP models if they had included the non-CO<sub>2</sub> greenhouse gases and aerosols can be estimated. For the SRES A2 scenario, these estimates show that the C<sup>4</sup>MIP range of global temperature increase by the end of the 21st century would be 2.4°C to 5.6°C, compared with 2.6°C to 4.1°C for standard IPCC-AR4 climate models (Figure 10.20b). As a result of a much larger CO<sub>2</sub> concentration by 2100 in most of the C<sup>4</sup>MIP models, the upper estimate of the global warming by 2100 is up to 1.5°C higher than for the standard SRES A2 simulations.

The C<sup>4</sup>MIP results highlight the importance of coupling the climate system and the carbon cycle in order to simulate, for a

given scenario of CO<sub>2</sub> emissions, a climate change that takes into account the dynamic evolution of the Earth's capacity to absorb the CO<sub>2</sub> perturbation.

Conversely, the climate-carbon cycle feedback will have an impact on the estimate of the projected CO<sub>2</sub> emissions leading to stabilisation of atmospheric CO<sub>2</sub> at a given level. The TAR showed the range of future emissions for the Wigley, Richels and Edmonds (WRE; Wigley et al., 1996) stabilisation concentration scenarios, using different model parametrizations (including the climate-carbon feedback, Joos et al., 2001; Kheshgi and Jain,



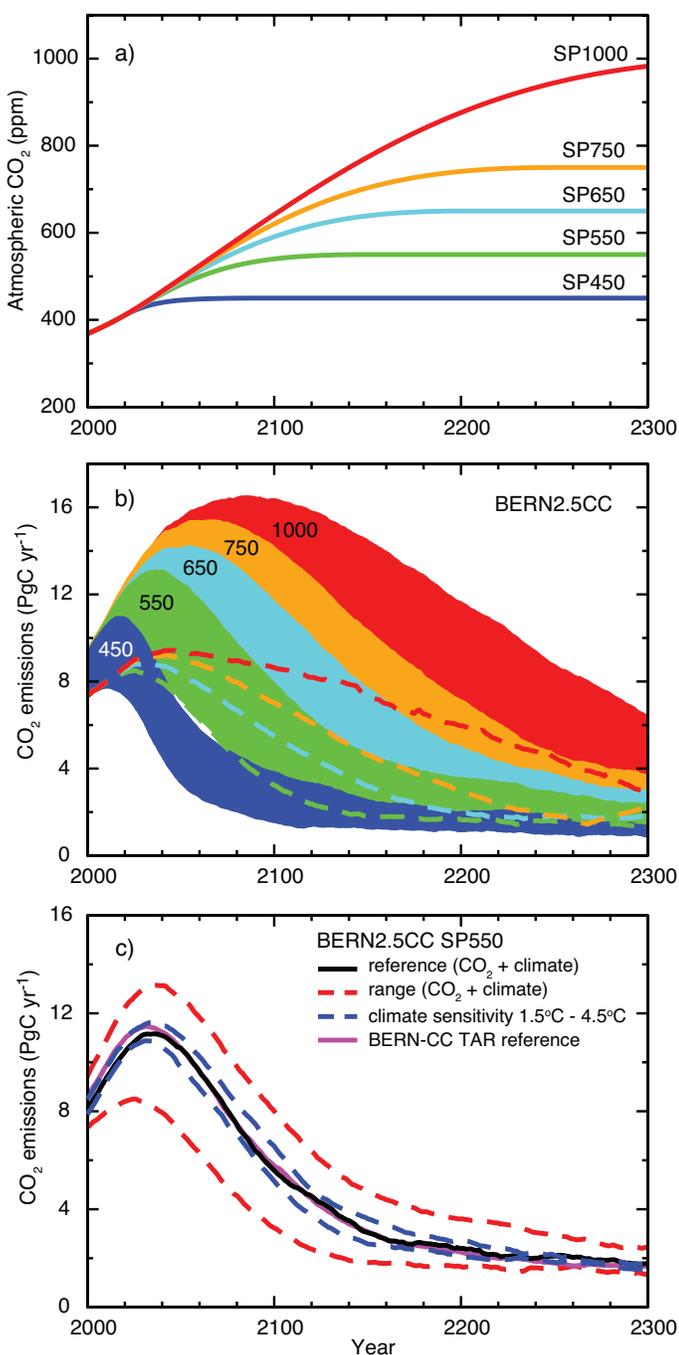
**Figure 10.21.** (a) Atmospheric CO<sub>2</sub> stabilisation scenarios SP1000 (red), SP750 (blue), SP550 (green) and SP450 (black). (b) Compatible annual emissions calculated by three models, the Hadley simple model (Jones et al., 2006; solid), the UVic EMIC (Matthews, 2005; dashed) and the BERN2.5CC EMIC (Joos et al., 2001; Plattner et al., 2001; triangles) for the three stabilisation scenarios without accounting for the impact of climate on the carbon cycle (see Table 8.3 for details of the latter two models). (c) As for (b) but with the climate impact on the carbon cycle accounted for. (d) The difference between (b) and (c) showing the impact of the climate-carbon cycle feedback on the calculation of compatible emissions.

2003). However, the emission reduction due to this feedback was not quantified. Similar to the C<sup>4</sup>MIP protocol, coupled and uncoupled simulations have been recently performed in order to specifically evaluate the impact of climate change on the future CO<sub>2</sub> emissions required to achieve stabilisation (Matthews, 2005; Jones et al., 2006). Figure 10.21 shows the emissions required to achieve CO<sub>2</sub> stabilisation for the stabilisation profiles SP450, SP550, SP750 and SP1000 (SP450 refers to stabilisation at a CO<sub>2</sub> concentration of 450 ppm, etc.) as simulated by three climate-carbon cycle models. As detailed above, the climate-carbon cycle feedback reduces the land and ocean uptake of CO<sub>2</sub>, leading to a reduction in the emissions compatible with a given atmospheric CO<sub>2</sub> stabilisation pathway. The higher the stabilisation scenario, the larger the climate change, the larger the impact on the carbon cycle, and hence the larger the emission reduction relative to the case without climate-carbon cycle feedback. For example, stabilising atmospheric CO<sub>2</sub> at 450 ppm, which will likely result in a global equilibrium warming of 1.4°C to 3.1°C, with a best guess of about 2.1°C, would require a reduction of current annual greenhouse gas emissions by 52 to 90% by 2100. Positive carbon cycle feedbacks (i.e., reduced ocean and terrestrial carbon uptake caused by the warming) reduce the total (cumulative) emissions over the 21st century compatible with a stabilisation of CO<sub>2</sub> concentration at 450 ppm by 105 to 300 GtC relative to a hypothetical case where the carbon cycle does not respond to temperature. The uncertainty regarding the strength of the climate-carbon cycle feedback highlighted in the C<sup>4</sup>MIP analysis is also evident in Figure 10.21. For higher stabilisation scenarios such as SP550, SP750 and SP1000, the larger warming (2.9°C, 4.3°C and 5.5°C, respectively) requires an increasingly larger reduction (130 to 425 GtC, 160 to 500 GtC and 165 to 510 GtC, respectively) in the cumulated compatible emissions.

The current uncertainty involving processes driving the land and ocean carbon uptake will translate into an uncertainty in the future emissions of CO<sub>2</sub> required to achieve stabilisation. In Figure 10.22, the carbon-cycle related uncertainty is addressed using the BERN2.5CC carbon cycle EMIC (Joos et al., 2001; Plattner et al., 2001; see Table 8.3 for model details) and the series of S450 to SP1000 CO<sub>2</sub> stabilisation scenarios. The range of emission uncertainty was derived using identical assumptions as made in the TAR, varying ocean transport parameters and parametrizations describing the cycling of carbon through the terrestrial biosphere. Results are thus very closely comparable, and the small differences can be largely explained by the different CO<sub>2</sub> trajectories and the use of a dynamic ocean model here compared to the TAR.

The model results confirm that for stabilisation of atmospheric CO<sub>2</sub>, emissions need to be reduced well below year 2000 values in all scenarios. This is true for the full range of simulations covering carbon cycle uncertainty, even including the upper bound, which is based on rather extreme assumptions of terrestrial carbon cycle processes.

Cumulative emissions for the period from 2000 to 2100 (to 2300) range between 596 GtC (933 GtC) for SP450, and 1,236 GtC (3,052 GtC) for SP1000. The emission uncertainty varies



**Figure 10.22.** Projected CO<sub>2</sub> emissions leading to stabilisation of atmospheric CO<sub>2</sub> concentrations at different levels and the effect of uncertainty in carbon cycle processes on calculated emissions. Panel (a) shows the assumed trajectories of CO<sub>2</sub> concentration (SP scenarios) (Knutti et al., 2005); (b) and (c) show the implied CO<sub>2</sub> emissions, as projected with the Bern2.5CC EMIC (Joos et al., 2001; Plattner et al., 2001). The ranges given in (b) for each of the SP scenarios represent effects of different model parametrizations and assumptions illustrated for scenario SP550 in panel (c) (range for 'CO<sub>2</sub> + climate'). The upper and lower bounds in (b) are indicated by the top and bottom of the shaded areas. Alternatively, the lower bound (where hidden) is indicated by a dashed line. Panel (c) illustrates emission ranges and sensitivities for scenario SP550.

between  $-26$  and  $+28\%$  about the reference cases in year 2100 and between  $-26$  and  $+34\%$  in year 2300, increasing with time. The range of uncertainty thus depends on the magnitude of the CO<sub>2</sub> stabilisation level and the induced climate change. The additional uncertainty in projected emissions due to uncertainty in climate sensitivity is illustrated by two additional simulations with  $1.5^{\circ}\text{C}$  and  $4.5^{\circ}\text{C}$  climate sensitivities (see Box 10.2). The resulting emissions for this range of climate sensitivities lie within the range covered by the uncertainty in processes driving the carbon cycle.

Both the standard IPCC-AR4 and the C<sup>4</sup>MIP models ignore the effect of land cover change in future projections. However, as described in Chapters 2 and 7, past and future changes in land cover may affect the climate through several processes. First, they may change surface characteristics such as albedo. Second, they may affect the ratio of latent to sensible heat and therefore affect surface temperature. Third, they may induce additional CO<sub>2</sub> emissions from the land. Fourth, they can affect the capacity of the land to take up atmospheric CO<sub>2</sub>. So far, no comprehensive coupled AOGCM has addressed these four components all together. Using AGCMs, DeFries et al. (2004) studied the impact of future land cover change on the climate, while Maynard and Royer (2004) performed a similar experiment on Africa only. DeFries et al. (2002) forced the Colorado State University GCM (Randall et al., 1996) with Atmospheric Model Intercomparison Project (AMIP) climatological sea surface temperatures and with either the present-day vegetation cover or a 2050 vegetation map adapted from a low-growth scenario of the Integrated Model to Assess the Global Environment (IMAGE-2; Leemans et al., 1998). The study finds that in the tropics and subtropics, replacement of forests by grassland or cropland leads to a reduction in carbon assimilation, and therefore in latent heat flux. The latter reduction leads to a surface warming of up to  $1.5^{\circ}\text{C}$  in deforested tropical regions. Using the ARPEGE-Climat AGCM (Déqué et al., 1994) with a higher resolution over Africa, Maynard et al. (2002) performed two experiments, one simulation with  $2 \times$  atmospheric CO<sub>2</sub> SSTs taken from a previous ARPEGE transient SRES B2 simulation and present-day vegetation, and one with the same SSTs but the vegetation taken from a SRES B2 simulation of the IMAGE-2 model (Leemans et al., 1998). Similar to DeFries et al. (2002), they find that future deforestation in tropical Africa leads to a redistribution of latent and sensible heat that leads to a warming of the surface. However, this warming is relatively small ( $0.4^{\circ}\text{C}$ ) and represents about 20% of the warming due to the atmospheric CO<sub>2</sub> doubling.

Two recent studies further investigated the relative roles of future changes in greenhouse gases compared with future changes in land cover. Using a similar model design as Maynard and Royer (2004), Voltaire (2006) compared the climate change simulated under a 2050 SRES B2 greenhouse gases scenario to the one under a 2050 SRES B2 land cover change scenario. They show that the relative impact of vegetation change compared to greenhouse gas concentration increase is of the order of 10%, and can reach 30% over localised tropical regions. In a more comprehensive study, Feddema et al. (2005) applied the same

methodology for the SRES A2 and B1 scenario over the 2000 to 2100 period. Similarly, they find no significant effect at the global scale, but a potentially large effect at the regional scale, such as a warming of 2°C by 2100 over the Amazon for the A2 land cover change scenario, associated with a reduction in the DTR. The general finding of these studies is that the climate change due to land cover changes may be important relative to greenhouse gases at the regional level, where intense land cover change occurs. Globally, the impact of greenhouse gas concentrations dominates over the impact of land cover change.

#### 10.4.2 Ocean Acidification Due to Increasing Atmospheric Carbon Dioxide

Increasing atmospheric CO<sub>2</sub> concentrations lower oceanic pH and carbonate ion concentrations, thereby decreasing the saturation state with respect to calcium carbonate (Feely et al., 2004). The main driver of these changes is the direct geochemical effect due to the addition of anthropogenic CO<sub>2</sub> to the surface ocean (see Box 7.3). Surface ocean pH today is already 0.1 unit lower than pre-industrial values (Section 5.4.2.3). In the multi-model median shown in Figure 10.23, pH is projected to decrease by another 0.3 to 0.4 units under the IS92a scenario by 2100. This translates into a 100 to 150% increase in the concentration of H<sup>+</sup> ions (Orr et al., 2005). Simultaneously, carbonate ion concentrations will decrease. When water is undersaturated with respect to calcium carbonate, marine organisms can no longer form calcium carbonate shells (Raven et al., 2005).

Under scenario IS92a, the multi-model projection shows large decreases in pH and carbonate ion concentrations throughout the world oceans (Orr et al., 2005; Figures 10.23 and 10.24). The decrease in surface carbonate ion concentrations is found to be largest at low and mid-latitudes, although undersaturation is projected to occur at high southern latitudes first (Figure 10.24). The present-day surface saturation state is strongly influenced by temperature and is lowest at high latitudes, with minima in the Southern Ocean. The model simulations project that undersaturation will be reached in a few decades. Therefore, conditions detrimental to high-latitude ecosystems could develop within decades, not centuries as suggested previously (Orr et al., 2005).

While the projected changes are largest at the ocean surface, the penetration of anthropogenic CO<sub>2</sub> into the ocean interior will alter the chemical composition over the 21st century down to several thousand metres, albeit with substantial regional differences (Figure 10.23). The total volume of water in the ocean that is undersaturated with regard to calcite (not shown) or aragonite, a meta-stable form of calcium carbonate, increases substantially as atmospheric CO<sub>2</sub> concentrations continue to rise (Figure 10.23). In the multi-model projections, the aragonite saturation horizon (i.e., the 100% line separating over- and undersaturated regions) reaches the surface in the Southern Ocean by about 2050 and substantially shoals by 2100 in the South Pacific (by >1,000 m) and throughout the Atlantic (between 800 m and 2,200 m).

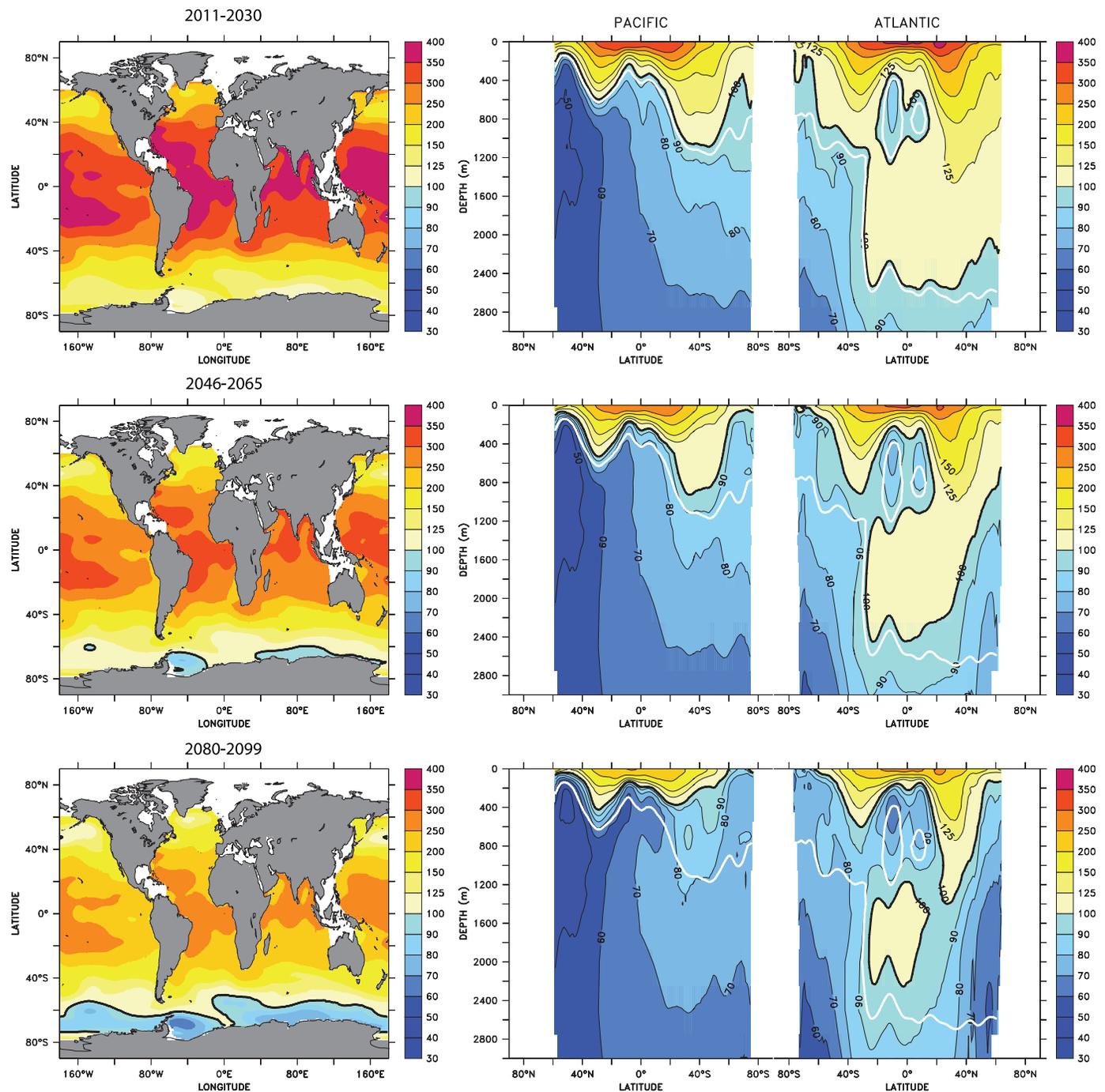
Ocean acidification could thus conceivably lead to undersaturation and dissolution of calcium carbonate in parts of the surface ocean during the 21st century, depending on the evolution of atmospheric CO<sub>2</sub> (Orr et al., 2005). Southern Ocean surface water is projected to become undersaturated with respect to aragonite at a CO<sub>2</sub> concentration of approximately 600 ppm. This concentration threshold is largely independent of emission scenarios.

Uncertainty in these projections due to potential future climate change effects on the ocean carbon cycle (mainly through changes in temperature, ocean stratification and marine biological production and re-mineralization; see Box 7.3) are small compared to the direct effect of rising atmospheric CO<sub>2</sub> from anthropogenic emissions. Orr et al. (2005) estimate that 21st century climate change could possibly counteract less than 10% of the projected direct geochemical changes. By far the largest uncertainty in the future evolution of these ocean interior changes is thus associated with the future pathway of atmospheric CO<sub>2</sub>.

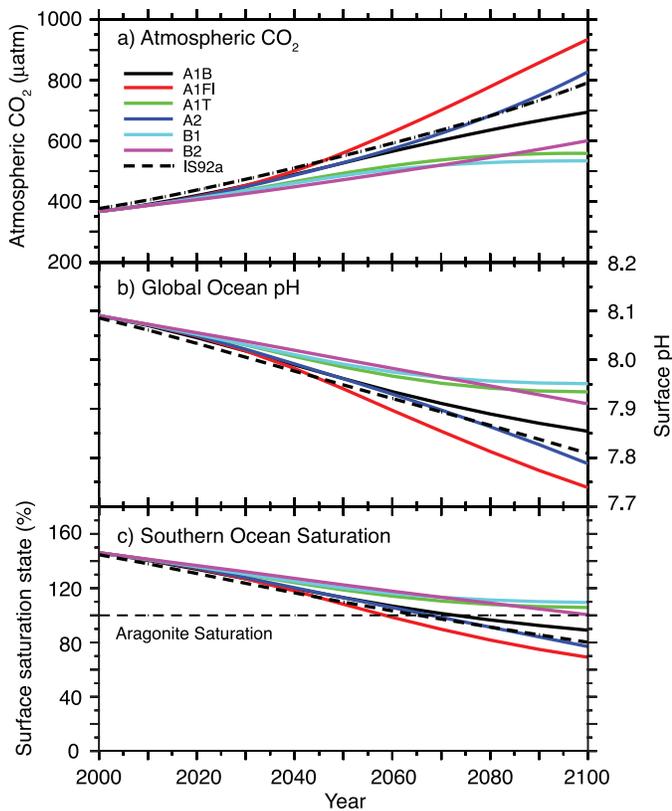
#### 10.4.3 Simulations of Future Evolution of Methane, Ozone and Oxidants

Simulations using coupled chemistry-climate models indicate that the trend in upper-stratospheric ozone changes sign sometime between 2000 and 2005 due to the gradual reduction in halocarbons. While ozone concentrations in the upper stratosphere decreased at a rate of 400 ppb (–6%) per decade during 1980 to 2000, they are projected to increase at a rate of 100 ppb (1 to 2%) per decade from 2000 to 2020 (Austin and Butchart, 2003). On longer time scales, simulations show significant changes in ozone and CH<sub>4</sub> relative to current concentrations. The changes are related to a variety of factors, including increased emissions of chemical precursors, changes in gas-phase and heterogeneous chemistry, altered climate conditions due to global warming and greater transport and mixing across the tropopause. The impacts on CH<sub>4</sub> and ozone from increased emissions are a direct effect of anthropogenic activity, while the impacts of different climate conditions and stratosphere-troposphere exchange represent indirect effects of these emissions (Grewe et al., 2001).

The projections for ozone based upon scenarios with high emissions (IS92a; Leggett et al., 1992) and SRES A2 (Nakićenović and Swart, 2000) indicate that concentrations of tropospheric ozone might increase throughout the 21st century, primarily as a result of these emissions. Simulations for the period 2015 through 2050 project increases in ozone of 20 to 25% (Grewe et al., 2001; Hauglustaine and Brasseur, 2001), and simulations through 2100 indicate that ozone below 250 mb may grow by 40 to 60% (Stevenson et al., 2000; Grenfell et al., 2003; Zeng and Pyle, 2003; Hauglustaine et al., 2005; Yoshimura et al., 2006). The primary species contributing to the increase in tropospheric ozone are anthropogenic emissions of NO<sub>x</sub>, CH<sub>4</sub>, CO and compounds from fossil fuel combustion. The photochemical reactions that produce smog are accelerated by increases of 2.6 times the present flux of NO<sub>x</sub>, 2.5 times the



**Figure 10.23.** Multi-model median for projected levels of saturation (%) with respect to aragonite, a meta-stable form of calcium carbonate, over the 21st century from the Ocean Carbon-Cycle Model Intercomparison Project (OCMIP-2) models (adapted from Orr et al., 2005). Calcium carbonate dissolves at levels below 100%. Surface maps (left) and combined Pacific/Atlantic zonal mean sections (right) are given for scenario IS92a as averages over three time periods: 2011 to 2030 (top), 2045 to 2065 (middle) and 2080 to 2099 (bottom). Atmospheric  $\text{CO}_2$  concentrations for these three periods average 440, 570 and 730 ppm, respectively. Latitude-depth sections start in the North Pacific (at the left border), extend to the Southern Ocean Pacific section and return through the Southern Ocean Atlantic section to the North Atlantic (right border). At 100%, waters are saturated (solid black line - the aragonite saturation horizon); values larger than 100% indicate super-saturation; values lower than 100% indicate undersaturation. The observation-based (Global Ocean Data Analysis Project; GLODAP) 1994 saturation horizon (solid white line) is also shown to illustrate the projected changes in the saturation horizon compared to the present.



**Figure 10.24.** Changes in global average surface pH and saturation state with respect to aragonite in the Southern Ocean under various SRES scenarios. Time series of (a) atmospheric CO<sub>2</sub> for the six illustrative SRES scenarios, (b) projected global average surface pH and (c) projected average saturation state in the Southern Ocean from the BERN2.5D EMIC (Plattner et al., 2001). The results for the SRES scenarios A1T and A2 are similar to those for the non-SRES scenarios S650 and IS92a, respectively. Modified from Orr et al. (2005).

present flux of CH<sub>4</sub> and 1.8 times the present flux of CO in the A2 scenario. Between 91 and 92% of the higher concentrations in ozone are related to direct effects of these emissions, with the remainder of the increase attributable to secondary effects of climate change (Zeng and Pyle, 2003) combined with biogenic precursor emissions (Hauglustaine et al., 2005). These emissions may also lead to higher concentrations of oxidants including the hydroxyl radical (OH), possibly leading to an 8% reduction in the lifetime of tropospheric CH<sub>4</sub> (Grewe et al., 2001).

Since the projected growth in emissions occurs primarily in low latitudes, the ozone increases are largest in the tropics and subtropics (Grenfell et al., 2003). In particular, the concentrations in Southeast Asia, India and Central America increase by 60 to 80% by 2050 under the A2 scenario. However, the effects of tropical emissions are not highly localised, since the ozone spreads throughout the lower atmosphere in plumes emanating from these regions. As a result, the ozone in remote marine regions in the SH may grow by 10 to 20% over present-day levels by 2050. The ozone may also be distributed through vertical transport in tropical convection followed by lateral transport on isentropic surfaces. Ozone concentrations can also be increased by emissions of biogenic hydrocarbons (e.g., Hauglustaine et

al., 2005), in particular isoprene emitted by broadleaf forests. Under the A2 scenario, biogenic hydrocarbons are projected to increase by between 27% (Sanderson et al., 2003) and 59% (Hauglustaine et al., 2005) contributing to a 30 to 50% increase in ozone formation over northern continental regions.

Developing countries have begun reducing emissions from mobile sources through stricter standards. New projections of the evolution of ozone precursors that account for these reductions have been developed with the Regional Air Pollution Information and Simulation (RAINS) model (Amann et al., 2004). One set of projections is consistent with source strengths permitted under the Current Legislation (CLE) scenario. A second set of projections is consistent with lower emissions under a Maximum Feasible Reduction (MFR) scenario. The concentrations of ozone and CH<sub>4</sub> have been simulated for the MFR, CLE and A2 scenarios for the period 2000 through 2030 using an ensemble of 26 chemical transport models (Dentener et al., 2006; Stevenson et al., 2006). The changes in NO<sub>x</sub> emissions for these three scenarios are -27%, +12% and +55%, respectively, relative to year 2000. The corresponding changes in ensemble-mean burdens in tropospheric ozone are -5%, +6% and +18% for the MFR, CLE and A2 scenarios, respectively. There are substantial inter-model differences of order ±25% in these results. The ozone decreases throughout the troposphere in the MFR scenario, but the zonal annual mean concentrations increase by up to 6 ppb in the CLE scenario and by typically 6 to 10 ppb in the A2 scenario (Supplementary Material, Figure S10.2).

The radiative forcing by the combination of ozone and CH<sub>4</sub> changes by -0.05, 0.18, and 0.30 W m<sup>-2</sup> for the MFR, CLE and A2 scenarios, respectively. These projections indicate that the growth in tropospheric ozone between 2000 and 2030 could be reduced or reversed depending on emission controls.

The major issues in the fidelity of these simulations for future tropospheric ozone are the sensitivities to the representation of the stratospheric production, destruction and transport of ozone and the exchange of species between the stratosphere and troposphere. Few of the models include the effects of non-methane hydrocarbons (NMHCs), and the sign of the effects of NMHCs on ozone are not consistent among the models that do (Hauglustaine and Brasseur, 2001; Grenfell et al., 2003).

The effect of more stratosphere-troposphere exchange (STE) in response to climate change is projected to increase the concentrations of ozone in the upper troposphere due to the much greater concentrations of ozone in the lower stratosphere than in the upper troposphere. While the sign of the effect is consistent in recent simulations, the magnitude of the change in STE and its effects on ozone are very model dependent. In a simulation forced by the SRES A1FI scenario, Collins et al. (2003) project that the downward flux of ozone increases by 37% from the 1990s to the 2090s. As a result, the concentration of ozone in the upper troposphere at mid-latitudes increases by 5 to 15%. For the A2 scenarios, projections of the increase in ozone by 2100 due to STE range from 35% (Hauglustaine et al., 2005) to 80% (Sudo et al., 2003; Zeng and Pyle, 2003). The increase in STE is driven by increases in the descending

branches of the Brewer-Dobson Circulation at mid-latitudes and is caused by changes in meridional temperature gradients in the upper troposphere and lower stratosphere (Rind et al., 2001). The effects of the enhanced STE are sensitive to the simulation of processes in the stratosphere, including the effects of lower temperatures and the evolution of chlorine, bromine and  $\text{NO}_x$  concentrations. Since the greenhouse effect of ozone is largest in the upper troposphere, the treatment of STE remains a significant source of uncertainty in the calculation of the total greenhouse effect of tropospheric ozone.

The effects of climate change, in particular increased tropospheric temperatures and water vapour, tend to offset some of the increase in ozone driven by emissions. The higher water vapour is projected to offset the increase in ozone by between 10% (Hauglustaine et al., 2005) and 17% (Stevenson et al., 2000). The water vapour both decelerates the chemical production and accelerates the chemical destruction of ozone. The photochemical production depends on the concentrations of  $\text{NO}_y$  (reactive odd nitrogen), and the additional water vapour causes a larger fraction of  $\text{NO}_y$  to be converted to nitric acid, which can be efficiently removed from the atmosphere in precipitation (Grewe et al., 2001). The water vapour also increases the concentrations of OH through reaction with the oxygen radical in the 1D excited state ( $\text{O}(^1\text{D})$ ), and the removal of  $\text{O}(^1\text{D})$  from the atmosphere slows the formation of ozone. The increased concentrations of OH and the increased rates of  $\text{CH}_4$  oxidation with higher temperature further reduce the lifetime of tropospheric  $\text{CH}_4$  by 12% by 2100 (Stevenson et al., 2000; Johnson et al., 2001). Decreases in  $\text{CH}_4$  concentrations also tend to reduce tropospheric ozone (Stevenson et al., 2000).

Recent measurements show that  $\text{CH}_4$  growth rates have declined and were negative for several years in the early 21st century (see Section 2.3.2). The observed rate of increase of  $0.8 \text{ ppb yr}^{-1}$  for the period 1999 to 2004 is considerably less than the rate of  $6 \text{ ppb yr}^{-1}$  assumed in all the SRES scenarios for the period 1990 to 2000 (Nakićenović and Swart, 2000; TAR Appendix II). Recent studies (Dentener et al., 2005) have considered lower emission scenarios (see above) that take account of new pollution control techniques adopted in major developing countries. In the CLE scenario, emissions of  $\text{CH}_4$  are comparable to the B2 scenario and increase from  $340 \text{ Tg yr}^{-1}$  in 2000 to  $450 \text{ Tg yr}^{-1}$  in 2030. The  $\text{CH}_4$  concentrations increase from 1,750 ppb in 2000 to between 2,090 and 2,200 ppb in 2030 under this scenario. In the MFR scenario, the emissions are sufficiently low that the concentrations in 2030 are unchanged at 1,750 ppb. Under these conditions, the changes in radiative forcing due to  $\text{CH}_4$  between the 1990s and 2020s are less than  $0.01 \text{ W m}^{-2}$ .

Current understanding of the magnitude and variation of  $\text{CH}_4$  sources and sinks is covered in Section 7.4, where it is noted that there are substantial uncertainties although the modelling has progressed. There is some evidence for a coupling between climate and wetland emissions. For example, calculations using atmospheric concentrations and small-scale emission measurements as input differ by 60% (Shindell and Schmidt, 2004). Concurrent changes in natural sources of  $\text{CH}_4$  are

now being estimated to first order using simple models of the biosphere coupled to AOGCMs. Simulations of the response of wetlands to climate change from doubling atmospheric  $\text{CO}_2$  show that wetland emissions increase by 78% (Shindell and Schmidt, 2004). Most of this effect is caused by growth in the flux of  $\text{CH}_4$  from existing tropical wetlands. The increase would be equivalent to approximately 20% of current inventories and would contribute an additional 430 ppb to atmospheric concentrations. Global radiative forcing would increase by approximately 4 to 5% from the effects of wetland emissions by 2100 (Gedney et al., 2004).

#### 10.4.4 Simulations of Future Evolution of Major Aerosol Species

The time-dependent evolution of major aerosol species and the interaction of these species with climate represent some of the major sources of uncertainty in projections of climate change. An increasing number of AOGCMs have included multiple types of tropospheric aerosols including sulphates, nitrates, black and organic carbon, sea salt and soil dust. Of the 23 models represented in the multi-model ensemble of climate-change simulations for IPCC AR4, 13 include other tropospheric species besides sulphates. Of these, seven have the non-sulphate species represented with parametrizations that interact with the remainder of the model physics. Nitrates are treated in just two of the models in the ensemble. Recent projections of nitrate and sulphate loading under the SRES A2 scenario suggest that forcing by nitrates may exceed forcing by sulphates by the end of the 21st century (Adams et al., 2001). This result is of course strongly dependent upon the evolution of precursor emissions for these aerosol species.

The black and organic carbon aerosols in the atmosphere include a very complex system of primary organic aerosols (POA) and secondary organic aerosols (SOA), which are formed by oxidation of biogenic VOCs. The models used for climate projections typically use highly simplified bulk parametrizations for POA and SOA. More detailed parametrizations for the formation of SOA that trace oxidation pathways have only recently been developed and used to estimate the direct radiative forcing by SOA for present-day conditions (Chung and Seinfeld, 2002). The forcing by SOA is an emerging issue for simulations of present-day and future climate since the rate of chemical formation of SOA may be 60% or more of the emissions rate for primary carbonaceous aerosols (Kanakidou et al., 2005). In addition, two-way coupling between reactive chemistry and tropospheric aerosols has not been explored comprehensively in climate change simulations. Unified models that treat tropospheric ozone- $\text{NO}_x$ -hydrocarbon chemistry, aerosol formation, heterogeneous processes in clouds and on aerosols, and gas-phase photolysis have been developed and applied to the current climate (Liao et al., 2003). However, these unified models have not yet been used extensively to study the evolution of the chemical state of the atmosphere under future scenarios.

The interaction of soil dust with climate is under active investigation. Whether emissions of soil dust aerosols increase or decrease in response to changes in atmospheric state and circulation is still unresolved (Tegen et al., 2004a). Several recent studies have suggested that the total surface area where dust can be mobilised will decrease in a warmer climate with higher concentrations of CO<sub>2</sub> (e.g., Harrison et al., 2001). The net effects of reductions in dust emissions from natural sources combined with land use change could potentially be significant but have not been systematically modelled as part of climate change assessment.

Uncertainty regarding the scenario simulations is compounded by inherently unpredictable natural forcings from future volcanic eruptions and solar variability. The eruptions that produce climatologically significant forcing represent just the extremes of global volcanic activity (Naveau and Ammann, 2005). Global simulations can account for the effects of future natural forcings using stochastic representations based upon prior eruptions and variations in solar luminosity. The relative contribution of these forcings to the projections of global mean temperature anomalies are largest in the period up to 2030 (Stott and Kettleborough, 2002).

## 10.5 Quantifying the Range of Climate Change Projections

### 10.5.1 Sources of Uncertainty and Hierarchy of Models

Uncertainty in predictions of anthropogenic climate change arises at all stages of the modelling process described in Section 10.1. The specification of future emissions of greenhouse gases, aerosols and their precursors is uncertain (e.g., Nakićenović and Swart, 2000). It is then necessary to convert these emissions into concentrations of radiatively active species, calculate the associated forcing and predict the response of climate system variables such as surface temperature and precipitation (Figure 10.1). At each step, uncertainty in the true signal of climate change is introduced both by errors in the representation of Earth system processes in models (e.g., Palmer et al., 2005) and by internal climate variability (e.g., Selten et al., 2004). The effects of internal variability can be quantified by running models many times from different initial conditions, provided that simulated variability is consistent with observations. The effects of uncertainty in the knowledge of Earth system processes can be partially quantified by constructing ensembles of models that sample different parametrizations of these processes. However, some processes may be missing from the set of available models, and alternative parametrizations of other processes may share common systematic biases. Such limitations imply that distributions of future climate responses from ensemble simulations are themselves subject to uncertainty (Smith, 2002), and would be wider were uncertainty

due to structural model errors accounted for. These distributions may be modified to reflect observational constraints expressed through metrics of the agreement between the observed historical climate and the simulations of individual ensemble members, for example through Bayesian methods (see Chapter 9 Supplementary Material, Appendix 9.B). In this case, the choice of observations and their associated errors introduce further sources of uncertainty. In addition, some sources of future radiative forcing are yet to be accounted for in the ensemble projections, including those from land use change, variations in solar and volcanic activity (Kettleborough et al., 2007), and CH<sub>4</sub> release from permafrost or ocean hydrates (see Section 8.7).

A spectrum or hierarchy of models of varying complexity has been developed (Claussen et al., 2002; Stocker and Knutti, 2003) to assess the range of future changes consistent with the understanding of known uncertainties. Simple climate models (SCMs) typically represent the ocean-atmosphere system as a set of global or hemispheric boxes, predicting global surface temperature using an energy balance equation, a prescribed value of climate sensitivity and a basic representation of ocean heat uptake (see Section 8.8.2). Their role is to perform comprehensive analyses of the interactions between global variables, based on prior estimates of uncertainty in their controlling parameters obtained from observations, expert judgement and from tuning to complex models. By coupling SCMs to simple models of biogeochemical cycles they can be used to extrapolate the results of AOGCM simulations to a wide range of alternative forcing scenarios (e.g., Wigley and Raper, 2001; see Section 10.5.3).

Compared to SCMs, EMICs include more of the processes simulated in AOGCMs, but in a less detailed, more highly parametrized form (see Section 8.8.3), and at coarser resolution. Consequently, EMICs are not suitable for quantifying uncertainties in regional climate change or extreme events, however they can be used to investigate the large-scale effects of coupling between multiple Earth system components in large ensembles or long simulations (e.g., Forest et al., 2002; Knutti et al., 2002), which is not yet possible with AOGCMs due to their greater computational expense. Some EMICs therefore include modules such as vegetation dynamics, the terrestrial and ocean carbon cycles and atmospheric chemistry (Plattner et al., 2001; Claussen et al., 2002), filling a gap in the spectrum of models between AOGCMs and SCMs. Thorough sampling of parameter space is computationally feasible for some EMICs (e.g., Stocker and Schmittner, 1997; Forest et al., 2002; Knutti et al., 2002), as for SCMs (Wigley and Raper, 2001), and is used to obtain probabilistic projections (see Section 10.5.4.5). In some EMICs, climate sensitivity is an adjustable parameter, as in SCMs. In other EMICs, climate sensitivity is dependent on multiple model parameters, as in AOGCMs. Probabilistic estimates of climate sensitivity and TCR from SCMs and EMICs are assessed in Section 9.6 and compared with estimates from AOGCMs in Box 10.2.

The high resolution and detailed parametrizations in AOGCMs enable them to simulate more comprehensively the

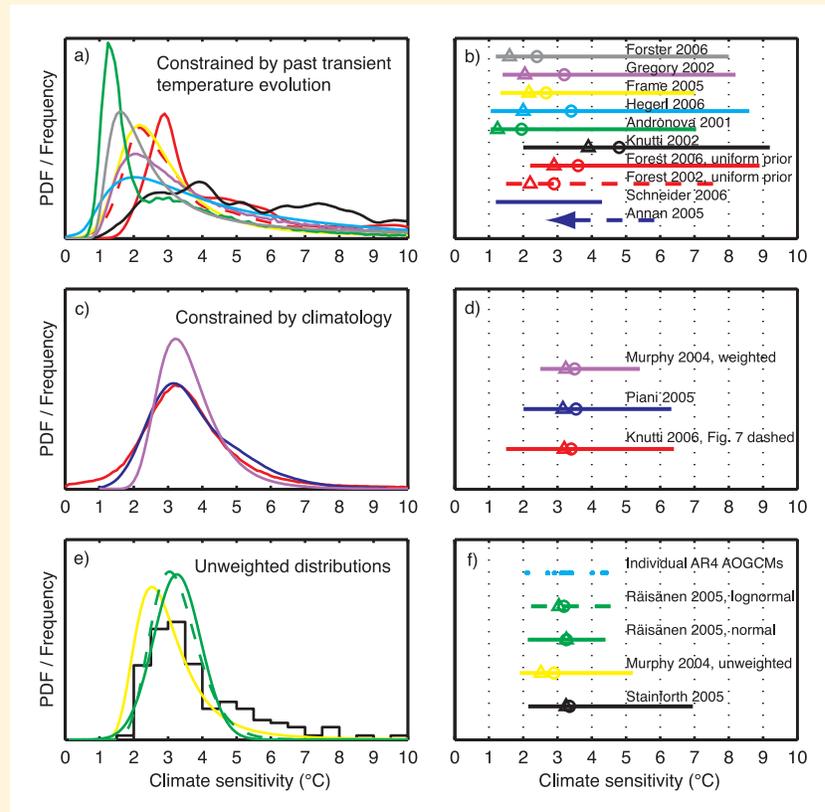
## Box 10.2: Equilibrium Climate Sensitivity

The likely range<sup>1</sup> for equilibrium climate sensitivity was estimated in the TAR (Technical Summary, Section F.3; Cubasch et al., 2001) to be 1.5°C to 4.5°C. The range was the same as in an early report of the National Research Council (Charney, 1979), and the two previous IPCC assessment reports (Mitchell et al., 1990; Kattenberg et al., 1996). These estimates were expert assessments largely based on equilibrium climate sensitivities simulated by atmospheric GCMs coupled to non-dynamic slab oceans. The mean  $\pm 1$  standard deviation values from these models were 3.8°C  $\pm$  0.78°C in the SAR (17 models), 3.5°C  $\pm$  0.92°C in the TAR (15 models) and in this assessment 3.26°C  $\pm$  0.69°C (18 models).

Considerable work has been done since the TAR (IPCC, 2001) to estimate climate sensitivity and to provide a better quantification of relative probabilities, including a most likely value, rather than just a subjective range of uncertainty. Since climate sensitivity of the real climate system cannot be measured directly, new methods have been used since the TAR to establish a relationship between sensitivity and some observable quantity (either directly or through a model), and to estimate a range or probability density function (PDF) of climate sensitivity consistent with observations. These methods are summarised separately in Chapters 9 and 10, and here we synthesize that information into an assessment. The information comes from two main categories: constraints from past climate change on various time scales, and the spread of results for climate sensitivity from ensembles of models.

The first category of methods (see Section 9.6) uses the historical transient evolution of surface temperature, upper air temperature, ocean temperature, estimates of the radiative forcing, satellite data, proxy data over the last millennium, or a subset thereof to calculate ranges or PDFs for sensitivity (e.g., Wigley et al., 1997b; Tol and De Vos, 1998; Andronova and Schlesinger, 2001; Forest et al., 2002; Gregory et al., 2002a; Harvey and Kaufmann, 2002; Knutti et al., 2002, 2003; Frame et al., 2005; Forster et al., 2006; Forster and Gregory, 2006; Hegerl et al., 2006). A summary of all PDFs of climate sensitivity from those methods is shown in Figure 9.20 and in Box 10.2, Figure 1a. Median values, most likely values (modes) and 5 to 95% uncertainty ranges are shown in Box 10.2, Figure 1b for each PDF. Most of the results confirm that climate sensitivity is very unlikely below 1.5°C. The upper bound is more difficult to constrain because of a nonlinear relationship between climate sensitivity and the observed transient response, and is further hampered by the limited length of the observational record and uncertainties in the observations, which are particularly large for ocean heat uptake and for the magnitude of the aerosol radiative forcing. Studies that take all the important known uncertainties in observed historical trends into account cannot rule out the possibility that the climate sensitivity exceeds 4.5°C, although such high values are consistently found to be less likely than values of around 2.0°C to 3.5°C. Observations of transient climate change provide better constraints for the TCR (see Section 9.6.1.3).

Two recent studies use a modelled relation between climate sensitivity and tropical SSTs in the Last Glacial Maximum (LGM) and proxy records of the latter to estimate ranges of climate sensitivity (Annan et al., 2005b; Schneider von Deimling et al., 2006; see (continued)



**Box 10.2, Figure 1.** (a) PDFs or frequency distributions constrained by the transient evolution of the atmospheric temperature, radiative forcing and ocean heat uptake, (b) as in (a) and (b) but 5 to 95% ranges, medians (circles) and maximum probabilities (triangles), (c) and (d) as in (a) but using constraints from present-day climatology, and (e) and (f) unweighted or fitted distributions from different models or from perturbing parameters in a single model. Distributions in (e) and (f) should not be strictly interpreted as PDFs. See Chapter 9 text, Figure 9.20 and Table 9.3 for details. Note that Annan et al. (2005b) only provide an upper but no lower bound. All PDFs are truncated at 10°C for consistency, some are shown for different prior distributions than in the original studies, and ranges may differ from numbers reported in individual studies.

<sup>1</sup> Though the TAR Technical Summary attached 'likely' to the 1.5°C - 4.5°C range, the word 'likely' was used there in a general sense rather than in a specific calibrated sense. No calibrated confidence assessment was given in either the Summary for Policymakers or in Chapter 9 of the TAR, and no probabilistic studies on climate sensitivity were cited in Chapter 9 where the range was assessed.

Section 9.6). While both of these estimates overlap with results from the instrumental period and results from other AOGCMS, the results differ substantially due to different forcings and the different relationships between LGM SSTs and sensitivity in the models used. Therefore, LGM proxy data provide support for the range of climate sensitivity based on other lines of evidence.

Studies comparing the observed transient response of surface temperature after large volcanic eruptions with results obtained from models with different climate sensitivities (see Section. 9.6) do not provide PDFs, but find best agreement with sensitivities around 3°C, and reasonable agreement within the 1.5°C to 4.5°C range (Wigley et al., 2005). They are not able to exclude sensitivities above 4.5°C.

The second category of methods examines climate sensitivity in GCMs. Climate sensitivity is not a single tuneable parameter in these models, but depends on many processes and feedbacks. Three PDFs of climate sensitivity were obtained by comparing different variables of the simulated present-day climatology and variability against observations in a perturbed physics ensemble (Murphy et al., 2004; Piani et al., 2005; Knutti et al., 2006, Box 10.2, Figure 1c,d; see Section 10.5.4.2). Equilibrium climate sensitivity is found to be most likely around 3.2°C, and very unlikely to be below about 2°C. The upper bound is sensitive to how model parameters are sampled and to the method used to compare with observations.

Box 10.2, Figure 1e,f show the frequency distributions obtained by different methods when perturbing parameters in the Hadley Centre Atmospheric Model (HadAM3) but before weighting with observations (Section 10.5.4). Murphy et al. (2004; unweighted) sampled 29 parameters and assumed individual effects to combine linearly.

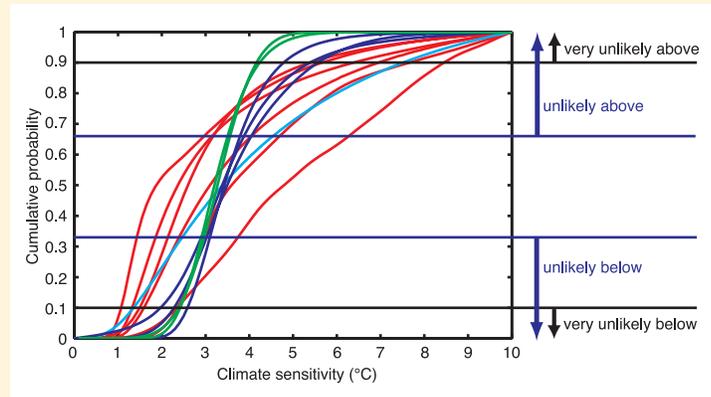
Stainforth et al. (2005) found nonlinearities when simulating multiple combinations of a subset of key parameters. The most frequently occurring climate sensitivity values are grouped around 3°C, but this could reflect the sensitivity of the unperturbed model. Some, but not all, of the simulations by high-sensitivity models have been found to agree poorly with observations and are therefore unlikely, hence even very high values are not excluded. This inability to rule out very high values is common to many methods, since for well-understood physical reasons, the rate of change (against sensitivity) of most quantities that can be observed tends to zero as the sensitivity increases (Hansen et al., 1985; Knutti et al., 2005; Allen et al., 2006b).

There is no well-established formal way of estimating a single PDF from the individual results, taking account of the different assumptions in each study. Most studies do not account for structural uncertainty, and thus probably tend to underestimate the uncertainty. On the other hand, since several largely independent lines of evidence indicate similar most likely values and ranges, climate sensitivity values are likely to be better constrained than those found by methods based on single data sets (Annan and Hargreaves, 2006; Hegerl et al., 2006).

The equilibrium climate sensitivity values for the AR4 AOGCMS coupled to non-dynamic slab ocean models are given for comparison (Box 10.2, Figure 1e,f; see also Table 8.2). These estimates come from models that represent the current best efforts from the international global climate modelling community at simulating climate. A normal fit yields a 5 to 95% range of about 2.1°C to 4.4°C with a mean value of equilibrium climate sensitivity of about 3.3°C (2.2°C to 4.6°C for a lognormal distribution, median 3.2°C) (Räisänen, 2005b). A probabilistic interpretation of the results is problematic, because each model is assumed to be equally credible and the results depend upon the assumed shape of the fitted distribution. Although the AOGCMS used in IPCC reports are an 'ensemble of opportunity' not designed to sample modelling uncertainties systematically or randomly, the range of sensitivities covered has been rather stable over many years. This occurs in spite of substantial model developments, considerable progress in simulating many aspects of the large-scale climate, and evaluation of those models against observations. Progress has been made since the TAR in diagnosing and understanding inter-model differences in climate feedbacks and equilibrium climate sensitivity. Confidence has increased in the strength of water vapour-lapse rate feedbacks, whereas cloud feedbacks (particularly from low-level clouds) have been confirmed as the primary source of climate sensitivity differences (see Section 8.6).

Since the TAR, the levels of scientific understanding and confidence in quantitative estimates of equilibrium climate sensitivity have increased substantially. Basing our assessment on a combination of several independent lines of evidence, as summarised in Box 10.2 Figures 1 and 2, including observed climate change and the strength of known feedbacks simulated in GCMs, we conclude that the global mean equilibrium warming for doubling CO<sub>2</sub>, or 'equilibrium climate sensitivity', is likely to lie in the range 2°C to 4.5°C, with a most likely value of about 3°C. Equilibrium climate sensitivity is very likely larger than 1.5°C.

For fundamental physical reasons as well as data limitations, values substantially higher than 4.5°C still cannot be excluded, but agreement with observations and proxy data is generally worse for those high values than for values in the 2°C to 4.5°C range.



**Box 10.2, Figure 2.** Individual cumulative distributions of climate sensitivity from the observed 20th-century warming (red), model climatology (blue) and proxy evidence (cyan), taken from Box 10.2, Figure 1a, c (except LGM studies and Forest et al. (2002), which is superseded by Forest et al. (2006)) and cumulative distributions fitted to the AOGCMS' climate sensitivities (green) from Box 10.2, Figure 1e. Horizontal lines and arrows mark the edges of the likelihood estimates according to IPCC guidelines.

processes giving rise to internal variability (see Section 8.4), extreme events (see Section 8.5) and climate change feedbacks, particularly at the regional scale (Boer and Yu, 2003a; Bony and Dufresne, 2005; Bony et al., 2006; Soden and Held, 2006). Given that ocean dynamics influence regional feedbacks (Boer and Yu, 2003b), quantification of regional uncertainties in time-dependent climate change requires multi-model ensemble simulations with AOGCMs containing a full, three-dimensional dynamic ocean component. However, downscaling methods (see Chapter 11) are required to obtain credible information at spatial scales near or below the AOGCM grid scale (125 to 400 km in the AR4 AOGCMs, see Table 8.1).

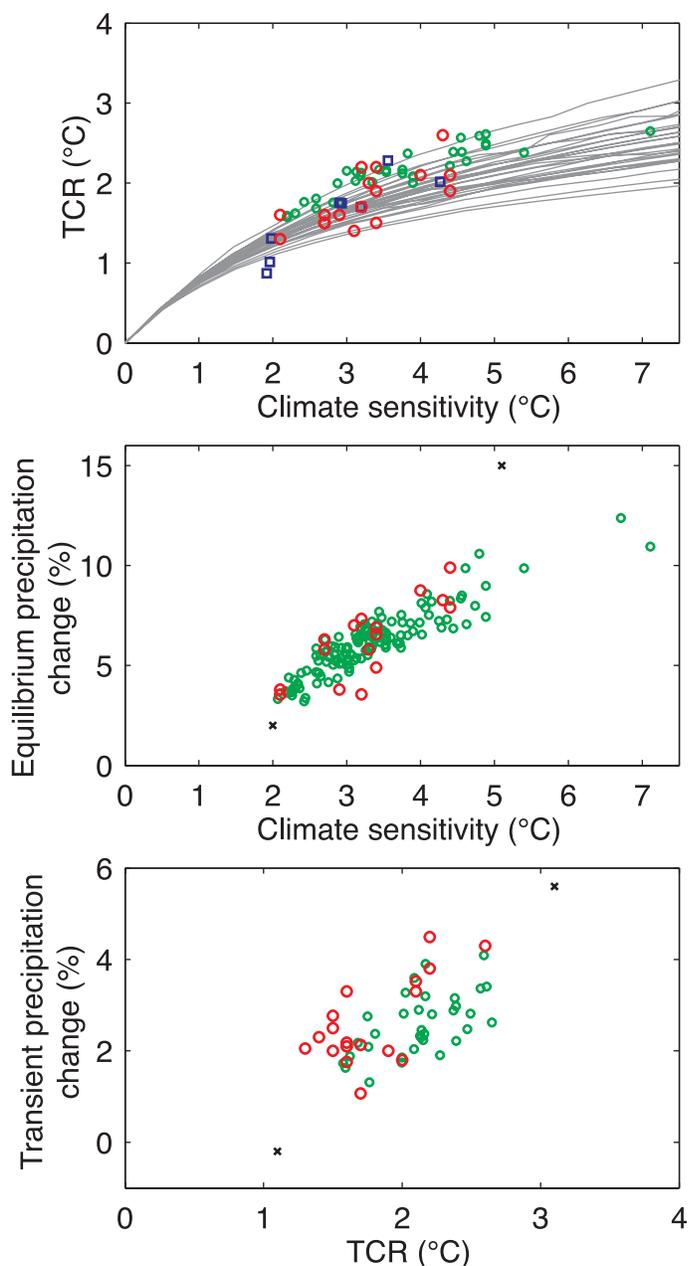
## 10.5.2 Range of Responses from Different Models

### 10.5.2.1 Comprehensive AOGCMs

The way a climate model responds to changes in external forcing, such as an increase in anthropogenic greenhouse gases, is characterised by two standard measures: (1) ‘equilibrium climate sensitivity’ (the equilibrium change in global surface temperature following a doubling of the atmospheric equivalent  $\text{CO}_2$  concentration; see Glossary), and (2) ‘transient climate response’ (the change in global surface temperature in a global coupled climate model in a  $1\% \text{ yr}^{-1}$   $\text{CO}_2$  increase experiment at the time of atmospheric  $\text{CO}_2$  doubling; see Glossary). The first measure provides an indication of feedbacks mainly residing in the atmospheric model but also in the land surface and sea ice components, and the latter quantifies the response of the fully coupled climate system including aspects of transient ocean heat uptake (e.g., Sokolov et al., 2003). These two measures have become standard for quantifying how an AOGCM will react to more complicated forcings in scenario simulations.

Historically, the equilibrium climate sensitivity has been given in the range from  $1.5^\circ\text{C}$  to  $4.5^\circ\text{C}$ . This range was reported in the TAR with no indication of a probability distribution within this range. However, considerable recent work has addressed the range of equilibrium climate sensitivity, and attempted to assign probabilities to climate sensitivity.

Equilibrium climate sensitivity and TCR are not independent (Figure 10.25a). For a given AOGCM, the TCR is smaller than the equilibrium climate sensitivity because ocean heat uptake delays the atmospheric warming. A large ensemble of the BERN2.5D EMIC has been used to explore the relationship of TCR and equilibrium sensitivity over a wide range of ocean heat uptake parametrizations (Knutti et al., 2005). Good agreement with the available results from AOGCMs is found, and the BERN2.5D EMIC covers almost the entire range of structurally different models. The percent change in precipitation is closely related to the equilibrium climate sensitivity for the current generation of AOGCMs (Figure 10.25b), with values from the current models falling within the range of the models from the TAR. Figure 10.25c shows the percent change in globally averaged precipitation as a function of TCR at the time of atmospheric  $\text{CO}_2$  doubling, as simulated by  $1\% \text{ yr}^{-1}$  transient  $\text{CO}_2$  increase experiments with AOGCMs. The figure suggests



**Figure 10.25.** (a) TCR versus equilibrium climate sensitivity for all AOGCMs (red), EMICs (blue), a perturbed physics ensemble of the UKMO-HadCM3 AOGCM (green; an updated ensemble based on M. Collins et al., 2006) and from a large ensemble of the Bern2.5D EMIC (Knutti et al., 2005) using different ocean vertical diffusivities and mixing parametrizations (grey lines). (b) Global mean precipitation change (%) as a function of global mean temperature change at equilibrium for doubled  $\text{CO}_2$  in atmospheric GCMs coupled to a non-dynamic slab ocean (red all AOGCMs, green from a perturbed physics ensemble of the atmosphere-slab ocean version of UKMO-HadCM3 (Webb et al., 2006)). (c) Global mean precipitation change (%) as a function of global mean temperature change (TCR) at the time of  $\text{CO}_2$  doubling in a transient  $1\% \text{ yr}^{-1}$   $\text{CO}_2$  increase scenario, simulated by coupled AOGCMs (red) and the UKMO-HadCM3 perturbed physics ensemble (green). Black crosses in (b) and (c) mark ranges covered by the TAR AOGCMs (IPCC, 2001) for each quantity.

a broadly positive correlation between these two quantities similar to that for equilibrium climate sensitivity, with these values from the new models also falling within the range of the previous generation of AOGCMs assessed in the TAR. Note that the apparent relationships may not hold for other forcings or at smaller scales. Values for an ensemble with perturbations made to parameters in the atmospheric component of UKMO-HadCM3 (M. Collins et al., 2006) cover similar ranges and are shown in Figure 10.25 for comparison.

Fitting normal distributions to the results, the 5 to 95% uncertainty range for equilibrium climate sensitivity from the AOGCMs is approximately 2.1°C to 4.4°C and that for TCR is 1.2°C to 2.4°C (using the method of Räisänen, 2005b). The mean for climate sensitivity is 3.26°C and that for TCR is 1.76°C. These numbers are practically the same for both the normal and the lognormal distribution (see Box 10.2). The assumption of a (log) normal fit is not well supported by the limited sample of AOGCM data. In addition, the AOGCMs represent an ‘ensemble of opportunity’ and are by design not sampled in a random way. However, most studies aiming to constrain climate sensitivity with observations do indeed indicate a similar to lognormal probability distribution of climate sensitivity and an approximately normal distribution of the uncertainty in future warming and thus TCR (see Box 10.2). Those studies also suggest that the current AOGCMs may not cover the full range of uncertainty for climate sensitivity. An assessment of all the evidence on equilibrium climate sensitivity is provided in Box 10.2. The spread of the AOGCM climate sensitivities is discussed in Section 8.6 and the AOGCM values for climate sensitivity and TCR are listed in Table 8.2.

The nonlinear relationship between TCR and equilibrium climate sensitivity shown in Figure 10.25a also indicates that on time scales well short of equilibrium, the model’s TCR is not particularly sensitive to the model’s climate sensitivity. The implication is that transient climate change is better constrained than the equilibrium climate sensitivity, that is, models with different sensitivity might still show good agreement for projections on decadal time scales. Therefore, in the absence of unusual solar or volcanic activity, climate change is well constrained for the coming few decades, because differences in some feedbacks will only become important on long time scales (see also Section 10.5.4.5) and because over the next few decades, about half of the projected warming would occur as a result of radiative forcing being held constant at year 2000 levels (constant composition commitment, see Section 10.7).

Comparing observed thermal expansion with those AR4 20th-century simulations that have natural forcings indicates that ocean heat uptake in the models may be 25% larger than observed, although both could be consistent within their uncertainties. This difference is possibly due to a combination of overestimated ocean heat uptake in the models, observational uncertainties and limited data coverage in the deep ocean (see Sections 9.5.1.1, 9.5.2, and 9.6.2.1). Assigning this difference solely to overestimated ocean heat uptake, the TCR estimates could increase by 0.6°C at most. This is in line with evidence for a relatively weak dependence of TCR on ocean mixing based

on SCMs and EMICS (Allen et al., 2000; Knutti et al., 2005). The range of TCR covered by an ensemble with perturbations made to parameters in the atmospheric component of UKMO-HadCM3 is 1.5 to 2.6°C (M. Collins et al., 2006), similar to the AR4 AOGCM range. Therefore, based on the range covered by AOGCMs, and taking into account structural uncertainties and possible biases in transient heat uptake, TCR is assessed as very likely larger than 1°C and very unlikely greater than 3°C (i.e., 1.0°C to 3.0°C is a 10 to 90% range). Because the dependence of TCR on sensitivity becomes small as sensitivity increases, uncertainties in the upper bound on sensitivity only weakly affect the range of TCR (see Figure 10.25; Chapter 9; Knutti et al., 2005; Allen et al., 2006b). Observational constraints based on detection and attribution studies provide further support for this TCR range (see Section 9.6.2.3).

### 10.5.2.2 Earth System Models of Intermediate Complexity

Over the last few years, a range of climate models has been developed that are dynamically simpler and of lower resolution than comprehensive AOGCMs, although they might well be more ‘complete’ in terms of climate system components that are included. The class of such models, usually referred to as EMICs (Claussen et al., 2002), is very heterogeneous, ranging from zonally averaged ocean models coupled to energy balance models (Stocker et al., 1992a) or to statistical-dynamical models of the atmosphere (Petoukhov et al., 2000), to low resolution three-dimensional ocean models, coupled to energy balance or simple dynamical models of the atmosphere (Opsteegh et al., 1998; Edwards and Marsh, 2005; Müller et al., 2006). Some EMICs have a radiation code and prescribe greenhouse gases, while others use simplified equations to project radiative forcing from projected concentrations and abundances (Joos et al., 2001; see Chapter 2 and the TAR, Appendix II, Table II.3.11). Compared to comprehensive models, EMICs have hardly any computational constraints, and therefore many simulations can be performed. This allows for the creation of large ensembles, or the systematic exploration of long-term changes many centuries hence. However, because of the reduced resolution, only results at the largest scales (continental to global) are to be interpreted (Stocker and Knutti, 2003). Table 8.3 lists all EMICs used in this section, including their components and resolution.

A set of simulations is used to compare EMICs with AOGCMs for the SRES A1B scenario with stable atmospheric concentrations after year 2100 (see Section 10.7.2). For global mean temperature and sea level, the EMICs generally reproduce the AOGCM behaviour quite well. Two of the EMICs have values for climate sensitivity and transient response below the AOGCM range. However, climate sensitivity is a tuneable parameter in some EMICs, and no attempt was made here to match the range of response of the AOGCMs. The transient reduction of the MOC in most EMICs is also similar to the AOGCMs (see also Sections 10.3.4 and 10.7.2 and Figure 10.34), providing support that this class of models can be used for both long-term commitment projections (see Section 10.7) and probabilistic projections involving hundreds to thousands

of simulations (see Section 10.5.4.5). If the forcing is strong enough, and lasts long enough (e.g.,  $4 \times \text{CO}_2$ ), a complete and irreversible collapse of the MOC can be induced in a few models. This is in line with earlier results using EMICs (Stocker and Schmittner, 1997; Rahmstorf and Ganopolski, 1999) or a coupled model (Stouffer and Manabe, 1999).

### 10.5.3 Global Mean Responses from Different Scenarios

The TAR projections with an SCM presented a range of warming over the 21st century for 35 SRES scenarios. The SRES emission scenarios assume that no climate policies are implemented (Nakićenović and Swart, 2000). The construction of Figure 9.14 of the TAR was pragmatic. It used a simple model tuned to AOGCMs that had a climate sensitivity within the long-standing range of  $1.5^\circ\text{C}$  to  $4.5^\circ\text{C}$  (e.g., Charney, 1979; and stated in earlier IPCC Assessment Reports). Models with climate sensitivity outside that range were discussed in the text and allowed the statement that the presented range was not the extreme range indicated by AOGCMs. The figure was based on a single anthropogenic-forcing estimate for 1750 to 2000, which is well within the range of values recommended by TAR Chapter 6, and is also consistent with that deduced from model simulations and the observed temperature record (TAR Chapter 12.). To be consistent with TAR Chapter 3, climate feedbacks on the carbon cycle were included. The resulting range of global mean temperature change from 1990 to 2100 given by the full set of SRES scenarios was  $1.4^\circ\text{C}$  to  $5.8^\circ\text{C}$ .

Since the TAR, several studies have examined the TAR projections and attempted probabilistic assessments. Allen et al. (2000) show that the forcing and simple climate model tunings used in the TAR give projections that are in agreement with the observationally constrained probabilistic forecast, reported in TAR Chapter 12.

As noted by Moss and Schneider (2000), giving only a range of warming results is potentially misleading unless some guidance is given as to what the range means in probabilistic terms. Wigley and Raper (2001) interpret the warming range in probabilistic terms, accounting for uncertainties in emissions, the climate sensitivity, the carbon cycle, ocean mixing and aerosol forcing. They give a 90% probability interval for 1990 to 2100 warming of  $1.7^\circ\text{C}$  to  $4^\circ\text{C}$ . As pointed out by Wigley and Raper (2001), such results are only as realistic as the assumptions upon which they are based. Key assumptions in this study were that each SRES scenario was equally likely, that  $1.5^\circ\text{C}$  to  $4.5^\circ\text{C}$  corresponds to the 90% confidence interval for the climate sensitivity, and that carbon cycle feedback uncertainties can be characterised by the full uncertainty range of abundance in 2100 of 490 to 1,260 ppm given in the TAR. The aerosol probability density function (PDF) was based on the uncertainty estimates given in the TAR together with constraints based on fitting the SCM to observed global and hemispheric mean temperatures.

The most controversial assumption in the Wigley and Raper (2001) probabilistic assessment was the assumption that each SRES scenario was equally likely. The *Special Report on*

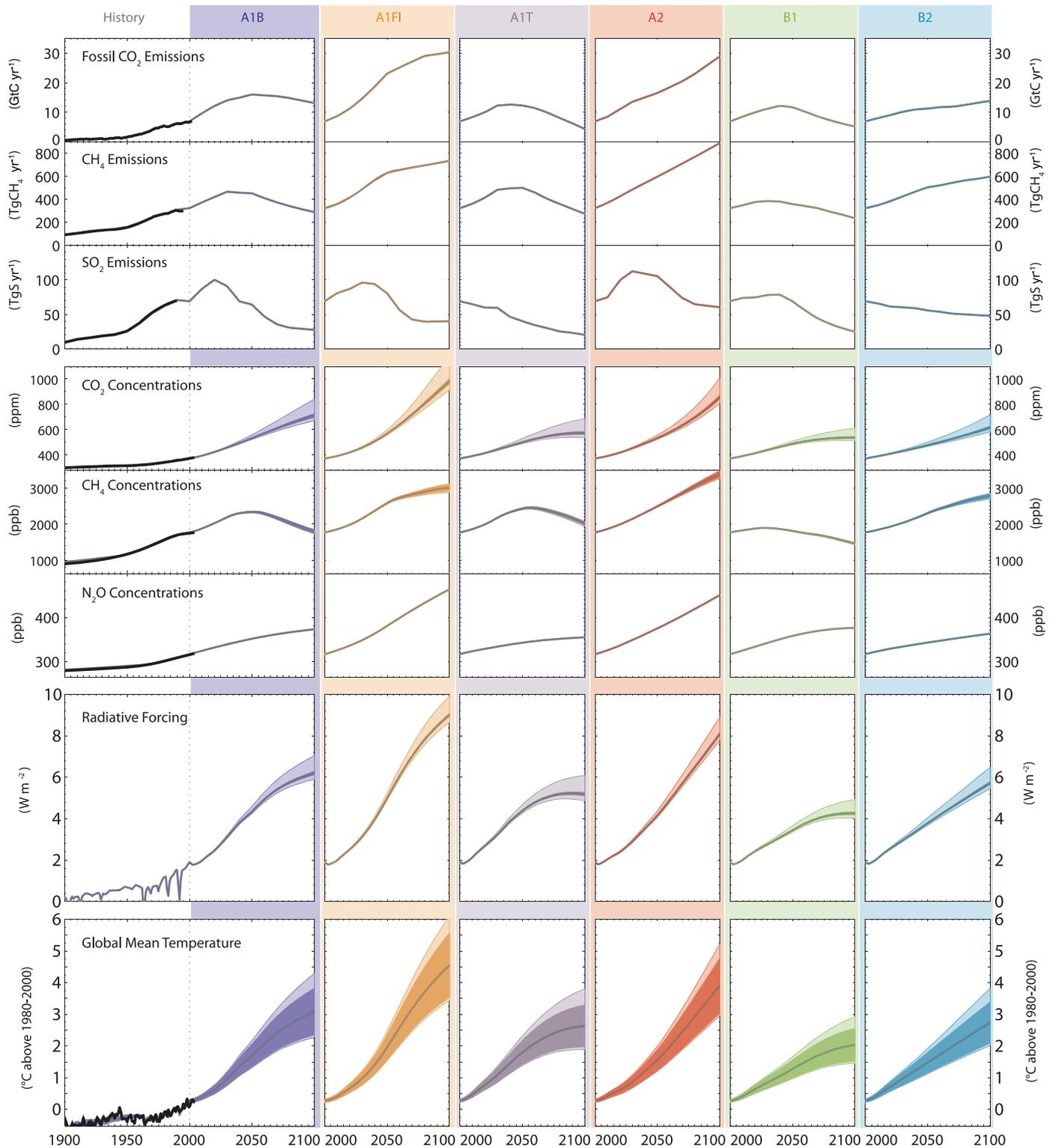
*Emissions Scenarios* (Nakićenović and Swart, 2000) states that ‘No judgment is offered in this report as to the preference for any of the scenarios and they are not assigned probabilities of occurrence, neither must they be interpreted as policy recommendations.’

Webster et al. (2003) use the probabilistic emissions projections of Webster et al. (2002), which consider present uncertainty in  $\text{SO}_2$  emissions, and allow the possibility of continuing increases in  $\text{SO}_2$  emissions over the 21st century, as well as the declining emissions consistent with SRES scenarios. Since their climate model parameter PDFs were constrained by observations and are mutually dependent, the effect of the lower present-day aerosol forcing on the projections is not easy to separate, but there is no doubt that their projections tend to be lower where they admit higher and increasing  $\text{SO}_2$  emissions.

Irrespective of the question of whether it is possible to assign probabilities to specific emissions scenarios, it is important to distinguish different sources of uncertainties in temperature projections up to 2100. Different emission scenarios arise because future greenhouse gas emissions are largely dependent on key socioeconomic drivers, technological development and political decisions. Clearly, one factor leading to different temperature projections is the choice of scenario. On the other hand, the ‘response uncertainty’ is defined as the range in projections for a particular emission scenario and arises from the limited knowledge of how the climate system will react to the anthropogenic perturbations. In the following, all given uncertainty ranges reflect the response uncertainty of the climate system and should therefore be seen as conditional on a specific emission scenario.

The following paragraphs describe the construction of the AR4 temperature projections for the six illustrative SRES scenarios, using the SCM tuned to 19 models from the MMD (see Section 8.8). These 19 tuned simple model versions have effective climate sensitivities in the range  $1.9^\circ\text{C}$  to  $5.9^\circ\text{C}$ . The simple model sensitivities are derived from the fully coupled  $2 \times$  and  $4 \times \text{CO}_2$   $1\% \text{ yr}^{-1} \text{ CO}_2$  increase AOGCM simulations and in some cases differ from the equilibrium slab ocean model sensitivities given in Table 8.2.

The SRES emission scenarios used here were designed to represent plausible futures assuming that no climate policies will be implemented. This chapter does not analyse any scenarios with explicit climate change mitigation policies. Still, there is a wide variation across these SRES scenarios in terms of anthropogenic emissions, such as those of fossil  $\text{CO}_2$ ,  $\text{CH}_4$  and  $\text{SO}_2$  (Nakićenović and Swart, 2000) as shown in the top three panels of Figure 10.26. As a direct consequence of the different emissions, the projected concentrations vary widely for the six illustrative SRES scenarios (see panel rows four to six in Figure 10.26 for the concentrations of the main greenhouse gases,  $\text{CO}_2$ ,  $\text{CH}_4$  and  $\text{N}_2\text{O}$ ). These results incorporate the effect of carbon cycle uncertainties (see Section 10.4.1), which were not explored with the SCM in the TAR. Projected  $\text{CH}_4$  concentrations are influenced by the temperature-dependent water vapour feedback on the lifetime of  $\text{CH}_4$ .



**Figure 10.26.** Fossil  $\text{CO}_2$ ,  $\text{CH}_4$  and  $\text{SO}_2$  emissions for six illustrative SRES non-mitigation emission scenarios, their corresponding  $\text{CO}_2$ ,  $\text{CH}_4$  and  $\text{N}_2\text{O}$  concentrations, radiative forcing and global mean temperature projections based on an SCM tuned to 19 AOGCMs. The dark shaded areas in the bottom temperature panel represent the mean  $\pm 1$  standard deviation for the 19 model tunings. The lighter shaded areas depict the change in this uncertainty range, if carbon cycle feedbacks are assumed to be lower or higher than in the medium setting. Mean projections for mid-range carbon cycle assumptions for the six illustrative SRES scenarios are shown as thick coloured lines. Historical emissions (black lines) are shown for fossil and industrial  $\text{CO}_2$  (Marland et al., 2005), for  $\text{SO}_2$  (van Aardenne et al., 2001) and for  $\text{CH}_4$  (van Aardenne et al., 2001, adjusted to Olivier and Berdowski, 2001). Observed  $\text{CO}_2$ ,  $\text{CH}_4$  and  $\text{N}_2\text{O}$  concentrations (black lines) are as presented in Chapter 6. Global mean temperature results from the SCM for anthropogenic and natural forcing compare favourably with 20th-century observations (black line) as shown in the lower left panel (Folland et al., 2001; Jones et al., 2001; Jones and Moberg, 2003).

In Figure 10.26, the plumes of CO<sub>2</sub> concentration reflect high and low carbon cycle feedback settings of the applied SCM. Their derivation is described as follows. The carbon cycle model in the SCM used here (Model for the Assessment of Greenhouse-gas Induced Climate Change: MAGICC) includes a number of climate-related carbon cycle feedbacks driven by global mean temperature. The parametrization of the overall effect of carbon cycle feedbacks is tuned to the more complex and physically realistic carbon cycle models of the C<sup>4</sup>MIP (Friedlingstein et al., 2006; see also Section 10.4) and the results are comparable to the BERN-CC model results across the six illustrative scenarios. This allows the SCM to produce projections of future CO<sub>2</sub> concentration change that are consistent with state-of-the-art carbon cycle model results. Specifically, the C<sup>4</sup>MIP range of CO<sub>2</sub> concentrations for the A2 emission scenario in 2100 is 730 to 1,020 ppm, while the SCM results presented here show an uncertainty range of 806 ppm to 1,008 ppm. The lower bound of this SCM uncertainty range is the mean minus one standard deviation for low carbon cycle feedback settings and the 19 AOGCM tunings, while the upper bound represents the mean plus one standard deviation for high carbon cycle settings. For comparison, the 90% confidence interval from Wigley and Raper (2001) is 770 to 1,090 ppm. The simple model CO<sub>2</sub> concentration projections can be slightly higher than under the C<sup>4</sup>MIP because the SCM's carbon cycle is driven by the full temperature changes in the A2 scenario, while the C<sup>4</sup>MIP values are driven by the component of A2 climate change due to CO<sub>2</sub> alone.

The radiative forcing projections in Figure 10.26 combine anthropogenic and natural (solar and volcanic) forcing. The forcing plumes reflect primarily the sensitivity of the forcing to carbon cycle uncertainties. Results are based on a forcing of 3.71 W m<sup>-2</sup> for a doubling of the atmospheric CO<sub>2</sub> concentration. The anthropogenic forcing is based on Table 2.12 but uses a value of -0.8 W m<sup>-2</sup> for the present-day indirect aerosol forcing. Solar forcing for the historical period is prescribed according to Lean et al. (1995) and volcanic forcing according to Ammann et al. (2003). The historical solar forcing series is extended into the future using its average over the most recent 22 years. The volcanic forcing is adjusted to have a zero mean over the past 100 years and the anomaly is assumed to be zero for the future. In the TAR, the anthropogenic forcing was used alone even though the projections started in 1765. There are several advantages of using both natural and anthropogenic forcing for the past. First, this was done by most of the AOGCMs the simple models are emulating. Second, it allows the simulations to be compared with observations. Third, the warming commitments accrued over the instrumental period are reflected in the projections. The disadvantage of including natural forcing is that the warming projections in 2100 are dependent to a few tenths of a degree on the necessary assumptions made about the natural forcing (Bertrand et al., 2002). These assumptions include how the natural forcing is projected into the future and whether to reference the volcanic forcing to a past reference

period mean value. In addition, the choice of data set for both solar and volcanic forcing affects the results (see Section 2.7 for discussion about uncertainty in natural forcings).

The temperature projections for the six illustrative scenarios are shown in the bottom panel of Figure 10.26. Model results are shown as anomalies from the mean of observations (Folland et al., 2001; Jones et al., 2001; Jones and Moberg, 2003) over the 1980 to 2000 period and the corresponding observed temperature anomalies are shown for comparison. The inner (darker) plumes show the ±1 standard deviation uncertainty due to the 19 model tunings and the outer (lighter) plumes show results for the corresponding high and low carbon cycle settings. Note that the asymmetry in the carbon cycle uncertainty causes global mean temperature projections to be skewed towards higher warming.

Considering only the mean of the SCM results with mid-range carbon cycle settings, the projected global mean temperature rise above 1980 to 2000 levels for the lower-emission SRES scenario B1 is 2.0°C in 2100. For a higher-emission scenario, for example, the SRES A2 scenario, the global mean temperature is projected to rise by 3.9°C above 1980 to 2000 levels in 2100. This clear difference in projected mean warming highlights the importance of assessing different emission scenarios separately. As mentioned above, the 'response uncertainty' is defined as the range in projections for a particular emission scenario. For the A2 emission scenario, the temperature change projections with the SCM span a ±1 standard deviation range of about 1.8°C, from 3.0°C to 4.8°C above 1980 to 2000 levels in 2100. If carbon cycle feedbacks are considered to be low, the lower end of this range decreases only slightly and is unchanged to one decimal place. For the higher carbon cycle feedback settings, the upper bound of the ±1 standard deviation range increases to 5.2°C. For lower-emission scenarios, this uncertainty range is smaller. For example, the B1 scenario projections span a range of about 1.4°C, from 1.5°C to 2.9°C, including carbon cycle uncertainties. The corresponding results for the medium-emission scenario A1B are 2.3°C to 4.3°C, and for the higher-emission scenario A1FI, they are 3.4°C to 6.1°C. Note that these uncertainty ranges are not the minimum to maximum bounds of the projected warming across all SCM runs, which are higher, namely 2.7°C to 7.1°C for the A2 scenario and 1.3°C to 4.2°C for the B1 scenario (not shown).

The SCM results presented here are a sensitivity study with different model tunings and carbon cycle feedback parameters. Note that forcing uncertainties have not been assessed and that the AOGCM model results available for SCM tuning may not span the full range of possible climate response. For example, studies that constrain forecasts based on model fits to historic or present-day observations generally allow for a somewhat wider 'response uncertainty' (see Section 10.5.4). The concatenation of all such uncertainties would require a probabilistic approach because the extreme ranges have low probability. A synthesis of the uncertainty in global temperature increase by the year 2100 is provided in Section 10.5.4.6.

### 10.5.4 Sampling Uncertainty and Estimating Probabilities

Uncertainty in the response of an AOGCM arises from the effects of internal variability, which can be sampled in isolation by creating ensembles of simulations of a single model using alternative initial conditions, and from modelling uncertainties, which arise from errors introduced by the discretization of the equations of motion on a finite resolution grid, and the parametrization of sub-grid scale processes (radiative transfer, cloud formation, convection, etc). Modelling uncertainties are manifested in alternative structural choices (for example, choices of resolution and the basic physical assumptions on which parametrizations are based), and in the values of poorly constrained parameters within parametrization schemes. Ensemble approaches are used to quantify the effects of uncertainties arising from variations in model structure and parameter settings. These are assessed in Sections 10.5.4.1 to 10.5.4.3, followed by a discussion of observational constraints in Section 10.5.4.4 and methods used to obtain probabilistic predictions in Sections 10.5.4.5 to 10.5.4.7.

While ensemble projections carried out to date give a wide range of responses, they do not sample all possible sources of modelling uncertainty. For example, the AR4 multi-model ensemble relies on specified concentrations of CO<sub>2</sub>, thus neglecting uncertainties in carbon cycle feedbacks (see Section 10.4.1), although this can be partially addressed by using less detailed models to extrapolate the AOGCM results (see Section 10.5.3). More generally, the set of available models may share fundamental inadequacies, the effects of which cannot be quantified (Kennedy and O'Hagan, 2001). For example, climate models currently implement a restricted approach to the parametrization of sub-grid scale processes, using deterministic bulk formulae coupled to the resolved flow exclusively at the grid scale. Palmer et al. (2005) argue that the outputs of parametrization schemes should be sampled from statistical distributions consistent with a range of possible sub-grid scale states, following a stochastic approach that has been tried in numerical weather forecasting (e.g., Buizza et al., 1999; Palmer, 2001). The potential for missing or inadequately parametrized processes to broaden the simulated range of future changes is not clear, however, this is an important caveat for the results discussed below.

#### 10.5.4.1 The Multi-Model Ensemble Approach

The use of ensembles of AOGCMs developed at different modelling centres has become established in climate prediction/projection on both seasonal-to-interannual and centennial time scales. To the extent that simulation errors in different AOGCMs are independent, the mean of the ensemble can be expected to outperform individual ensemble members, thus providing an improved 'best estimate' forecast. Results show this to be the case, both in verification of seasonal forecasts (Palmer et al., 2004; Hagedorn et al., 2005) and of the present-day climate from long term simulations (Lambert and Boer, 2001). By

sampling modelling uncertainties, ensembles of AOGCMs should provide an improved basis for probabilistic projections compared with ensembles of a single model sampling only uncertainty in the initial state (Palmer et al., 2005). However, members of a multi-model ensemble share common systematic errors (Lambert and Boer, 2001), and cannot span the full range of possible model configurations due to resource constraints. Verification of future climate change projections is not possible, however, Räisänen and Palmer (2001) used a 'perfect model approach' (treating one member of an ensemble as truth and predicting its response using the other members) to show that the hypothetical economic costs associated with climate events can be reduced by calculating the probability of the event across the ensemble, rather than using a deterministic prediction from an individual ensemble member.

An additional strength of multi-model ensembles is that each member is subjected to careful testing in order to obtain a plausible and stable control simulation, although the process of tuning model parameters to achieve this (Section 8.1.3.1) involves subjective judgement, and is not guaranteed to identify the optimum location in the model parameter space.

#### 10.5.4.2 Perturbed Physics Ensembles

The AOGCMs featured in Section 10.5.2 are built by selecting components from a pool of alternative parametrizations, each based on a given set of physical assumptions and including a number of uncertain parameters. In principle, the range of predictions consistent with these components could be quantified by constructing very large ensembles with systematic sampling of multiple options for parametrization schemes and parameter values, while avoiding combinations likely to double-count the effect of perturbing a given physical process. Such an approach has been taken using simple climate models and EMICs (Wigley and Raper, 2001; Knutti et al., 2002), and Murphy et al. (2004) and Stainforth et al. (2005) describe the first steps in this direction using AOGCMs, constructing large ensembles by perturbing poorly constrained parameters in the atmospheric component of UKMO-HadCM3 coupled to a mixed layer ocean. These experiments quantify the range of equilibrium responses to doubled atmospheric CO<sub>2</sub> consistent with uncertain parameters in a single GCM. Murphy et al. (2004) perturbed 29 parameters one at a time, assuming that effects of individual parameters were additive but making a simple allowance for additional uncertainty introduced by nonlinear interactions. They find a probability distribution for climate sensitivity with a 5 to 95% range of 2.4°C to 5.4°C when weighting the models with a broadly based metric of the agreement between simulated and observed climatology, compared to 1.9°C to 5.3°C when all model versions are assumed equally reliable (Box 10.2, Figure 1c).

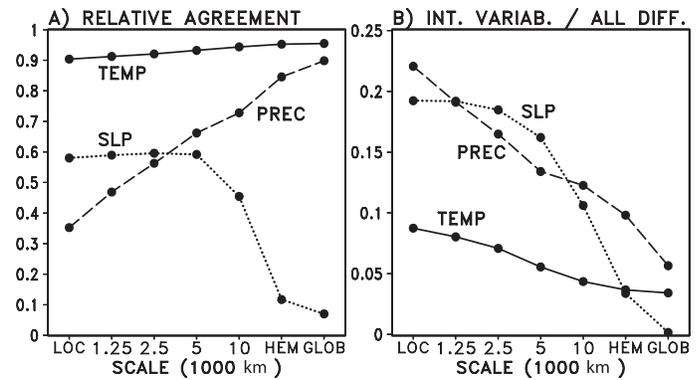
Stainforth et al. (2005) deployed a distributed computing approach (Allen, 1999) to run a very large ensemble of 2,578 simulations sampling combinations of high, intermediate and low values of six parameters known to affect climate sensitivity. They find climate sensitivities ranging from 2°C to

11°C, with 4.2% of model versions exceeding 8°C, and show that the high-sensitivity models cannot be ruled out, based on a comparison with surface annual mean climatology. By utilising multivariate linear relationships between climate sensitivity and spatial fields of several present-day observables, the 5 to 95% range of climate sensitivity is estimated at 2.2°C to 6.8°C from the same data set (Piani et al., 2005; Box 10.2 Figure 1c). In this ensemble, Knutti et al. (2006) find a strong relationship between climate sensitivity and the amplitude of the seasonal cycle in surface temperature in the present-day simulations. Most of the simulations with high sensitivities overestimate the observed amplitude. Based on this relationship, the 5 to 95% range of climate sensitivity is estimated at 1.5°C to 6.4°C (Box 10.2, Figure 1c). The differences between the PDFs in Box 10.2, Figure 1c, which are all based on the same climate model, reflect uncertainties in methodology arising from choices of uncertain parameters, their expert-specified prior distributions and alternative applications of observational constraints. They do not account for uncertainties associated with changes in ocean circulation, and do not account for structural model errors (Smith, 2002; Goldstein and Rougier, 2004)

Annan et al. (2005a) use an ensemble Kalman Filter technique to obtain uncertainty ranges for model parameters in an EMIC subject to the constraint of minimising simulation errors with respect to a set of climatological observations. Using this method, Hargreaves and Annan (2006) find that the risk of a collapse in the Atlantic MOC (in response to increasing CO<sub>2</sub>) depends on the set of observations to which the EMIC parameters are tuned. Section 9.6.3 assesses perturbed physics studies of the link between climate sensitivity and cooling during the Last Glacial Maximum (Annan et al., 2005b; Schneider von Deimling et al., 2006).

#### 10.5.4.3 Diagnosing Drivers of Uncertainty from Ensemble Results

Figure 10.27a shows the agreement between annual changes simulated by members of the AR4 multi-model ensemble for 2080 to 2099 relative to 1980 to 1999 for the A1B scenario, calculated as in Räisänen (2001). For precipitation, the agreement increases with spatial scale. For surface temperature, the agreement is high even at local scales, indicating the robustness of the simulated warming (see also Figure 10.8, discussed in Section 10.3.2.1). Differences in model formulation are the dominant contributor to ensemble spread, though the role of internal variability increases at smaller scales (Figure 10.27b). The agreement between AR4 ensemble members is slightly higher compared with the earlier CMIP2 ensemble of Räisänen (2001) (also reported in the TAR), and internal variability explains a smaller fraction of the ensemble spread. This is expected, given the larger forcing and responses in the A1B scenario for 2080 to 2099 compared to the transient response to doubled CO<sub>2</sub> considered by Räisänen (2001), although the use of an updated set of models may also contribute. For seasonal changes, internal variability is found to be comparable with model differences as a source of



**Figure 10.27.** Statistics of annual mean responses to the SRES A1B scenario, for 2080 to 2099 relative to 1980 to 1999, calculated from the 21-member AR4 multi-model ensemble using the methodology of Räisänen (2001). Results are expressed as a function of horizontal scale on the x axis ('Loc': grid box scale; 'Hem': hemispheric scale; 'Glob': global mean) plotted against the y axis showing (a) the relative agreement between ensemble members, a dimensionless quantity defined as the square of the ensemble-mean response (corrected to avoid sampling bias) divided by the mean squared response of individual ensemble members, and (b) the dimensionless fraction of internal variability relative to the ensemble variance of responses. Values are shown for surface air temperature, precipitation and sea level pressure. The low agreement of SLP changes at hemispheric and global scales reflects problems with the conservation of total atmospheric mass in some of the models, however, this has no practical significance because SLP changes at these scales are extremely small.

uncertainty in local precipitation and SLP changes (although not for surface temperature) in both multi-model and perturbed physics ensembles (Räisänen, 2001; Murphy et al., 2004). Consequently the local seasonal changes for precipitation and SLP are not consistent in the AR4 ensemble over large areas of the globe (i.e., the multi-model mean change does not exceed the ensemble standard deviation; see Figure 10.9), whereas the surface temperature changes are consistent almost everywhere, as discussed in Section 10.3.2.1.

Wang and Swail (2006b) examine the relative importance of internal variability, differences in radiative forcing and model differences in explaining the transient response of ocean wave height using three AOGCMs each run for three plausible forcing scenarios, and find model differences to be the largest source of uncertainty in the simulated changes.

Selten et al. (2004) report a 62-member initial condition ensemble of simulations of 1940 to 2080 including natural and anthropogenic forcings. They find an individual member that reproduces the observed trend in the NAO over the past few decades, but no trend in the ensemble mean, and suggest that the observed change can be explained through internal variability associated with a mode driven by increases in precipitation over the tropical Indian Ocean. Terray et al. (2004) find that the ARPEGE coupled ocean-atmosphere model shows small increases in the residence frequency of the positive phase of the NAO in response to SRES A2 and B2 forcing, whereas larger increases are found when SST changes prescribed from the coupled experiments are used to drive a version of the atmosphere model with enhanced resolution over the North Atlantic and Europe (Gibelin and Déqué, 2003).

Figure 10.25 compares global mean transient and equilibrium changes simulated by the AR4 multi-model ensembles against perturbed physics ensembles (M. Collins et al., 2006; Webb et al., 2006) designed to produce credible present-day simulations while sampling a wide range of multiple parameter perturbations and climate sensitivities. The AR4 ensembles partially sample structural variations in model components, whereas the perturbed physics ensembles sample atmospheric parameter uncertainties for a fixed choice of model structure. The results show similar relationships between TCR, climate sensitivity and precipitation change in both types of ensemble. The perturbed physics ensembles contain several members with sensitivities higher than the multi-model range, while some of the multi-model transient simulations give TCR values slightly below the range found in the perturbed physics ensemble (Figure 10.25a,b).

Soden and Held (2006) find that differences in cloud feedback are the dominant source of uncertainty in the transient response of surface temperature in the AR4 ensemble (see also Section 8.6.3.2), as in previous IPCC assessments. Webb et al. (2006) compare equilibrium radiative feedbacks in a 9-member multi-model ensemble against those simulated in a 128-member perturbed physics ensemble with multiple parameter perturbations. They find that the ranges of climate sensitivity in both ensembles are explained mainly by differences in the response of shortwave cloud forcing in areas where changes in low-level clouds predominate. Bony and Dufresne (2005) find that marine boundary layer clouds in areas of large-scale subsidence provide the largest source of spread in tropical cloud feedbacks in the AR4 ensemble. Narrowing the uncertainty in cloud feedback may require both improved parametrizations of cloud microphysical properties (e.g., Tsushima et al., 2006) and improved representations of cloud macrophysical properties, through improved parametrizations of other physical processes (e.g., Williams et al., 2001) and/or increases in resolution (Palmer, 2005).

#### 10.5.4.4 Observational Constraints

A range of observables has been used since the TAR to explore methods for constraining uncertainties in future climate change in studies using simple climate models, EMICs and AOGCMs. Probabilistic estimates of global climate sensitivity have been obtained from the historical transient evolution of surface temperature, upper-air temperature, ocean temperature, estimates of the radiative forcing, satellite data, proxy data over the last millennium, or a subset thereof (Wigley et al., 1997a; Tol and De Vos, 1998; Andronova and Schlesinger, 2001; Forest et al., 2002; Gregory et al., 2002a; Knutti et al., 2002, 2003; Frame et al., 2005; Forest et al., 2006; Forster and Gregory, 2006; Hegerl et al., 2006; see Section 9.6). Some of these studies also constrain the transient response to projected future emissions (see section 10.5.4.5). For climate sensitivity, further probabilistic estimates have been obtained using statistical measures of the correspondence between simulated and observed fields of present-day climate (Murphy et al.,

2004; Piani et al., 2005), the climatological seasonal cycle of surface temperature (Knutti et al., 2006) and the response to palaeoclimatic forcings (Annan et al., 2005b; Schneider von Deimling et al., 2006). For the purpose of constraining regional climate projections, spatial averages or fields of time-averaged regional climate have been used (Giorgi and Mearns, 2003; Tebaldi et al., 2004, 2005; Laurent and Cai, 2007), as have past regional- or continental-scale trends in surface temperature (Greene et al., 2006; Stott et al., 2006a).

Further observables have been suggested as potential constraints on future changes, but are not yet used in formal probabilistic estimates. These include measures of climate variability related to cloud feedbacks (Bony et al., 2004; Bony and Dufresne, 2005; Williams et al., 2005), radiative damping of the seasonal cycle (Tsushima et al., 2005), the relative entropy of simulated and observed surface temperature variations (Shukla et al., 2006), major volcanic eruptions (Wigley et al., 2005; Yokohata et al., 2005; see Section 9.6) and trends in multiple variables derived from reanalysis data sets (Lucarini and Russell, 2002).

Additional constraints could also be found, for example, from evaluation of ensemble climate prediction systems on shorter time scales for which verification data exist. These could include assessment of the reliability of seasonal to interannual probabilistic forecasts (Palmer et al., 2004; Hagedorn et al., 2005) and the evaluation of model parametrizations in short-range weather predictions (Phillips et al., 2004; Palmer, 2005). Annan and Hargreaves (2006) point out the potential for narrowing uncertainty by combining multiple lines of evidence. This will require objective quantification of the impact of different constraints and their degree of independence, estimation of the effects of structural modelling errors and the development of comprehensive probabilistic frameworks in which to combine these elements (e.g., Rougier, 2007).

#### 10.5.4.5 Probabilistic Projections - Global Mean

A number of methods for providing probabilistic climate change projections, both for global means (discussed in this section) and geographical depictions (discussed in the following section) have emerged since the TAR.

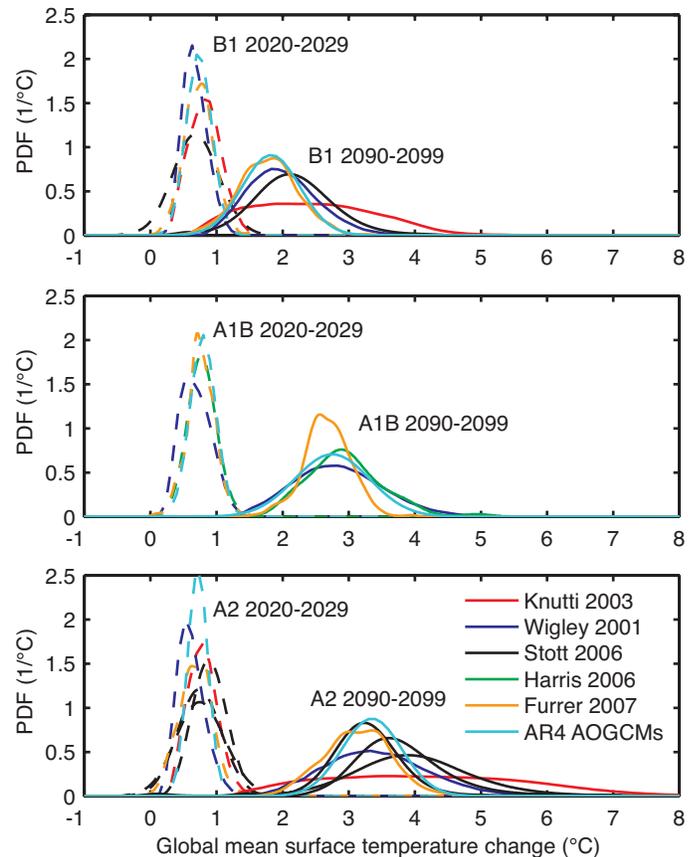
Methods of constraining climate sensitivity using observations of present-day climate are discussed in Section 10.5.4.2. Results from both the AR4 multi-model ensemble and from perturbed physics ensembles suggest a very low probability for a climate sensitivity below 2°C, despite exploring the effects of a wide range of alternative modelling assumptions on the global radiative feedbacks arising from lapse rate, water vapour, surface albedo and cloud (Bony et al., 2006; Soden and Held, 2006; Webb et al., 2006; Box 10.2). However, exclusive reliance on AOGCM ensembles can be questioned on the basis that models share components, and therefore errors, and may not sample the full range of possible outcomes (e.g., Allen and Ingram, 2002).

Observationally constrained probability distributions for climate sensitivity have also been derived from physical

relationships based on energy balance considerations, and from instrumental observations of historical changes during the past 50 to 150 years or proxy reconstructions of surface temperature during the past millennium (Section 9.6). The results vary according to the choice of verifying observations, the forcings considered and their specified uncertainties, however, all these studies report a high upper limit for climate sensitivity, with the 95th percentile of the distributions invariably exceeding 6°C (Box 10.2). Frame et al. (2005) demonstrate that uncertainty ranges for sensitivity are dependent on the choices made about prior distributions of uncertain quantities before the observations are applied. Frame et al. (2005) and Piani et al. (2005) show that many observable variables are likely to scale inversely with climate sensitivity, implying that projections of quantities that are inversely related to sensitivity will be more strongly constrained by observations than climate sensitivity itself, particularly with respect to the estimated upper limit (Allen et al., 2006b).

In the case of transient climate change, optimal detection techniques have been used to determine factors by which hindcasts of global surface temperature from AOGCMs can be scaled up or down while remaining consistent with past changes, accounting for uncertainty due to internal variability (Section 9.4.1.6). Uncertainty is propagated forward in time by assuming that the fractional error found in model hindcasts of global mean temperature change will remain constant in projections of future changes. Using this approach, Stott and Kettleborough (2002) find that probabilistic projections of global mean temperature derived from UKMO-HadCM3 simulations were insensitive to differences between four representative SRES emissions scenarios over the first few decades of the 21st century, but that much larger differences emerged between the response to different SRES scenarios by the end of the 21st century (see also Section 10.5.3 and Figure 10.28). Stott et al. (2006b) show that scaling the responses of three models with different sensitivities brings their projections into better agreement. Stott et al. (2006a) extend their approach to obtain probabilistic projections of future warming averaged over continental-scale regions under the SRES A2 scenario. Fractional errors in the past continental warming simulated by UKMO-HadCM3 are used to scale future changes, yielding wide uncertainty ranges, notably for North America and Europe where the 5 to 95% ranges for warming during the 21st century are 2°C to 12°C and 2°C to 11°C respectively. These estimates do not account for potential constraints arising from regionally differentiated warming rates. Tighter ranges of 4°C to 8°C for North America and 4°C to 7°C for Europe are obtained if fractional errors in past global mean temperature are used to scale the future continental changes, although this neglects uncertainty in the relationship between global and regional temperature changes.

Allen and Ingram (2002) suggest that probabilistic projections for some variables may be made by searching for ‘emergent constraints’. These are relationships between variables that can be directly constrained by observations, such as global surface temperature, and variables that may be indirectly constrained by establishing a consistent, physically



**Figure 10.28.** Probability density functions from different studies for global mean temperature change for the SRES scenarios B1, A1B and A2 and for the decades 2020 to 2029 and 2090 to 2099 relative to the 1980 to 1999 average (Wigley and Raper, 2001; Knutti et al., 2002; Furrer et al., 2007; Harris et al., 2006; Stott et al., 2006b). A normal distribution fitted to the multi-model ensemble is shown for comparison.

based relationship which holds across a wide range of models. They present an example in which future changes in global mean precipitation are constrained using a probability distribution for global temperature obtained from a large EMIC ensemble (Forest et al., 2002) and a relationship between precipitation and temperature obtained from multi-model ensembles of the response to doubled atmospheric CO<sub>2</sub>. These methods are designed to produce distributions constrained by observations, and are relatively model independent (Allen and Stainforth, 2002; Allen et al., 2006a). This can be achieved provided the inter-variable relationships are robust to alternative modelling assumptions Piani et al. (2005) and Knutti et al. (2006) (described in Section 10.5.4.2) follow this approach, noting that in these cases the inter-variable relationships are derived from perturbed versions of a single model, and need to be confirmed using other models.

A synthesis of published probabilistic global mean projections for the SRES scenarios B1, A1B and A2 is given in Figure 10.28. Probability density functions are given for short-term projections (2020–2030) and the end of the century (2090–2100). For comparison, normal distributions fitted to results from AOGCMs in the multi-model archive (see Section

10.3.1) are also given, although these curve fits should not be regarded as PDFs. The five methods of producing PDFs are all based on different models and/or techniques, described in Section 10.5. In short, Wigley and Raper (2001) use a large ensemble of a simple model with expert prior distributions for climate sensitivity, ocean heat uptake, sulphate forcing and the carbon cycle, without applying constraints. Knutti et al. (2002, 2003) use a large ensemble of EMIC simulations with non-informative prior distributions, consider uncertainties in climate sensitivity, ocean heat uptake, radiative forcing and the carbon cycle, and apply observational constraints. Neither method considers natural variability explicitly. Stott et al. (2006b) apply the fingerprint scaling method to AOGCM simulations to obtain PDFs which implicitly account for uncertainties in forcing, climate sensitivity and internal unforced as well as forced natural variability. For the A2 scenario, results obtained from three different AOGCMs are shown, illustrating the extent to which the Stott et al. PDFs depend on the model used. Harris et al. (2006) obtain PDFs by boosting a 17-member perturbed physics ensemble of the UKMO-HadCM3 model using scaled equilibrium responses from a larger ensemble of simulations. Furrer et al. (2007) use a Bayesian method described in Section 10.5.4.7 to calculate PDFs from the AR4 multi-model ensemble. The Stott et al. (2006b), Harris et al. (2006) and Furrer et al. (2007) methods neglect carbon cycle uncertainties.

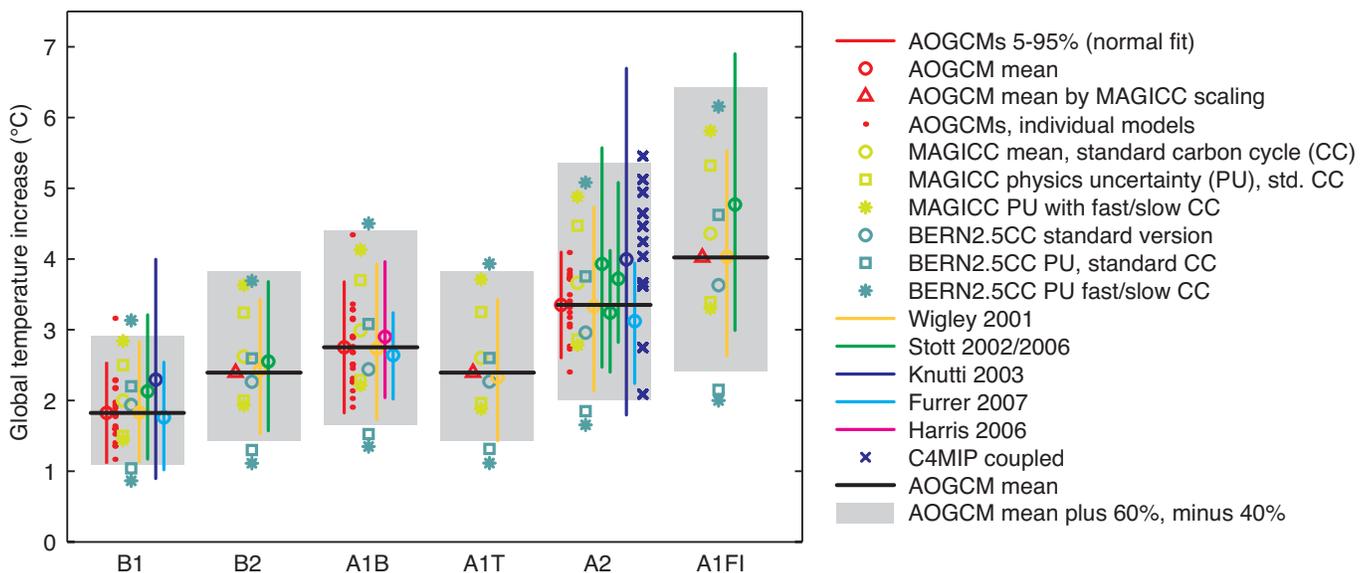
Two key points emerge from Figure 10.28. For the projected short-term warming (i) there is more agreement among models and methods (narrow width of the PDFs) compared to later in

the century (wider PDFs), and (ii) the warming is similar across different scenarios, compared to later in the century where the choice of scenario significantly affects the projections. These conclusions are consistent with the results obtained with SCMs (Section 10.5.3).

Additionally, projection uncertainties increase close to linearly with temperature in most studies. The different methods show relatively good agreement in the shape and width of the PDFs, but with some offsets due to different methodological choices. Only Stott et al. (2006b) account for variations in future natural forcing, and hence project a small probability of cooling over the next few decades not seen in the other PDFs. The results of Knutti et al. (2003) show wider PDFs for the end of the century because they sample uniformly in climate sensitivity (see Section 9.6.2 and Box 10.2). Resampling uniformly in observables (Frame et al., 2005) would bring their PDFs closer to the others. In sum, probabilistic estimates of uncertainties for the next few decades seem robust across a variety of models and methods, while results for the end of the century depend on the assumptions made.

#### 10.5.4.6 Synthesis of Projected Global Temperature at Year 2100

All available estimates for projected warming by the end of the 21st century are summarised in Figure 10.29 for the six SRES non-intervention marker scenarios. Among the various techniques, the AR4 AOGCM ensemble provides the most



**Figure 10.29.** Projections and uncertainties for global mean temperature increase in 2090 to 2099 (relative to the 1980 to 1999 average) for the six SRES marker scenarios. The AOGCM means and the uncertainty ranges of the mean  $-40\%$  to  $+60\%$  are shown as black horizontal solid lines and grey bars, respectively. For comparison, results are shown for the individual models (red dots) of the multi-model AOGCM ensemble for B1, A1B and A2, with a mean and 5 to 95% range (red line and circle) from a fitted normal distribution. The AOGCM mean estimates for B2, A1T and A1FI (red triangles) are obtained by scaling the A1B AOGCM mean with ratios obtained from the SCM (see text). The mean (light green circle) and one standard deviation (light green square) of the MAGICC SCM tuned to all AOGCMs (representing the physics uncertainty) are shown for standard carbon cycle settings, as well as for a slow and fast carbon cycle assumption (light green stars). Similarly, results from the BERN2.5CC EMIC are shown for standard carbon cycle settings and for climate sensitivities of  $3.2^{\circ}\text{C}$  (AOGCM average, dark green circle),  $1.5^{\circ}\text{C}$  and  $4.5^{\circ}\text{C}$  (dark green squares). High climate sensitivity/low carbon cycle and low climate sensitivity/high carbon cycle combinations are shown as dark green stars. The 5 to 95% ranges (vertical lines) and medians (circles) are shown from probabilistic methods (Wigley and Raper, 2001; Stott and Kettleborough, 2002; Knutti et al., 2003; Furrer et al., 2007; Harris et al., 2006; Stott et al., 2006b). Individual model results are shown for the C4MIP models (blue crosses, see Figure 10.20).

sophisticated set of models in terms of the range of processes included and consequent realism of the simulations compared to observations (see Chapters 8 and 9). On average, this ensemble projects an increase in global mean surface air temperature of 1.8°C, 2.8°C and 3.4°C in the B1, A1B and A2 scenarios, respectively, by 2090 to 2099 relative to 1980 to 1999 (note that in Table 10.5, the years 2080 to 2099 were used for those globally averaged values to be consistent with the comparable averaging period for the geographic plots in Section 10.3; this longer averaging period smoothes spatial noise in the geographic plots). A scaling method is used to estimate AOGCM mean results for the three missing scenarios B2, A1T and A1FI. The ratio of the AOGCM mean values for B1 relative to A1B and A2 relative to A1B are almost identical to the ratios obtained with the MAGICC SCM, although the absolute values for the SCM are higher. Thus, the AOGCM mean response for the scenarios B2, A1T and A1FI can be estimated as 2.4°C, 2.4°C and 4.0°C by multiplying the AOGCM A1B mean by the SCM-derived ratios B2/A1B, A1T/A1B and A1FI/A1B, respectively (for details see Appendix 10.A.1).

The AOGCMs cannot sample the full range of possible warming, in particular because they do not include uncertainties in the carbon cycle. In addition to the range derived directly from the AR4 multi-model ensemble, Figure 10.29 depicts additional uncertainty estimates obtained from published probabilistic methods using different types of models and observational constraints: the MAGICC SCM and the BERN2.5CC coupled climate-carbon cycle EMIC tuned to different climate sensitivities and carbon cycle settings, and the C4MIP coupled climate-carbon cycle models. Based on these results, the future increase in global mean temperature is likely to fall within -40 to +60% of the multi-model AOGCM mean warming simulated for each scenario. This range results from an expert judgement of the multiple lines of evidence presented in Figure 10.29, and assumes that the models approximately capture the range of uncertainties in the carbon cycle. The range is well constrained at the lower bound since climate sensitivity is better constrained at the low end (see Box 10.2), and carbon cycle uncertainty only weakly affects the lower bound. The upper bound is less certain as there is more variation across the different models and methods, partly because carbon cycle feedback uncertainties are greater with larger warming. The uncertainty ranges derived from the above percentages for the warming by 2090 to 2099 relative to 1980 to 1999 are 1.1°C to 2.9°C, 1.4°C to 3.8°C, 1.7°C to 4.4°C, 1.4°C to 3.8°C, 2.0°C to 5.4°C and 2.4°C to 6.4°C for the scenarios B1, B2, A1B, A1T, A2 and A1FI, respectively. It is not appropriate to compare the lowest and highest values across these ranges against the single range given in the TAR, because the TAR range resulted only from projections using an SCM and covered all SRES scenarios, whereas here a number of different and independent modelling approaches are combined to estimate ranges for the six illustrative scenarios separately. Additionally, in contrast to the TAR, carbon cycle uncertainties are now included in these ranges. These uncertainty ranges include only anthropogenically forced changes.

#### 10.5.4.7 Probabilistic Projections - Geographical Depictions

Tebaldi et al. (2005) present a Bayesian approach to regional climate prediction, developed from the ideas of Giorgi and Mearns (2002, 2003). Non-informative prior distributions for regional temperature and precipitation are updated using observations and results from AOGCM ensembles to produce probability distributions of future changes. Key assumptions are that each model and the observations differ randomly and independently from the true climate, and that the weight given to a model prediction should depend on the bias in its present-day simulation and its degree of convergence with the weighted ensemble mean of the predicted future change. Lopez et al. (2006) apply the Tebaldi et al. (2005) method to a 15-member multi-model ensemble to predict future changes in global surface temperature under a 1% yr<sup>-1</sup> increase in atmospheric CO<sub>2</sub>. They compare it with the method developed by Allen et al. (2000) and Stott and Kettleborough (2002) (ASK), which aims to provide relatively model independent probabilities consistent with observed changes (see Section 10.5.4.5). The Bayesian method predicts a much narrower uncertainty range than ASK. However its results depend on choices made in its design, particularly the convergence criterion for up-weighting models close to the ensemble mean, relaxation of which substantially reduces the discrepancy with ASK.

Another method by Furrer et al. (2007) employs a hierarchical Bayesian model to construct PDFs of temperature change at each grid point from a multi-model ensemble. The main assumptions are that the true climate change signal is a common large-scale structure represented to some degree in each of the model simulations, and that the signal unexplained by climate change is AOGCM-specific in terms of small-scale structure, but can be regarded as noise when averaged over all AOGCMs. In this method, spatial fields of future minus present temperature difference from each ensemble member are regressed upon basis functions. One of the basis functions is a map of differences of observed temperatures from late-minus mid-20th century, and others are spherical harmonics. The statistical model then estimates the regression coefficients and their associated errors, which account for the deviation in each AOGCM from the (assumed) true pattern of change. By recombining the coefficients with the basis functions, an estimate is derived of the true climate change field and its associated uncertainty, thus providing joint probabilities for climate change at all grid points around the globe.

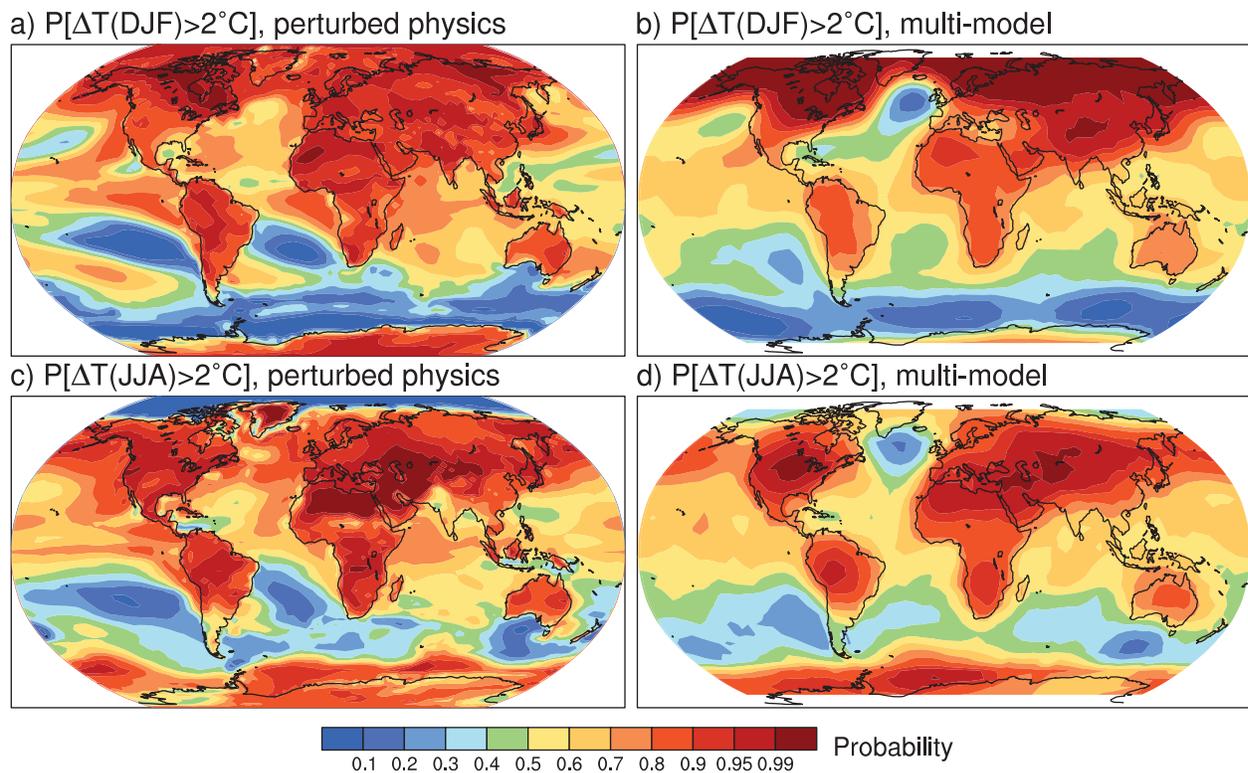
Estimates of uncertainty derived from multi-model ensembles of 10 to 20 members are potentially sensitive to outliers (Räisänen, 2001). Harris et al. (2006) therefore augment a 17-member ensemble of AOGCM transient simulations by scaling the equilibrium response patterns of a large perturbed physics ensemble. Transient responses are emulated by scaling equilibrium response patterns according to global temperature (predicted from an energy balance model tuned to the relevant climate sensitivities). For surface temperature, the scaled equilibrium patterns correspond well to the transient response patterns, while scaling errors for precipitation vary more

widely with location. A correction field is added to account for ensemble-mean differences between the equilibrium and transient patterns, and uncertainty is allowed for in the emulated result. The correction field and emulation errors are determined by comparing the responses of model versions for which both transient and equilibrium simulations exist. Results are used to obtain frequency distributions of transient regional changes in surface temperature and precipitation in response to increasing atmospheric CO<sub>2</sub>, arising from the combined effects of atmospheric parameter perturbations and internal variability in UKMO-HadCM3.

Figure 10.30 shows probabilities of a temperature change larger than 2°C by the end of the 21st century under the A1B scenario, comparing values estimated from the 21-member AR4 multi-model ensemble (Furrer et al., 2007) against values estimated by combining transient and equilibrium perturbed physics ensembles of 17 and 128 members, respectively (Harris et al., 2006). Although the methods use different ensembles and different statistical approaches, the large-scale patterns are similar in many respects. Both methods show larger probabilities (typically 80% or more) over land, and at high latitudes in the winter hemisphere, with relatively low values (typically less than 50%) over the southern oceans. However, the plots also reveal some substantial differences at a regional level, notably over the North Atlantic Ocean, the sub-tropical Atlantic and Pacific Oceans in the SH, and at high northern latitudes during June to August.

#### 10.5.4.8 Summary

Significant progress has been made since the TAR in exploring ensemble approaches to provide uncertainty ranges and probabilities for global and regional climate change. Different methods show consistency in some aspects of their results, but differ significantly in others (see Box 10.2; Figures 10.28 and 10.30), because they depend to varying degrees on the nature and use of observational constraints, the nature and design of model ensembles and the specification of prior distributions for uncertain inputs (see, e.g., Table 11.3). A preferred method cannot yet be recommended, but the assumptions and limitations underlying the various approaches, and the sensitivity of the results to them, should be communicated to users. A good example concerns the treatment of model error in Bayesian methods, the uncertainty in which affects the calculation of the likelihood of different model versions, but is difficult to specify (Rougier, 2007). Awareness of this issue is growing in the field of climate prediction (Annan et al., 2005b; Knutti et al., 2006), however, it is yet to be thoroughly addressed. Probabilistic depictions, particularly at the regional level, are new to climate change science and are being facilitated by the recently available multi-model ensembles. These are discussed further in Section 11.10.2.



**Figure 10.30.** Estimated probabilities for a mean surface temperature change exceeding 2°C in 2080 to 2099 relative to 1980 to 1999 under the SRES A1B scenario. Results obtained from a perturbed physics ensemble of a single model (a, c), based on Harris et al. (2006), are compared with results from the AR4 multi-model ensemble (b, d), based on Furrer et al. (2007), for December to February (DJF, a, b) and June to August (JJA, c, d).

## 10.6 Sea Level Change in the 21st Century

### 10.6.1 Global Average Sea Level Rise Due to Thermal Expansion

As seawater warms up, it expands, increasing the volume of the global ocean and producing thermosteric sea level rise (see Section 5.5.3). Global average thermal expansion can be calculated directly from simulated changes in ocean temperature. Results are available from 17 AOGCMs for the 21st century for SRES scenarios A1B, A2 and B1 (Figure 10.31), continuing from simulations of the 20th century. One ensemble member was used for each model and scenario. The time series are rather smooth compared with global average temperature time series, because thermal expansion reflects heat storage in the entire ocean, being approximately proportional to the time integral of temperature change (Gregory et al., 2001).

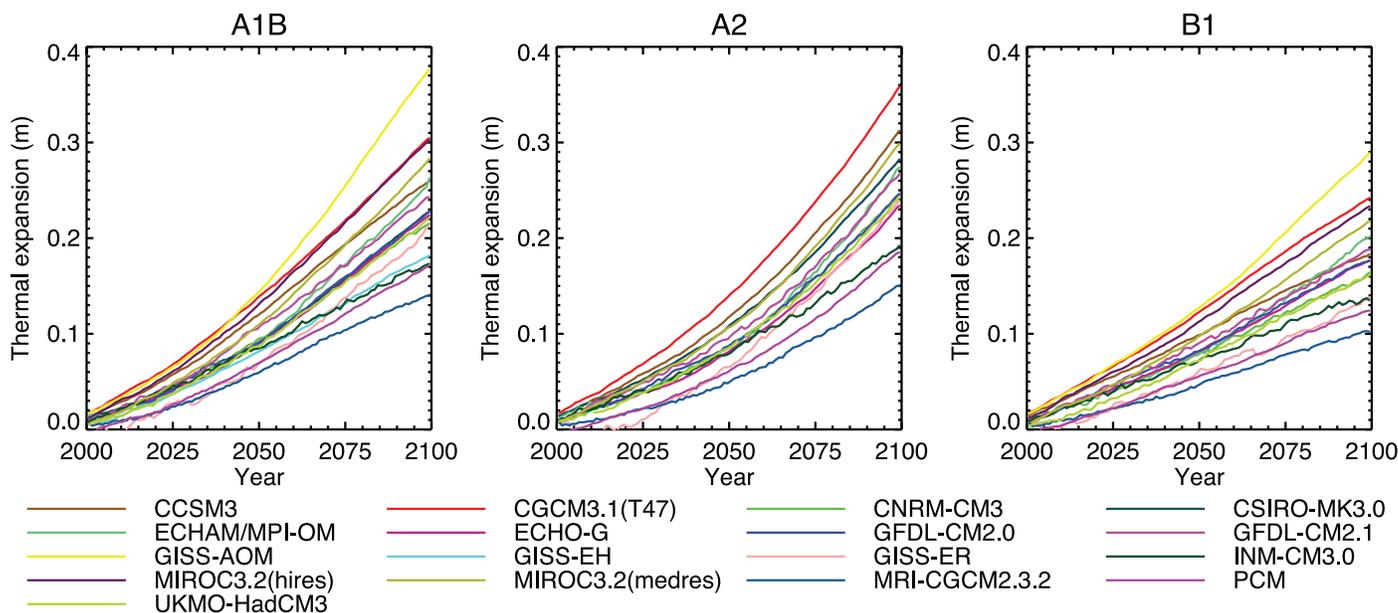
During 2000 to 2020 under scenario SRES A1B in the ensemble of AOGCMs, the rate of thermal expansion is  $1.3 \pm 0.7$  mm yr<sup>-1</sup>, and is not significantly different under A2 or B1. This rate is more than twice the observationally derived rate of  $0.42 \pm 0.12$  mm yr<sup>-1</sup> during 1961 to 2003. It is similar to the rate of  $1.6 \pm 0.5$  mm yr<sup>-1</sup> during 1993 to 2003 (see Section 5.5.3), which may be larger than that of previous decades partly because of natural forcing and internal variability (see Sections 5.5.2.4, 5.5.3 and 9.5.2). In particular, many of the AOGCM experiments do not include the influence of Mt. Pinatubo, the omission of which may reduce the projected rate of thermal expansion during the early 21st century.

During 2080 to 2100, the rate of thermal expansion is projected to be  $1.9 \pm 1.0$ ,  $2.9 \pm 1.4$  and  $3.8 \pm 1.3$  mm yr<sup>-1</sup> under

scenarios SRES B1, A1B and A2 respectively in the AOGCM ensemble (the width of the range is affected by the different numbers of models under each scenario). The acceleration is caused by the increased climatic warming. Results are shown for all SRES marker scenarios in Table 10.7 (see Appendix 10.A for methods). In the AOGCM ensemble, under any given SRES scenario, there is some correlation of the global average temperature change across models with thermal expansion and its rate of change, suggesting that the spread in thermal expansion for that scenario is caused both by the spread in surface warming and by model-dependent ocean heat uptake efficiency (Raper et al., 2002; Table 8.2) and the distribution of added heat within the ocean (Russell et al., 2000).

### 10.6.2 Local Sea Level Change Due to Change in Ocean Density and Dynamics

The geographical pattern of mean sea level relative to the geoid (the dynamic topography) is an aspect of the dynamical balance relating the ocean's density structure and its circulation, which are maintained by air-sea fluxes of heat, freshwater and momentum. Over much of the ocean on multi-annual time scales, a good approximation to the pattern of dynamic topography change is given by the steric sea level change, which can be calculated straightforwardly from local temperature and salinity change (Gregory et al., 2001; Lowe and Gregory, 2006). In much of the world, salinity changes are as important as temperature changes in determining the pattern of dynamic topography change in the future, and their contributions can be opposed (Landerer et al., 2007; and as in the past, Section 5.5.4.1). Lowe and Gregory (2006) show that in the UKMO-HadCM3 AOGCM, changes in heat fluxes are the cause of many of the large-scale features of sea level change, but freshwater



**Figure 10.31.** Projected global average sea level rise (m) due to thermal expansion during the 21st century relative to 1980 to 1999 under SRES scenarios A1B, A2 and B1. See Table 8.1 for model descriptions.

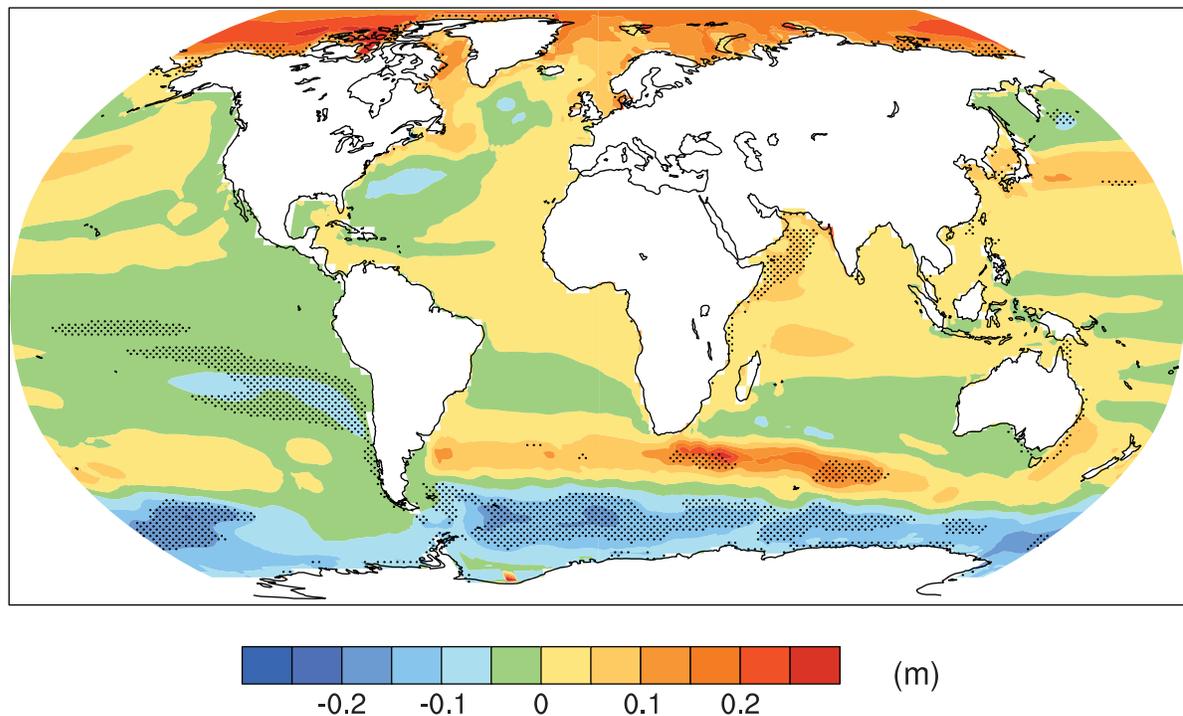
flux change dominates the North Atlantic and momentum flux change has a signature in the north and low-latitude Pacific and the Southern Ocean.

Results are available for local sea level change due to ocean density and circulation change from AOGCMs in the multi-model ensemble for the 20th century and the 21st century. There is substantial spatial variability in all models (i.e., sea level change is not uniform), and as the geographical pattern of climate change intensifies, the spatial standard deviation of local sea level change increases (Church et al., 2001; Gregory et al., 2001). Suzuki et al. (2005) show that, in their high-resolution model, enhanced eddy activity contributes to this increase, but across models there is no significant correlation of the spatial standard deviation with model spatial resolution. This section evaluates sea level change between 1980 to 1999 and 2080 to 2099 projected by 16 models forced with SRES scenario A1B. (Other scenarios are qualitatively similar, but fewer models are available.) The ratio of spatial standard deviation to global average thermal expansion varies among models, but is mostly within the range 0.3 to 0.4. The model median spatial standard deviation of thermal expansion is 0.08 m, which is about 25% of the central estimate of global average sea level rise during the 21st century under A1B (Table 10.7).

The geographical patterns of sea level change from different models are not generally similar in detail, although they have more similarity than those analysed in the TAR by Church et al.

(2001). The largest spatial correlation coefficient between any pair is 0.75, but only 25% of correlation coefficients exceed 0.5. To identify common features, an ensemble mean (Figure 10.32) is examined. There are only limited areas where the model ensemble mean change exceeds the inter-model standard deviation, unlike for surface air temperature change (Section 10.3.2.1).

Like Church et al. (2001) and Gregory et al. (2001), Figure 10.32 shows smaller than average sea level rise in the Southern Ocean and larger than average in the Arctic, the former possibly due to wind stress change (Landerer et al., 2007) or low thermal expansivity (Lowe and Gregory, 2006) and the latter due to freshening. Another obvious feature is a narrow band of pronounced sea level rise stretching across the southern Atlantic and Indian Oceans and discernible in the southern Pacific. This could be associated with a southward shift in the circumpolar front (Suzuki et al., 2005) or subduction of warm anomalies in the region of formation of sub antarctic mode water (Banks et al., 2002). In the zonal mean, there are maxima of sea level rise in 30°S to 45°S and 30°N to 45°N. Similar indications are present in the altimetric and thermosteric patterns of sea level change for 1993 to 2003 (Figure 5.15). The model projections do not share other aspects of the observed pattern of sea level rise, such as in the western Pacific, which could be related to interannual variability.



**Figure 10.32.** Local sea level change (m) due to ocean density and circulation change relative to the global average (i.e., positive values indicate greater local sea level change than global) during the 21st century, calculated as the difference between averages for 2080 to 2099 and 1980 to 1999, as an ensemble mean over 16 AOGCMs forced with the SRES A1B scenario. Stippling denotes regions where the magnitude of the multi-model ensemble mean divided by the multi-model standard deviation exceeds 1.0.

The North Atlantic dipole pattern noted by Church et al. (2001), that is, reduced rise to the south of the Gulf Stream extension, enhanced to the north, consistent with a weakening of the circulation, is present in some models; a more complex feature is described by Landerer et al. (2007). The reverse is apparent in the north Pacific, which Suzuki et al. (2005) associate with a wind-driven intensification of the Kuroshio Current. Using simplified models, Hsieh and Bryan (1996) and Johnson and Marshall (2002) show how upper-ocean velocities and sea level would be affected in North Atlantic coastal regions within months of a cessation of sinking in the North Atlantic as a result of propagation by coastal and equatorial Kelvin waves, but would take decades to adjust in the central regions and the south Atlantic. Levermann et al. (2005) show that a sea level rise of several tenths of a metre could be realised in coastal regions of the North Atlantic within a few decades (i.e., tens of millimetres per year) of a collapse of the MOC. Such changes to dynamic topography would be much more rapid than global average sea level change. However, it should be emphasized that these studies are sensitivity tests, not projections; the Atlantic MOC does not collapse in the SRES scenario runs evaluated here (see Section 10.3.4).

The geographical pattern of sea level change is affected also by changes in atmospheric surface pressure, but this is a relatively small effect given the projected pressure changes (Figure 10.9; a pressure increase of 1 hPa causes a drop in local sea level of 0.01 m; see Section 5.5.4.3). Land movements and changes in the gravitational field resulting from the changing loading of the crust by water and ice also have effects which are small over most of the ocean (see Section 5.5.4.4).

### 10.6.3 Glaciers and Ice Caps

Glaciers and ice caps (G&IC, see also Section 4.5.1) comprise all land ice except for the ice sheets of Greenland and Antarctica (see Sections 4.6.1 and 10.6.4). The mass of G&IC can change because of changes in surface mass balance (Section 10.6.3.1). Changes in mass balance cause changes in area and thickness (Section 10.6.3.2), with feedbacks on surface mass balance.

#### 10.6.3.1 Mass Balance Sensitivity to Temperature and Precipitation

Since G&IC mass balance depends strongly on their altitude and aspect, use of data from climate models to make projections requires a method of downscaling, because individual G&IC are much smaller than typical AOGCM grid boxes. Statistical relations for meteorological quantities can be developed between the GCM and local scales (Reichert et al., 2002), but they may not continue to hold in future climates. Hence, for projections the approach usually adopted is to use GCM simulations of changes in climate parameters to perturb the observed climatology or mass balance (Gregory and Oerlemans, 1998; Schneeberger et al., 2003).

Change in ablation (mostly melting) of a glacier or ice cap is modelled using  $b_T$  (in  $\text{m yr}^{-1} \text{ } ^\circ\text{C}^{-1}$ ), the sensitivity of the mean

specific surface mass balance to temperature (refer to Section 4.5 for a discussion of the relation of mass balance to climate). One approach determines  $b_T$  by energy balance modelling, including evolution of albedo and refreezing of melt water within the firm (Zuo and Oerlemans, 1997). Oerlemans and Reichert (2000), Oerlemans (2001) and Oerlemans et al. (2006) refine this approach to include dependence on monthly temperature and precipitation changes. Another approach uses a degree-day method, in which ablation is proportional to the integral of mean daily temperature above the freezing point (Braithwaite et al., 2003). Braithwaite and Raper (2002) show that there is excellent consistency between the two approaches, which indicates a similar relationship between  $b_T$  and climatological precipitation. Schneeberger et al. (2000, 2003) use a degree-day method for ablation modified to include incident solar radiation, again obtaining similar results. De Woul and Hock (2006) find somewhat larger sensitivities for arctic G&IC from the degree-day method than the energy balance method. Calculations of  $b_T$  are estimated to have an uncertainty of  $\pm 15\%$  (standard deviation) (Gregory and Oerlemans, 1998; Raper and Braithwaite, 2006).

The global average sensitivity of G&IC surface mass balance to temperature is estimated by weighting the local sensitivities by land ice area in various regions. For a geographically and seasonally uniform rise in global temperature, Oerlemans and Fortuin (1992) derive a global average G&IC surface mass balance sensitivity of  $-0.40 \text{ m yr}^{-1} \text{ } ^\circ\text{C}^{-1}$ , Dyurgerov and Meier (2000)  $-0.37 \text{ m yr}^{-1} \text{ } ^\circ\text{C}^{-1}$  (from observations), Braithwaite and Raper (2002)  $-0.41 \text{ m yr}^{-1} \text{ } ^\circ\text{C}^{-1}$  and Raper and Braithwaite (2005)  $-0.35 \text{ m yr}^{-1} \text{ } ^\circ\text{C}^{-1}$ . Applying the scheme of Oerlemans (2001) and Oerlemans et al. (2006) worldwide gives a smaller value of  $-0.32 \text{ m yr}^{-1} \text{ } ^\circ\text{C}^{-1}$ , the reduction being due to the modified treatment of albedo by Oerlemans (2001).

These global average sensitivities for uniform temperature change are given only for scenario-independent comparison of the various methods; they cannot be used for projections, which require regional and seasonal temperature changes (Gregory and Oerlemans, 1998; van de Wal and Wild, 2001). Using monthly temperature changes simulated in G&IC regions by 17 AR4 AOGCMs for scenarios A1B, A2 and B1, the global total surface mass balance sensitivity to global average temperature change for all G&IC outside Greenland and Antarctica is  $0.61 \pm 0.12 \text{ mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$  (sea level equivalent) with the  $b_T$  of Zuo and Oerlemans (1997) or  $0.49 \pm 0.13 \text{ mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$  with those of Oerlemans (2001) and Oerlemans et al. (2006), subject to uncertainty in G&IC area (see Section 4.5.2 and Table 4.4).

Hansen and Nazarenko (2004) collate measurements of soot (fossil fuel black carbon) in snow and estimate consequent reductions in snow and ice albedo of between 0.001 for the pristine conditions of Antarctica and over 0.10 for polluted NH land areas. They argue that glacial ablation would be increased by this effect. While it is true that soot has not been explicitly considered in existing sensitivity estimates, it may already be included because the albedo and degree-day parametrizations have been empirically derived from data collected in affected regions.

For seasonally uniform temperature rise, Oerlemans et al. (1998) find that an increase in precipitation of 20 to 50% °C<sup>-1</sup> is required to balance increased ablation, while Braithwaite et al. (2003) report a required precipitation increase of 29 to 41% °C<sup>-1</sup>, in both cases for a sample of G&IC representing a variety of climatic regimes. Oerlemans et al. (2006) require a precipitation increase of 20 to 43% °C<sup>-1</sup> to balance ablation increase, and de Woul and Hock (2006) approximately 20% °C<sup>-1</sup> for Arctic G&IC. Although AOGCMs generally project larger than average precipitation change in northern mid- and high-latitude regions, the global average is 1 to 2% °C<sup>-1</sup> (Section 10.3.1), so ablation increases would be expected to dominate worldwide. However, precipitation changes may sometimes dominate locally (see Section 4.5.3).

Regressing observed global total mass balance changes of all G&IC outside Greenland and Antarctica against global average surface temperature change gives a global total mass balance sensitivity which is greater than model results (see Appendix 10.A). The current state of knowledge does not permit a satisfactory explanation of the difference. Giving more weight to the observational record but enlarging the uncertainty to allow for systematic error, a value of  $0.80 \pm 0.33$  mm yr<sup>-1</sup> °C<sup>-1</sup> (5 to 95% range) is adopted for projections. The regression indicates that the climate of 1865 to 1895 was 0.13°C warmer globally than the climate that gives a steady state for G&IC (cf., Zuo and Oerlemans, 1997; Gregory et al., 2006). Model results for the 20th century are sensitive to this value, but the projected temperature change in the 21st century is large by comparison, making the effect relatively less important for projections (see Appendix 10.A).

### 10.6.3.2 Dynamic Response and Feedback on Mass Balance

As glacier volume is lost, glacier area declines so the ablation decreases. Oerlemans et al. (1998) calculate that omitting this effect leads to overestimates of ablation of about 25% by 2100. Church et al. (2001), following Bahr et al. (1997) and Van de Wal and Wild (2001), make some allowance for it by diminishing the area  $A$  of a glacier of volume  $V$  according to  $V \propto A^{1.375}$ . This is a scaling relation derived for glaciers in a steady state, which may hold only approximately during retreat. For example, thinning in the ablation zone will steepen the surface slope and tend to increase the flow. Comparison with a simple flow model suggests the deviations do not exceed 20% (van de Wal and Wild, 2001). Schneeberger et al. (2003) find that the scaling relation produced a mixture of over- and underestimates of volume loss for their sample of glaciers compared with more detailed dynamic modelling. In some regions where G&IC flow into the sea or lakes there is accelerated dynamic discharge (Rignot et al., 2003) that is not included in currently available glacier models, leading to an underestimate of G&IC mass loss.

The mean specific surface mass balance of the glacier or ice cap will change as volume is lost: lowering the ice surface as the ice thins will tend to make it more negative, but the predominant loss of area at lower altitude in the ablation zone

will tend to make it less negative (Braithwaite and Raper, 2002). For rapid thinning rates in the ablation zone, of several metres per year, lowering the surface will give enhanced local warmings comparable to the rate of projected climatic warming. However, those areas of the ablation zone of valley glaciers that thin most rapidly will soon be removed altogether, resulting in retreat of the glacier. The enhancement of ablation by surface lowering can only be sustained in glaciers with a relatively large, thick and flat ablation area. On multi-decadal time scales, for the majority of G&IC, the loss of area is more important than lowering of the surface (Schneeberger et al., 2003).

The dynamical approach (Oerlemans et al., 1998; Schneeberger et al., 2003) cannot be applied to all the world's glaciers individually as the required data are unknown for the vast majority of them. Instead, it might be applied to a representative ensemble derived from statistics of size distributions of G&IC. Raper et al. (2000) developed a geometrical approach, in which the width, thickness and length of a glacier are reduced as its volume and area declines. When applied statistically to the world population of glaciers and individually to ice caps, this approach shows that the reduction of area of glaciers strongly reduces the ablation during the 21st century (Raper and Braithwaite, 2006), by about 45% under scenario SRES A1B for the GFDL-CM2.0 and PCM AOGCMs (see Table 8.1 for model details). For the same cases, using the mass-balance sensitivities to temperature of Oerlemans (2001) and Oerlemans et al. (2006), G&IC mass loss is reduced by about 35% following the area scaling of Van de Wal and Wild (2001), suggesting that the area scaling and the geometrical model have a similar effect in reducing estimated ablation for the 21st century. The effect is greater when using the observationally derived mass balance sensitivity (Section 10.6.3.1), which is larger, implying faster mass loss for fixed area. The uncertainty in present-day glacier volume (Table 4.4) introduces a 5 to 10% uncertainty into the results of area scaling. For projections, the area scaling of Van de Wal and Wild (2001) is applied, using three estimates of world glacier volume (see Table 4.4 and Appendix 10.A). The scaling reduces the projections of the G&IC contribution up to the mid-21st century by 25% and over the whole century by 40 to 50% with respect to fixed G&IC area.

### 10.6.3.3 Glaciers and Ice Caps on Greenland and Antarctica

The G&IC on Greenland and Antarctica (apart from the ice sheets) have been less studied and projections for them are consequently more uncertain. A model estimate for the G&IC on Greenland indicates an addition of about 6% to the G&IC sea level contribution in the 21st century (van de Wal and Wild, 2001). Using a degree-day scheme, Vaughan (2006) estimates that ablation of glaciers in the Antarctic Peninsula presently amounts to 0.008 to 0.055 mm yr<sup>-1</sup> of sea level, 1 to 9% of the contribution from G&IC outside Greenland and Antarctica (Table 4.4). Morris and Mulvaney (2004) find that accumulation increases on the Antarctic Peninsula were larger than ablation increases during 1972 to 1998, giving a small net *negative* sea

level contribution from the region. However, because ablation increases nonlinearly with temperature, they estimate that for future warming the contribution would become positive, with a sensitivity of  $0.07 \pm 0.03 \text{ mm yr}^{-1} \text{ }^{\circ}\text{C}^{-1}$  to uniform temperature change in Antarctica, that is, about 10% of the global sensitivity of G&IC outside Greenland and Antarctica (Section 10.6.3.1).

These results suggest that the Antarctic and Greenland G&IC will together give 10 to 20% of the sea level contribution of other G&IC in future decades. In recent decades, the G&IC on Greenland and Antarctica have together made a contribution of about 20% of the total of other G&IC (see Section 4.5.2). On these grounds, the global G&IC sea level contribution is increased by a factor of 1.2 to include those in Greenland and Antarctica in projections for the 21st century (see Section 10.6.5 and Table 10.7). Dynamical acceleration of glaciers in Greenland and Antarctica following removal of ice shelves, as has recently happened on the Antarctic Peninsula (Sections 4.6.2.2 and 10.6.4.2), would add further to this, and is included in projections of that effect (Section 10.6.4.3).

### 10.6.4 Ice Sheets

The mass of ice grounded on land in the Greenland and Antarctic Ice Sheets (see also Section 4.6.1) can change as a result of changes in surface mass balance (the sum of accumulation and ablation; Section 10.6.4.1) or in the flux of ice crossing the grounding line, which is determined by the dynamics of the ice sheet (Section 10.6.4.2). Surface mass balance and dynamics together both determine and are affected by the change in surface topography.

#### 10.6.4.1 Surface Mass Balance

Surface mass balance (SMB) is immediately influenced by climate change. A good simulation of the ice sheet SMB requires a resolution exceeding that of AGCMs used for long climate experiments, because of the steep slopes at the margins of the ice sheet, where the majority of the precipitation and all of the ablation occur. Precipitation over ice sheets is typically overestimated by AGCMs, because their smooth topography does not present a sufficient barrier to inland penetration (Ohmura et al., 1996; Glover, 1999; Murphy et al., 2002). Ablation also tends to be overestimated because the area at low altitude around the margins of the ice sheet, where melting preferentially occurs, is exaggerated (Glover, 1999; Wild et al., 2003). In addition, AGCMs do not generally have a representation of the refreezing of surface melt water within the snowpack and may not include albedo variations dependent on snow ageing and its conversion to ice.

To address these issues, several groups have computed SMB at resolutions of tens of kilometres or less, with results that compare acceptably well with observations (e.g., van Lipzig et al., 2002; Wild et al., 2003). Ablation is calculated either by schemes based on temperature (degree-day or other temperature index methods) or by energy balance modelling. In the studies listed in Table 10.6, changes in SMB have been calculated

from climate change simulations with high-resolution AGCMs or by perturbing a high-resolution observational climatology with climate model output, rather than by direct use of low-resolution GCM results. The models used for projected SMB changes are similar in kind to those used to study recent SMB changes (Section 4.6.3.1).

All the models show an increase in accumulation, but there is considerable uncertainty in its size (Table 10.6; van de Wal et al., 2001; Huybrechts et al., 2004). Precipitation increase could be determined by atmospheric radiative balance, increase in saturation specific humidity with temperature, circulation changes, retreat of sea ice permitting greater evaporation or a combination of these (van Lipzig et al., 2002). Accumulation also depends on change in local temperature, which strongly affects whether precipitation is solid or liquid (Janssens and Huybrechts, 2000), tending to make the accumulation increase smaller than the precipitation increase for a given temperature rise. For Antarctica, accumulation increases by 6 to 9%  $^{\circ}\text{C}^{-1}$  in the high-resolution AGCMs. Precipitation increases somewhat less in AR4 AOGCMs (typically of lower resolution), by 3 to 8%  $^{\circ}\text{C}^{-1}$ . For Greenland, accumulation derived from the high-resolution AGCMs increases by 5 to 9%  $^{\circ}\text{C}^{-1}$ . Precipitation increases by 4 to 7%  $^{\circ}\text{C}^{-1}$  in the AR4 AOGCMs.

Kapsner et al. (1995) do not find a relationship between precipitation and temperature variability inferred from Greenland ice cores for the Holocene, although both show large changes from the Last Glacial Maximum (LGM) to the Holocene. In the UKMO-HadCM3 AOGCM, the relationship is strong for climate change forced by greenhouse gases and the glacial-interglacial transition, but weaker for naturally forced variability (Gregory et al., 2006). Increasing precipitation in conjunction with warming has been observed in recent years in Greenland (Section 4.6.3.1).

All studies for the 21st century project that antarctic SMB changes will contribute negatively to sea level, owing to increasing accumulation exceeding any ablation increase (see Table 10.6). This tendency has not been observed in the average over Antarctica in reanalysis products for the last two decades (see Section 4.6.3.1), but during this period Antarctica as a whole has not warmed; on the other hand, precipitation has increased on the Antarctic Peninsula, where there has been strong warming.

In projections for Greenland, ablation increase is important but uncertain, being particularly sensitive to temperature change around the margins. Climate models project less warming in these low-altitude regions than the Greenland average, and less warming in summer (when ablation occurs) than the annual average, but greater warming in Greenland than the global average (Church et al., 2001; Huybrechts et al., 2004; Chylek and Lohmann, 2005; Gregory and Huybrechts, 2006). In most studies, Greenland SMB changes represent a net positive contribution to sea level in the 21st century (Table 10.6; Kiilsholm et al., 2003) because the ablation increase is larger than the precipitation increase. Only Wild et al. (2003) find the opposite, so that the net SMB change contributes negatively to sea level in the 21st century. Wild et al. (2003) attribute this

**Table 10.6.** Comparison of ice sheet (grounded ice area) SMB changes calculated from high-resolution climate models.  $\Delta P/\Delta T$  is the change in accumulation divided by change in temperature over the ice sheet, expressed as sea level equivalent (positive for falling sea level), and  $\Delta R/\Delta T$  the corresponding quantity for ablation (positive for rising sea level). Note that ablation increases more rapidly than linearly with  $\Delta T$  (van de Wal et al., 2001; Gregory and Huybrechts, 2006). To convert from  $\text{mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$  to  $\text{kg yr}^{-1} \text{ } ^\circ\text{C}^{-1}$ , multiply by  $3.6 \times 10^{14} \text{ m}^2$ . To convert  $\text{mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$  of sea level equivalent to  $\text{mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$  averaged over the ice sheet, multiply by  $-206$  for Greenland and  $-26$  for Antarctica.  $\Delta P/(P\Delta T)$  is the fractional change in accumulation divided by the change in temperature.

Study	Climate model <sup>a</sup>	Model resolution and SMB source <sup>b</sup>	Greenland			Antarctica	
			$\Delta P/\Delta T$	$\Delta P/(P\Delta T)$	$\Delta R/\Delta T$	$\Delta P/\Delta T$	$\Delta P/(P\Delta T)$
			( $\text{mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$ )	(% $^\circ\text{C}^{-1}$ )	( $\text{mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$ )	( $\text{mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$ )	(% $^\circ\text{C}^{-1}$ )
Van de Wal et al. (2001)	ECHAM4	20 km EB	0.14	8.5	0.16	n.a.	n.a.
Wild and Ohmura (2000)	ECHAM4	T106 $\approx$ 1.1° EB	0.13	8.2	0.22	0.47	7.4
Wild et al. (2003)	ECHAM4	2 km TI	0.13	8.2	0.04	0.47	7.4
Bugnion and Stone (2002)	ECHAM4	20 km EB	0.10	6.4	0.13	n.a.	n.a.
Huybrechts et al. (2004)	ECHAM4	20 km TI	0.13 <sup>c</sup>	7.6 <sup>c</sup>	0.14	0.49 <sup>c</sup>	7.3 <sup>c</sup>
Huybrechts et al. (2004)	HadAM3H	20 km TI	0.09 <sup>c</sup>	4.7 <sup>c</sup>	0.23	0.37 <sup>c</sup>	5.5 <sup>c</sup>
Van Lipzig et al. (2002)	RACMO	55 km EB	n.a.	n.a.	n.a.	0.53	9.0
Krinner et al. (2007)	LMDZ4	60 km EB	n.a.	n.a.	n.a.	0.49	8.4

## Notes:

<sup>a</sup> ECHAM4: Max Planck Institute for Meteorology AGCM; HadAM3H: high-resolution Met Office Hadley Centre AGCM; RACMO: Regional Atmospheric Climate Model (for Antarctica); LMDZ4: Laboratoire de Météorologie Dynamique AGCM (with high resolution over Antarctica).

<sup>b</sup> EB: SMB calculated from energy balance; TI: SMB calculated from temperature index.

<sup>c</sup> In these cases  $P$  is precipitation rather than accumulation.

difference to the reduced ablation area in their higher-resolution grid. A positive SMB change is not consistent with analyses of recent changes in Greenland SMB (see Section 4.6.3.1).

For an average temperature change of 3°C over each ice sheet, a combination of four high-resolution AGCM simulations and 18 AR4 AOGCMs (Huybrechts et al., 2004; Gregory and Huybrechts, 2006) gives SMB changes of  $0.3 \pm 0.3 \text{ mm yr}^{-1}$  for Greenland and  $-0.9 \pm 0.5 \text{ mm yr}^{-1}$  for Antarctica (sea level equivalent), that is, sensitivities of  $0.11 \pm 0.09 \text{ mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$  for Greenland and  $-0.29 \pm 0.18 \text{ mm yr}^{-1} \text{ } ^\circ\text{C}^{-1}$  for Antarctica. These results generally cover the range shown in Table 10.6, but tend to give more positive (Greenland) or less negative (Antarctica) sea level rise because of the smaller precipitation increases projected by the AOGCMs than by the high-resolution AGCMs. The uncertainties are from the spatial and seasonal patterns of precipitation and temperature change over the ice sheets, and from the ablation calculation. Projections under SRES scenarios for the 21st century are shown in Table 10.7.

#### 10.6.4.2 Dynamics

Ice sheet flow reacts to changes in topography produced by SMB change. Projections for the 21st century are given in Section 10.6.5 and Table 10.7, based on the discussion in this

section. In Antarctica, topographic change tends to increase ice flow and discharge. In Greenland, lowering of the surface tends to increase the ablation, while a steepening slope in the ablation zone opposes the lowering, and thinning of outlet glaciers reduces discharge. Topographic and dynamic changes simulated by ice flow models (Huybrechts and De Wolde, 1999; van de Wal et al., 2001; Huybrechts et al., 2002, 2004; Gregory and Huybrechts, 2006) can be roughly represented as modifying the sea level changes due to SMB change with fixed topography by  $-5\% \pm 5\%$  from Antarctica, and  $0\% \pm 10\%$  from Greenland ( $\pm$  one standard deviation) during the 21st century.

The TAR concluded that accelerated sea level rise caused by rapid dynamic response of the ice sheets to climate change is very unlikely during the 21st century (Church et al., 2001). However, new evidence of recent rapid changes in the Antarctic Peninsula, West Antarctica and Greenland (see Section 4.6.3.3) has again raised the possibility of larger dynamical changes in the future than are projected by state-of-the-art continental models, such as cited above, because these models do not incorporate all the processes responsible for the rapid marginal thinning currently taking place (Box 4.1; Alley et al., 2005a; Vaughan, 2007).

The main uncertainty is the degree to which the presence of ice shelves affects the flow of inland ice across the grounding

## Frequently Asked Question 10.2

# How Likely are Major or Abrupt Climate Changes, such as Loss of Ice Sheets or Changes in Global Ocean Circulation?

*Abrupt climate changes, such as the collapse of the West Antarctic Ice Sheet, the rapid loss of the Greenland Ice Sheet or large-scale changes of ocean circulation systems, are not considered likely to occur in the 21st century, based on currently available model results. However, the occurrence of such changes becomes increasingly more likely as the perturbation of the climate system progresses.*

Physical, chemical and biological analyses from Greenland ice cores, marine sediments from the North Atlantic and elsewhere and many other archives of past climate have demonstrated that local temperatures, wind regimes and water cycles can change rapidly within just a few years. The comparison of results from records in different locations of the world shows that in the past major changes of hemispheric to global extent occurred. This has led to the notion of an unstable past climate that underwent phases of abrupt change. Therefore, an important concern is that the continued growth of greenhouse gas concentrations in the atmosphere may constitute a perturbation sufficiently strong to trigger abrupt changes in the climate system. Such interference with the climate system could be considered dangerous, because it would have major global consequences.

Before discussing a few examples of such changes, it is useful to define the terms 'abrupt' and 'major'. 'Abrupt' conveys the meaning that the changes occur much faster than the perturbation inducing the change; in other words, the response is nonlinear. A 'major' climate change is one that involves changes that exceed the range of current natural variability and have a spatial extent ranging from several thousand kilometres to global. At local to regional scales, abrupt changes are a common characteristic of natural climate variability. Here, isolated, short-lived events that are more appropriately referred to as 'extreme events' are not considered, but rather large-scale changes that evolve rapidly and persist for several years to decades. For instance, the mid-1970s shift in sea surface temperatures in the Eastern Pacific, or the salinity reduction in the upper 1,000 m of the Labrador Sea since the mid-1980s, are examples of abrupt events with local to regional consequences, as opposed to the larger-scale, longer-term events that are the focus here.

One example is the potential collapse, or shut-down of the Gulf Stream, which has received broad public attention. The Gulf Stream is a primarily horizontal current in the north-western Atlantic Ocean driven by winds. Although a stable feature of the general circulation of the ocean, its northern extension, which feeds deep-water formation in the Greenland-Norwegian-Iceland Seas and thereby delivers substantial amounts of heat to these seas and nearby land areas, is influenced strongly by changes in the density of the surface waters in these areas. This current

constitutes the northern end of a basin-scale meridional overturning circulation (MOC) that is established along the western boundary of the Atlantic basin. A consistent result from climate model simulations is that if the density of the surface waters in the North Atlantic decreases due to warming or a reduction in salinity, the strength of the MOC is decreased, and with it, the delivery of heat into these areas. Strong sustained reductions in salinity could induce even more substantial reduction, or complete shut-down of the MOC in all climate model projections. Such changes have indeed happened in the distant past.

The issue now is whether the increasing human influence on the atmosphere constitutes a strong enough perturbation to the MOC that such a change might be induced. The increase in greenhouse gases in the atmosphere leads to warming and an intensification of the hydrological cycle, with the latter making the surface waters in the North Atlantic less salty as increased rain leads to more freshwater runoff to the ocean from the region's rivers. Warming also causes land ice to melt, adding more freshwater and further reducing the salinity of ocean surface waters. Both effects would reduce the density of the surface waters (which must be dense and heavy enough to sink in order to drive the MOC), leading to a reduction in the MOC in the 21st century. This reduction is predicted to proceed in lockstep with the warming: none of the current models simulates an abrupt (nonlinear) reduction or a complete shut-down in this century. There is still a large spread among the models' simulated reduction in the MOC, ranging from virtually no response to a reduction of over 50% by the end of the 21st century. This cross-model variation is due to differences in the strengths of atmosphere and ocean feedbacks simulated in these models.

Uncertainty also exists about the long-term fate of the MOC. Many models show a recovery of the MOC once climate is stabilised. But some models have thresholds for the MOC, and they are passed when the forcing is strong enough and lasts long enough. Such simulations then show a gradual reduction of the MOC that continues even after climate is stabilised. A quantification of the likelihood of this occurring is not possible at this stage. Nevertheless, even if this were to occur, Europe would still experience warming, since the radiative forcing caused by increasing greenhouse gases would overwhelm the cooling associated with the MOC reduction. Catastrophic scenarios suggesting the beginning of an ice age triggered by a shutdown of the MOC are thus mere speculations, and no climate model has produced such an outcome. In fact, the processes leading to an ice age are sufficiently well understood and so completely different from those discussed here, that we can confidently exclude this scenario.

*(continued)*

Irrespective of the long-term evolution of the MOC, model simulations agree that the warming and resulting decline in salinity will significantly reduce deep and intermediate water formation in the Labrador Sea during the next few decades. This will alter the characteristics of the intermediate water masses in the North Atlantic and eventually affect the deep ocean. The long-term effects of such a change are unknown.

Other widely discussed examples of abrupt climate changes are the rapid disintegration of the Greenland Ice Sheet, or the sudden collapse of the West Antarctic Ice Sheet. Model simulations and observations indicate that warming in the high latitudes of the Northern Hemisphere is accelerating the melting of the Greenland Ice Sheet, and that increased snowfall due to the intensified hydrological cycle is unable to compensate for this melting. As a consequence, the Greenland Ice Sheet may shrink substantially in the coming centuries. Moreover, results suggest that there is a critical temperature threshold beyond which the Greenland Ice Sheet would be committed to disappearing completely, and that threshold could be crossed in this century. However, the total melting of the Greenland Ice Sheet, which

would raise global sea level by about seven metres, is a slow process that would take many hundreds of years to complete.

Recent satellite and *in situ* observations of ice streams behind disintegrating ice shelves highlight some rapid reactions of ice sheet systems. This raises new concern about the overall stability of the West Antarctic Ice Sheet, the collapse of which would trigger another five to six metres of sea level rise. While these streams appear buttressed by the shelves in front of them, it is currently unknown whether a reduction or failure of this buttressing of relatively limited areas of the ice sheet could actually trigger a widespread discharge of many ice streams and hence a destabilisation of the entire West Antarctic Ice Sheet. Ice sheet models are only beginning to capture such small-scale dynamical processes that involve complicated interactions with the glacier bed and the ocean at the perimeter of the ice sheet. Therefore, no quantitative information is available from the current generation of ice sheet models as to the likelihood or timing of such an event.

line. A strong argument for enhanced flow when the ice shelf is removed is yielded by the acceleration of Jakobshavn Glacier (Greenland) following the loss of its floating tongue, and of the glaciers supplying the Larsen B Ice Shelf (Antarctic Peninsula) after it collapsed (see Section 4.6.3.3). The onset of disintegration of the Larsen B Ice Shelf has been attributed to enhanced fracturing by crevasses promoted by surface melt water (Scambos et al., 2000). Large portions of the Ross and Filchner-Ronne Ice Shelves (West Antarctica) currently have mean summer surface temperatures of around  $-5^{\circ}\text{C}$  (Comiso, 2000, updated). Four high-resolution GCMs (Gregory and Huybrechts, 2006) project summer surface warming in these major ice shelf regions of between 0.2 and 1.3 times the antarctic annual average warming, which in turn will be a factor  $1.1 \pm 0.3$  greater than global average warming according to AOGCM simulations using SRES scenarios. These figures indicate that a local mean summer warming of  $5^{\circ}\text{C}$  is unlikely for a global warming of less than  $5^{\circ}\text{C}$  (see Appendix 10.A). This suggests that ice shelf collapse due to surface melting is unlikely under most SRES scenarios during the 21st century, but we have low confidence in the inference because there is evidently large systematic uncertainty in the regional climate projections, and it is not known whether episodic surface melting might initiate disintegration in a warmer climate while mean summer temperatures remain below freezing.

In the Amundsen Sea sector of West Antarctica, ice shelves are not so extensive and the cause of ice shelf thinning is not surface melting, but bottom melting at the grounding line (Rignot and Jacobs, 2002). Shepherd et al. (2004) find an average ice-

shelf thinning rate of  $1.5 \pm 0.5 \text{ m yr}^{-1}$ . At the same time as the basal melting, accelerated inland flow has been observed for Pine Island, Thwaites and other glaciers in the sector (Rignot, 1998, 2001; Thomas et al., 2004). The synchronicity of these changes strongly implies that their cause lies in oceanographic change in the Amundsen Sea, but this has not been attributed to anthropogenic climate change and could be connected with variability in the SAM.

Because the acceleration took place in only a few years (Rignot et al., 2002; Joughin et al., 2003) but appears up to about 150 km inland, it implies that the dynamical response to changes in the ice shelf can propagate rapidly up the ice stream. This conclusion is supported by modelling studies of Pine Island Glacier by Payne et al. (2004) and Dupont and Alley (2005), in which a single and instantaneous reduction of the basal or lateral drag at the ice front is imposed in idealised ways, such as a step retreat of the grounding line. The simulated acceleration and inland thinning are rapid but transient; the rate of contribution to sea level declines as a new steady state is reached over a few decades. In the study of Payne et al. (2004) the imposed perturbations were designed to resemble loss of drag in the 'ice plain', a partially grounded region near the ice front, and produced a velocity increase of about  $1 \text{ km yr}^{-1}$  there. Thomas et al. (2005) suggest the ice plain will become ungrounded during the next decade and obtain a similar velocity increase using a simplified approach.

Most of inland ice of West Antarctica is grounded below sea level and so it could float if it thinned sufficiently; discharge therefore promotes inland retreat of the grounding line, which

represents a positive feedback by further reducing basal traction. Unlike the one-time change in the idealised studies, this would represent a sustained dynamical forcing that would prolong the contribution to sea level rise. Grounding line retreat of the ice streams has been observed recently at rates of up to about 1 km yr<sup>-1</sup> (Rignot, 1998, 2001; Shepherd et al., 2002), but a numerical model formulation is difficult to construct (Vieli and Payne, 2005).

The majority of West Antarctic ice discharge is through the ice streams that feed the Ross and Ronne-Filchner ice shelves, but in these regions no accelerated flow causing thinning is currently observed; on the contrary, they are thickening or near balance (Zwally et al., 2005). Excluding these regions, and likewise those parts of the East Antarctic Ice Sheet that drain into the large Amery ice shelf, the total area of ice streams (areas flowing faster than 100 m yr<sup>-1</sup>) discharging directly into the sea or via a small ice shelf is 270,000 km<sup>2</sup>. If all these areas thinned at 2 m yr<sup>-1</sup>, the order of magnitude of the larger rates observed in fast-flowing areas of the Amundsen Sea sector (Shepherd et al., 2001, 2002), the contribution to sea level rise would be about 1.5 mm yr<sup>-1</sup>. This would require sustained retreat simultaneously on many fronts, and should be taken as an indicative upper limit for the 21st century (see also Section 10.6.5).

The observation in west-central Greenland of seasonal variation in ice flow rate and of a correlation with summer temperature variation (Zwally et al., 2002) suggest that surface melt water may join a sub-glacially routed drainage system lubricating the ice flow (although this implies that it penetrates more than 1,200 m of subfreezing ice). By this mechanism, increased surface melting during the 21st century could cause

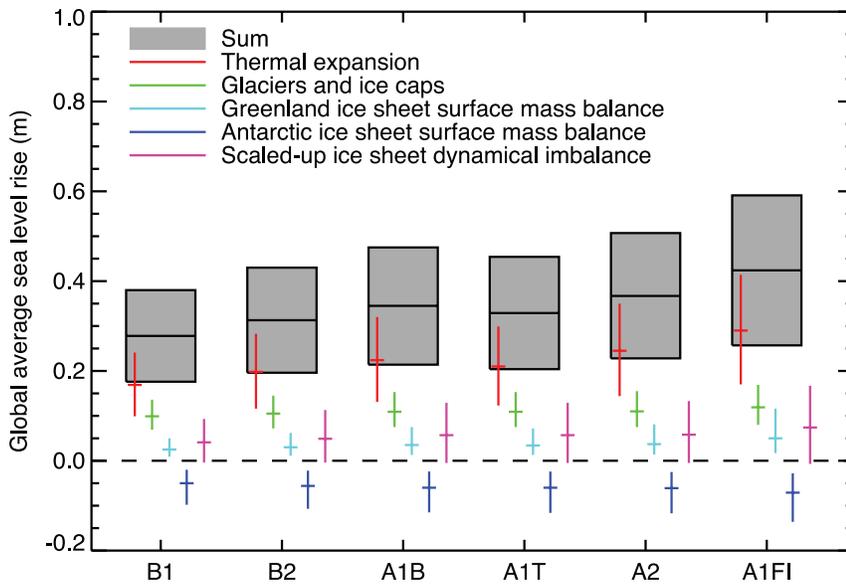
acceleration of ice flow and discharge; a sensitivity study (Parizek and Alley, 2004) indicated that this might increase the sea level contribution from the Greenland Ice Sheet during the 21st century by up to 0.2 m, depending on the warming and other assumptions. However, other studies (Echelmeyer and Harrison, 1990; Joughin et al., 2004) found no evidence of seasonal fluctuations in the flow rate of nearby Jakobshavn Glacier despite a substantial supply of surface melt water.

### 10.6.5 Projections of Global Average Sea Level Change for the 21st Century

Table 10.7 and Figure 10.33 show projected changes in global average sea level under the SRES marker scenarios for the 21st century due to thermal expansion and land ice changes based on AR4 AOGCM results (see Sections 10.6.1, 10.6.3 and 10.6.4 for discussion). The ranges given are 5 to 95% intervals characterising the spread of model results, but we are not able to assess their likelihood in the way we have done for temperature change (Section 10.5.4.6), for two main reasons. First, the observational constraint on sea level rise projections is weaker, because records are shorter and subject to more uncertainty. Second, current scientific understanding leaves poorly known uncertainties in the methods used to make projections for land ice (Sections 10.6.3 and 10.6.4). Since the AOGCMs are integrated with scenarios of CO<sub>2</sub> concentration, uncertainties in carbon cycle feedbacks are not included in the results. The carbon cycle uncertainty in projections of temperature change cannot be translated into sea level rise because thermal expansion is a major contributor and its relation to temperature change is uncertain (Section 10.6.1).

**Table 10.7.** Projected global average sea level rise during the 21st century and its components under SRES marker scenarios. The upper row in each pair gives the 5 to 95% range (m) of the rise in sea level between 1980 to 1999 and 2090 to 2099. The lower row in each pair gives the range of the rate of sea level rise (mm yr<sup>-1</sup>) during 2090 to 2099. The land ice sum comprises G&I and ice sheets, including dynamics, but excludes the scaled-up ice sheet discharge (see text). The sea level rise comprises thermal expansion and the land ice sum. Note that for each scenario the lower/upper bound for sea level rise is larger/smaller than the total of the lower/upper bounds of the contributions, since the uncertainties of the contributions are largely independent. See Appendix 10.A for methods.

		B1		B2		A1B		A1T		A2		A1FI	
Thermal expansion	m	0.10	0.24	0.12	0.28	0.13	0.32	0.12	0.30	0.14	0.35	0.17	0.41
	mm yr <sup>-1</sup>	1.1	2.6	1.6	4.0	1.7	4.2	1.3	3.2	2.6	6.3	2.8	6.8
G&I	m	0.07	0.14	0.07	0.15	0.08	0.15	0.08	0.15	0.08	0.16	0.08	0.17
	mm yr <sup>-1</sup>	0.5	1.3	0.5	1.5	0.6	1.6	0.5	1.4	0.6	1.9	0.7	2.0
Greenland Ice Sheet SMB	m	0.01	0.05	0.01	0.06	0.01	0.08	0.01	0.07	0.01	0.08	0.02	0.12
	mm yr <sup>-1</sup>	0.2	1.0	0.2	1.5	0.3	1.9	0.2	1.5	0.3	2.8	0.4	3.9
Antarctic Ice Sheet SMB	m	-0.10	-0.02	-0.11	-0.02	-0.12	-0.02	-0.12	-0.02	-0.12	-0.03	-0.14	-0.03
	mm yr <sup>-1</sup>	-1.4	-0.3	-1.7	-0.3	-1.9	-0.4	-1.7	-0.3	-2.3	-0.4	-2.7	-0.5
Land ice sum	m	0.04	0.18	0.04	0.19	0.04	0.20	0.04	0.20	0.04	0.20	0.04	0.23
	mm yr <sup>-1</sup>	0.0	1.8	-0.1	2.2	-0.2	2.5	-0.1	2.1	-0.4	3.2	-0.8	4.0
Sea level rise	m	0.18	0.38	0.20	0.43	0.21	0.48	0.20	0.45	0.23	0.51	0.26	0.59
	mm yr <sup>-1</sup>	1.5	3.9	2.1	5.6	2.1	6.0	1.7	4.7	3.0	8.5	3.0	9.7
Scaled-up ice sheet discharge	m	0.00	0.09	0.00	0.11	-0.01	0.13	-0.01	0.13	-0.01	0.13	-0.01	0.17
	mm yr <sup>-1</sup>	0.0	1.7	0.0	2.3	0.0	2.6	0.0	2.3	-0.1	3.2	-0.1	3.9



**Figure 10.33.** Projections and uncertainties (5 to 95% ranges) of global average sea level rise and its components in 2090 to 2099 (relative to 1980 to 1999) for the six SRES marker scenarios. The projected sea level rise assumes that the part of the present-day ice sheet mass imbalance that is due to recent ice flow acceleration will persist unchanged. It does not include the contribution shown from scaled-up ice sheet discharge, which is an alternative possibility. It is also possible that the present imbalance might be transient, in which case the projected sea level rise is reduced by 0.02 m. It must be emphasized that we cannot assess the likelihood of any of these three alternatives, which are presented as illustrative. The state of understanding prevents a best estimate from being made.

In all scenarios, the average rate of rise during the 21st century is very likely to exceed the 1961 to 2003 average rate of  $1.8 \pm 0.5$  mm yr<sup>-1</sup> (see Section 5.5.2.1). The central estimate of the rate of sea level rise during 2090 to 2099 is 3.8 mm yr<sup>-1</sup> under A1B, which exceeds the central estimate of 3.1 mm yr<sup>-1</sup> for 1993 to 2003 (see Section 5.5.2.2). The 1993 to 2003 rate may have a contribution of about 1 mm yr<sup>-1</sup> from internally generated or naturally forced decadal variability (see Sections 5.5.2.4 and 9.5.2). These sources of variability are not predictable and not included in the projections; the actual rate during any future decade might therefore be more or less than the projected rate by a similar amount. Although simulated and observed sea level rise agree reasonably well for 1993 to 2003, the observed rise for 1961 to 2003 is not satisfactorily explained (Section 9.5.2), as the sum of observationally estimated components is  $0.7 \pm 0.7$  mm yr<sup>-1</sup> less than the observed rate of rise (Section 5.5.6). This indicates a deficiency in current scientific understanding of sea level change and may imply an underestimate in projections.

For an average model (the central estimate for each scenario), the scenario spread (from B1 to A1FI) in sea level rise is only 0.02 m by the middle of the century. This is small because of the time-integrating effect of sea level rise, on which the divergence among the scenarios has had little effect by then. By 2090 to 2099 it is 0.15 m.

In all scenarios, the central estimate for thermal expansion by the end of the century is 70 to 75% of the central estimate for the sea level rise. In all scenarios, the average rate of expansion

during the 21st century is larger than central estimate of 1.6 mm yr<sup>-1</sup> for 1993 to 2003 (Section 5.5.3). Likewise, in all scenarios the average rate of mass loss by G&IC during the 21st century is greater than the central estimate of 0.77 mm yr<sup>-1</sup> for 1993 to 2003 (Section 4.5.2). By the end of the century, a large fraction of the present global G&IC mass is projected to have been lost (see, e.g., Table 4.3). The G&IC projections are rather insensitive to the scenario because the main uncertainties come from the G&IC model.

Further accelerations in ice flow of the kind recently observed in some Greenland outlet glaciers and West Antarctic ice streams could increase the ice sheet contributions substantially, but quantitative projections cannot be made with confidence (see Section 10.6.4.2). The land ice sum in Table 10.7 includes the effect of dynamical changes in the ice sheets that can be simulated with a continental ice sheet model (Section 10.6.4.2). It also includes a scenario-independent term of  $0.32 \pm 0.35$  mm yr<sup>-1</sup> ( $0.035 \pm 0.039$  m in 110 years). This is the central estimate for 1993 to 2003 of the sea level contribution from the Antarctic Ice Sheet, plus half of that from Greenland (Sections 4.6.2.2 and 5.5.5.2). We take this as an estimate of the part of the present ice sheet mass imbalance that is due to recent ice flow acceleration (Section 4.6.3.2), and assume that this contribution will persist unchanged.

We also evaluate the contribution of rapid dynamical changes under two alternative assumptions (see, e.g., Alley et al., 2005b). First, the present imbalance might be a rapid short-term adjustment, which will diminish during coming decades. We take an e-folding time of 100 years, on the basis of an idealised model study (Payne et al., 2004). This assumption reduces the sea level rise in Table 10.7 by 0.02 m. Second, the present imbalance might be a response to recent climate change, perhaps through oceanic or surface warming (Section 10.6.4.2). No models are available for such a link, so we assume that the imbalance might scale up with global average surface temperature change, which we take as a measure of the magnitude of climate change (see Appendix 10.A). This assumption adds 0.1 to 0.2 m to the estimated upper bound for sea level rise depending on the scenario (Table 10.7). During 2090 to 2099, the rate of scaled-up antarctic discharge roughly balances the increased rate of antarctic accumulation (SMB). The central estimate for the increased antarctic discharge under the SRES scenario A1FI is about 1.3 mm yr<sup>-1</sup>, a factor of 5 to 10 greater than in recent years, and similar to the order-of-magnitude upper limit of Section 10.6.4.2. It must be emphasized that we cannot assess the likelihood of any of these three alternatives, which are presented as illustrative. The state of understanding prevents a best estimate from being made.

The central estimates for sea level rise in Table 10.7 are smaller than the TAR model means (Church et al., 2001) by 0.03 to 0.07 m, depending on scenario, for two reasons. First, these projections are for 2090-2099, whereas the TAR projections were for 2100. Second, the TAR included some small constant additional contributions to sea level rise which are omitted here (see below regarding permafrost). If the TAR model means are adjusted for this, they are within 10% of the central estimates from Table 10.7. (See Appendix 10.A for further information.) For each scenario, the upper bound of sea level rise in Table 10.7 is smaller than in the TAR, and the lower bound is larger than in the TAR. This is because the uncertainty on the sea level projection has been reduced, for a combination of reasons (see Appendix 10.A for details). The TAR would have had similar ranges to those shown here if it had treated the uncertainties in the same way.

Thawing of permafrost is projected to contribute about 5 mm during the 21st century under the SRES scenario A2 (calculated from Lawrence and Slater, 2005). The mass of the ocean will also be changed by climatically driven alteration in other water storage, in the forms of atmospheric water vapour, seasonal snow cover, soil moisture, groundwater, lakes and rivers. All of these are expected to be relatively small terms, but there may be substantial contributions from anthropogenic change in terrestrial water storage, through extraction from aquifers and impounding in reservoirs (see Sections 5.5.5.3 and 5.5.5.4).

## 10.7 Long Term Climate Change and Commitment

### 10.7.1 Climate Change Commitment to Year 2300 Based on AOGCMs

Building on Wigley (2005), we use three specific definitions of climate change commitment: (i) the ‘constant composition commitment’, which denotes the further change of temperature (‘constant composition temperature commitment’ or ‘committed warming’), sea level (‘constant composition sea level commitment’) or any other quantity in the climate system, since the time the composition of the atmosphere, and hence the radiative forcing, has been held at a constant value; (ii) the ‘constant emission commitment’, which denotes the further change of, for example, temperature (‘constant emission temperature commitment’) since the time the greenhouse gas emissions have been held at a constant value; and (iii) the ‘zero emission commitment’, which denotes the further change of, for example, temperature (‘zero emission temperature commitment’) since the time the greenhouse gas emissions have been set to zero.

The concept that the climate system exhibits commitment when radiative forcing has changed is mainly due to the thermal inertia of the oceans, and was discussed independently by Wigley (1984), Hansen et al. (1984) and Siegenthaler and Oeschger

(1984). The term ‘commitment’ in this regard was introduced by Ramanathan (1988). In the TAR, this was illustrated in idealised scenarios of doubling and quadrupling atmospheric CO<sub>2</sub>, and stabilisation at 2050 and 2100 after an IS92a forcing scenario. Various temperature commitment values were reported (about 0.3°C per century with much model dependency), and EMIC simulations were used to illustrate the long-term influence of the ocean owing to long mixing times and the MOC. Subsequent studies have confirmed this behaviour of the climate system and ascribed it to the inherent property of the climate system that the thermal inertia of the ocean introduces a lag to the warming of the climate system after concentrations of greenhouse gases are stabilised (Mitchell et al., 2000; Wetherald et al., 2001; Wigley and Raper, 2003; Hansen et al., 2005b; Meehl et al., 2005c; Wigley, 2005). Climate change commitment as discussed here should not be confused with ‘unavoidable climate change’ over the next half century, which would surely be greater because forcing cannot be instantly stabilised. Furthermore, in the very long term it is plausible that climate change could be less than in a commitment run since forcing could plausibly be reduced below current levels as illustrated in the overshoot simulations and zero emission commitment simulations discussed below.

Three constant composition commitment experiments have recently been performed by the global coupled climate modelling community: (1) stabilising concentrations of greenhouse gases at year 2000 values after a 20th-century climate simulation, and running the model for an additional 100 years; (2) stabilising concentrations of greenhouse gases at year 2100 values after a 21st-century B1 experiment (e.g., CO<sub>2</sub> near 550 ppm) and running the model for an additional 100 years (with some models run to 200 years); and (3) stabilising concentrations of greenhouse gases at year 2100 values after a 21st-century A1B experiment (e.g., CO<sub>2</sub> near 700 ppm), and running the model for an additional 100 years (and some models to 200 years). Multi-model mean warming in these experiments is depicted in Figure 10.4. Time series of the globally averaged surface temperature and percent precipitation change after stabilisation are shown for all the models in the Supplementary Material, Figure S10.3.

The multi-model average warming for all radiative forcing agents held constant at year 2000 (reported earlier for several of the models by Meehl et al., 2005c), is about 0.6°C for the period 2090 to 2099 relative to the 1980 to 1999 reference period. This is roughly the magnitude of warming simulated in the 20th century. Applying the same uncertainty assessment as for the SRES scenarios in Fig. 10.29 (–40 to +60%), the likely uncertainty range is 0.3°C to 0.9°C. Hansen et al. (2005a) calculate the current energy imbalance of the Earth to be 0.85 W m<sup>-2</sup>, implying that the unrealised global warming is about 0.6°C without any further increase in radiative forcing. The committed warming trend values show a rate of warming averaged over the first two decades of the 21st century of about 0.1°C per decade, due mainly to the slow response of the oceans. About twice as much warming (0.2°C per decade) would be expected if emissions are within the range of the SRES scenarios.

For the B1 constant composition commitment run, the additional warming after 100 years is also about  $0.5^{\circ}\text{C}$ , and roughly the same for the A1B constant composition commitment (Supplementary Material, Figure S10.3). These new results quantify what was postulated in the TAR in that the warming commitment after stabilising concentrations is about  $0.5^{\circ}\text{C}$  for the first century, and considerably smaller after that, with most of the warming commitment occurring in the first several decades of the 22nd century.

Constant composition precipitation commitment for the multi-model ensemble average is about 1.1% by 2100 for the 20th-century constant composition commitment experiment, and for the B1 constant composition commitment experiment it is 0.8% by 2200 and 1.5% by 2300, while for the A1B constant composition commitment experiment it is 1.5% by 2200 and 2% by 2300.

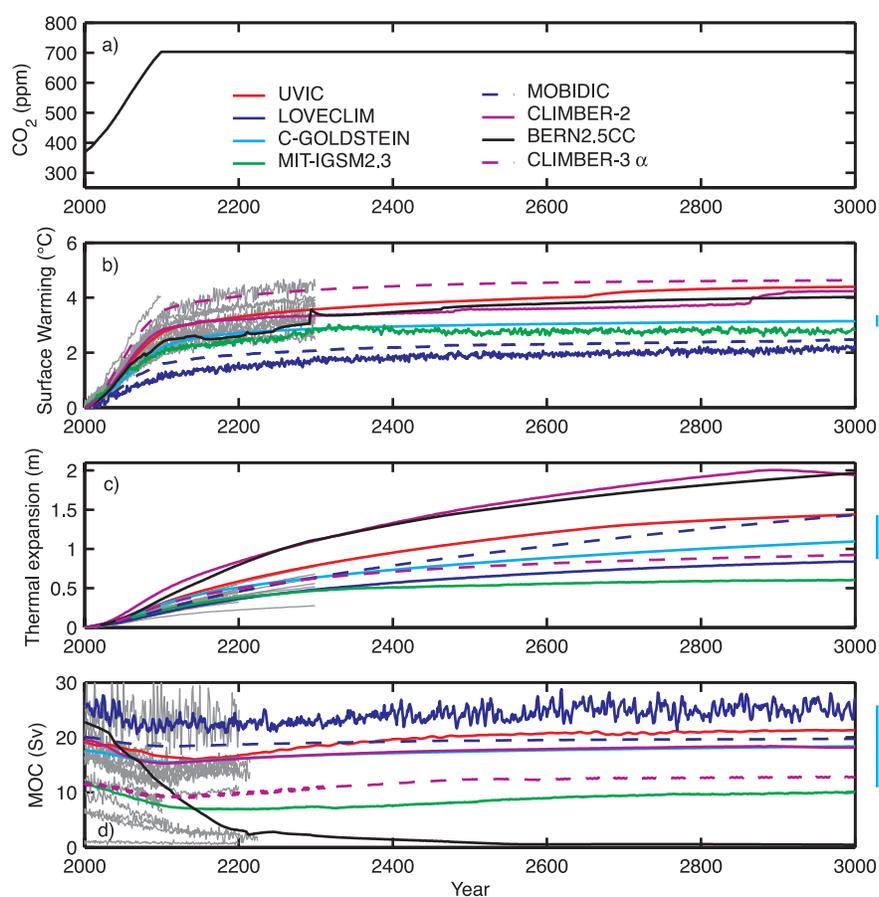
The patterns of change in temperature in the B1 and A1B experiments, relative to the pre-industrial period, do not change greatly after stabilisation (Table 10.5). Even the 20th-century stabilisation case warms with some similarity to the A1B pattern (Table 10.5). However, there is some contrast in the land and

ocean warming rates, as seen from Figure 10.6. Mid- and low-latitude land warms at rates closer to the global mean of that of A1B, while high-latitude ocean warming is larger.

### 10.7.2 Climate Change Commitment to Year 3000 and Beyond to Equilibrium

Earth System Models of Intermediate Complexity are used to extend the projections for a scenario that follows A1B to 2100 and then keeps atmospheric composition, and hence radiative forcing, constant to the year 3000 (see Figure 10.34). By 2100, the projected warming is between  $1.2^{\circ}\text{C}$  and  $4.1^{\circ}\text{C}$ , similar to the range projected by AOGCMs. A large constant composition temperature and sea level commitment is evident in the simulations and is slowly realised over coming centuries. By the year 3000, the warming range is  $1.9^{\circ}\text{C}$  to  $5.6^{\circ}\text{C}$ . While surface temperatures approach equilibrium relatively quickly, sea level continues to rise for many centuries.

Five of these EMICs include interactive representations of the marine and terrestrial carbon cycle and, therefore, can be used to assess carbon cycle-climate feedbacks and effects of



**Figure 10.34.** (a) Atmospheric  $\text{CO}_2$ , (b) global mean surface warming, (c) sea level rise from thermal expansion and (d) Atlantic meridional overturning circulation (MOC) calculated by eight EMICs for the SRES A1B scenario and stable radiative forcing after 2100, showing long-term commitment after stabilisation. Coloured lines are results from EMICs, grey lines indicate AOGCM results where available for comparison. Anomalies in (b) and (c) are given relative to the year 2000. Vertical bars indicate  $\pm 2$  standard deviation uncertainties due to ocean parameter perturbations in the C-GOLDSTEIN model. The MOC shuts down in the BERN2.5CC model, leading to an additional contribution to sea level rise. Individual EMICs (see Table 8.3 for model details) treat the effect from non- $\text{CO}_2$  greenhouse gases and the direct and indirect aerosol effects on radiative forcing differently. Despite similar atmospheric  $\text{CO}_2$  concentrations, radiative forcing among EMICs can thus differ within the uncertainty ranges currently available for present-day radiative forcing (see Chapter 2).

### Frequently Asked Question 10.3

## If Emissions of Greenhouse Gases are Reduced, How Quickly do Their Concentrations in the Atmosphere Decrease?

The adjustment of greenhouse gas concentrations in the atmosphere to reductions in emissions depends on the chemical and physical processes that remove each gas from the atmosphere. Concentrations of some greenhouse gases decrease almost immediately in response to emission reduction, while others can actually continue to increase for centuries even with reduced emissions.

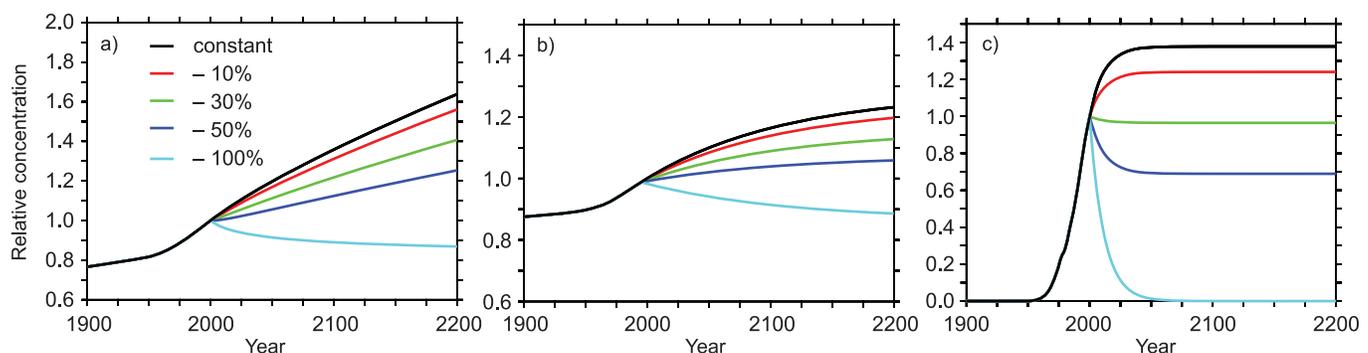
The concentration of a greenhouse gas in the atmosphere depends on the competition between the rates of emission of the gas into the atmosphere and the rates of processes that remove it from the atmosphere. For example, carbon dioxide (CO<sub>2</sub>) is exchanged between the atmosphere, the ocean and the land through processes such as atmosphere-ocean gas transfer and chemical (e.g., weathering) and biological (e.g., photosynthesis) processes. While more than half of the CO<sub>2</sub> emitted is currently removed from the atmosphere within a century, some fraction (about 20%) of emitted CO<sub>2</sub> remains in the atmosphere for many millennia. Because of slow removal processes, atmospheric CO<sub>2</sub> will continue to increase in the long term even if its emission is substantially reduced from present levels. Methane (CH<sub>4</sub>) is removed by chemical processes in the atmosphere, while nitrous oxide (N<sub>2</sub>O) and some halocarbons are destroyed in the upper atmosphere by solar radiation. These processes each operate at different time scales ranging from years to millennia. A measure for this is the lifetime of a gas in the atmosphere, defined as the time it takes for a perturbation to be reduced to 37% of its initial amount. While for CH<sub>4</sub>, N<sub>2</sub>O, and other trace gases such as hydrochlorofluorocarbon-22 (HCFC-22), a refrigerant fluid, such lifetimes can be reasonably determined (for CH<sub>4</sub> it is about 12 yr, for N<sub>2</sub>O about 110 yr and for HCFC-22 about 12 yr), a lifetime for CO<sub>2</sub> cannot be defined.

The change in concentration of any trace gas depends in part on how its emissions evolve over time. If emissions increase with time, the atmospheric concentration will also increase with time, regardless of the atmospheric lifetime of the gas. However, if actions are taken to reduce the emissions, the fate of the trace gas concentration will depend on the relative changes not only of emissions but also of its removal processes. Here we show how the lifetimes and removal processes of different gases dictate the evolution of concentrations when emissions are reduced.

As examples, FAQ 10.3, Figure 1 shows test cases illustrating how the future concentration of three trace gases would respond to illustrative changes in emissions (represented here as a response to an imposed pulse change in emission). We consider CO<sub>2</sub>, which has no specific lifetime, as well as a trace gas with a well-defined long lifetime on the order of a century (e.g., N<sub>2</sub>O), and a trace gas with a well-defined short lifetime on the order of decade (such as CH<sub>4</sub>, HCFC-22 or other halocarbons). For each gas, five illustrative cases of future emissions are presented: stabilisation of emissions at present-day levels, and immediate emission reduction by 10%, 30%, 50% and 100%.

The behaviour of CO<sub>2</sub> (Figure 1a) is completely different from the trace gases with well-defined lifetimes. Stabilisation of CO<sub>2</sub> emissions at current levels would result in a continuous increase of atmospheric CO<sub>2</sub> over the 21st century and beyond, whereas for a gas with a lifetime on the order of a century (Figure 1b) or a decade (Figure 1c), stabilisation of emissions at current levels would lead to a stabilisation of its concentration at a level higher than today within a couple of centuries, or decades, respectively. In fact, only in the case of essentially complete elimination of

(continued)



**FAQ 10.3, Figure 1.** (a) Simulated changes in atmospheric CO<sub>2</sub> concentration relative to the present-day for emissions stabilised at the current level (black), or at 10% (red), 30% (green), 50% (dark blue) and 100% (light blue) lower than the current level; (b) as in (a) for a trace gas with a lifetime of 120 years, driven by natural and anthropogenic fluxes; and (c) as in (a) for a trace gas with a lifetime of 12 years, driven by only anthropogenic fluxes.

emissions can the atmospheric concentration of CO<sub>2</sub> ultimately be stabilised at a constant level. All other cases of moderate CO<sub>2</sub> emission reductions show increasing concentrations because of the characteristic exchange processes associated with the cycling of carbon in the climate system.

More specifically, the rate of emission of CO<sub>2</sub> currently greatly exceeds its rate of removal, and the slow and incomplete removal implies that small to moderate reductions in its emissions would not result in stabilisation of CO<sub>2</sub> concentrations, but rather would only reduce the rate of its growth in coming decades. A 10% reduction in CO<sub>2</sub> emissions would be expected to reduce the growth rate by 10%, while a 30% reduction in emissions would similarly reduce the growth rate of atmospheric CO<sub>2</sub> concentrations by 30%. A 50% reduction would stabilise atmospheric CO<sub>2</sub>, but only for less than a decade. After that, atmospheric CO<sub>2</sub> would be expected to rise again as the land and ocean sinks decline owing to well-known chemical and biological adjustments. Complete elimination of CO<sub>2</sub> emissions is estimated to lead to a slow decrease in atmospheric CO<sub>2</sub> of about 40 ppm over the 21st century.

carbon emission reductions on atmospheric CO<sub>2</sub> and climate. Although carbon cycle processes in these models are simplified, global-scale quantities are in good agreement with more complex models (Doney et al., 2004).

Results for one carbon emission scenario are shown in Figure 10.35, where anthropogenic emissions follow a path towards stabilisation of atmospheric CO<sub>2</sub> at 750 ppm but at year 2100 are reduced to zero. This permits the determination of the zero emission climate change commitment. The prescribed emissions were calculated from the SP750 profile (Knutti et al., 2005) using the BERN-CC model (Joos et al., 2001). Although unrealistic, such a scenario permits the calculation of zero emission commitment, i.e., climate change due to 21st-century emissions. Even though emissions are instantly reduced to zero at year 2100, it takes about 100 to 400 years in the different models for the atmospheric CO<sub>2</sub> concentration to drop from the maximum (ranges between 650 to 700 ppm) to below the level of doubled pre-industrial CO<sub>2</sub> (~560 ppm) owing to a continuous transfer of carbon from the atmosphere into the terrestrial and oceanic reservoirs. Emissions during the 21st century continue to have an impact even at year 3000 when both surface temperature and sea level rise due to thermal expansion are still substantially higher than pre-industrial. Also shown are atmospheric CO<sub>2</sub> concentrations and ocean/terrestrial carbon inventories at year 3000 versus total emitted carbon for similar emission pathways targeting (but not actually reaching) 450, 550, 750 and 1,000 ppm atmospheric CO<sub>2</sub> and with carbon emissions reduced to zero at year 2100. Atmospheric CO<sub>2</sub> at year 3000 is approximately linearly related to the total amount of carbon emitted in each model, but with a substantial spread among the models in both slope and absolute values, because the redistribution of carbon between the different reservoirs is

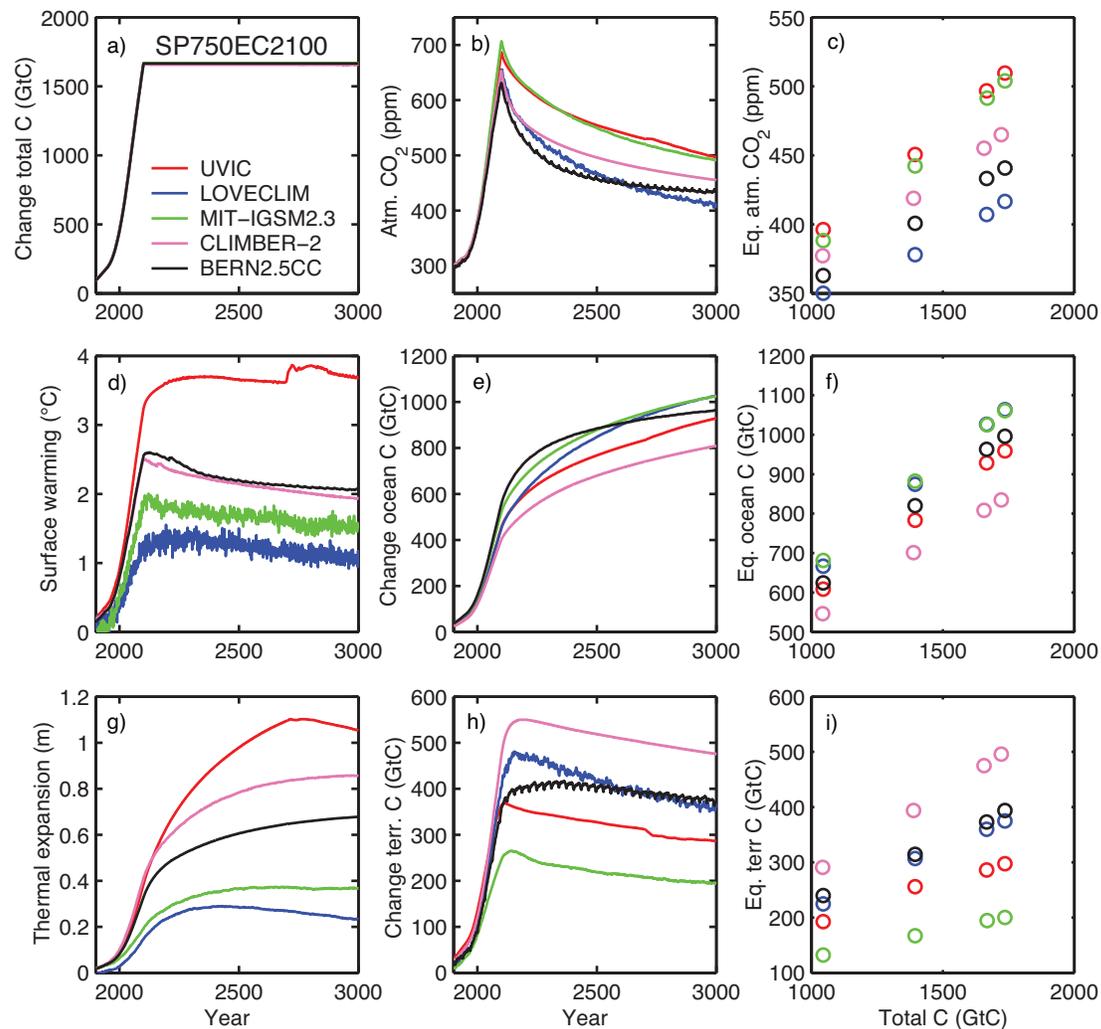
The situation is completely different for the trace gases with a well-defined lifetime. For the illustrative trace gas with a lifetime of the order of a century (e.g., N<sub>2</sub>O), emission reduction of more than 50% is required to stabilise the concentrations close to present-day values (Figure 1b). Constant emission leads to a stabilisation of the concentration within a few centuries.

In the case of the illustrative gas with the short lifetime, the present-day loss is around 70% of the emissions. A reduction in emissions of less than 30% would still produce a short-term increase in concentration in this case, but, in contrast to CO<sub>2</sub>, would lead to stabilisation of its concentration within a couple of decades (Figure 1c). The decrease in the level at which the concentration of such a gas would stabilise is directly proportional to the emission reduction. Thus, in this illustrative example, a reduction in emissions of this trace gas larger than 30% would be required to stabilise concentrations at levels significantly below those at present. A complete cut-off of the emissions would lead to a return to pre-industrial concentrations within less than a century for a trace gas with a lifetime of the order of a decade.

model dependent. In summary, the model results show that 21st-century emissions represent a minimum commitment of climate change for several centuries, irrespective of later emissions. A reduction of this ‘minimum’ commitment is possible only if, in addition to avoiding CO<sub>2</sub> emissions after 2100, CO<sub>2</sub> were actively removed from the atmosphere.

Using a similar approach, Friedlingstein and Solomon (2005) show that even if emissions were immediately cut to zero, the system would continue to warm for several more decades before starting to cool. It is important also to note that ocean heat content and changes in the cryosphere evolve on time scales extending over centuries.

On very long time scales (order several thousand years as estimated by AOGCM experiments, Bi et al., 2001; Stouffer, 2004), equilibrium climate sensitivity is a useful concept to characterise the ultimate response of climate models to different future levels of greenhouse gas radiative forcing. This concept can be applied to climate models irrespective of their complexity. Based on a global energy balance argument, equilibrium climate sensitivity  $S$  and global mean surface temperature increase  $\Delta T$  at equilibrium relative to pre-industrial for an equivalent stable CO<sub>2</sub> concentration are linearly related according to  $\Delta T = S \times \log(\text{CO}_2 / 280 \text{ ppm}) / \log(2)$ , which follows from the definition of climate sensitivity and simplified expressions for the radiative forcing of CO<sub>2</sub> (Section 6.3.5 of the TAR). Because the combination of various lines of modelling results and expert judgement yields a quantified range of climate sensitivity  $S$  (see Box 10.2), this can be carried over to equilibrium temperature increase. Most likely values, and the likely range, as well as a very likely lower bound for the warming, all consistent with the quantified range of  $S$ , are given in Table 10.8.



**Figure 10.35.** Changes in carbon inventories and climate response relative to the pre-industrial period simulated by five different intermediate complexity models (see Table 8.3 for model descriptions) for a scenario where emissions follow a pathway leading to stabilisation of atmospheric CO<sub>2</sub> at 750 ppm, but before reaching this target, emissions are reduced to zero instantly at year 2100. (a) Change in total carbon, (b) atmospheric CO<sub>2</sub>, (d) change in surface temperature, (e) change in ocean carbon, (g) sea level rise from thermal expansion and (h) change in terrestrial carbon. Right column: (c) atmospheric CO<sub>2</sub> and the change in (f) oceanic and (i) terrestrial carbon inventories at year 3000 relative to the pre-industrial period for several emission scenarios of similar shape but with different total carbon emissions.

**Table 10.8.** Best guess (i.e. most likely), likely and very likely bounds/ranges of global mean equilibrium surface temperature increase  $\Delta T(^{\circ}\text{C})$  above pre-industrial temperatures for different levels of CO<sub>2</sub> equivalent concentrations (ppm), based on the assessment of climate sensitivity given in Box 10.2.

Equivalent CO <sub>2</sub>	Best Guess	Very Likely Above	Likely in the Range
350	1.0	0.5	0.6–1.4
450	2.1	1.0	1.4–3.1
550	2.9	1.5	1.9–4.4
650	3.6	1.8	2.4–5.5
750	4.3	2.1	2.8–6.4
1,000	5.5	2.8	3.7–8.3
1,200	6.3	3.1	4.2–9.4

It is emphasized that this table does not contain more information than the best knowledge of  $S$  and that the numbers are not the result of any climate model simulation. Rather it is assumed that the above relationship between temperature increase and CO<sub>2</sub> holds true for the entire range of equivalent CO<sub>2</sub> concentrations. There are limitations to the concept of radiative forcing and climate sensitivity (Senior and Mitchell, 2000; Joshi et al., 2003; Shine et al., 2003; Hansen et al., 2005b). Only a few AOGCMs have been run to equilibrium under elevated CO<sub>2</sub> concentrations, and some results show that nonlinearities in the feedbacks (e.g., clouds, sea ice and snow cover) may cause a time dependence of the effective climate sensitivity and substantial deviations from the linear relation assumed above (Manabe and Stouffer, 1994; Senior and Mitchell, 2000; Voss and Mikolajewicz, 2001; Gregory et al., 2004b), with effective climate sensitivity tending to grow with time in some of the AR4 AOGCMs. Some studies suggest

that climate sensitivities larger than the likely estimate given below (which would suggest greater warming) cannot be ruled out (see Box 10.2 on climate sensitivity).

Another way to address eventual equilibrium temperature for different CO<sub>2</sub> concentrations is to use the projections from the AOGCMs in Figure 10.4, and an idealised 1% yr<sup>-1</sup> CO<sub>2</sub> increase to 4 × CO<sub>2</sub>. The equivalent CO<sub>2</sub> concentrations in the AOGCMs can be estimated from the forcings given in Table 6.14 in the TAR. The actual CO<sub>2</sub> concentrations for A1B and B1 are roughly 715 ppm and 550 ppm (depending on which model is used to convert emissions to concentrations), and equivalent CO<sub>2</sub> concentrations are estimated to be about 835 ppm and 590 ppm, respectively. Using the equation above for an equilibrium climate sensitivity of 3.0°C, eventual equilibrium warming in these experiments would be 4.8°C and 3.3°C, respectively. The multi-model average warming in the AOGCMs at the end of the 21st century (relative to pre-industrial temperature) is 3.1°C and 2.3°C, or about 65 to 70% of the eventual estimated equilibrium warming. Given rates of CO<sub>2</sub> increase of between 0.5 and 1.0% yr<sup>-1</sup> in these two scenarios, this can be compared to the calculated fraction of eventual warming of around 50% in AOGCM experiments with those CO<sub>2</sub> increase rates (Stouffer and Manabe, 1999). The Stouffer and Manabe (1999) model has somewhat higher equilibrium climate sensitivity, and was actually run to equilibrium in a 4-kyr integration to enable comparison of transient and equilibrium warming. Therefore, the AOGCM results combined with the estimated equilibrium warming seem roughly consistent with earlier AOGCM experiments of transient warming rates. Additionally, similar numbers for the 4 × CO<sub>2</sub> stabilisation experiments performed with the AOGCMs can be computed. In that case, the actual and equivalent CO<sub>2</sub> concentrations are the same, since there are no other radiatively active species changing in the models, and the multi-model CO<sub>2</sub> concentration at quadrupling would produce an eventual equilibrium warming of 6°C, where the multi-model average warming at the time of quadrupling is about 4.0°C or 66% of eventual equilibrium. This is consistent with the numbers for the A1B and B1 scenario integrations with the AOGCMs.

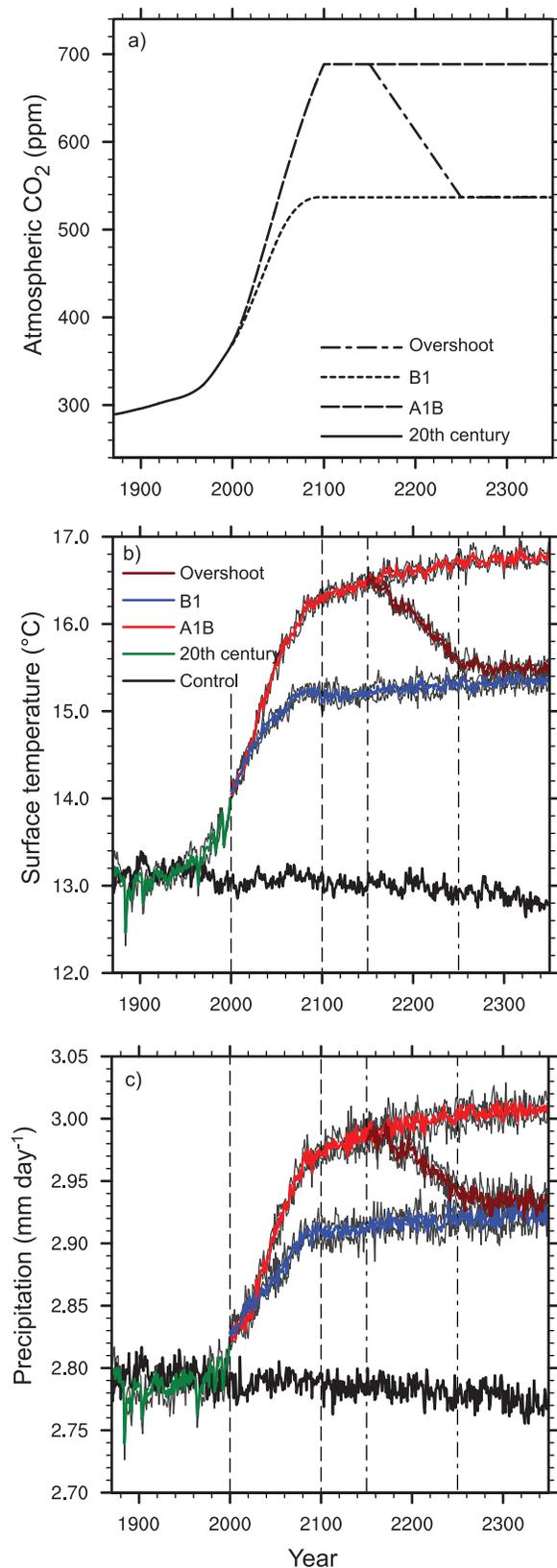
It can be estimated how much closer to equilibrium the climate system is 100 years after stabilisation in these AOGCM experiments. After 100 years of stabilised concentrations, the warming relative to pre-industrial temperature is 3.8°C in A1B and 2.6°C in B1, or about 80% of the estimated equilibrium warming. For the stabilised 4 × CO<sub>2</sub> experiment, after 100 years of stabilised CO<sub>2</sub> concentrations the warming is 4.7°C, or 78% of the estimated equilibrium warming. Therefore, about an additional 10 to 15% of the eventual equilibrium warming is achieved after 100 years of stabilised concentrations (Stouffer, 2004). This emphasizes that the approach to equilibrium takes a long time, and even after 100 years of stabilised atmospheric concentrations, only about 80% of the eventual equilibrium warming is realised.

### 10.7.3 Long-Term Integrations: Idealised Overshoot Experiments

The concept of mitigation related to overshoot scenarios has implications for IPCC Working Groups II and III and was addressed in the Second Assessment Report. A new suite of mitigation scenarios is currently being assessed for the AR4. Working Group I does not have the expertise to assess such scenarios, so this section assesses the processes and response of the physical climate system in a very idealised overshoot experiment. Plausible new mitigation and overshoot scenarios will be run subsequently by modelling groups and assessed in the next IPCC report.

An idealised overshoot scenario has been run in an AOGCM where the CO<sub>2</sub> concentration decreases from the A1B stabilised level to the B1 stabilised level between 2150 and 2250, followed by 200 years of integration with that constant B1 level (Figure 10.36a). This reduction in CO<sub>2</sub> concentration would require large reductions in emissions, but such an idealised experiment illustrates the processes involved in how the climate system would respond to such a large change in emissions and concentrations. Yoshida et al. (2005) and Tsutsui et al. (2007) show that there is a relatively fast response in the surface and upper ocean, which start to recover to temperatures at the B1 level after several decades, but a much more sluggish response with more commitment in the deep ocean. As shown in Figure 10.36b and c, the overshoot scenario temperatures only slowly decrease to approach the lower temperatures of the B1 experiment, and continue a slow convergence that has still not cooled to the B1 level at the year 2350, or 100 years after the CO<sub>2</sub> concentration in the overshoot experiment was reduced to equal the concentration in the B1 experiment. However, Dai et al. (2001a) show that reducing emissions to achieve a stabilised CO<sub>2</sub> concentration in the 21st century reduces warming moderately (less than 0.5°C) by the end of the 21st century in comparison to a business-as-usual scenario, but the warming reduction is about 1.5°C by the end of the 22nd century in that experiment. Other climate system responses include the North Atlantic MOC and sea ice volume that almost recover to the B1 level in the overshoot scenario experiment, except for a significant hysteresis effect that is shown in the sea level change due to thermal expansion (Yoshida et al., 2005; Nakashiki et al., 2006).

Such stabilisation and overshoot scenarios have implications for risk assessment as suggested by Yoshida et al. (2005) and others. For example, in a probabilistic study using an SCM and multi-gas scenarios, Meinshausen (2006) estimated that the probability of exceeding a 2°C warming is between 68 and 99% for a stabilisation of equivalent CO<sub>2</sub> at 550 ppm. They also considered scenarios with peaking CO<sub>2</sub> and subsequent stabilisation at lower levels as an alternative pathway and found that if the risk of exceeding a warming of 2°C is not to be greater than 30%, it is necessary to peak equivalent CO<sub>2</sub> concentrations around 475 ppm before returning to lower concentrations of about 400 ppm. These overshoot and targeted climate change estimations take into account the climate change commitment



**Figure 10.36.** (a) Atmospheric CO<sub>2</sub> concentrations for several experiments simulated with an AOGCM; (b) globally averaged surface air temperatures for the overshoot scenario and the A1B and B1 experiments; (c) same as in (b) but for globally averaged precipitation rate. Modified from Yoshida et al. (2005).

in the system that must be overcome on the time scale of any overshoot or emissions target calculation. The probabilistic studies also show that when certain thresholds of climate change are to be avoided, emission pathways depend on the certainty requested of not exceeding the threshold.

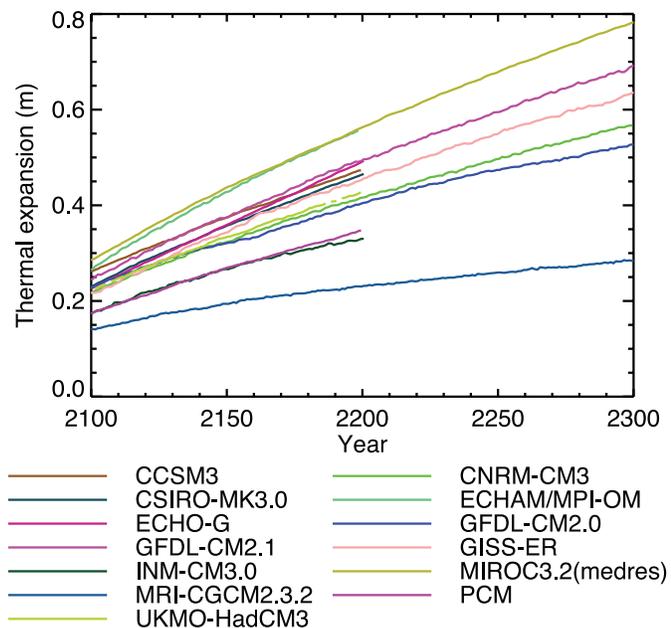
Earth System Models of Intermediate Complexity have been used to calculate the long-term climate response to stabilisation of atmospheric CO<sub>2</sub>, although EMICs have not been adjusted to take into account the full range of AOGCM sensitivities. The newly developed stabilisation profiles were constructed following Enting et al. (1994) and Wigley et al. (1996) using the most recent atmospheric CO<sub>2</sub> observations, CO<sub>2</sub> projections with the BERN-CC model (Joos et al., 2001) for the A1T scenario over the next few decades, and a ratio of two polynomials (Enting et al., 1994) leading to stabilisation at levels of 450, 550, 650, 750 and 1,000 ppm atmospheric CO<sub>2</sub> equivalent. Other forcings are not considered. Supplementary Material, Figure S10.4a shows the equilibrium surface warming for seven different EMICs and six stabilisation levels. Model differences arise mainly from the models having different climate sensitivities.

Knutti et al. (2005) explore this further with an EMIC using several published PDFs of climate sensitivity and different ocean heat uptake parametrizations and calculate probabilities of not overshooting a certain temperature threshold given an equivalent CO<sub>2</sub> stabilisation level (Supplementary Material, Figure S10.4b). This plot illustrates, for example, that for low values of stabilised CO<sub>2</sub>, the range of response of possible warming is smaller than for high values of stabilised CO<sub>2</sub>. This is because with greater CO<sub>2</sub> forcing, there is a greater spread of outcomes as illustrated in Figure 10.26. Figure S10.4b also shows that for any given temperature threshold, the smaller the desired probability of exceeding the target is, the lower the stabilisation level that must be chosen. Stabilisation of atmospheric greenhouse gases below about 400 ppm CO<sub>2</sub> equivalent is required to keep the global temperature increase likely less than 2°C above pre-industrial temperature (Knutti et al., 2005).

## 10.7.4 Commitment to Sea Level Rise

### 10.7.4.1 Thermal Expansion

The sea level rise commitment due to thermal expansion has much longer time scales than the surface warming commitment, owing to the slow processes that mix heat into the deep ocean (Church et al., 2001). If atmospheric composition were stabilised at A1B levels in 2100, thermal expansion in the 22nd century would be similar to in the 21st (see, e.g., Section 10.6.1; Meehl et al., 2005c), reaching 0.3 to 0.8 m by 2300 (Figure 10.37). The ranges of thermal expansion overlap substantially for stabilisation at different levels, since model uncertainty is dominant; A1B is given here because results are available from more models for this scenario than for other scenarios. Thermal expansion would continue over many centuries at a gradually decreasing rate (Figure 10.34). There is a wide spread among



**Figure 10.37.** Globally averaged sea level rise from thermal expansion relative to the period 1980 to 1999 for the A1B commitment experiment calculated from AOGCMs. See Table 8.1 for model details.

the models for the thermal expansion commitment at constant composition due partly to climate sensitivity, and partly to differences in the parametrization of vertical mixing affecting ocean heat uptake (e.g., Weaver and Wiebe, 1999). If there is deep-water formation in the final steady state as in the present day, the ocean will eventually warm up fairly uniformly by the amount of the global average surface temperature change (Stouffer and Manabe, 2003), which would result in about 0.5 m of thermal expansion per degree celsius of warming, calculated from observed climatology; the EMICs in Figure 10.34 indicate 0.2 to 0.6 m °C<sup>-1</sup> for their final steady state (year 3000) relative to 2000. If deep-water formation is weakened or suppressed, the deep ocean will warm up more (Knutti and Stocker, 2000). For instance, in the 3 × CO<sub>2</sub> experiment of Bi et al. (2001) with the CSIRO AOGCM, both North Atlantic Deep Water and Antarctic Bottom Water formation cease, and the steady-state thermal expansion is 4.5 m. Although these commitments to sea level rise are large compared with 21st-century changes, the eventual contributions from the ice sheets could be larger still.

#### 10.7.4.2 Glaciers and Ice Caps

Steady-state projections for G&IC require a model that evolves their area-altitude distribution (see, e.g., Section 10.6.3.3). Little information is available on this. A comparative study including seven GCM simulations at 2 × CO<sub>2</sub> conditions inferred that many glaciers may disappear completely due to an increase of the equilibrium line altitude (Bradley et al., 2004), but even in a warmer climate, some glacier volume may persist at high altitude. With a geographically uniform warming relative to 1900 of 4°C maintained after 2100, about 60% of G&IC volume would vanish by 2200 and practically all by 3000

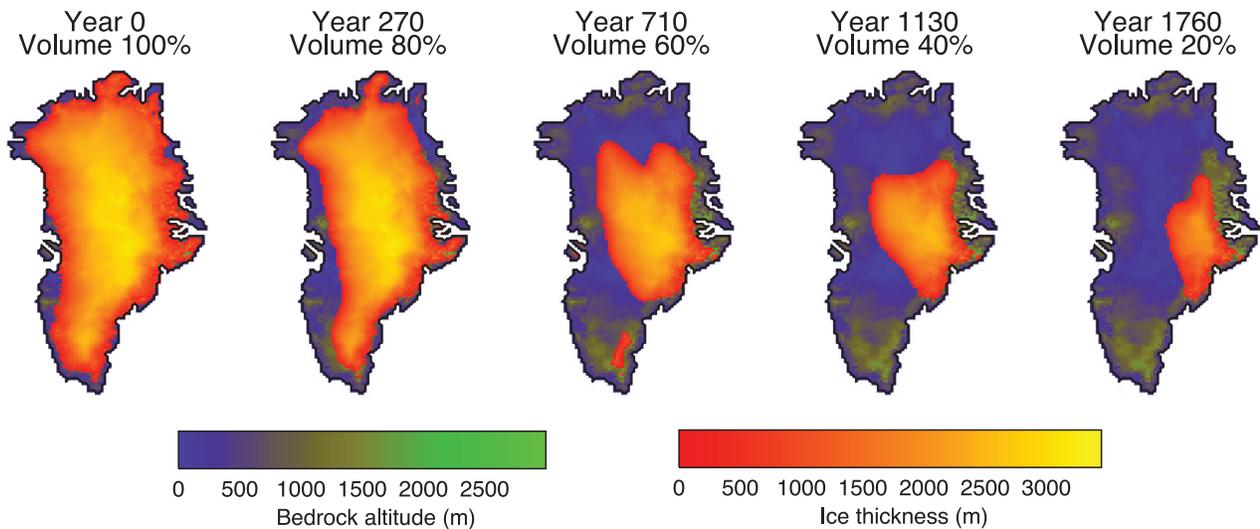
(Raper and Braithwaite, 2006). Nonetheless, this commitment to sea level rise is relatively small (<1 m; Table 4.4) compared with those from thermal expansion and ice sheets.

#### 10.7.4.3 Greenland Ice Sheet

The present SMB of Greenland is a net accumulation estimated as 0.6 mm yr<sup>-1</sup> of sea level equivalent from a compilation of studies (Church et al., 2001) and 0.47 mm yr<sup>-1</sup> for 1988 to 2004 (Box et al., 2006). In a steady state, the net accumulation would be balanced by calving of icebergs. General Circulation Models suggest that ablation increases more rapidly than accumulation with temperature (van de Wal et al., 2001; Gregory and Huybrechts, 2006), so warming will tend to reduce the SMB, as has been observed in recent years (see Section 4.6.3), and is projected for the 21st century (Section 10.6.4.1). Sufficient warming will reduce the SMB to zero. This gives a threshold for the long-term viability of the ice sheet because negative SMB means that the ice sheet must contract even if ice discharge has ceased owing to retreat from the coast. If a warmer climate is maintained, the ice sheet will eventually be eliminated, except perhaps for remnant glaciers in the mountains, raising sea level by about 7 m (see Table 4.1). Huybrechts et al. (1991) evaluated the threshold as 2.7°C of seasonally and geographically uniform warming over Greenland relative to a steady state (i.e. pre-industrial temperature). Gregory et al. (2004a) examine the probability of this threshold being reached under various CO<sub>2</sub> stabilisation scenarios for 450 to 1000 ppm using TAR projections, and find that it was exceeded in 34 out of 35 combinations of AOGCM and CO<sub>2</sub> concentration considering seasonally uniform warming, and 24 out of 35 considering summer warming and using an upper bound on the threshold.

Assuming the warming to be uniform underestimates the threshold, because warming is projected by GCMs to be weaker in the ablation area and in summer, when ablation occurs. Using geographical and seasonal patterns of simulated temperature change derived from a combination of four high-resolution AGCM simulations and 18 AR4 AOGCMs raises the threshold to 3.2°C to 6.2°C in annual- and area-average warming in Greenland, and 1.9°C to 4.6°C in the global average (Gregory and Huybrechts, 2006), relative to pre-industrial temperatures. This is likely to be reached by 2100 under the SRES A1B scenario, for instance (Figure 10.29). These results are supported by evidence from the last interglacial, when the temperature in Greenland was 3°C to 5°C warmer than today and the ice sheet survived, but may have been smaller by 2 to 4 m in sea level equivalent (including contributions from arctic ice caps, see Section 6.4.3). However, a lower threshold of 1°C (Hansen, 2005) in global warming above present-day temperatures has also been suggested, on the basis that global mean (rather than Greenland) temperatures during previous interglacials exceeded today's temperatures by no more than that.

For stabilisation in 2100 with SRES A1B atmospheric composition, Greenland would initially contribute 0.3 to



**Figure 10.38.** Evolution of Greenland surface elevation and ice sheet volume versus time in the experiment of Ridley et al. (2005) with the UKMO-HadCM3 AOGCM coupled to the Greenland Ice Sheet model of Huybrechts and De Wolde (1999) under a climate of constant quadrupled pre-industrial atmospheric  $\text{CO}_2$ .

$2.1 \text{ mm yr}^{-1}$  to sea level (Table 10.7). The greater the warming, the faster the loss of mass. Ablation would be further enhanced by the lowering of the surface, which is not included in the calculations in Table 10.7. To include this and other climate feedbacks in calculating long-term rates of sea level rise requires coupling an ice sheet model to a climate model. Ridley et al. (2005) couple the Greenland Ice Sheet model of Huybrechts and De Wolde (1999) to the UKMO-HadCM3 AOGCM. Under constant  $4 \times \text{CO}_2$ , the sea level contribution is  $5.5 \text{ mm yr}^{-1}$  over the first 300 years and declines as the ice sheet contracts; after 1 kyr only about 40% of the original volume remains and after 3 kyr only 4% (Figure 10.38). The rate of deglaciation would increase if ice flow accelerated, as in recent years (Section 4.6.3.3). Basal lubrication due to surface melt water might cause such an effect (see Section 10.6.4.2). The best estimate of Parizek and Alley (2004) is that this could add an extra 0.15 to 0.40 m to sea level by 2500, compared with 0.4 to 3.2 m calculated by Huybrechts and De Wolde (1999) without this effect. The processes whereby melt water might penetrate through subfreezing ice to the bed are unclear and only conceptual models exist at present (Alley et al., 2005b).

Under pre-industrial or present-day atmospheric  $\text{CO}_2$  concentrations, the climate of Greenland would be much warmer without the ice sheet, because of lower surface altitude and albedo, so it is possible that Greenland deglaciation and the resulting sea level rise would be irreversible. Toniazzo et al. (2004) find that snow does not accumulate anywhere on an ice-free Greenland with pre-industrial atmospheric  $\text{CO}_2$ , whereas Lunt et al. (2004) obtain a substantial regenerated ice sheet in east and central Greenland using a higher-resolution model.

#### 10.7.4.4 Antarctic Ice Sheet

With rising global temperature, GCMs indicate increasingly positive SMB for the Antarctic Ice Sheet as a whole because

of greater accumulation (Section 10.6.4.1). For stabilisation in 2100 with SRES A1B atmospheric composition, antarctic SMB would contribute 0.4 to  $2.0 \text{ mm yr}^{-1}$  of sea level fall (Table 10.7). Continental ice sheet models indicate that this would be offset by tens of percent by increased ice discharge (Section 10.6.4.2), but still give a negative contribution to sea level, of  $-0.8 \text{ m}$  by 3000 in one simulation with antarctic warming of about  $4.5^\circ\text{C}$  (Huybrechts and De Wolde, 1999).

However, discharge could increase substantially if buttressing due to the major West Antarctic ice shelves were reduced (see Sections 4.6.3.3 and 10.6.4.2), and could outweigh the accumulation increase, leading to a net positive antarctic sea level contribution in the long term. If the Amundsen Sea sector were eventually deglaciated, it would add about 1.5 m to sea level, while the entire West Antarctic Ice Sheet (WAIS) would account for about 5 m (Vaughan, 2007). Contributions could also come in this manner from the limited marine-based portions of East Antarctica that discharge into large ice shelves.

Weakening or collapse of the ice shelves could be caused either by surface melting or by thinning due to basal melting. In equilibrium experiments with mixed-layer ocean models, the ratio of antarctic to global annual warming is  $1.4 \pm 0.3$ . Following reasoning in Section 10.6.4.2 and Appendix 10.A, it appears that mean summer temperatures over the major West Antarctic ice shelves are about as likely as not to pass the melting point if global warming exceeds  $5^\circ\text{C}$ , and disintegration might be initiated earlier by surface melting. Observational and modelling studies indicate that basal melt rates depend on water temperature near to the base, with a constant of proportionality of about  $10 \text{ m yr}^{-1} \text{ }^\circ\text{C}^{-1}$  indicated for the Amundsen Sea ice shelves (Rignot and Jacobs, 2002; Shepherd et al., 2004) and 0.5 to  $10 \text{ m yr}^{-1} \text{ }^\circ\text{C}^{-1}$  for the Amery ice shelf (Williams et al., 2002). If this order of magnitude applies to future changes, a warming of about  $1^\circ\text{C}$  under the major ice shelves would eliminate them within centuries. We are not able to relate this

quantitatively to global warming with any confidence, because the issue has so far received little attention, and current models may be inadequate to treat it because of limited resolution and poorly understood processes. Nonetheless, it is reasonable to suppose that sustained global warming would eventually lead to warming in the seawater circulating beneath the ice shelves.

Because the available models do not include all relevant processes, there is much uncertainty and no consensus about what dynamical changes could occur in the Antarctic Ice Sheet (see, e.g., Vaughan and Spouge, 2002; Alley et al., 2005a). One line of argument is to consider an analogy with palaeoclimate (see Box 4.1). Palaeoclimatic evidence that sea level was 4 to 6 m above present during the last interglacial may not all be explained by reduction in the Greenland Ice Sheet, implying a contribution from the Antarctic Ice Sheet (see Section 6.4.3). On this basis, using the limited available evidence, sustained global warming of 2°C (Oppenheimer and Alley, 2005) above present-day temperatures has been suggested as a threshold beyond which there will be a commitment to a large sea level contribution from the WAIS. The maximum rates of sea level rise during previous glacial terminations were of the order of 10 mm yr<sup>-1</sup> (Church et al., 2001). We can be confident that future accelerated discharge from WAIS will not exceed this size, which is roughly an order of magnitude increase in present-day WAIS discharge, since no observed recent acceleration has exceeded a factor of ten.

Another line of argument is that there is insufficient evidence that rates of dynamical discharge of this magnitude could be sustained over long periods. The WAIS is 20 times smaller than the LGM NH ice sheets that contributed most of the melt water during the last deglaciation at rates that can be explained by surface melting alone (Zweck and Huybrechts, 2005). In the study of Huybrechts and De Wolde (1999), the largest simulated rate of sea level rise from the Antarctic Ice Sheet over the next 1 kyr is 2.5 mm yr<sup>-1</sup>. This is dominated by dynamical discharge associated with grounding line retreat. The model did not simulate ice streams, for which widespread acceleration would give larger rates. However, the maximum loss of ice possible from rapid discharge of existing ice streams is the volume in excess of flotation in the regions occupied by these ice streams (defined as regions of flow exceeding 100 m yr<sup>-1</sup>; see Section 10.6.4.2). This volume (in both West and East Antarctica) is 230,000 km<sup>3</sup>, equivalent to about 0.6 m of sea level, or about 1% of the mass of the Antarctic Ice Sheet, most of which does not flow in ice streams. Loss of ice affecting larger portions of the ice sheet could be sustained at rapid rates only if new ice streams developed in currently slow-moving ice. The possible extent and rate of such changes cannot presently be estimated, since there is only very limited understanding of controls on the development and variability of ice streams. In this argument, rapid discharge may be transient and the long-term sign of the antarctic contribution to sea level depends on whether increased accumulation is more important than large-scale retreat of the grounding line.

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## Appendix 10.A: Methods for Sea Level Projections for the 21st Century

### 10.A.1 Scaling MAGICC Results

The MAGICC SCM was tuned to emulate global average surface air temperature change and radiative flux at the top of the atmosphere (assumed equal to ocean heat uptake on decadal time scales; Section 5.2.2.3 and Figure 5.4) simulated by each of 19 AOGCMs in scenarios with CO<sub>2</sub> increasing at 1% yr<sup>-1</sup> (Section 10.5.3). Under SRES scenarios for which AOGCMs have been run (B1, A1B and A2), the ensemble average of the tuned versions of MAGICC gives about 10% greater temperature rise and 25% more thermal expansion over the 21st century (2090 to 2099 minus 1980 to 1999) than the average of the corresponding AOGCMs. The MAGICC radiative forcing is close to that of the AOGCMs (as estimated for A1B by Forster and Taylor, 2006), so the mismatch suggests there may be structural limitations on the accurate emulation of AOGCMs by the SCM. We therefore do not use the tuned SCM results directly to make projections, unlike in the TAR. The TAR model means for thermal expansion were 0.06–0.10 m larger than the central estimates in Table 10.7, probably because the simple climate model used in the TAR overestimated the TAR AOGCM results.

The SCM may nonetheless be used to estimate results for scenarios that have not been run in AOGCMs, by calculating time-dependent ratios between pairs of scenarios (Section 10.5.4.6). This procedure is supported by the close match between the ratios derived from the AOGCM and MAGICC ensemble averages under the scenarios for which AOGCMs are available. Applying the MAGICC ratios to the A1B AOGCM results yields estimates of temperature rise and thermal expansion for B1 and A2 differing by less than 5% from the AOGCM ensemble averages. We have high confidence that the procedure will yield similarly accurate estimates for the results that the AOGCMs would give under scenarios B2, A1T and A1FI.

The spread of MAGICC models is much narrower than the AOGCM ensemble because the AOGCMs have internally generated climate variability and a wider range of forcings. We assume inter-model standard deviations of 20% of the model average for temperature rise and 25% for thermal expansion, since these proportions are found to be fairly time and scenario independent in the AOGCM ensemble.

### 10.A.2 Mass Balance Sensitivity of Glaciers and Ice Caps

A linear relationship  $r_g = b_g \times (T - T_0)$  is found for the period 1961 to 2003 between the observational time series of the contribution  $r_g$  to the rate of sea level rise from the world's glaciers and ice caps (G&IC, excluding those on Antarctica and Greenland; Section 4.5.2, Figure 4.14) and global average

surface air temperature  $T$  (Hadley Centre/Climatic Research Unit gridded surface temperature dataset HadCRUT3; Section 3.2.2.4, Figure 3.6), where  $b_g$  is the global total G&IC mass balance sensitivity and  $T_0$  is the global average temperature of the climate in which G&IC are in a steady state,  $T$  and  $T_0$  being expressed relative to the average of 1865 to 1894. The correlation coefficient is 0.88. Weighted least-squares regression gives a slope  $b_g = 0.84 \pm 0.15$  (one standard deviation) mm yr<sup>-1</sup> °C<sup>-1</sup>, with  $T_0 = -0.13$ °C. Surface mass balance models driven with climate change scenarios from AOGCMs (Section 10.6.3.1) also indicate such a linear relationship, but the model results give a somewhat lower  $b_g$  of around 0.5 to 0.6 mm yr<sup>-1</sup> °C<sup>-1</sup> (Section 10.6.3.1). To cover both observations and models, we adopt a value of  $b_g = 0.8 \pm 0.2$  (one standard deviation) mm yr<sup>-1</sup> °C<sup>-1</sup>. This uncertainty of  $\pm 25\%$  is smaller than that of  $\pm 40\%$  used in the TAR because of the improved observational constraint now available. To make projections, we choose a set of values of  $b_g$  randomly from a normal distribution. We use  $T_0 = T - r_g/b_g$ , where  $T = 0.40$  °C and  $r_g = 0.45$  mm yr<sup>-1</sup>, are the averages over the period 1961 to 2003. This choice of  $T_0$  minimises the root mean square difference of the predicted  $r_g$  from the observed, and gives  $T_0$  in the range  $-0.5$ °C to  $0.0$ °C (5 to 95%). Note that a constant  $b_g$  is not expected to be a good approximation if glacier area changes substantially (see Section 10.A.3).

### 10.A.3 Area Scaling of Glaciers and Ice Caps

Model results using area-volume scaling of G&IC (Section 10.6.3.2) are approximately described by the relations  $b_g / b_1 = (A_g / A_1)^{1.96}$  and  $A_g / A_1 = (V_g / V_1)^{0.84}$ , where  $A_g$  and  $V_g$  are the global G&IC area and volume (excluding those on Greenland and Antarctica) and variable  $X_i$  is the initial value of  $X_g$ . The first relation describes how total SMB sensitivity declines as the most sensitive areas are ablated most rapidly. The second relation follows Wigley and Raper (2005) in its form, and describes how area declines as volume is lost, with  $dV_g / dt = -r_g$  (expressing  $V$  as sea level equivalent, i.e., the liquid-water-equivalent volume of ice divided by the surface area of the world ocean). Projections are made starting from 1990 using  $T$  from Section 10.A.1 with initial values of the present-day  $b_g$  from Section 10.A.2 and the three recent estimates  $V_g = 0.15, 0.24$  and  $0.37$  m from Table 4.4, which are assumed equally likely. We use  $T = 0.48$ °C at 1990 relative to 1865 to 1894, and choose  $T_0$  as in Section 10.A.2. An uncertainty of 10% (one standard deviation) is assumed because of the scaling relations. The results are multiplied by 1.2 (Section 10.6.3.3) to include contributions from G&IC on Greenland and Antarctica (apart from the ice sheets). These scaling relations are expected to give a decreasingly adequate approximation as greater area and volume is lost, because they do not model hypsometry explicitly; they predict that  $V$  will tend eventually to zero in any steady-state warmer climate, for instance, although this is not necessarily the case. A similar scaling procedure was used in the TAR. Current estimates of present-day G&IC mass are smaller than those used in the TAR, leading to more rapid wastage of

area. Hence, the central estimates for the G&IC contribution to sea level rise in Table 10.7 are similar to those in the TAR, despite our use of a larger mass balance sensitivity (Section 10.A.2).

#### 10.A.4 Changes in Ice Sheet Surface Mass Balance

Quadratic fits are made to the results of Gregory and Huybrechts (2006) (Section 10.6.4.1) for the SMB change of each ice sheet as a function of global average temperature change relative to a steady state, which is taken to be the late 19th century (1865–1894). The spread of results for the various models used by Gregory and Huybrechts represents uncertainty in the patterns of temperature and precipitation change. The Greenland contribution has a further uncertainty of 20% (one standard deviation) from the ablation calculation. The Antarctic SMB projections are similar to those of the TAR, while the Greenland SMB projections are larger by 0.01–0.04 m because of the use of a quadratic fit to temperature change rather than the constant sensitivity of the TAR, which gave an underestimate for larger warming.

#### 10.A.5 Changes in Ice Sheet Dynamics

Topographic and dynamic changes that can be simulated by currently available ice flow models are roughly represented as modifying the sea level changes due to SMB change by  $-5\% \pm 5\%$  from Antarctica, and  $0\% \pm 10\%$  from Greenland ( $\pm$  one standard deviation) (Section 10.6.4.2).

The contribution from scaled-up ice sheet discharge, given as an illustration of the effect of accelerated ice flow (Section 10.6.5), is calculated as  $r_1 \times T / T_1$ , with  $T$  and  $T_1$  expressed relative to the 1865 to 1894 average, where  $r_1 = 0.32 \text{ mm yr}^{-1}$  is an estimate of the contribution during 1993 to 2003 due to recent acceleration and  $T_1 = 0.63^\circ\text{C}$  is the global average temperature during that period.

#### 10.A.6 Combination of Uncertainties

For each scenario, time series of temperature rise and the consequent land ice contributions to sea level are generated using a Monte Carlo simulation (van der Veen, 2002). Temperature rise and thermal expansion have some correlation for a given scenario in AOGCM results (Section 10.6.1). In the Monte Carlo simulation, we assume them to be perfectly correlated; by correlating the uncertainties in the thermal expansion and land ice contributions, this increases the resulting uncertainty in the sea level rise projections. However, the uncertainty in the projections of the land ice contributions is dominated by the various uncertainties in the land ice models themselves (Sections 10.A.2–4) rather than in the temperature projections. We assume the uncertainties in land ice models and temperature projections to be uncorrelated. The procedure used in the TAR, however, effectively assumed the land ice model uncertainty

to be correlated with the temperature and expansion projection uncertainty. This is the main reason why the TAR ranges for sea level rise under each of the scenarios are wider than those of Table 10.7. Also, the TAR gave uncertainty ranges of  $\pm 2$  standard deviations, whereas the present report gives  $\pm 1.65$  standard deviations (5 to 95%).

#### 10.A.7 Change in Surface Air Temperature Over the Major West Antarctic Ice Shelves

The mean surface air temperature change over the area of the Ross and Filchner-Ronne ice shelves in December and January, divided by the mean annual antarctic surface air temperature change, is  $F_1 = 0.62 \pm 0.48$  (one standard deviation) on the basis of the climate change simulations from the four high-resolution GCMs used by Gregory and Huybrechts (2006). From AR4 AOGCMs, the ratio of mean annual antarctic temperature change to global mean temperature change is  $F_2 = 1.1 \pm 0.2$  (one standard deviation) under SRES scenarios with stabilisation beyond 2100 (Gregory and Huybrechts, 2006), while from AR4 AGCMs coupled to mixed-layer ocean models it is  $F_2 = 1.4 \pm 0.2$  (one standard deviation) at equilibrium under doubled  $\text{CO}_2$ . To evaluate the probability of ice shelf mean summer temperature increase exceeding a particular value, given the global temperature rise, a Monte Carlo distribution of  $F_1 \times F_2$  is used, generated by assuming the two factors to be normal and independent random variables. Since this procedure is based on a small number of models, and given other caveats noted in Sections 10.6.4.2 and 10.7.4.4, we have low confidence in these probabilities.



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# 10

## Supplementary Materials

# Global Climate Projections

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### *Details of data preparation for runoff and soil moisture plots (Fig. 10.12)*

For both these land quantities a technique was used to allow improved presentation of the simulated data, particularly at coasts. The basic method was previously used for the soil moisture plot of the Working Group I contribution to the IPCC Second Assessment Report (Figure 6.12). Firstly, for each model, each climatological field was tested for data that were clearly invalid, including missing values over ocean and ice sheets. Data outside the range  $10^{-12}$  and  $0.001 \text{ kg m}^{-2} \text{ s}^{-1}$  for runoff, and  $10^{-4}$  and  $3000 \text{ kg m}^{-2}$  for soil moisture, were set to a missing value. The field was then interpolated to a finer grid with halved spacing, letting valid data extend to the original coastlines. The resulting field from each model was then interpolated to a common fine grid. At each point, a simple average was then used, provided there were valid data from at least 10 models. This produced a field with data for most of the true land, and excluding permanent ice sheets in the case of soil moisture. Land with seasonal cover may still be poorly represented by this process. For soil moisture the field plotted was the change as a percentage of the multi-model mean for 1980-1999. In effect, the changes were biased towards those in models with a greater depth of soil, but this is not unreasonable given that these are likely more sophisticated schemes. Averaging the individual percentage changes produced a noisier field. The use of normalised soil moisture changes by Wang (2005) is a worthy alternative.

**Table S10.1.** Models used in constructing multi-model means shown in figures in Section 10.3. Letters below figure numbers refer either to the SRES scenario considered or to the panel within the figure.

Model	Figure <sup>a</sup>													
	10.6	10.7	10.8 (B1)	10.8 (A1B)	10.8 (A2)	10.9	10.10 (a)	10.10 (b)	10.11 (a)	10.11 (b)	10.12 (a)	10.12 (b)	10.12 (c)	10.12 (d)
BCCR-BCM2.0			X		X									
CCSM3	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CGCM3.1(T47)	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CGCM3.1(T63)		X	X	X		X	X	X	X	X	X	X	X	X
CNRM-CM3	X	X	X	X	X	X		X	X	X	X			X
CSIRO-MK3.0	X	X	X	X	X	X		X	X	X	X			X
ECHAM5/MPI-OM			X	X	X	X		X	X	X	X	X	X	X
ECHO-G	X		X	X	X	X		X	X	X	X	X	X	X
FGOALS-g1.0		X	X		X	X	X	X	X	X	X	X	X	X
GFDL-CM2.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GFDL-CM2.1	X		X	X	X	X	X	X	X	X	X	X	X	X
GISS-AOM			X	X		X		X		X	X	X	X	X
GISS-EH		X		X		X	X	X	X		X	X	X	X
GISS-ER	X		X	X	X	X	X	X	X	X	X	X	X	X
INM-CM3.0	X		X	X	X	X	X	X	X	X	X	X	X	X
IPSL-CM4	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MIROC3.2 (hires)			X	X		X		X	X	X	X	X	X	X
MIROC3.2 (medres)	X		X	X	X	X	X	X	X	X	X	X	X	X
MRI-CGCM2.3.2	X	X	X	X	X	X		X	X	X	X	X	X	X
PCM	X	X	X	X	X	X	X	X	X		X	X	X	X
UKMO-HadCM3	X	X	X	X	X	X	X	X	X		X	X	X	X
UKMO-HadGEM1				X	X	X		X	X		X	X	X	X

<sup>a</sup> Note Section 10.3 figure contents are as follows:

Figure 10.6: zonal average temperature and precipitation

Figure 10.7: atmospheric and oceanic temperature

Figure 10.8: surface air temperature

Figure 10.9: seasonal temperature, rainfall, sea level pressure

Figure 10.10a: zonal average cloud fraction

Figure 10.10b: total cloud fraction

Figure 10.11a: cloud radiative forcing

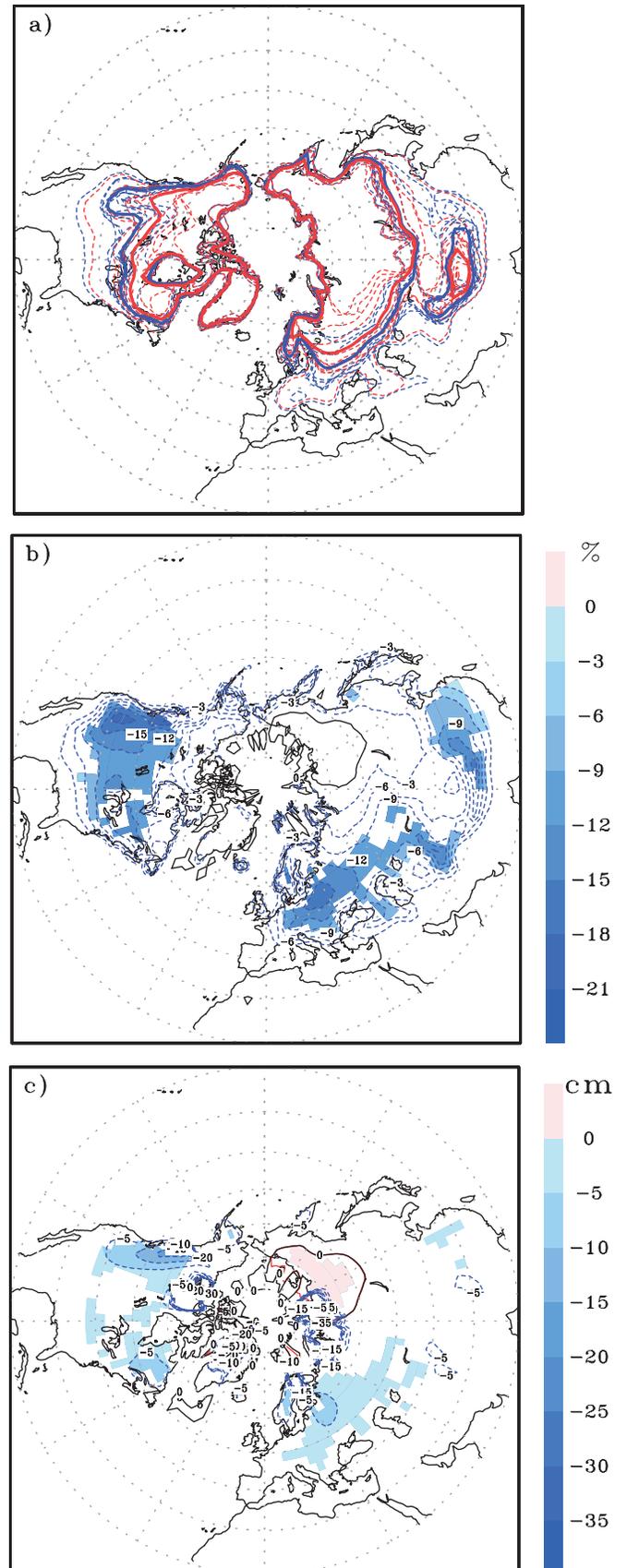
Figure 10.11b: diurnal temperature range

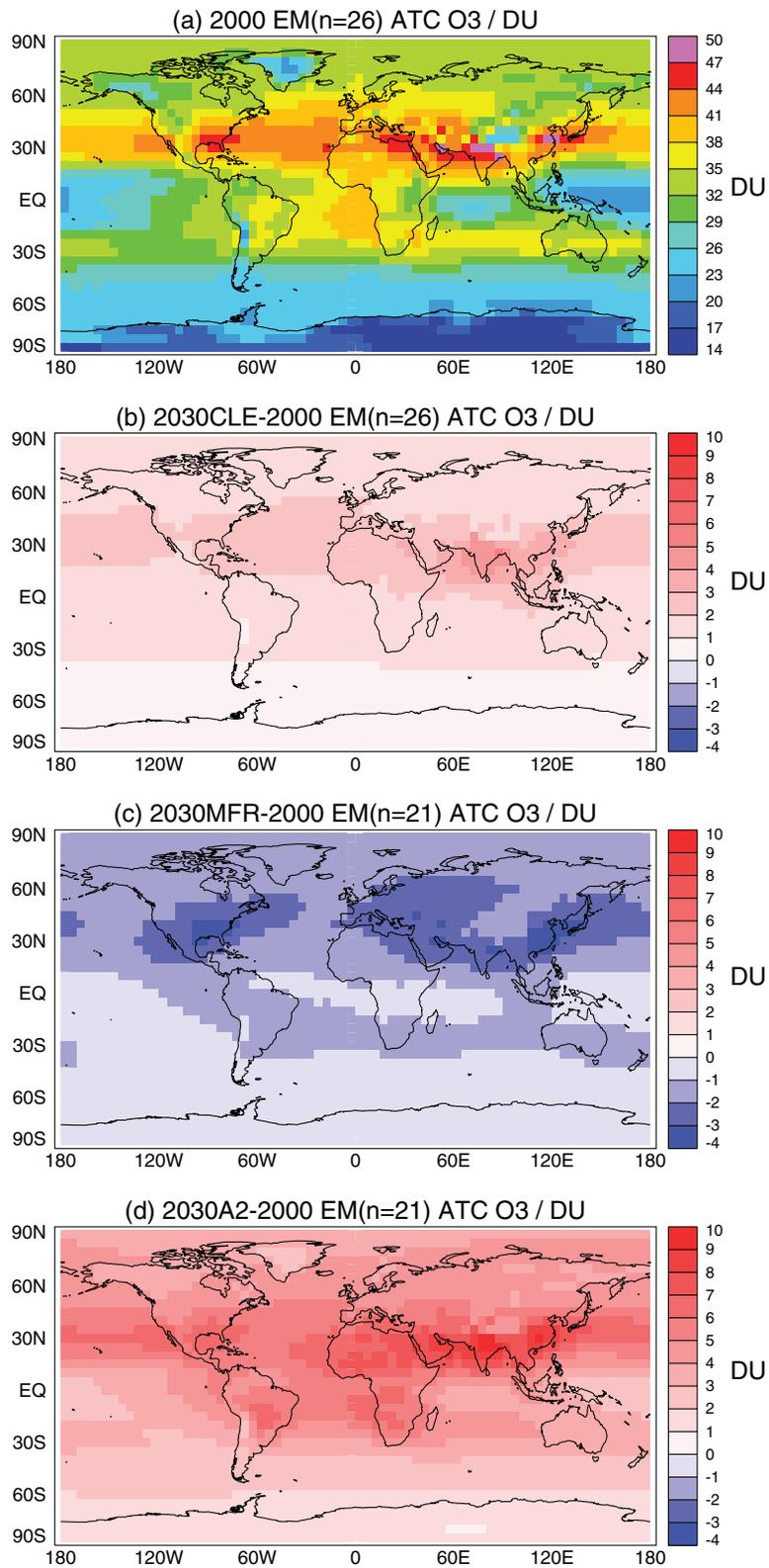
Figure 10.12: precipitation, soil moisture, runoff, evaporation

**Table S10.2.** Global mean change in annual mean precipitation from the multi-model ensemble mean for four time periods relative to 1980–1999, for each of the available scenarios. Values are given as a percentage of the global mean for 1980–1999 (2.83 mm d<sup>-1</sup>), divided by the global mean warming for each case (Table 10.5). (The data are averages of the series depicted in Fig. 10.5.) Also given are two measures of agreement of the geographic scaled patterns of change (the precipitation fields normalised by the global mean warming), relative to the A1B 2080–2099 case. First the non-dimensional *M* value (see text, and caption to Table 10.5), and second (in italics) the mae (global mean absolute ‘error’ or difference, in mm d<sup>-1</sup> K<sup>-1</sup>) between the fields, both multiplied by 100 for brevity. ‘Commit’ refers to the constant-composition commitment experiment.

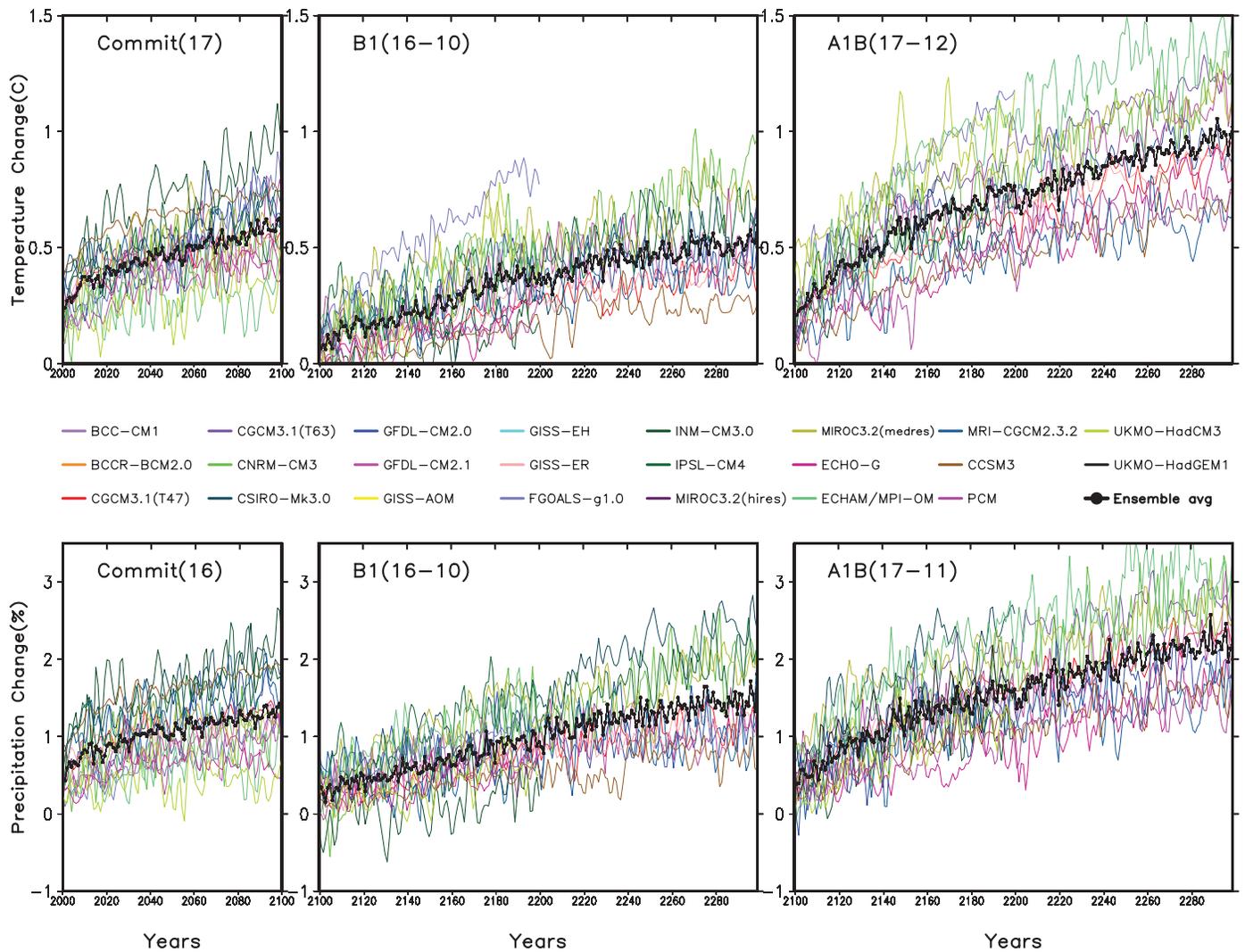
	Global mean rainfall change (scaled, % K <sup>-1</sup> )				Measures of agreement of scaled field ( <i>M</i> × 100 n.d., mae × 100 mm d <sup>-1</sup> K <sup>-1</sup> )			
	2011– 2030	2046– 2065	2080– 2099	2180– 2199	2011– 2030	2046– 2065	2080– 2099	2180– 2199
A2	1.38	1.33	1.45		56, 5	80, 2	84, 2	
A1B	1.45	1.51	1.63	1.68	66, 4	86, 2	100, 0	86, 2
B1	1.62	1.65	1.88	1.89	68, 4	80, 2	84, 2	80, 2
Commit	2.27	2.32	2.29		46, 7	55, 6	57, 5	

**Supplementary Figure S10.1.** Multi model mean snow cover and projected changes over the 21st century from 12 (a and b) and 11 (c) AOGCMs, respectively. a) Contours mark the locations where the December to February (DJF) snow area fraction exceeds 50%, blue for the period 1980–1999, and red for 2080–2099, dashed for the individual models and solid for the multi model mean. b) Projected multi model mean change in snow area fraction over the period 2080–2099, relative to 1980–1999. Shading denotes regions where the ensemble mean divided by the ensemble standard deviation exceeds 1.0 (in magnitude), c) as b) but changes in snow depth (in cm).

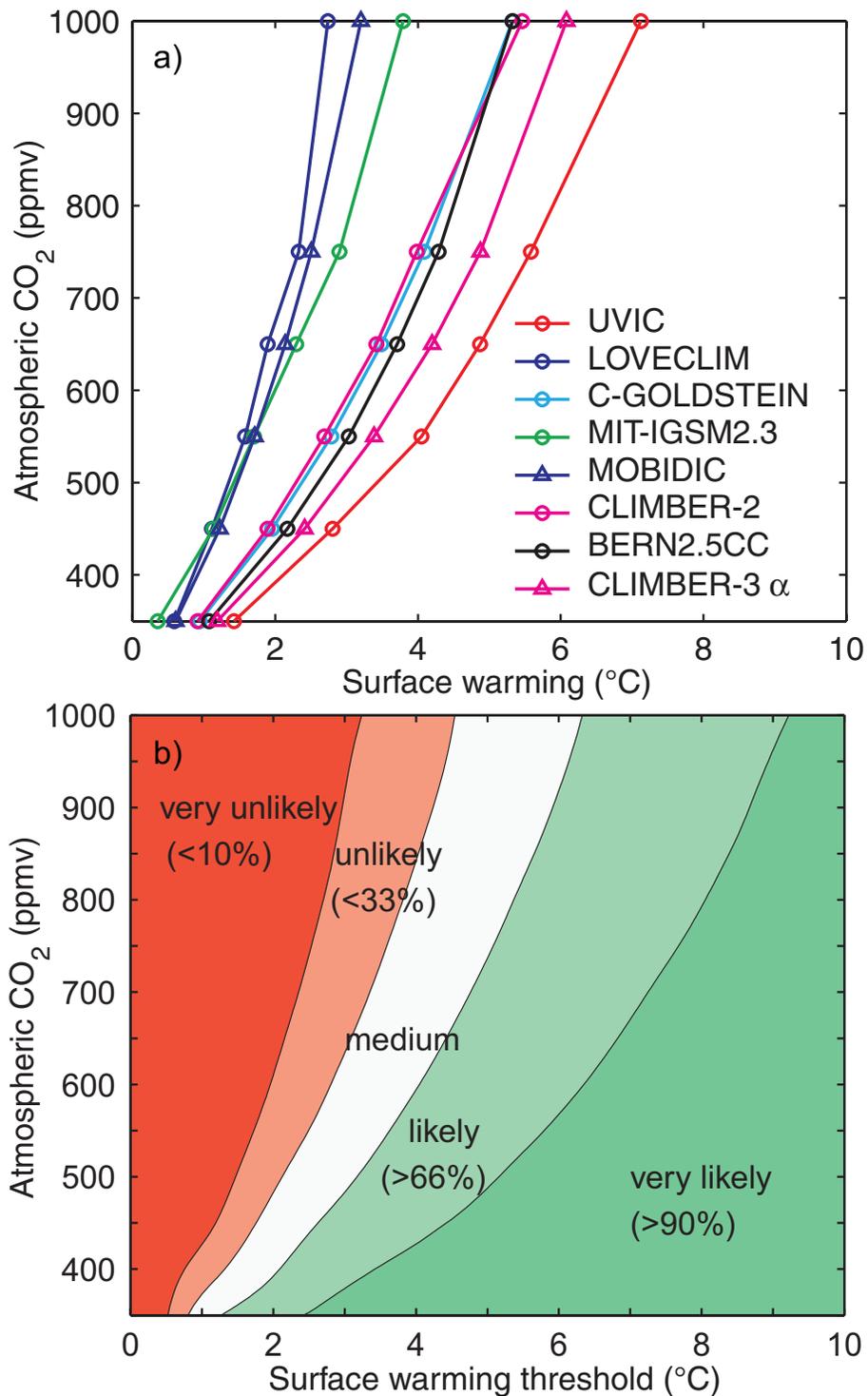




**Supplementary Figure S10.2.** Tropospheric ozone simulated in the ACCENT model intercomparison (Stevenson et al., 2006). The panels in the figure show annual mean tropospheric column results (in units of DU). Each panel is a multi model ensemble mean; the number of models in the ensemble is given in brackets. (a) Year 2000; (b) difference between 2030CLE (IIASA Current Legislation) scenario and 2000; (c) difference between 2030MFR (IIASA Maximum Feasible Reductions) and 2000; and (d) difference between 2030A2 (SRES A2) and 2000.



Supplementary Figure S10.3. Top left: Globally averaged surface air temperature change relative to 1980–1999 for the 20th century commitment experiment; Top center: Same as left except for the B1 commitment experiment computed with respect to the 2080–2099 average; Top right: Same as center except for the A1B commitment experiment; Bottom row: same as top row but for percent change in globally averaged precipitation. The numbers in the panels denote the number of models used for each scenario and each century.



Supplementary Figure S10.4. a) Equilibrium surface warming for seven different EMICs and different stabilization levels of atmospheric CO<sub>2</sub> or the equivalent radiative forcing, b) a probabilistic picture based on the same scenarios, showing probability of remaining below a certain warming threshold for a given CO<sub>2</sub>-equivalent stabilization concentration, derived from Bern2.5D EMIC with variable ocean heat uptake and using several PDFs of climate sensitivity (modified from Knutti et al. (2005)).

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# 19

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## Assessing key vulnerabilities and the risk from climate change

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## Executive summary

Climate change will lead to changes in geophysical, biological and socio-economic systems. An impact describes a specific change in a system caused by its exposure to climate change. Impacts may be judged to be harmful or beneficial. Vulnerability to climate change is the degree to which these systems are susceptible to, and unable to cope with, adverse impacts. The concept of risk, which combines the magnitude of the impact with the probability of its occurrence, captures uncertainty in the underlying processes of climate change, exposure, impacts and adaptation. [19.1.1]

Many of these impacts, vulnerabilities and risks merit particular attention by policy-makers due to characteristics that might make them 'key'. The identification of potential key vulnerabilities is intended to provide guidance to decision-makers for identifying levels and rates of climate change that may be associated with 'dangerous anthropogenic interference' (DAI) with the climate system, in the terminology of United Nations Framework Convention on Climate Change (UNFCCC) Article 2 (see Box 19.1). Ultimately, the definition of DAI cannot be based on scientific arguments alone, but involves other judgements informed by the state of scientific knowledge. No single metric can adequately describe the diversity of key vulnerabilities, nor determine their ranking. [19.1.1]

This chapter identifies seven criteria from the literature that may be used to identify key vulnerabilities, and then describes some potential key vulnerabilities identified using these criteria. The criteria are [19.2]:

- magnitude of impacts,
- timing of impacts,
- persistence and reversibility of impacts,
- likelihood (estimates of uncertainty) of impacts and vulnerabilities and confidence in those estimates
- potential for adaptation
- distributional aspects of impacts and vulnerabilities
- importance of the system(s) at risk.

Key vulnerabilities are associated with many climate-sensitive systems, including food supply, infrastructure, health, water resources, coastal systems, ecosystems, global biogeochemical cycles, ice sheets and modes of oceanic and atmospheric circulation. [19.3]

General conclusions include the following [19.3].

- Some observed key impacts have been at least partly attributed to anthropogenic climate change. Among these are increases in human mortality, loss of glaciers, and increases in the frequency and/or intensity of extreme events.
- Global mean temperature changes of up to 2°C above 1990-2000 levels (see Box 19.2) would exacerbate current key impacts, such as those listed above (high confidence), and trigger others, such as reduced food security in many low-latitude nations (medium confidence). At the same time, some systems, such as global agricultural productivity, could benefit (low/medium confidence).

- Global mean temperature changes of 2 to 4°C above 1990-2000 levels would result in an increasing number of key impacts at all scales (high confidence), such as widespread loss of biodiversity, decreasing global agricultural productivity and commitment to widespread deglaciation of Greenland (high confidence) and West Antarctic (medium confidence) ice sheets.
- Global mean temperature changes greater than 4°C above 1990-2000 levels would lead to major increases in vulnerability (very high confidence), exceeding the adaptive capacity of many systems (very high confidence).
- Regions that are already at high risk from observed climate variability and climate change are more likely to be adversely affected in the near future by projected changes in climate and increases in the magnitude and/or frequency of already damaging extreme events.

The 'reasons for concern' identified in the Third Assessment Report (TAR) remain a viable framework in which to consider key vulnerabilities. Recent research has updated some of the findings from the TAR [19.3.7].

- There is new and stronger evidence of observed impacts of climate change on unique and vulnerable systems (such as polar and high-mountain communities and ecosystems), with increasing levels of adverse impacts as temperatures increase (very high confidence).
- There is new evidence that observed climate change is likely to have already increased the risk of certain extreme events such as heatwaves, and it is more likely than not that warming has contributed to the intensification of some tropical cyclones, with increasing levels of adverse impacts as temperatures increase (very high confidence).
- The distribution of impacts and vulnerabilities is still considered to be uneven, and low-latitude, less-developed areas are generally at greatest risk due to both higher sensitivity and lower adaptive capacity; but there is new evidence that vulnerability to climate change is also highly variable within countries, including developed countries.
- There is some evidence that initial net market benefits from climate change will peak at a lower magnitude and sooner than was assumed for the TAR, and it is likely that there will be higher damages for larger magnitudes of global mean temperature increases than was estimated in the TAR.
- The literature offers more specific guidance on possible thresholds for initiating partial or near-complete deglaciation of the Greenland and West Antarctic ice sheets.

Adaptation can significantly reduce many potentially dangerous impacts of climate change and reduce the risk of many key vulnerabilities. However, the technical, financial and institutional capacity, and the actual planning and implementation of effective adaptation, is currently quite limited in many regions. In addition, the risk-reducing potential of planned adaptation is either very limited or very costly for some key vulnerabilities, such as loss of biodiversity, melting of mountain glaciers and disintegration of major ice sheets. [19.4.1]

A general conclusion on the basis of present understanding is that for market and social systems there is considerable adaptation potential, but the economic costs are potentially large, largely unknown and unequally distributed, as is the adaptation potential itself. For biological and geophysical systems, the adaptation potential is much less than in social and market systems. There is wide agreement that it will be much more difficult for both human and natural systems to adapt to larger magnitudes of global mean temperature change than to smaller ones, and that adaptation will be more difficult and/or costly for faster warming rates than for slower rates. [19.4.1]

Several conclusions appear robust across a diverse set of studies in the integrated assessment and mitigation literature [19.4.2, 19.4.3].

- Given the uncertainties in factors such as climate sensitivity, regional climate change, vulnerability to climate change, adaptive capacity and the likelihood of bringing such capacity to bear, a risk-management framework emerges as a useful framework to address key vulnerabilities. However, the assignment of probabilities to specific key impacts is often very difficult, due to the large uncertainties involved.
- Actions to mitigate climate change and reduce greenhouse gas emissions will reduce the risk associated with most key vulnerabilities. Postponement of such actions, in contrast, generally increases risks.
- Given current atmospheric greenhouse gas concentrations (IPCC, 2007a) and the range of projections for future climate change, some key impacts (e.g., loss of species, partial deglaciation of major ice sheets) cannot be avoided with high confidence. The probability of initiating some large-scale events is very likely to continue to increase as long as greenhouse gas concentrations and temperature continue to increase.

## 19.1 Introduction

### 19.1.1 Purpose, scope and structure of the chapter

Many social, biological and geophysical systems are at risk from climate change. Since the Third Assessment Report (TAR; IPCC, 2001a), policy-makers and the scientific community have increasingly turned their attention to climate change impacts, vulnerabilities and associated risks that may be considered ‘key’ because of their magnitude, persistence and other characteristics. An impact describes a specific change in a system caused by its exposure to climate change. Impacts may be judged to be either harmful or beneficial. Vulnerability to climate change is the degree to which these systems are susceptible to, and unable to cope with, the adverse impacts. The concept of risk, which combines the magnitude of the impact with the probability of its occurrence, captures uncertainty in the underlying processes of climate change, exposure, sensitivity and adaptation.

The identification of potential key vulnerabilities is intended to provide guidance to decision-makers for identifying levels and

rates of climate change that may be associated with ‘dangerous anthropogenic interference’ (DAI) with the climate system, in the terminology of the United Nations Framework Convention on Climate Change (UNFCCC) Article 2 (see Box 19.1). Ultimately, the determination of DAI cannot be based on scientific arguments alone, but involves other judgements informed by the state of scientific knowledge.

The purpose of this chapter is two-fold. First, it synthesises information from Working Group I (WGI) and Chapters 3-16 of Working Group II (WGII) of the IPCC Fourth Assessment Report (AR4) within the uncertainty framework established by IPCC (Moss and Schneider, 2000; IPCC, 2007b) and the risk management approach discussed in Chapter 2, and identifies key vulnerabilities based on seven criteria (see Section 19.2). A focus on key vulnerabilities is meant to help policy-makers and stakeholders assess the level of risk and design pertinent response strategies. Given this focus, the analytic emphasis of this chapter is on people and systems that may be *adversely* affected by climate change, particularly where impacts could have serious and/or irreversible consequences. Positive impacts on a system are addressed when reported in the literature and where relevant to the assessment of key vulnerabilities. A comprehensive assessment of positive and negative climate impacts in all sectors and regions is beyond the scope of this chapter, and readers are encouraged to turn to the sectoral and regional chapters of this volume (Chapters 3-16) for this information.

Furthermore, it is acknowledged that the impacts of future climate change will occur in the context of an evolving socio-economic baseline. This chapter attempts to reflect the limited literature examining the possible positive and negative relationships between baseline scenarios and future impacts. However, the purpose of this chapter is not to compare the effects of climate change with the effects of socio-economic development, but rather to assess the additional effects of climate change on top of whatever baseline development scenario is assumed. Whether a climate change impact would be greater or smaller than welfare gains or losses associated with particular development scenarios is beyond the scope of this chapter but is dealt with in Chapter 20 and by Working Group III (WGIII).

Second, this chapter provides an assessment of literature focusing on the contributions that various mitigation and adaptation response strategies, such as stabilisation of greenhouse gas concentrations in the atmosphere, could make in avoiding or reducing the probability of occurrence of key impacts. Weighing the benefits of avoiding such climate-induced risks versus the costs of mitigation or adaptation, as well as the distribution of such costs and benefits (i.e., equity implications of such trade-offs) is also beyond the scope of this chapter, as is attempting a normative trade-off analysis among and between various groups and between human and natural systems. (The term ‘normative’ is used in this chapter to refer to a process or statement that inherently involves value judgements or beliefs.) Many more examples of such literature can be obtained in Chapters 18 and 20 of this volume and in the Working Group III (WGIII) AR4.

The remainder of Section 19.1 presents the conceptual framework, and Section 19.2 presents the specific criteria used in this chapter for the assessment of key vulnerabilities. Section 19.3 presents selected key vulnerabilities based on these criteria. Key

vulnerabilities are linked to specific levels of global mean temperature increase (above 1990-2000 levels; see Box 19.2) using available estimates from the literature wherever possible. Section 19.3 provides an indicative, rather than an exhaustive, list of key vulnerabilities, representing the authors' collective judgements based on the criteria presented in Section 19.2, selected from a vast array of possible candidates suggested in the literature. Section 19.4 draws on the literature addressing the linkages between key vulnerabilities and strategies to avoid them by adaptation (Section 19.4.1) and mitigation (Section 19.4.2). Section 19.4.4 concludes this chapter by suggesting research priorities for the natural and social sciences that may provide relevant knowledge for assessing key vulnerabilities of climate change. The assessment of key vulnerabilities and review of the particular assemblage of literature needed to do so is unique to the mission of Chapter 19. Accordingly, in Sections 19.3 and 19.4, we have made judgments with regard to likelihood and confidence whereas, in some cases, other chapters in this volume and in the WGI AR4 have not.

Another important area of concern, also marked by large uncertainties, is the assessment of impacts resulting from multiple factors. In some cases, key vulnerabilities emerging from such interactions are assessed, such as the fragmentation of habitats that constrains some species, which – when combined with climate change – forces species movements across disturbed habitats. This is a multi-stressor example that is likely to multiply the impacts relative to either stressor acting alone. Other examples from the literature are also given in the text; though any attempt

to be comprehensive or quantitative in such multi-stress situations is beyond the scope of the chapter.

## 19.1.2 Conceptual framework for the identification and assessment of key vulnerabilities

### 19.1.2.1 Meaning of 'key vulnerability'

Vulnerability to climate change is the degree to which geophysical, biological and socio-economic systems are susceptible to, and unable to cope with, adverse impacts of climate change (see Chapter 17; Füssel and Klein, 2006). The term 'vulnerability' may therefore refer to the vulnerable system itself, e.g., low-lying islands or coastal cities; the impact to this system, e.g., flooding of coastal cities and agricultural lands or forced migration; or the mechanism causing these impacts, e.g., disintegration of the West Antarctic ice sheet.

Many impacts, vulnerabilities and risks merit particular attention by policy-makers due to characteristics that might make them *key*. Key impacts that may be associated with key vulnerabilities are found in many social, economic, biological and geophysical systems, and various tabulations of risks, impacts and vulnerabilities have been provided in the literature (e.g., Smith et al., 2001; Corfee-Morlot and Höhne, 2003; Hare, 2003; Oppenheimer and Petsonk, 2003, 2005; ECF, 2004; Hitz and Smith, 2004; Leemans and Eickhout, 2004; Schellnhuber et al., 2006). Key vulnerabilities are associated with many climate-sensitive systems, including, for example, food supply, infrastructure, health, water resources, coastal systems,

### Box 19.1. UNFCCC Article 2

The text of the UNFCCC Article 2 reads:

"The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."

### Box 19.2. Reference for temperature levels

Levels of global mean temperature change are variously presented in the literature with respect to: pre-industrial temperatures in a specified year e.g., 1750 or 1850; the average temperature of the 1961-1990 period; or the average temperature within the 1990-2000 period. The best estimate for the increase above pre-industrial levels in the 1990-2000 period is 0.6°C, reflecting the best estimate for warming over the 20th century (Folland et al., 2001; Trenberth et al., 2007). Therefore, to illustrate this by way of a specific example, a 2°C increase above pre-industrial levels corresponds to a 1.4°C increase above 1990-2000 levels. Climate impact studies often assess changes in response to regional temperature change, which can differ significantly from changes in global mean temperature. In most land areas, regional warming is larger than global warming (see Christensen et al., 2007). Unless otherwise specified, this chapter refers to global mean temperature change above 1990-2000 levels, which reflects the most common metric used in the literature on key vulnerabilities. However, given the many conventions in the literature for baseline periods, the reader is advised to check carefully and to adjust baseline levels for consistency every time a number is given for impacts at some specified level of global mean temperature change.

ecosystems, global biogeochemical cycles, ice sheets, and modes of oceanic and atmospheric circulation (see Section 19.3).

### 19.1.2.2 Scientific assessment and value judgements

The assessment of key vulnerabilities involves substantial scientific uncertainties as well as value judgements. It requires consideration of the response of biophysical and socio-economic systems to changes in climatic and non-climatic conditions over time (e.g., changes in population, economy or technology), important non-climatic developments that affect adaptive capacity, the potential for effective adaptation across regions, sectors and social groupings, value judgements about the acceptability of potential risks, and potential adaptation and mitigation measures. To achieve transparency in such complex assessments, scientists and analysts need to provide a ‘traceable account’ of all relevant assumptions (Moss and Schneider, 2000).

Scientific analysis can inform policy processes but choices about which vulnerabilities are ‘key’, and preferences for policies appropriate for addressing them, necessarily involve value judgements. “Natural, technical and social sciences can provide essential information and evidence needed for decision-making on what constitutes ‘dangerous anthropogenic interference with the climate system’. At the same time, such decisions are value judgments determined through socio-political processes, taking into account considerations such as development, equity and sustainability, as well as uncertainties and risk” (IPCC, 2001b).

### 19.1.2.3 UNFCCC Article 2

The question of which impacts might constitute DAI in terms of Article 2 has only recently attracted a high level of attention, and the literature still remains relatively sparse (see Oppenheimer and Petsonk 2005; Schellnhuber et al., 2006 for reviews). Interpreting Article 2 (ultimately the obligation of the Conference of the Parties to the UNFCCC) involves a scientific assessment of what impacts might be associated with different levels of greenhouse gas concentrations or climate change; and a normative evaluation by policy-makers of which potential impacts and associated likelihoods are significant enough to constitute, individually or in combination, DAI. This assessment is informed by the magnitude and timing of climate impacts as well as by their distribution across regions, sectors and population groups (e.g., Corfee-Morlot and Agrawala, 2004; Schneider and Mastrandrea, 2005; Yamin et al., 2005). The social, cultural and ethical dimensions of DAI have drawn increasing attention recently (Jamieson 1992, 1996; Rayner and Malone, 1998; Adger, 2001; Gupta et al., 2003; Gardiner, 2006). The references to adverse effects as significant deleterious effects in Article 1 of the UNFCCC<sup>1</sup> and to natural ecosystems, food production, and sustainable development in Article 2 provide guidance as to which impacts may be considered relevant to the definition of DAI (Schneider et al., 2001).

Interpreting Article 2 is necessarily a dynamic process because the assessment of what levels of greenhouse gas

concentrations may be considered ‘dangerous’ would be modified based on changes in scientific knowledge, social values and political priorities.

### 19.1.2.4 Distribution and aggregation of impacts

Vulnerability to climate change differs considerably across socio-economic groups, thus raising important questions about equity. Most studies of impacts in the context of key vulnerabilities and Article 2 have focused on aggregate impacts, grouping developing countries or populations with special needs or situations. Examples include island nations faced with sea-level rise (Barnett and Adger, 2003), countries in semi-arid regions with a marginal agricultural base, indigenous populations facing regionalised threats, or least-developed countries (LDCs; Huq et al., 2003). Within developed countries, research on vulnerability has often focused on groups of people, for example those living in coastal or flood-prone regions, or socially vulnerable groups such as the elderly.

No single metric for climate impacts can provide a commonly accepted basis for climate policy decision-making (Jacoby, 2004; Schneider, 2004). Aggregation, whether by region, sector, or population group, implies value judgements about the selection, comparability and significance of vulnerabilities and cohorts (e.g., Azar and Sterner, 1996; Fankhauser et al., 1997; Azar, 1998, on regional aggregation). The choice of scale at which impacts are examined is also crucial, as considerations of fairness, justice or equity require examination of the distribution of impacts, vulnerability and adaptation potential, not only between, but also within, groupings (Jamieson, 1992; Gardiner, 2004; Yamin et al., 2005).

### 19.1.2.5 Critical levels and thresholds

Article 2 of the UNFCCC defines international policy efforts in terms of avoidance of a level of greenhouse gas concentrations beyond which the effects of climate change would be considered to be ‘dangerous’. Discussions about ‘dangerous interference with the climate system’ and ‘key vulnerabilities’ are also often framed around thresholds or critical limits (Patwardhan et al., 2003; Izrael, 2004). Key vulnerabilities may be linked to systemic thresholds where non-linear processes cause a system to shift from one major state to another (such as a hypothetical sudden change in the Asian monsoon or disintegration of the West Antarctic ice sheet). Systemic thresholds may lead to large and widespread consequences that may be considered as ‘dangerous’. Examples include climate impacts such as those arising from ice sheet disintegration leading to large sea-level rises or changes to the carbon cycle, or those affecting natural and managed ecosystems, infrastructure and tourism in the Arctic.

Smooth and gradual climate change may also lead to damages that are considered unacceptable beyond a certain point. For instance, even a gradual and smooth increase of sea-level rise would eventually reach a level that certain stakeholders would consider unacceptable. Such normative impact thresholds could

<sup>1</sup> Article 1 reads, “For the purposes of this Convention: 1. ‘Adverse effects of climate change’ means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.”

be defined at the global level (e.g., Toth et al., 2002, for natural ecosystems) and some have already been identified at the regional level (e.g., Jones, 2001, for irrigation in Australia).

## 19.2 Criteria for selecting 'key' vulnerabilities

As previously discussed, determining which impacts of climate change are potentially 'key' and what is 'dangerous' is a dynamic process involving, inter alia, combining scientific knowledge with factual and normative elements (Patwardhan et al., 2003; Dessai et al., 2004; Pittini and Rahman, 2004). Largely factual or objective criteria include the scale, magnitude, timing and persistence of the harmful impact (Parry et al., 1996; Kenny et al., 2000; Moss and Schneider, 2000; Goklany, 2002; Corfee-Morlot and Höhne, 2003; Schneider, 2004; Oppenheimer, 2005). Normative and subjective elements are embedded in assessing the uniqueness and importance of the threatened system, equity considerations regarding the distribution of impacts, the degree of risk aversion, and assumptions regarding the feasibility and effectiveness of potential adaptations (IPCC, 2001a; OECD, 2003; Pearce, 2003; Tol et al., 2004). Normative criteria are influenced by the perception of risk, which depends on the cultural and social context (e.g., Slovic, 2000; Oppenheimer and Todorov, 2006). Some aspects of confidence in the climate change–impact relationship are factual, while others are subjective (Berger and Berry, 1988). In addition, the choice of which factual criteria to employ in assessing impacts has a normative component.

This chapter identifies seven criteria from the literature that may be used to identify key vulnerabilities, and then describes some potential key vulnerabilities identified using these criteria. The criteria are listed and explained in detail below:

- magnitude of impacts,
- timing of impacts,
- persistence and reversibility of impacts,
- likelihood (estimates of uncertainty) of impacts and vulnerabilities, and confidence in those estimates,
- potential for adaptation,
- distributional aspects of impacts and vulnerabilities,
- importance of the system(s) at risk.

### *Magnitude*

Impacts of large magnitude are more likely to be evaluated as 'key' than impacts with more limited effects. The magnitude of an impact is determined by its scale (e.g., the area or number of people affected) and its intensity (e.g., the degree of damage caused). Therefore, many studies have associated key vulnerabilities or dangerous anthropogenic interference primarily with large-scale geophysical changes in the climate system.

Various aggregate metrics are used to describe the magnitude of climate impacts. The most widely used quantitative measures for climate impacts (see Chapter 20 and WGIII AR4 Chapter 3 (Fisher et al., 2007)) are monetary units such as welfare, income or revenue losses (e.g., Nordhaus and Boyer, 2000), costs of

anticipating and adapting to certain biophysical impacts such as a large sea-level rise (e.g., Nicholls et al., 2005), and estimates of people's willingness to pay to avoid (or accept as compensation for) certain climate impacts (see, e.g., Li et al., 2004). Another aggregate, non-monetary indicator is the number of people affected by certain impacts such as food and water shortages, morbidity and mortality from diseases, and forced migration (Barnett, 2003; Arnell, 2004; Parry et al., 2004; van Lieshout et al., 2004; Schär and Jendritzky, 2004; Stott et al., 2004). Climate impacts are also quantified in terms of the biophysical end-points, such as agricultural yield changes (see Chapter 5; Füssel et al., 2003; Parry et al., 2004) and species extinction numbers or rates (see Chapter 4; Thomas et al., 2004). For some impacts, qualitative rankings of magnitude are more appropriate than quantitative ones. Qualitative methods have been applied to reflect social preferences related to the potential loss of cultural or national identity, loss of cultural heritage sites, and loss of biodiversity (Schneider et al., 2000).

### *Timing*

A harmful impact is more likely to be considered 'key' if it is expected to happen soon rather than in the distant future (Bazermann, 2005; Weber, 2005). Climate change in the 20th century has already led to numerous impacts on natural and social systems (see Chapter 1), some of which may be considered 'key'. Impacts occurring in the distant future which are caused by nearer-term events or forcings (i.e., 'commitment'), may also be considered 'key'. An often-cited example of such 'delayed irreversibility' is the disintegration of the West Antarctic ice sheet: it has been proposed that melting of ice shelves in the next 100 to 200 years may lead to gradual but irreversible deglaciation and a large sea-level rise over a much longer time-scale (see Section 19.3.5.2; Meehl et al., 2007). Debates over an 'appropriate' rate of time preference for such events (i.e., discounting) are widespread in the integrated assessment literature (WGIII AR4 Chapter 2: Halsnaes et al., 2007), and can influence the extent to which a decision-maker might label such possibilities as 'key'.

Another important aspect of timing is the rate at which impacts occur. In general, adverse impacts occurring suddenly (and surprisingly) would be perceived as more significant than the same impacts occurring gradually, as the potential for adaptation for both human and natural systems would be much more limited in the former case. Finally, very rapid change in a non-linear system can exacerbate other vulnerabilities (e.g., impacts on agriculture and nutrition can aggravate human vulnerability to disease), particularly where such rapid change curtails the ability of systems to prevent and prepare for particular kinds of impacts (Niemeyer et al., 2005).

### *Persistence and reversibility*

A harmful impact is more likely to be considered 'key' if it is persistent or irreversible. Examples of impacts that could become key due to persistence include the emergence of near-permanent drought conditions (e.g., in semi-arid and arid regions in Africa – Nyong, 2005; see Chapter 9) and intensified cycles of extreme flooding that were previously regarded as 'one-off' events (e.g., in parts of the Indian subcontinent; see Chapter 10).

Examples of climate impacts that are irreversible, at least on time-scales of many generations, include changes in regional or global biogeochemical cycles and land cover (Denman et al., 2007; see Section 19.3.5.1), the loss of major ice sheets (Meehl et al., 2007; see Section 19.3.5.2); the shutdown of the meridional overturning circulation (Randall et al., 2007; Meehl et al., 2007; see Section 19.3.5.3), the extinction of species (Thomas et al., 2004; Lovejoy and Hannah, 2005), and the loss of unique cultures (Barnett and Adger, 2003). The latter is illustrated by Small Island Nations at risk of submergence through sea-level rise (see Chapter 16) and the necessity for the Inuit of the North American Arctic (see Chapter 15) to cope with recession of the sea ice that is central to their socio-cultural environment.

#### *Likelihood and confidence*

Likelihood of impacts and our confidence in their assessment are two properties often used to characterise uncertainty of climate change and its impacts (Moss and Schneider, 2000; IPCC, 2007b). Likelihood is the probability of an outcome having occurred or occurring in the future; confidence is the subjective assessment that any statement about an outcome will prove correct. Uncertainty may be characterised by these properties individually or in combination. For example, in expert elicitations of subjective probabilities (Nordhaus, 1994; Morgan and Keith, 1995; Arnell et al., 2005; Morgan et al., 2006), likelihood of an outcome has been framed as the central value of a probability distribution, whereas confidence is reflected primarily by its spread (the lesser the spread, the higher the confidence). An impact characterised by high likelihood is more apt to be seen as ‘key’ than the same impact with a lower likelihood of occurrence. Since risk is defined as consequence (impact) multiplied by its likelihood (probability), the higher the probability of occurrence of an impact the higher its risk, and the more likely it would be considered ‘key’.

#### *Potential for adaptation*

To assess the potential harm caused by climate change, the ability of individuals, groups, societies and nature to adapt to or ameliorate adverse impacts must be considered (see Section 19.3.1; Chapter 17). The lower the availability and feasibility of effective adaptations, the more likely such impacts would be characterised as ‘key vulnerabilities’. The potential for adaptation to ameliorate the impacts of climate change differs between and within regions and sectors (e.g., O’Brien et al., 2004). There is often considerable scope for adaptation in agriculture and in some other highly managed sectors. There is much less scope for adaptation to some impacts of sea-level rise such as land loss in low-lying river deltas, and there are no realistic options for preserving many endemic species in areas that become climatically unsuitable (see Chapter 17). Adaptation assessments need to consider not only the technical feasibility of certain adaptations but also the availability of required resources (which is often reduced in circumstances of poverty), the costs and side-effects of adaptation, the knowledge about those adaptations, their timeliness, the (dis-)incentives for adaptation actors to actually implement them, and their compatibility with individual or cultural preferences.

The adaptation literature (see Chapter 17) can be largely separated into two groups: one with a more favourable view of the potential for adaptation of social systems to climate change, and an opposite group that expresses less favourable views, stressing the limits to adaptation in dealing with large climate changes and the social, financial and technical obstacles that might inhibit the actual implementation of many adaptation options (see, e.g., the debate about the Ricardian climate change impacts methods – Mendelsohn et al., 1994; Cline, 1996; Mendelsohn and Nordhaus, 1996; Kaufmann, 1998; Hanemann, 2000; Polsky and Easterling, 2001; Polsky, 2004; Schlenker et al., 2005). This chapter reports the range of views in the literature on adaptive capacity relevant for the assessment of key vulnerabilities, and notes that these very different views contribute to the large uncertainty that accompanies assessments of many key vulnerabilities.

#### *Distribution*

The distribution of climate impacts across regions and population groups raises important equity issues (see Section 19.1.2.4 for a detailed discussion). The literature concerning distributional impacts of climate change covers an increasingly broad range of categories, and includes, among others, income (Tol et al., 2004), gender (Denton, 2002; Lambrou and Laub, 2004) and age (Bunyavanich et al., 2003), in addition to regional, national and sectoral groupings. Impacts and vulnerabilities that are highly heterogeneous or which have significant distributional consequences are likely to have higher salience, and therefore a greater chance of being considered as ‘key’.

#### *Importance of the vulnerable system*

A salient, though subjective, criterion for the identification of ‘key vulnerabilities’ is the importance of the vulnerable system or system property. Various societies and peoples may value the significance of impacts and vulnerabilities on human and natural systems differently. For example, the transformation of an existing natural ecosystem may be regarded as important if that ecosystem is the unique habitat of many endemic species or contains endangered charismatic species. On the other hand, if the livelihoods of many people depend crucially on the functioning of a system, this system may be regarded as more important than a similar system in an isolated area (e.g., a mountain snowpack system with large downstream use of the melt water versus an equally large snowpack system with only a small population downstream using the melt water).

## 19.3 Identification and assessment of key vulnerabilities

This section discusses what the authors have identified as possible key vulnerabilities based on the criteria specified in the Introduction and Section 19.2, and on the literature on impacts that may be considered potentially ‘dangerous’ in the sense of Article 2. The key vulnerabilities identified in this section are, as noted earlier, not a comprehensive list but illustrate a range of

impacts relevant for policy-makers. Section 19.3.1 introduces, in condensed tabular form, key vulnerabilities, organising them by type of system, i.e., market, social, ecological or geophysical. The following sections discuss some of the key vulnerabilities by type of system, and add discussions of extreme events and an update on the 'reasons for concern' framework from the TAR. Each sub-section is cross-referenced to the relevant sections of the Fourth Assessment Report as well as primary publications from which more detail can be obtained. As noted in Section 19.1.1, the likelihood and confidence judgements in this section reflect the assessments of the authors of this chapter.

### 19.3.1 Introduction to Table 19.1

Table 19.1 provides short summaries of some vulnerabilities which, in the judgment of the authors of this chapter and in the

light of the WGI AR4 and chapters of the WGII AR4, may be considered 'key' according to the criteria set out above in Section 19.2. The table presents vulnerabilities grouped by the following categories, described in the following text:

- Global social systems
- Regional systems
- Global biological systems
- Geophysical systems
- Extreme events

The table attempts to describe, as quantitatively as the literature allows, how impacts vary with global mean temperature increase above 1990-2000 levels. In addition, the authors of this chapter have assigned confidence estimates to this information. Where known, the table presents information regarding the dependence of effects on rates of warming, duration of the changes, exposure to the stresses, and adaptation taking into account uncertainties

**Table 19.1.** Examples of potential key vulnerabilities. This list is not ordered by priority or severity but by category of system, process or group, which is either affected by or which causes vulnerability. Information is presented where available on how impacts may change at larger increases in global mean temperature (GMT). All increases in GMT are relative to circa 1990. Entries are necessarily brief to limit the size of the table, so further details, caveats and supporting evidence should be sought in the accompanying text, cross-references, and in the primary scientific studies referenced in this and other chapters of the AR4. In many cases, climate change impacts are marginal or synergistic on top of other existing and changing stresses. Confidence symbol legend: \*\*\* very high confidence, \*\* high confidence, \* medium confidence, • low confidence. Sources in [square brackets] are from chapters in the WGII AR4 unless otherwise indicated. Where no source is given, the entries are based on the conclusions of the Chapter 19 authors.

Systems, processes or groups at risk [cross-references]	Prime criteria for 'key vulnerability' (based on the seven criteria listed in Section 19.2)	Relationship between temperature and risk. Temperature change by 2100 (relative to 1990-2000)					
		0°C	1°C	2°C	3°C	4°C	5°C
<b>Global social systems</b>							
Food supply [19.3.2.2]	Distribution, Magnitude			Productivity decreases for some cereals in low latitudes */• [5.4]			
				Productivity increases for some cereals in mid/high latitudes */• [5.4]			Cereal productivity decreases in some mid/high-latitude regions */• [5.4]
				Global production potential increases to around 3°C * [5.4, 5.6]			Global production potential very likely to decrease above about 3°C * [5.4, 5.6]
Infrastructure [19.3.2]	Distribution, Magnitude, Timing	Damages likely to increase exponentially, sensitive to rate of climate change, change in extreme events and adaptive capacity ** [3.5, 6.5.3, 7.5].					
Health [19.3.2]	Distribution, Magnitude, Timing, Irreversibility	Current effects are small but discernible * [1.3.7, 8.2].	Although some risks would be reduced, aggregate health impacts would increase, particularly from malnutrition, diarrhoeal diseases, infectious diseases, floods and droughts, extreme heat, and other sources of risk */**. Sensitive to status of public health system *** [8.ES, 8.3, 8.4, 8.6].				
Water resources [19.3.2]	Distribution, Magnitude, Timing	Decreased water availability and increased drought in some mid latitudes and semi-arid low latitudes ** [3.2, 3.4, 3.7].	Severity of floods, droughts, erosion, water-quality deterioration will increase with increasing climate change ***. Sea-level rise will extend areas of salinisation of groundwater, decreasing freshwater availability in coastal areas *** [3.ES]. Hundreds of millions people would face reduced water supplies ** [3.5].				
Migration and conflict	Distribution, Magnitude	Stresses such as increased drought, water shortages, and riverine and coastal flooding will affect many local and regional populations **. This will lead in some cases to relocation within or between countries, exacerbating conflicts and imposing migration pressures * [19.2].					
Aggregate market impacts and distribution	Magnitude, Distribution	Uncertain net benefits and greater likelihood of lower benefits or higher damages than in TAR •. Net market benefits in many high-latitude areas; net market losses in many low-latitude areas. * [20.6, 20.7]. Most people negatively affected •/*.		Net global negative market impacts increasing with higher temperatures * [20.6]. Most people negatively affected *.			

Systems, processes or groups at risk [cross-references]	Prime criteria for 'key vulnerability' (based on the seven criteria listed in Section 19.2)	Relationship between temperature and risk.					
		Temperature change by 2100 (relative to 1990-2000)					
Regional systems		0°C	1°C	2°C	3°C	4°C	5°C
Africa [19.3.3]	Distribution, Magnitude, Timing, Low Adaptive Capacity	Tens of millions of people at risk of increased water stress; increased spread of malaria • [9.2, 9.4.1, 9.4.3].					Hundreds of millions of additional people at risk of increased water stress; increased risk of malaria in highlands; reductions in crop yields in many countries, harm to many ecosystems such as Succulent Karoo • [9.4.1, 9.4.3, 9.4.4, 9.4.5].
Asia [19.3.3]	Distribution, Magnitude, Timing, Low Adaptive Capacity	About 1 billion people would face risks from reduced agricultural production potential, reduced water supplies or increases in extremes events • [10.4].					
Latin America [19.3.3]	Magnitude, Irreversibility, Distribution, and Timing, Low Adaptive Capacity	Tens of millions of people at risk of water shortages • [13.ES, 13.4.3]; many endemic species at risk from land-use and climate change • (~1°C) [13.4.1, 13.4.2].					More than a hundred million people at risk of water shortages • [13.ES, 13.4.3]; low-lying coastal areas, many of which are heavily populated, at risk from sea-level rise and more intense coastal storms • (about 2-3°C) [13.4.4]. Widespread loss of biodiversity, particularly in the Amazon • [13.4.1, 13.4.2].
Polar regions [19.3.3]	Timing, Magnitude, Irreversibility, Distribution, Low Adaptive Capacity	Climate change is already having substantial impacts on societal and ecological systems ** [15.ES].					Continued warming likely to lead to further loss of ice cover and permafrost ** [15.3]. Arctic ecosystems further threatened **, although net ecosystem productivity estimated to increase ** [15.2.2, 15.4.2]. While some economic opportunities will open up (e.g., shipping), traditional ways of life will be disrupted ** [15.4, 15.7].
Small islands [19.3.3]	Irreversibility, Magnitude, Distribution, Low Adaptive Capacity	Many islands already experiencing some negative effects ** [16.2]. Increasing coastal inundation and damage to infrastructure due to sea-level rise ** [16.4].					
Indigenous, poor or isolated communities [19.3.3]	Irreversibility, Distribution, Timing, Low Adaptive Capacity	Some communities already affected ** [11.4, 14.2.3, 15.4.5].					Climate change and sea-level rise add to other stresses **. Communities in low-lying coastal and arid areas are especially threatened ** [3.4, 6.4].
Drying in Mediterranean, western North America, southern Africa, southern Australia, and north-eastern Brazil [19.3.3]	Distribution, Magnitude, Timing	Climate models generally project decreased precipitation in these regions [3.4.1, 3.5.1, 11.3.1]. Reduced runoff will exacerbate limited water supplies, decrease water quality, harm ecosystems and result in decreased crop yields ** [3.4.1, 11.4].					
Inter-tropical mountain glaciers and impacts on high-mountain communities [19.3.3]	Magnitude, Timing, Persistence, Low Adaptive Capacity, Distribution	Inter-tropical glaciers are melting and causing flooding in some areas; shifts in ecosystems are likely to cause water security problems due to decreased storage ** [Box 1.1, 10.ES, 10.2, 10.4.4, 13.ES, 13.2.4, 19.3].					Accelerated reduction of inter-tropical mountain glaciers. Some of these systems will disappear in the next few decades * [Box 1.1, 9.2.1, Box 9.1, 10.ES, 10.2.4, 10.4.2, 13.ES, 13.2.4.1].
<b>Global biological systems</b>							
Terrestrial ecosystems and biodiversity [19.3.4]	Irreversibility, Magnitude, Low Adaptive Capacity, Persistence, Rate of Change, Confidence	Many ecosystems already affected *** [1.3].			circa 20-30% species at increasingly high risk of extinction * [4.4].		Major extinctions around the globe ** [4.4]  Terrestrial biosphere tends toward a net carbon source ** [4.4]
Marine ecosystems and biodiversity [19.3.4]	Irreversibility, Magnitude, Low Adaptive Capacity, Persistence, Rate of Change, Confidence	Increased coral bleaching ** [4.4]			Most corals bleached ** [4.4]		Widespread coral mortality *** [4.4]

Systems, processes or groups at risk [cross-references]	Prime criteria for 'key vulnerability' (based on the seven criteria listed in Section 19.2)	Relationship between temperature and risk.					
		Temperature change by 2100 (relative to 1990-2000)					
		0°C	1°C	2°C	3°C	4°C	5°C
<b>Global biological systems</b>							
Freshwater ecosystems [19.3.4]	Irreversibility, Magnitude, Persistence Low Adaptive Capacity	Some lakes already showing decreased fisheries output; poleward migration of aquatic species ** [1.3.4, 4.4.9].	Intensified hydrological cycles, more severe droughts and floods *** [3.4.3].	Extinction of many freshwater species **, major changes in limnology of lakes **, increased salinity of inland lakes **.			
<b>Geophysical systems</b>							
Biogeochemical cycles [WGII 4.4.9, 19.3.5.1; WGI 7.3.3, 7.3.4, 7.3.5, 7.4.1.2, 10.4.1, 10.4.2]	Magnitude, Persistence, Confidence, Low Adaptive Capacity, Rate of Change	Ocean acidification already occurring, increasing further as atmospheric CO <sub>2</sub> concentration increases ***; ecological changes are potentially severe * [1.3.4, 4.4.9]. Carbon cycle feedback increases projected CO <sub>2</sub> concentrations by 2100 by 20-220 ppm for SRES <sup>2</sup> A2, with associated additional warming of 0.1 to 1.5°C **. AR4 temperature range (1.1-6.4°C) accounts for this feedback from all scenarios and models but additional CO <sub>2</sub> and CH <sub>4</sub> releases are possible from permafrost, peat lands, wetlands, and large stores of marine hydrates at high latitudes * [4.4.6, 15.4.2]. Permafrost already melting, and above feedbacks generally increase with climate change, but eustatic sea-level rise likely to increase stability of hydrates *** [1.3.1].					
Greenland ice sheet [WGII 6.3, 19.3.5.2; WGI 6.4.3.3, 10.7.4.3]	Magnitude, Irreversibility, Low Adaptive Capacity, Confidence	Localised deglaciation (already observed, due to local warming); extent would increase with temperature increase *** [19.3.5].	Commitment to widespread ** to near-total * deglaciation, 2-7 m sea-level rise <sup>3</sup> over centuries to millennia * [19.3.5].	Near-total deglaciation ** [19.3.5]			
West Antarctic ice sheet [WGII 6.3, 19.3.5.2; WGI 6.4.3.3, 10.7.4.4]	Magnitude, Irreversibility, Low Adaptive Capacity	Localised ice shelf loss and grounding line retreat * (already observed, due to local warming) [1.3.1, 19.3.5]	Commitment to partial deglaciation, 1.5-5 m sea-level rise over centuries to millennia •* [19.3.5]	Likelihood of near-total deglaciation increases with increases in temperature ** [19.3.5]			
Meridional overturning circulation [WGII 19.3.5.3; WGI 8.7.2.1, 10.3.4]	Magnitude, Persistence, Distribution, Timing, Low Adaptive Capacity, Confidence	Variations including regional weakening (already observed but no trend identified)	Considerable weakening **. Commitment to large-scale and persistent change including possible cooling in northern high-latitude areas near Greenland and north-west Europe • highly dependent on rate of climate change [12.6, 19.3.5].				
<b>Extreme events</b>							
Tropical cyclone intensity [WGII 7.5, 8.2, 11.4.5, 16.2.2, 16.4, 19.3.6; WGI Table TS-4, 3.8.3, Q3.3, 9.5.3.6, Q10.1]	Magnitude, Timing, Distribution	Increase in Category 4-5 storms*/**, with impacts exacerbated by sea-level rise	Further increase in tropical cyclone intensity */** exceeding infrastructure design criteria with large economic costs ** and many lives threatened **.				
Flooding, both large-scale and flash floods [WGII 14.4.1; WGI Table TS-4, 10.3.6.1, Q10.1]	Timing, Magnitude	Increases in flash flooding in many regions due to increased rainfall intensity** and in floods in large basins in mid and high latitudes **.	Increased flooding in many regions (e.g., North America and Europe) due to greater increase in winter rainfall exacerbated by loss of winter snow storage **. Greater risk of dam burst in glacial mountain lakes ** [10.2.4.2].				
Extreme heat [WGII 14.4.5; WGI Table TS-4, 10.3.6.2, Q10.1]	Timing, Magnitude	Increased heat stress and heat-waves, especially in continental areas ***.	Frequency of heatwaves (according to current classification) will increase rapidly, causing increased mortality, crop failure, forest die-back and fire, and damage to ecosystems ***.				
Drought [WGI Table TS-4, 10.3.6.1]	Magnitude, Timing	Drought already increasing * [1.3.2.1]. Increasing frequency and intensity of drought in mid-latitude continental areas projected ** [WGI 10.3.6.1].	Extreme drought increasing from 1% land area to 30% (SRES A2 scenario) [WGI 10.3.6.1]. Mid-latitude regions seriously affected by poleward migration of Annular Modes ** [WGI 10.3.5.5].				
Fire [WGII 1.3.6; WGI 7.3]	Timing, Magnitude	Increased fire frequency and intensity in many areas, particularly where drought increases ** [4.4, 14.2.2].	Frequency and intensity likely to be greater, especially in boreal forests and dry peat lands after melting of permafrost ** [4.4.5, 11.3, 13.4.1, 14.4.2, 14.4.4].				

<sup>2</sup> SRES: Special Report on Emissions Scenarios, see Nakićenović et al., 2000.

<sup>3</sup> Range is based on a variety of methods including models and analysis of palaeo data [19.3.5.2]

regarding socio-economic development. However, only in a few cases does the literature address rate or duration of warming and its consequences. As entries in the table are necessarily short, reference should be made to the relevant chapters and to the accompanying text in this chapter for more detailed information and cross-referencing, including additional caveats where applicable.

### 19.3.2 Global social systems

The term ‘social systems’ is used here in a broad sense to describe human systems, and includes both market systems and social systems. Market systems typically involve the provision and sale of goods and services in formal or informal markets. Valuation of non-market impacts (e.g., losses of human life, species lost, distributional inequity, etc.) involves a series of normative judgements that limit the degree of consensus and confidence commanded by different studies (see Section 19.1.2). The importance of non-market impacts and equity weighting is suggested by Stern (2007) but, in the absence of likelihood and confidence assessments, it is difficult to apply to any risk-management framework calculations.

We first discuss impacts on major market systems, followed by a discussion of impacts on major aspects of social systems. Such impacts are often considered to be important in the context of sustainable development.

#### 19.3.2.1 Agriculture

Ensuring that food production is not threatened is an explicit criterion of UNFCCC Article 2. In general, low-latitude areas are most at risk of having decreased crop yields. In contrast, mid- and high-latitude areas could generally, although not in all locations, see increases in crop yields for temperature increases of up to 1-3°C (see Chapter 5 Section 5.4.2). Taken together, there is low to medium confidence that global agricultural production could increase up to approximately 3°C of warming. For temperature increases beyond 1-3°C, yields of many crops in temperate regions are projected to decline (•/\*<sup>4</sup>). As a result, beyond 3°C warming, global production would decline because of climate change (•/\*) and the decline would continue as GMT increases (•/\*). Most studies on global agriculture have not yet incorporated a number of critical factors, including changes in extreme events or the spread of pests and diseases. In addition, they have not considered the development of specific practices or technologies to aid adaptation.

#### 19.3.2.2 Other market sectors

Other market systems will also be affected by climate change. These include the livestock, forestry and fisheries industries, which are very likely to be directly affected as climate affects the quality and extent of rangeland for animals, soils and other growing conditions for trees, and freshwater and marine ecosystems for fish. Other sectors are also sensitive to climate change. These include energy, construction, insurance, tourism and recreation. The aggregate effects of climate change on many of these sectors has received little attention in the literature and remains highly uncertain. Some sectors are likely to see shifts in

expenditure; with some contracting and some expanding. Yet, for some sectors, such as insurance, the impacts of climate change are likely to result in increased damage payments and premiums (see Chapter 7).

Other sectors, such as tourism and recreation, are likely to see some substantial shifts (e.g., reduction in ski season, loss of some ski areas, shifts in location of tourist destinations because of changes in climate and extreme events; e.g., Hamilton et al., 2005; see also Chapter 7 Section 7.4.2 and Chapter 14 Section 14.4.7). Global net energy demand is very likely to change (Tol, 2002b). Demand for air-conditioning is highly likely to increase, whereas demand for heating is highly likely to decrease. The literature is not clear on what temperature is associated with minimum global energy demand, so it is uncertain whether warming will initially increase or decrease net global demand for energy relative to some projected baseline. However, as temperatures rise, net global demand for energy will eventually rise as well (Hitz and Smith, 2004).

#### 19.3.2.3 Aggregate market impacts

The total economic impacts from climate change are highly uncertain. Depending upon the assumptions used (e.g., climate sensitivity, discount rate and regional aggregation) total economic impacts are typically estimated to be in the range of a few percent of gross world product for a few degrees of warming (see Chapter 20). Some estimates suggest that gross world product could increase up to about 1-3°C warming, largely because of estimated direct CO<sub>2</sub> effects on agriculture, but such estimates carry only low confidence. Even the direction of gross world product change with this level of warming is highly uncertain. Above the 1-3°C level of warming, available studies indicate that gross world product could decrease (•). For example, Tol (2002a) estimates net positive global market impacts at 1°C when weighting by economic output, but finds much smaller positive impacts when equity-weighted. Nordhaus (2006) uses a geographically based method and finds more negative economic impacts than previous studies, although still in the range of a few percent of gross world product.

Studies of aggregate market impacts tend to rely on scenarios of average changes in climate and focus on direct economic effects alone. Potential damages from increased severity of extreme climate events are often not included. The damages from an increase in extreme events could substantially increase market damages, especially at larger magnitudes of climate change (\*). Also, recent studies draw attention to indirect effects of climate change on the economy (e.g., on capital accumulation and investment, on savings rate); although there is debate about methods, the studies agree that such effects could be significant and warrant further attention (see Section 19.3.7; Fankhauser and Tol, 2005; Kempfert, 2006; Roson and Tol, 2006; Fisher et al., 2007).

#### 19.3.2.4 Distribution of market impacts

Global market impacts mask substantial variation in market impacts at the continental, regional, national and local scales. Even if gross world product were to change just a few percent, national economies could be altered by relatively large amounts.

<sup>4</sup> The following confidence symbols are used: \*\*\* very high confidence, \*\* high confidence, \* medium confidence, • low confidence.

For example, Maddison (2003) reports increases in cost of living in low-latitude areas and decreases in high-latitude areas from a 2.5°C warming. All studies with regional detail show Africa, for example, with climate damages of the order of several percent of gross domestic product (GDP) at 2°C increase in GMT or even lower levels of warming (\*). As noted below, very small economies such as Kiribati face damages from climate change in the range of 20% of their GDP (•) (see Chapter 16 Section 16.4.3). The distributional heterogeneity in market system impacts reflects the equity criterion described in Section 19.2 when considering which impacts may be considered ‘key’.

### 19.3.2.5 Societal systems

With regard to vulnerability of societal systems, there are myriad thresholds specific to particular groups and systems at specific time-frames beyond which they can be vulnerable to variability and to climate change (Yamin et al., 2005). These differences in vulnerability are a function of a number of factors. Exposure is one key factor. For example, crops at low latitudes will have greater exposure to higher temperatures than crops at mid- and high latitudes. Thus, yields for grain crops, which are sensitive to heat, are more likely to decline at lower latitudes than at higher latitudes. Social systems in low-lying coastal areas will vary in their exposure and adaptive capacities, yet most will have increased vulnerability with greater warming and associated sea-level rises or storm surges.

A second key factor affecting vulnerability is the capacity of social systems to adapt to their environment, including coping with the threats it may pose, and taking advantage of beneficial changes. Smit et al. (2001) identified a number of determinants of adaptive capacity, including such factors as wealth, societal organisation and access to technology (see also Yohe and Tol, 2002). These attributes differentiate vulnerability to climate change across societies facing similar exposure. For example, Nicholls (2004) and Nicholls and Tol (2006) found that level of development and population growth are very important factors affecting vulnerability to sea-level rise. The specific vulnerabilities of communities with climate-related risks, such as the elderly and the poor or indigenous communities, are typically much higher than for the population as a whole (see Section 14.2.6)

Even though some cold-related deaths and infectious disease exposure are likely to be reduced, on balance there is medium confidence that global mortality will increase as a result of climate change. It is estimated that an additional 5-170 million people will be at risk of hunger by the 2080s as a consequence of climate change (Chapter 5 Section 5.6.5). There is medium to high confidence that some other climate-sensitive health outcomes, including heatwave impacts, diarrhoeal diseases, flood-related risks, and diseases associated with exposure to elevated concentrations of ozone and aeroallergens, will increase with GMT (Chapter 8 Section 8.4.1). Development and adaptation are key factors influencing human health risk (Chapter 8 Section 8.6).

Vulnerability associated with water resources is complex because vulnerability is quite region-specific. In addition, the level of development and adaptation and social factors determining access to water are very important in determining vulnerability in the water sector. Studies differ as to whether

climate change will increase or decrease the number of people living in water-stressed areas (e.g., Parry et al., 1999; Arnell, 2004; Hitz and Smith, 2004; Alcamo et al., 2007). Hundreds of millions of people are estimated to be affected by changes in water quantity and quality (Chapter 3 Section 3.4.3; Arnell, 2004) but uncertainties limit confidence and thus the degree to which these risks might be labelled as ‘key’. Floods and droughts appear to have increased in some regions and are likely to become more severe in the future (Chapter 3 Section 3.4.3).

### 19.3.3 Regional vulnerabilities

Many of the societal impacts discussed above will be felt within the regions assessed as part of the AR4. At a regional and sub-regional scale, vulnerabilities can vary quite considerably. For example, while mid- and high-latitude areas would have increased crop yields up to about 3°C of warming, low-latitude areas would face decreased yields and increased risks of malnutrition at lower levels of warming (•/\*) (Chapter 5 Section 5.4.2; Parry et al., 2004).

Africa is likely to be the continent most vulnerable to climate change. Among the risks the continent faces are reductions in food security and agricultural productivity, particularly regarding subsistence agriculture (Chapter 9 Sections 9.4.4 and 9.6.1; Parry et al., 2004; Elasha et al., 2006), increased water stress (Chapter 9 Section 9.4.1) and, as a result of these and the potential for increased exposure to disease and other health risks, increased risks to human health (Chapter 9 Section 9.4.3). Other regions also face substantial risks from climate change. Approximately 1 billion people in South, South-East, and East Asia would face increased risks from reduced water supplies (•) (Chapter 10 Section 10.4.2), decreased agricultural productivity (•) (Chapter 10 Section 10.4.1.1), and increased risks of floods, droughts and cholera (\*) (Chapter 10 Section 10.4.5). Tens of millions to over a hundred million people in Latin America would face increased risk of water stress (•) (Chapter 13 Section 13.4.3). Low-lying, densely populated coastal areas are very likely to face risks from sea-level rise and more intense extreme events (Chapter 13 Section 13.4.4). The combination of land-use changes and climate change is very likely to reduce biodiversity substantially (Chapter 13 Section 13.2.5.1).

There is very high confidence that human settlements in polar regions are already being adversely affected by reduction in ice cover and coastal erosion (Chapter 15 Section 15.2.2). Future climate change is very likely to result in additional disruption of traditional cultures and loss of communities. For example, warming of freshwater sources poses risks to human health because of transmission of disease (\*) (Martin et al., 2005). Shifts in ecosystems are very likely to alter traditional use of natural resources, and hence lifestyles.

Small islands, particularly several small island states, are likely to experience large impacts due to the combination of higher exposure, for example to sea-level rise and storm surge, and limited ability to adapt (Chapter 16 Sections 16.ES, 16.2.1 and 16.4). There is very high confidence that many islands are already experiencing some negative effects of climate change (Chapter 1 Section 1.3.3; Chapter 16 Section 16.4). The long-term sustainability of small-island societies is at great risk from

climate change, with sea-level rise and extreme events posing particular challenges on account of their limited size, proneness to natural hazards and external shocks combined with limited adaptive capacity and high costs relative to GDP. Subsistence and commercial agriculture on small islands is likely to be adversely affected by climate change and sea-level rise, as a result of inundation, seawater intrusion into freshwater lenses, soil salinisation, decline in water supply and deterioration of water quality (Chapter 16 Executive Summary and Section 16.4). A group of low-lying islands, such as Tarawa and Kiribati, would face average annual damages of 17 to 18% of its economy by 2050 under the SRES A2 and B2 scenarios (•) (Chapter 16 Section 16.4.3).

Even in developed countries, there are many vulnerabilities. Arnell (2004) estimated a 40 to 50% reduction in runoff in southern Europe by the 2080s (associated with a 2 to 3°C increase in global mean temperature). Fires will very likely continue to increase in arid and semi-arid areas such as Australia and the western USA, threatening development in wildland areas (Chapter 4 Section 4.4.4; Chapter 11 Section 11.3.1; Chapter 14 Box 14.1 and Section 14.4.4; Westerling et al., 2006). Climate change is likely to increase the frequency and intensity of extreme heat events, as well as concentrations of air pollutants, such as ozone, which increase mortality and morbidity in urban areas (see Chapters 8, 11, 12 and 14).

### 19.3.4 Ecosystems and biodiversity

There is high confidence that climate change will result in extinction of many species and reduction in the diversity of ecosystems (see Section 4.4) Vulnerability of ecosystems and species is partly a function of the expected rapid rate of climate change relative to the resilience of many such systems. However, multiple stressors are significant in this system, as vulnerability is also a function of human development, which has already substantially reduced the resilience of ecosystems and makes many ecosystems and species more vulnerable to climate change through blocked migration routes, fragmented habitats, reduced populations, introduction of alien species and stresses related to pollution.

There is very high confidence that regional temperature trends are already affecting species and ecosystems around the world (Chapter 1 Sections 1.3.4 and 1.3.5; Parmesan and Yohe, 2003; Root et al., 2003; Menzel et al., 2006) and it is likely that at least part of the shifts in species observed to be exhibiting changes in the past several decades can be attributed to human-induced warming (see Chapter 1; Root et al., 2005). Thus, additional climate changes are likely to adversely affect many more species and ecosystems as global mean temperatures continue to increase (see Section 4.4). For example, there is high confidence that the extent and diversity of polar and tundra ecosystems is in decline and that pests and diseases have spread to higher latitudes and altitudes (Chapter 1 Sections 1.3.5 and 1.5).

Each additional degree of warming increases disruption of ecosystems and loss of species. Individual ecosystems and species often have different specific thresholds of change in temperature, precipitation or other variables, beyond which they

are at risk of disruption or extinction. Looking across the many ecosystems and thousands of species at risk of climate change, a continuum of increasing risk of loss of ecosystems and species emerges in the literature as the magnitude of climate change increases, although individual confidence levels will vary and are difficult to assess. Nevertheless, further warming is likely to cause additional adverse impacts to many ecosystems and contribute to biodiversity losses. Some examples follow.

- About half a degree of additional warming can cause harm to vulnerable ecosystems such as coral reefs and Arctic ecosystems \* (Table 4.1).
- A warming of 1°C above 1990 levels would result in all coral reefs being bleached and 10% of global ecosystems being transformed (Chapter 4 Section 4.4.11).
- A warming of 2°C above 1990 levels will result in mass mortality of coral reefs globally \*\*\* (Chapter 4 Section 4.4; Chapter 6 Box 6.1), with one-sixth of the Earth's ecosystems being transformed (Leemans and Eickhout, 2004) \*\*, and about one-quarter of known species being committed to extinction \*. For example, if Arctic sea-ice cover recedes markedly, many ice-dependent Arctic species, such as polar bears and walrus, will be increasingly likely to be at risk of extinction; other estimates suggest that the African Succulent Karoo is likely to lose four-fifths of its area (Chapter 4 Section 4.4.11 and Table 4.1). There is low confidence that the terrestrial biosphere will become a net source of carbon (Chapter 4 Section 4.4.1).
- An additional degree of warming, to 3°C, is likely to result in global terrestrial vegetation becoming a net source of carbon (Chapter 4 Section 4.4.1), over one-fifth of ecosystems being transformed \* (Chapter 4 Section 4.4.11; Leemans and Eickhout, 2003), up to 30% of known species being committed to extinction \* (Chapter 4 Section 4.4.11 and Table 4.1; Thomas et al., 2004; Malcolm et al., 2006, estimate that 1 to 43% of species in 25 biodiversity hotspots are at risk from an approximate 3 to 4°C warming) and half of all nature reserves being unable to meet conservation objectives \* (Chapter 4 Table 4.1). Disturbances such as fire and pests are very likely to increase substantially (Chapter 4 Section 4.4).
- There is very high confidence that warming above 3°C will cause further disruption of ecosystems and extinction of species.

### 19.3.5 Geophysical systems

A number of Earth-system changes may be classified as key impacts resulting in key vulnerabilities.

#### 19.3.5.1. Global biogeochemical cycles

The sensitivity of the carbon cycle to increased CO<sub>2</sub> concentrations and climate change is a key vulnerability due to its magnitude, persistence, rate of change, low adaptive capacity and the level of confidence in resulting impacts. Models suggest that the overall effect of carbon–climate interactions is a positive feedback (Denman et al., 2007 Section 7.1.5). As CO<sub>2</sub> concentrations increase and climate changes, feedbacks from terrestrial stores of carbon in forests and grasslands, soils, wetlands, peatlands and permafrost, as well as from the ocean,

would reduce net uptake of CO<sub>2</sub> (Denman et al., 2007 Sections 7.3.3 and 7.3.4). Hence the predicted atmospheric CO<sub>2</sub> concentration in 2100 is higher (and consequently the climate is warmer) than in models that do not include these couplings (Denman et al., 2007 Section 7.1.5). An intercomparison of ten climate models with a representation of the land and ocean carbon cycle forced by the SRES A2 emissions scenario (Denman et al., 2007 Section 7.3.5; Meehl et al., 2007 Section 10.4.1) shows that, by the end of the 21st century, additional CO<sub>2</sub> varies between 20 and 200 ppm for the two extreme models, with most of the models projecting additional CO<sub>2</sub> between 50 and 100 ppm (Friedlingstein et al., 2003), leading to an additional warming ranging between 0.1 and 1.5°C. A similar range results from estimating the effect including forcing from aerosols and non-CO<sub>2</sub> greenhouse gases (GHGs). Such additional warming would increase the number and severity of impacts associated with many key vulnerabilities identified in this chapter. In addition, these feedbacks reduce the emissions (Meehl et al., 2007 Section 10.4.1) compatible with a given atmospheric CO<sub>2</sub> stabilisation pathway (\*\*)

At the regional level (see Chapters 4, 10, 11, 12 and 14), important aspects of the carbon–climate interaction include the role of fire (Denman et al., 2007 Section 7.3.3.1.4) in transient response and possible abrupt land-cover transitions from forest to grassland or grassland to semi-arid conditions (Claussen et al., 1999; Eastman et al., 2001; Cowling et al., 2004; Rial et al., 2004).

Warming destabilises permafrost and marine sediments of methane gas hydrates in some regions according to some model simulations (Denman et al., 2007 Section 7.4.1.2), as has been proposed as an explanation for the rapid warming that occurred during the Palaeocene/Eocene thermal maximum (Dickens, 2001; Archer and Buffett, 2005). A rising eustatic (global) contribution to sea level is estimated to stabilise hydrates to some degree. One study (Harvey and Huang, 1995) reports that methane releases may increase very long-term future temperature by 10-25% over a range of scenarios. Most studies also point to increased methane emissions from wetlands in a warmer, wetter climate (Denman et al., 2007 Section 7.4.1.2).

Increasing ocean acidity due to increasing atmospheric concentrations of CO<sub>2</sub> (Denman et al., 2007 Section 7.3.4.1; Sabine et al., 2004; Royal Society, 2005) is very likely to reduce biocalcification of marine organisms such as corals (Hughes et al., 2003; Feely et al., 2004). Though the limited number of studies available makes it difficult to assess confidence levels, potentially severe ecological changes would result from ocean acidification, especially for corals in tropical stably stratified waters, but also for cold water corals, and may influence the marine food chain from carbonate-based phytoplankton up to higher trophic levels (Denman et al., 2007 Section 7.3.4.1; Turley et al., 2006).

### 19.3.5.2 Deglaciation of West Antarctic and Greenland ice sheets

The potential for partial or near-total deglaciation of the Greenland and the West Antarctic ice sheets (WAIS) and associated sea-level rise (Jansen et al., 2007 Sections 6.4.3.2 and 6.4.3.3; Meehl et al., 2007 Sections 10.6.4, 10.7.4.3 and

10.7.4.4; Alley et al., 2005; Vaughan, 2007), is a key impact that creates a key vulnerability due to its magnitude and irreversibility, in combination with limited adaptive capacity and, if substantial deglaciation occurred, high levels of confidence in associated impacts. Ice sheets have been discussed specifically in the context of Article 2 (O'Neill and Oppenheimer 2002; Hansen, 2005; Keller et al., 2005; Oppenheimer and Alley, 2005). Near-total deglaciation would eventually lead to a sea-level rise of around 7 m and 5 m (\*\*\*) from Greenland and the WAIS, respectively, with wide-ranging consequences including a reconfiguration of coastlines worldwide and inundation of low-lying areas, particularly river deltas (Schneider and Chen, 1980; Revelle, 1983; Tol et al., 2006; Vaughan, 2007). Widespread deglaciation would not be reversible except on very long time-scales, if at all (Meehl et al., 2007 Sections 10.7.4.3 and 10.7.4.4). The Amundsen Sea sector of the WAIS, already experiencing ice acceleration and rapid ground-line retreat (Lemke et al., 2007 Section 4.6.2.2), on its own includes ice equivalent to about 1.5 m sea-level rise (Meehl et al., 2007 Section 10.7.4.4; Vaughan, 2007). The ability to adapt would depend crucially on the rate of deglaciation (\*\*). Estimates of this rate and the corresponding time-scale for either ice sheet range from more rapid (several centuries for several metres of sea-level rise, up to 1 m/century) to slower (i.e., a few millennia; Meehl et al., 2007 Section 10.7.4.4; Vaughan and Spouge, 2002), so that deglaciation is very likely to be completed long after it is first triggered.

For Greenland, the threshold for near-total deglaciation is estimated at 3.2-6.2°C local warming (1.9-4.6°C global warming) relative to pre-industrial temperatures using current models (Meehl et al., 2007 Section 10.7.4.3). Such models also indicate that warming would initially cause the Antarctic ice sheet as a whole to gain mass owing to an increased accumulation of snowfall (\*; some recent studies find no significant continent-wide trends in accumulation over the past several decades; Lemke et al., 2007 Section 4.6.3.1). Scenarios of deglaciation (Meehl et al., 2007 Section 10.7.4.4) assume that any such increase would be outweighed by accelerated discharge of ice following weakening or collapse of an ice shelf due to melting at its surface or its base (\*). Mean summer temperatures over the major West Antarctic ice shelves are about as likely as not to pass the melting point if global warming exceeds 5°C (Meehl et al., 2007 Section 10.7.4.4). Some studies suggest that disintegration of ice shelves would occur at lower temperatures due to basal or episodic surface melting (Meehl et al., 2007 Sections 10.6.4.2 and 10.7.4.4; Wild et al., 2003). Recent observations of unpredicted, local acceleration and consequent loss of mass from both ice sheets (Alley et al., 2005) underscores the inadequacy of existing ice-sheet models, leaving no generally agreed basis for projection, particularly for WAIS (Lemke et al., 2007 Section 4.6.3.3; Meehl et al., 2007 Sections 10.6.4.2 and 10.7.4.4; Vieli and Payne, 2005). However, palaeoclimatic evidence (Denman et al., 2007 Sections 6.4.3.2 and 6.4.3.3; Overpeck et al., 2006; Otto-Bliesner et al., 2006) suggests that Greenland and possibly the WAIS contributed to a sea-level rise of 4-6 m during the last interglacial, when polar temperatures were 3-5°C warmer, and the global mean was not notably warmer, than at present (Meehl et al., 2007 Sections

10.7.4.3 and 10.7.4.4). Accordingly, there is medium confidence that at least partial deglaciation of the Greenland ice sheet, and possibly the WAIS, would occur over a period of time ranging from centuries to millennia for a global average temperature increase of 1-4°C (relative to 1990-2000), causing a contribution to sea-level rise of 4-6 m or more (Meehl et al., 2007 Sections 10.7.4.3 and 10.7.4.4; Oppenheimer and Alley, 2004, 2005; Hansen, 2005).

Current limitations of ice-sheet modelling also increase uncertainty in the projections of 21st-century sea-level rise (Meehl et al., 2007 Section 10.6.4.2) used to assess coastal impacts in this report. An illustrative estimate by WGI of the contribution of processes not represented by models yielded an increase of 0.1-0.2 m in the upper ranges of projected sea-level rise for 2100 (Meehl et al., 2007 Section 10.6.4.2). Other approximation methods would yield larger or smaller adjustments, including zero.

### 19.3.5.3 Possible changes in the North Atlantic meridional overturning circulation (MOC)

The sensitivity of the North Atlantic meridional overturning circulation (MOC) (cf., WGI AR4 Glossary; Bindoff et al., 2007 Box 5.1) to anthropogenic forcing is regarded as a key vulnerability due to the potential for sizeable and abrupt impacts (Tol, 1998; Keller et al., 2000; Mastrandrea and Schneider, 2001; Alley et al., 2003; Rahmstorf et al., 2003; Link and Tol, 2004, 2006; Higgins and Schneider, 2005; Sathaye et al., 2007).

Palaeo-analogues and model simulations show that the MOC can react abruptly and with a hysteresis response, once a certain forcing threshold is crossed (Randall et al., 2007; Meehl et al., 2007). Estimates of the forcing threshold that would trigger large-scale and persistent MOC changes rely on three main lines of evidence. The first, based on the analysis of coupled Atmosphere-Ocean General Circulation Models (AOGCMs), do not show MOC collapse in the 21st century (Meehl et al., 2007 Box 10.1). Assessing the confidence in this is, however, difficult, as these model runs sample only a subset of potentially relevant uncertainties (e.g., Challenor et al., 2006) and do not cross the forcing thresholds suggested by the second line of evidence: simulations using Earth system models of intermediate complexity (EMICs) (Randall et al., 2007 Section 8.8.3; Meehl et al., 2007 10.3.4). EMIC simulations, which use simplified representations of processes to explore a wider range of uncertainties, suggest that the probability that forcing would trigger an MOC threshold response during the 21st century could exceed estimates derived from AOGCM runs alone (e.g., Challenor et al., 2006). The third line of evidence, not assessed by Working Group I, relies on expert elicitations (sometimes combined with the analysis of simple climate models). These MOC projections show a large spread, with some suggesting a substantial likelihood of triggering a MOC threshold response within this century (Arnell et al., 2005; Rahmstorf and Zickfeld, 2005; McInerney and Keller, 2006; Schlesinger et al., 2006; Yohe et al., 2006).

Potential impacts associated with MOC changes include reduced warming or (in the case of abrupt change) absolute cooling of northern high-latitude areas near Greenland and

north-western Europe, an increased warming of Southern Hemisphere high latitudes, tropical drying (Vellinga and Wood, 2002, 2006; Wood et al., 2003, 2006), as well as changes in marine ecosystem productivity (Schmittner, 2005), terrestrial vegetation (Higgins and Vellinga, 2004), oceanic CO<sub>2</sub> uptake (Sarmiento and Le Quéré, 1996), oceanic oxygen concentrations (Matear and Hirst, 2003) and shifts in fisheries (Keller et al., 2000; Link and Tol, 2004). Adaptation to MOC-related impacts is very likely to be difficult if the impacts occur abruptly (e.g., on a decadal time-scale). Overall, there is high confidence in predictions of a MOC slowdown during the 21st century, but low confidence in the scale of climate change that would cause an abrupt transition or the associated impacts (Meehl et al., 2007 Section 10.3.4). However, there is high confidence that the likelihood of large-scale and persistent MOC responses increases with the extent and rate of anthropogenic forcing (e.g., Stocker and Schmittner, 1997; Stouffer and Manabe, 2003).

### 19.3.5.4 Changes in the modes of climate variability

Change in the modes of climate variability in response to anthropogenic forcing can lead to key impacts because these modes dominate annual-to-decadal variability, and adaptation to variability remains challenging in many regions. For example, some studies suggest that anthropogenic forcings would affect El Niño-Southern Oscillation (ENSO) variability (Timmermann et al., 1999; Fedorov and Philander, 2000; Fedorov et al., 2006; Hegerl et al., 2007 Section 9.5.3.1; Meehl et al., 2007 Section 10.3.5.3-5). Current ENSO projections are marked by many uncertainties, including

- the potential for an abrupt and/or hysteresis response,
- the direction of the shift,
- the level of warming when triggered.

ENSO shifts would affect agriculture (Cane et al., 1994; Legler et al., 1999), infectious diseases (Rodo et al., 2002), water supply, flooding, droughts (Kuhnel and Coates, 2000; Cole et al., 2002), wildfires (Swetnam and Betancourt, 1990), tropical cyclones (Pielke and Landsea, 1999; Emanuel, 2005), fisheries (Lehodey et al., 1997), carbon sinks (Bacastow et al., 1980) and the North Atlantic MOC (Latif et al., 2000).

The North Atlantic Oscillation (NAO) and the Annular Mode in both the Northern and Southern Hemispheres (also known as the Arctic Oscillation, AO, and the Antarctic Oscillation, AAO; Meehl et al., 2007 Section 10.3.5.6; Hartmann et al., 2000; Thompson and Wallace, 2000; Fyfe et al., 1999; Kushner et al., 2001; Cai et al., 2003; Gillett et al., 2003; Kuzmina et al., 2005) are likely to be affected by greenhouse forcing and ozone depletion. For example, the average of the IPCC WGI AR4 simulations from thirteen models shows a positive trend for the Northern Annular Mode that becomes statistically significant early in the 21st century (Meehl et al., 2007 Section 10.3.5.6). Such changes would affect surface pressure patterns, storm tracks and rainfall distributions in the mid and high latitudes of both hemispheres, with potentially serious impacts on regional water supplies, agriculture, wind speeds and extreme events. Implications are potentially severe for water resources and storminess in Australia, New Zealand, southern Africa, Argentina and Chile, southern Europe, and possibly parts of the USA where Mediterranean-type climates prevail.

Current forcing may have caused changes in these modes but observed changes are also similar to those simulated in AOGCMs in the absence of forcing (Cai et al., 2003). There is some evidence for a weakening of major tropical monsoon circulations (AR4 WGI 3.7.1, 9.5.3.5). Projections of monsoon precipitation show a complex pattern of increases (e.g., Australia in the southern summer and Asia), and decreases (e.g., the Sahel in the northern summer) (Meehl et al., 2007 Section 10.3.5.2). Confidence in projections of specific monsoonal changes is low to medium.

### 19.3.6 Extreme events

As discussed in WGI AR4 Technical Summary (Solomon et al., 2007) Box TS.5 and Table TS.4, various extreme events are very likely to change in magnitude and/or frequency and location with global warming. In some cases, significant trends have been observed in recent decades (Trenberth et al., 2007 Table 3.8).

The most likely changes are an increase in the number of hot days and nights (with some minor regional exceptions), or in days exceeding various threshold temperatures, and decreases in the number of cold days, particularly including frosts. These are virtually certain to affect human comfort and health, natural ecosystems and crops. Extended warmer periods are also very likely to increase water demand and evaporative losses, increasing the intensity and duration of droughts, assuming no increases in precipitation.

Precipitation is generally predicted in climate models to increase in high latitudes and to decrease in some mid-latitude regions, especially in regions where the mid-latitude westerlies migrate polewards in the summer season, thus steering fewer storms into such 'Mediterranean climates' (Meehl et al., 2007 Section 10.3.2.3). These changes, together with a general intensification of rainfall events (Meehl et al., 2007 Section 10.3.6.1), are very likely to increase the frequency of flash floods and large-area floods in many regions, especially at high latitudes. This will be exacerbated, or at least seasonally modified in some locations, by earlier melting of snowpacks and melting of glaciers. Regions of constant or reduced precipitation are very likely to experience more frequent and intense droughts, notably in Mediterranean-type climates and in mid-latitude continental interiors.

Extended warm periods and increased drought will increase water stress in forests and grasslands and increase the frequency and intensity of wildfires (Cary, 2002; Westerling et al., 2006), especially in forests and peatland, including thawed permafrost. These effects may lead to large losses of accumulated carbon from the soil and biosphere to the atmosphere, thereby amplifying global warming (\*\*) (see Sections 4.4.1, 19.3.5.1; Langmann and Heil, 2004; Angert et al., 2005; Bellamy et al., 2005).

Tropical cyclones (including hurricanes and typhoons), are likely to become more intense with sea surface temperature increases, with model simulations projecting increases by mid-century (Meehl et al., 2007 Section 10.3.6.3). However, despite an ongoing debate, some data reanalyses suggest that, since the 1970s, tropical cyclone intensities have increased far more

rapidly in all major ocean basins where tropical cyclones occur (Trenberth et al., 2007 Section 3.8.3), and that this is consistently related to increasing sea surface temperatures. Some authors have questioned the reliability of these data, in part because climate models do not predict such large increases; however, the climate models could be underestimating the changes due to inadequate spatial resolution. This issue currently remains unresolved. Some modelling experiments suggest that the total number of tropical cyclones is expected to decrease slightly (Meehl et al., 2007 Section 10.3.6.3), but it is the more intense storms that have by far the greatest impacts and constitute a key vulnerability.

The combination of rising sea level and more intense coastal storms, especially tropical cyclones, would cause more frequent and intense storm surges, with damages exacerbated by more intense inland rainfall and stronger winds (see Section 6.3.2). Increasing exposure occurs as coastal populations increase (see Section 6.3.1).

Many adaptation measures exist that could reduce vulnerability to extreme events. Among them are dams to provide flood protection and water supply, dykes and coastal restoration for protection against coastal surges, improved construction standards, land-use planning to reduce exposure, disaster preparedness, improved warning systems and evacuation procedures, and broader availability of insurance and emergency relief (see Chapter 18). However, despite considerable advances in knowledge regarding weather extremes, the relevant adaptation measures are underused, partly for reasons of cost, especially in developing countries (White et al., 2001; Sections 7.4.3, 7.5 and 7.6). Despite progress in reducing the mortality associated with many classes of extremes, human societies, particularly in the developing world, are not well adapted to the current baseline of climate variability and extreme events, such as tropical cyclones, floods and droughts, and thus these impacts are often assessed as key vulnerabilities.

### 19.3.7 Update on 'Reasons for Concern'

The TAR (Smith et al., 2001; IPCC, 2001b) identified five 'reasons for concern' about climate change and showed schematically how their seriousness would increase with global mean temperature change. In this section, the 'reasons for concern' are updated.

#### *Unique and threatened systems*

The TAR concluded that there is medium confidence that an increase in global mean temperature of 2°C above 1990 levels or less would harm several such systems, in particular coral reefs and coastal regions.

Since the TAR, there is new and much stronger evidence of observed impacts of climate change on unique and vulnerable systems (see Sections 1.3.4 and 1.3.5; Parmesan and Yohe, 2003; Root et al., 2003, 2005; Menzel et al., 2006), many of which are described as already being adversely affected by climate change. This is particularly evident in polar ecosystems (e.g., ACIA, 2005). Furthermore, confidence has increased that an increase in global mean temperature of up to 2°C relative to 1990 temperatures will pose significant risks to many unique and

vulnerable systems, including many biodiversity hotspots (e.g., Hare, 2003; Leemans and Eickhout, 2004; Malcolm et al., 2006). In summary, there is now high confidence that a warming of up to 2°C above 1990–2000 levels would have significant impacts on many unique and vulnerable systems, and is likely to increase the endangered status of many threatened species, with increasing adverse impacts and confidence in this conclusion at higher levels of temperature increase.

#### *Extreme events*

The TAR concluded that there is high confidence that the frequency and magnitude of many extreme climate-related events (e.g., heatwaves, tropical cyclone intensities) will increase with a temperature increase of less than 2°C above 1990 levels; and that this increase and consequent damages will become greater at higher temperatures.

Recent extreme climate events have demonstrated that such events can cause significant loss of life and property damage in both developing and developed countries (e.g., Schär et al., 2004). While individual events cannot be attributed solely to anthropogenic climate change, recent research indicates that human influence has already increased the risk of certain extreme events such as heatwaves (\*\*) and intense tropical cyclones (\*) (Stott et al., 2004; Emanuel, 2005; Webster et al., 2005; Trenberth et al., 2007; Bindoff et al., 2007). There is high confidence that a warming of up to 2°C above 1990–2000 levels would increase the risk of many extreme events, including floods, droughts, heatwaves and fires, with increasing levels of adverse impacts and confidence in this conclusion at higher levels of temperature increase.

#### *Distribution of impacts*

Chapter 19 of the WGII TAR (Smith et al., 2001) concluded that there is high confidence that developing countries will be more vulnerable to climate change than developed countries; medium confidence that a warming of less than 2°C above 1990 levels would have net negative impacts on market sectors in many developing countries and net positive impacts on market sectors in many developed countries; and high confidence that above 2 to 3°C, there would be net negative impacts in many developed countries and additional negative impacts in many developing countries.

There is still high confidence that the distribution of impacts will be uneven and that low-latitude, less-developed areas are generally at greatest risk due to both higher sensitivity and lower adaptive capacity. However, recent work has shown that vulnerability to climate change is also highly variable within individual countries. As a consequence, some population groups in developed countries are also highly vulnerable even to a warming of less than 2°C (see, e.g., Section 12.4.). For instance, indigenous populations in high-latitude areas are already faced with significant adverse impacts from climate change to date (see Section 14.4; ACIA, 2005), and the increasing number of coastal dwellers, particularly in areas subject to tropical cyclones, are facing increasing risks (Christensen et al., 2007 Box 11.5; Section 11.9.5). There is high confidence that warming of 1 to 2°C above 1990–2000 levels would include key negative impacts in some regions of the world (e.g., Arctic nations, small islands), and pose

new and significant threats to certain highly vulnerable population groups in other regions (e.g., high-altitude communities, coastal-zone communities with significant poverty levels), with increasing levels of adverse impacts and confidence in this conclusion at higher levels of temperature increase.

#### *Aggregate impacts*

Chapter 19 of the WGII TAR (Smith et al., 2001) concluded that there is medium confidence that with an increase in global mean temperature of up to 2°C above 1990 levels, aggregate market sector impacts would be plus or minus a few percent of gross world product, but most people in the world would be negatively affected. Studies of aggregate economic impacts found net damages beyond temperature increases of 2 to 3°C above 1990 levels, with increasing damages at higher magnitudes of climate change.

The findings of the TAR are consistent with more recent studies, as reviewed in Hitz and Smith (2004). Many limitations of aggregated climate impact estimates have already been noted in the TAR, such as difficulties in the valuation of non-market impacts, the scarcity of studies outside a few developed countries, the focus of most studies on selected effects of a smooth mean temperature increase, and a preliminary representation of adaptation and development. Recent studies have included some of these previously unaccounted for aspects, such as flood damage to agriculture (Rosenzweig et al., 2002) and damages from increased cyclone intensity (Climate Risk Management Limited, 2005). These studies imply that the physical impacts and costs associated with these neglected aspects of climate change may be very significant. Different analytic techniques (e.g., Nordhaus, 2006) can result in estimates of higher net damages; inclusion of indirect effects can increase the magnitude of impacts (e.g., Fankhauser and Tol, 2005; Stern, 2007). Other studies reinforce the finding of potential benefits at a few degrees of warming, followed by damages with more warming (Maddison, 2003; Tol, 2005). However, long-term costs from even a few degrees of warming, such as eventual rise in sea level (e.g., Overpeck et al., 2006), are not included in aggregate damage estimates. In addition, the current literature is limited in accounting for the economic opportunities that can be created by climate change.

On balance, the current generation of aggregate estimates in the literature is more likely than not to understate the actual costs of climate change. Consequently, it is possible that initial net market benefits from climate change will peak at a lower magnitude and sooner than was assumed for the TAR, and it is likely that there will be higher damages for larger magnitudes of global mean temperature increases than estimated in the TAR.

The literature also includes analysis of aggregate impacts of climate change other than monetary effects. Parry et al. (1999) found that climate change could adversely affect hundreds of millions of people through increased risk of coastal flooding, reduction in water supplies, increased risk of malnutrition and increased risk of exposure to disease. All of these impacts would directly affect human health. The 'Global Burden of Disease' study estimated that the climate change that has occurred since 1990 has increased mortality, and that projected climate change will increase future disease burdens even with adaptation

(McMichael et al., 2004). There is low to medium confidence that most people in the world will be negatively affected at global mean temperature increases of 1-2°C above 1990-2000 levels, with increasing levels of adverse impacts and confidence in this conclusion at higher levels of temperature increase.

#### *Large-scale singularities*

The TAR concluded that there is low to medium confidence that a rapid warming of over 3°C would trigger large-scale singularities in the climate system, such as changes in climate variability (e.g., ENSO changes), breakdown of the thermohaline circulation (THC – or equivalently, meridional overturning circulation, MOC), deglaciation of the WAIS, and climate–biosphere–carbon cycle feedbacks. However, determining the trigger points and timing of large-scale singularities was seen as difficult because of the many complex interactions of the climate system.

Since the TAR, the literature offers more specific guidance on possible thresholds for partial or near-complete deglaciation of the Greenland and West Antarctic ice sheets. There is medium confidence that at least partial deglaciation of the Greenland ice sheet, and possibly the WAIS, would occur over a period of time ranging from centuries to millennia for a global average temperature increase of 1-4°C (relative to 1990-2000), causing a contribution to sea-level rise of 4-6 m or more (Section 19.3.5.2; Jansen et al., 2007 Section 6.4; Meehl et al., 2007 Sections 10.7.4.3 and 10.7.4.4; Oppenheimer and Alley, 2004, 2005; Hansen, 2005; Otto-Bliesner et al., 2006; Overpeck et al., 2006). Since the TAR, there is more confidence in projections of the climate consequences of feedbacks in the carbon cycle (see Section 19.3.5.1).

## 19.4 Assessment of response strategies to avoid key vulnerabilities

This section reviews the literature addressing the linkages between key vulnerabilities and response strategies in order to avoid or reduce them. This section is structured as follows. Section 19.4.1 reviews the literature on the role of adaptation to avoid key vulnerabilities. As discussed in Section 19.2, the lack of adaptive capacity, or the inability to adapt, is one of the criteria relevant for the selection of key vulnerabilities. Section 19.4.2 reviews the literature that specifically addresses the avoidance of key vulnerabilities through mitigation of climate change. Section 19.4.3 synthesises the knowledge about avoiding key vulnerabilities of climate change.

The principal response strategies – mitigation of climate change and adaptation – are often portrayed as having largely different foci in terms of their characteristic spatial and temporal scales. Other important strategies include investing in gaining knowledge (e.g., improving predictions and the understanding of options) and investing in capacity-building (improving ability and tools to make good decisions under uncertainty). Finally, some have suggested geo-engineering as a backstop policy option (see, e.g., Izrael, 2005; Cicerone, 2006; Crutzen, 2006; Kiehl, 2006; Wigley, 2006, for an update on this debate).

Given the integrating nature of this section at the interface between climate change impacts and vulnerabilities, mitigation, and adaptation, there are important links with other chapters of the IPCC AR4. Most importantly, WGII Chapter 17 discusses the role of adaptation to climate change; WGII Chapter 18, WGIII Chapter 2 Section 2.5 and Chapter 3 Section 3.5 discuss the links between mitigation and adaptation; WGIII Chapter 1 Section 1.2 and Chapter 2 Section 2.2 discuss the characteristics of the challenge and some decision-making problems in responding to global climate change, respectively; WGII Chapter 2 Section 2.2.7 and WGIII Chapter 2 Section 2.3 discuss methods to address uncertainties in this context; WGIII Chapter 3 Section 3.3 and Chapter 3 Section 3.6 discuss climate change mitigation from a long-term and a short-term perspective, respectively; and WGII Chapter 2 Section 2.4.6 discusses methods of evaluating impacts associated with mitigation scenarios.

### 19.4.1 Adaptation as a response strategy

How much can anticipatory and autonomous adaptation achieve? What is the potential for, and limitations of, adaptation to reduce impacts and to reduce or avoid key vulnerabilities?

The scientific literature on these questions is less well developed than for mitigation, and the conclusions are more speculative in many cases. It is clear, however, that there is no simple comprehensive response to the adaptation question, and that the answers are often place-specific and very nuanced, and are likely to become more so as research advances.

In agriculture, for example, previous IPCC assessments have generally concluded that, in the near to medium term, aggregate world food production is not threatened (IPCC, 1996, 2001a). However, considerable regional variation in impacts and adaptive capacity suggests that severe impacts and food scarcity could occur in some regions, especially at low latitudes, where large numbers of poorer people are already engaged in agriculture that is not currently viable (see Section 5.4.2). In global terms, agriculture has been extremely resilient and world food production has expanded rapidly to keep pace with world population growth. Of course, there is debate on the sustainability of these trends, as they depend in part on the growing demand for meat and meat products as well as potential competition between agricultural resources for producing food versus those used for producing energy. Nevertheless, even where shortages have occurred, the reasons are rarely to be found in an absolute lack of food but are more due to lack of purchasing power and failures of the distribution system.

Attention to adaptation in agriculture has tended to focus on specific measures at the farm level, and some progress is being made in the incorporation of climate risks into agricultural practices. On the other hand, the processes of globalisation and technological change are placing adaptation more in the hands of agri-business, national policy-makers, and the international political economy, including such factors as prices, tariffs and subsidies, and the terms of international trade (Apuuli et al., 2000; Burton and Lim, 2005).

The record of past success in agriculture is often seen in other sectors, particularly in developed countries and, in many regions it is evident that current climate variability falls largely within

the coping range (Burton and Lim, 2005). One possible exception is in the case of extreme events where monetary losses (both insured and uninsured – Munich Re, 2005) have been rising sharply, although mortality has been falling. In such cases, adaptation has not been so successful, despite major improvements in understanding the risks and in forecasts and warnings (White et al., 2001). One reason is the decline in local concern and thus a reduced propensity to adopt proactive adaptation measures, as the memory of specific disaster events fades. Related to this lack of appreciation of possible risks is that governments and communities can still be taken by surprise when extreme events occur, even though scientific evidence of their potential occurrence is widely available (Bazermann, 2005). Economic damage and loss of life from Hurricane Katrina in 2005, the European heatwave of 2003, and many other similar events are due in large measure to a lack of sufficient anticipatory adaptation, or even maladaptation in some cases. So while the overall record of adaptation to climate change and variability in the past 200 or so years has been successful overall, there is evidence of insufficient investments in adaptation opportunities, especially in relation to extreme events (Burton, 2004, Burton and May, 2004; Hallegatte et al., 2007). While economic losses have increased, there has been considerable success in reducing loss of life; and despite the recent spate of deadly extreme weather events, the general trend in mortality and morbidity remains downwards.

It is clear that in the future there is considerable scope for adaptation, provided that existing and developing scientific understanding, technology and know-how can be effectively applied. It might be expected that the slower the rate of climate change, the more likely it is that adaptation will be successful. For example, even a major rise in sea level might be accommodated and adjusted to by human societies if it happens very slowly over many centuries (Nicholls and Tol, 2006). On the other hand, slow incremental change can still involve considerable costs and people might not be sufficiently motivated to take precautionary action and bear the associated costs without some more dramatic stimulus. Paradoxically, therefore, the full array of human adaptation potential is not likely to be brought to bear when all the market, social, psychological and institutional barriers to adaptation are taken into account.

In terms of the key vulnerabilities identified in Table 19.1, it is clear that adaptation potential is greater the more the system is under human management and control. Major geophysical changes leave little room for human-managed adaptation. Fortunately these changes are likely to unfold relatively slowly, thus allowing more time for adaptation to their eventual impacts. There is somewhat greater adaptive capacity in biological systems, but it is still very limited. Biodiversity and ecosystems are likely to be impacted at a much faster rate than geophysical systems without a commensurately larger adaptive capacity for such impacts. It seems likely, therefore, that the greatest impacts in the near to medium term, where adaptation capacity is very limited, will occur in biological systems (Leemans and Eickhout, 2004; Smith, 2004; see Chapter 4). As we move into human social systems and market systems, adaptive capacity at the technical level increases dramatically. However, the understanding of impacts, adaptive capacity, and the costs of

adaptation is weaker in social systems than in biological systems, and the uncertainties are high. This is especially the case for synergistic or cross-cutting impacts. Considered in isolation, the potential for agricultural adaptation may appear to be good. When related impacts in water regimes, droughts and floods, pest infestations and plant diseases, human health, the reliability of infrastructure, poor governance, as well as other non-climate-related stresses are taken into account, the picture is less clear.

A general conclusion on the basis of the present understanding is that for market and social systems there is considerable adaptation potential, but the economic costs are potentially large, largely unknown and unequally distributed, as is the adaptation potential itself. For biological and geophysical systems, the adaptation potential is much less than in social and market systems, because impacts are more direct and therefore appear more rapidly. A large proportion of the future increase in key vulnerabilities is likely to be recorded first in biological systems (see Chapter 1). This does not mean that key vulnerabilities will not occur in social and market systems. They depend on biological systems, and as ecosystems are affected by mounting stresses from climate change and concomitant factors such as habitat fractionation, and the spread of plant diseases and pest infestations, then the follow-on, second-order effects on human health and safety, livelihoods and prosperity, will be considerable (\*/\*\*).

## 19.4.2 Mitigation

This subsection reviews the growing literature (see, e.g., Schellnhuber et al., 2006) on mitigation of climate change as a means to avoid key vulnerabilities or dangerous anthropogenic interference (DAI) with the climate system. A more general review of the literature on climate change mitigation is found in the WGIII AR4 Chapter 3 (Fisher et al., 2007) Sections 3.3.5 (on long-term stabilisation scenarios), 3.5.2 and 3.5.3 (on integrated assessment and risk management) and 3.6 (on linkages between short-term and long-term targets).

### 19.4.2.1 Methodological approaches to the assessment of mitigation strategies

A variety of methods is used in the literature to identify response strategies that may avoid potential key vulnerabilities or DAI (see also Fisher et al., 2007, Section 3.5.2). These methods can be characterised according to the following dimensions.

- *Targeted versus non-targeted*

In this section, targeted approaches refer to the determination of policy strategies that attempt to avoid exceeding pre-defined targets for key vulnerabilities or DAI thresholds, whereas non-targeted approaches determine the implications for key vulnerabilities or DAI of emissions or concentration pathways selected without initial consideration of such targets or thresholds. Targeted approaches are sometimes referred to as ‘inverse’ approaches, as they are working backwards from a specified outcome (e.g., an impact threshold not to be exceeded) towards the origin of the cause–effect chain that links GHG emissions with climate impacts.

- *Deterministic versus set-based versus probabilistic*  
Deterministic analyses are based on best-guess estimates for uncertain parameters, whereas probabilistic analyses explicitly consider key uncertainties of the coupled socio-natural system by describing one or more parameters in terms of probability distributions. Uncertainty can also be treated discretely by set-based methods that select different possible values without specifying any probability distribution across the members of that set. For a more detailed discussion of the role of uncertainty in the assessment of response strategies, see Box 19.3.
- *Optimising versus adaptive versus non-optimising*  
Optimising analyses determine recommended policy strategies based on a pre-defined objective, such as cost minimisation; whereas non-optimising analyses do not require the specification of such an objective function.

Adaptive analyses optimise near-term decisions under the assumption that future decisions will consider new information as and when it materialises.

Table 19.2 characterises the main methods applied in the relevant literature based on two of the three dimensions defined above, because deterministic, set-based and probabilistic approaches can be applied to each of these methods. The remainder of Section 19.4 reviews literature pertaining to these methods that examines mitigation strategies to avoid key vulnerabilities or DAI.

#### 19.4.2.2 Scenario analysis and analysis of stabilisation targets

Scenario analysis examines the implications of specified emissions pathways or concentration profiles for future climate change, e.g., magnitude and rate of temperature increase. Some studies focus on the key radiative forcing agent CO<sub>2</sub>, while

### Box 19.3. Uncertainties in the assessment of response strategies

Climate change assessments and the development of response strategies face multiple uncertainties and unknowns (see Fourth Assessment Working Group II Chapter 2 and Working Group III Chapter 2). The most relevant sources of uncertainty in this context are:

- (i) Natural randomness,
- (ii) Lack of scientific knowledge,
- (iii) Social choice (reflexive uncertainty),
- (iv) Value diversity.

Some sources of uncertainty can be reasonably represented by probabilities, whereas others are more difficult to characterise probabilistically. The natural randomness in the climate system can be characterised by frequentist (or objective) probabilities, which describe the *relative frequency* (sometimes referred to as ‘likelihood’) of a repeatable event under known circumstances. There are, however, limitations to the frequentist description, given that the climate system is non-stationary at a range of scales and that past forcing factors cannot be perfectly known. The reliability of *knowledge* about uncertain aspects of the world (such as the ‘true’ value of climate sensitivity) cannot be empirically represented by frequentist probabilities alone. It is possible to construct probability distributions of climate sensitivity that look like frequency representations, but they will always have substantial elements of subjectivity embedded (Morgan and Keith, 1995; Allen et al., 2001). The inherent need for probabilistic analyses in a risk-management framework becomes problematic when some analysts object in principle to even assessing probabilities in situations of considerable lack of data or other key ingredients for probabilistic assessment. To help bridge this philosophical conflict, it has been suggested that making subjective elements transparent is an essential obligation of assessments using such an approach (e.g., Moss and Schneider, 2000). One method of characterising uncertainty due to a lack of scientific knowledge is by Bayesian (or subjective) probabilities, which refer to the *degree of belief* of experts in a particular statement, considering the available data. Another approach involves non-probabilistic representations such as imprecise probabilities (e.g., Hall et al., 2006). Whether probabilities can be applied to describe future social choice, in particular uncertainties in future greenhouse gas emissions, has also been the subject of considerable scientific debate (e.g., Allen et al., 2001; Grubler and Nakićenović, 2001; Lempert and Schlesinger, 2001; Pittock et al., 2001; Reilly et al., 2001; Schneider, 2001, 2002). Value diversity (such as different attitudes towards risk or equity) cannot be meaningfully addressed through an objective probabilistic description. It is often assessed through sensitivity analysis or scenario analysis, in which different value systems are explicitly represented and their associated impacts contrasted.

The probabilistic analyses of DAI reported in this section draw substantially on (subjective) Bayesian probabilities to describe key uncertainties in the climate system, such as climate sensitivity, the rate of oceanic heat uptake, current radiative forcing, and indirect aerosol forcing. See WGI Chapter 9 (Hegerl et al., 2007) and Chapter 10 (Meehl et al., 2007) for a more detailed discussion. While these uncertainties prevent the establishment of a high-confidence, one-to-one linkage between atmospheric greenhouse gas concentrations and global mean temperature increase, probabilistic analyses can assign a subjective probability of exceeding certain temperature thresholds for given emissions scenarios or concentration targets (e.g., Meinshausen, 2005; Harvey, 2007).

**Table 19.2.** Methods to identify climate policies to avoid key vulnerabilities or DAI.

Method	Description	Optimising approach?	Targeted approach?
Scenario analysis, analysis of stabilisation targets	Analyse the implications for temperature increase of specific concentration stabilisation levels, concentration pathways, emissions scenarios, or other policy scenarios.	No	No
Guardrail analysis	Derive ranges of emissions that are compatible with predefined constraints on temperature increase, intolerable climate impacts, and/or unacceptable mitigation costs.	No	Yes
Cost-benefit analysis including key vulnerabilities and DAI	Include representations of key vulnerabilities or DAI in a cost-optimising integrated assessment framework.	Yes	No
Cost-effectiveness analysis	Identify cost-minimising emissions pathways that are consistent with predefined constraints for GHG concentrations, climate change or climate impacts.	Yes	Yes

others include additional gases and aerosols in their analysis, often representing concentrations in terms of CO<sub>2</sub>-equivalent ppm or radiative forcing in W/m<sup>2</sup> (see Forster et al., 2007 Section 2.3). Dynamic analyses include information about the trajectories of GHG emissions and development pathways, GHG concentrations, climate change and associated impacts. Related static analyses examine the relationship between stabilisation targets for GHG concentrations and equilibrium values for climate parameters (typically the increase in global mean temperature). Note that the term ‘GHG stabilisation’ is used here with a time horizon of up to several centuries. Over a longer time period without anthropogenic GHG emissions, CO<sub>2</sub> concentrations may return to values close to pre-industrial levels through natural processes (Brovkin et al., 2002; Putilov, 2003; Semenov, 2004a,b; Izrael and Semenov, 2005, 2006).

The shape over time of the specified emissions pathway or concentration profile is of particular relevance when considering key vulnerabilities, as it influences transient climate change and associated climate impacts (see, e.g., O’Neill and Oppenheimer, 2004; Meinshausen, 2005; Schneider and Mastrandrea, 2005; Mastrandrea and Schneider, 2006). Two general categories can be distinguished in studies that specifically consider CO<sub>2</sub> concentrations or temperature thresholds associated with key vulnerabilities or DAI: stabilisation scenarios, which imply concentrations increasing smoothly from current levels to a final stabilisation concentration (e.g., Enting et al., 1994; Schimel et al., 1996; Wigley et al., 1996; Morita et al., 2000; Swart et al., 2002; O’Neill and Oppenheimer, 2004) and peaking or overshoot scenarios, where a final concentration stabilisation level is temporarily exceeded (Harvey, 2004; Kheshgi, 2004;

O’Neill and Oppenheimer, 2004; Wigley, 2004; Izrael and Semenov, 2005; Kheshgi et al., 2005; Meinshausen et al., 2005; Frame et al., 2006). Overshoot scenarios are necessary for the exploration of stabilisation levels close to or below current concentration levels.

Some studies treat the uncertainty in future GHG emissions and climate change by analysing a discrete range of scenarios. O’Neill and Oppenheimer (2002) examined ranges of global mean temperature increase in 2100 associated with 450, 550 and 650 ppm CO<sub>2</sub> concentration stabilisation profiles, as reported in the TAR (Cubasch et al., 2001). They concluded that none of these scenarios would prevent widespread coral-reef bleaching in 2100 (assumed to have a threshold 1°C increase above current levels), and that only the 450 ppm CO<sub>2</sub> stabilisation profile is likely to be associated with avoiding both deglaciation of West Antarctica (assumed to have a threshold of 2°C above current levels) and collapse of the MOC (assumed to have a threshold of 3°C increase within 100 years). Lowe et al. (2006) consider a suite of climate scenarios based on a ‘perturbed parameter ensemble’ of Hadley Centre climate models, finding that, for stabilisation close to 450 ppm, 5% of their scenarios exceed a threshold for deglaciation of West Antarctica (assumed to be 2.1°C local warming above 1990-2000 levels). Corfee-Morlot and Höhne (2003) review the current knowledge about climate impacts for each ‘reason for concern’ at different levels of global mean temperature change and CO<sub>2</sub> stabilisation, based on published probability density functions (PDFs) of climate sensitivity, finding that any CO<sub>2</sub> stabilisation target above 450 ppm is associated with a significant probability of triggering a large-scale climatic event. An inverse analysis of the implications of reaching CO<sub>2</sub> stabilisation at 450 ppm concludes that more than half of the SRES emissions scenarios leave this stabilisation target virtually out of reach as of 2020. A robust finding across such studies is that the probability of exceeding thresholds for specific key vulnerabilities or DAI increases with higher stabilisation levels for GHG concentrations.

Other studies quantify uncertainty using probability distributions for one or more parameters of the coupled social-natural system. Figure 19.1, for instance, depicts the likelihood of exceeding an equilibrium temperature threshold of 2°C above pre-industrial levels based on a range of published probability distributions for climate sensitivity. To render eventual exceedence of this exemplary threshold ‘unlikely’ (<33% chance), the CO<sub>2</sub>-equivalent stabilisation level must be below 410 ppm for the majority of considered climate sensitivity uncertainty distributions (range between 350 and 470 ppm).

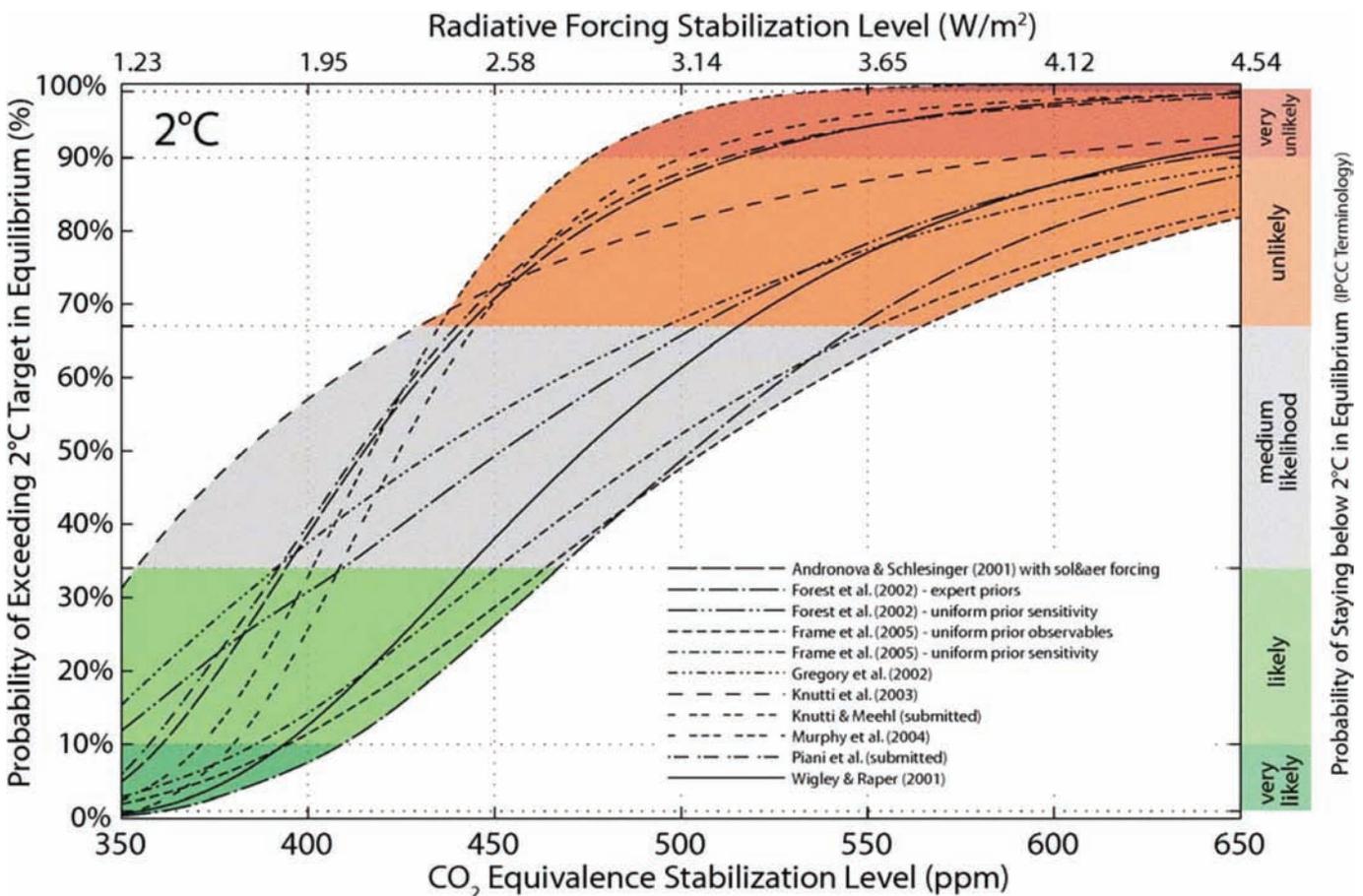
*Key caveat:* The analysis in Figure 19.1 employs a number of probability distributions taken from the literature. The WGIAR4 has assessed the body of literature pertaining to climate sensitivity, and concludes that the climate sensitivity is ‘likely’ to lie in the range 2-4.5°C, and is ‘very likely’ to be above 1.5°C (Meehl et al., 2007 Executive Summary). For fundamental physical reasons, as well as data limitations, values substantially higher than 4.5°C still cannot be excluded, although agreement with observations and proxy data is generally worse for those high values than for values in the 2-4.5°C range (Meehl et al., 2007 Executive Summary). ‘Likely’ in IPCC usage has been defined as a 66 to 90% chance, and ‘very likely’ has been

defined as a 90 to 99% chance. Therefore, implicit in the information given by WGI is a 10 to 34% chance that climate sensitivity is outside the 'likely' range, with equal probability (5 to 17%) that it is below 2°C or above 4.5°C. Furthermore, the WGI assessment assigns a 90 to 99% chance that the climate sensitivity is above 1.5°C. However, the shape of the distribution to the right of 4.5°C – crucial for risk-management analyses – is, as noted by WGI, so uncertain given the lack of scientific knowledge, that any quantitative conclusion reached based on probability functions beyond 4.5°C climate sensitivity would be very low confidence. For these reasons, we assign no more than low confidence to any of the distributions or results presented in this section, particularly if the result depends on the tails of the probability distribution for climate sensitivity. Nevertheless, as noted here, a risk-management framework requires input of (even if low-probability, low-confidence) outlier information. Therefore, we present the literature based on probabilistic analyses to demonstrate the framework inherent in the risk management approach to assessing key vulnerabilities.

The temperature threshold for DAI can itself be represented by a subjective probability distribution. Wigley (2004) combined probability distributions for climate sensitivity and the temperature threshold for DAI in order to construct a distribution for the CO<sub>2</sub> stabilisation level required to avoid DAI. Under this assumption set, the median stabilisation level for atmospheric

CO<sub>2</sub> concentrations is 536 ppm, and there is a 17% chance that the stabilisation level necessary to avoid DAI is below current atmospheric CO<sub>2</sub> levels. A similar analysis by Harvey (2006, 2007) added the explicit normative choice of an 'acceptable' probability (10%) for exceeding the probabilistic temperature threshold for DAI. With similar assumptions about the probability distributions for climate sensitivity and the DAI temperature threshold, he finds that the allowable CO<sub>2</sub> stabilisation concentration is between 390 and 435 ppm, depending on assumptions about aerosol forcing. Of course, these results are quite sensitive to all the assumptions made, as both authors explicitly acknowledge.

Finally, significant differences in environmental impacts are anticipated between GHG concentration stabilisation trajectories that allow overshoot of the stabilisation concentration versus those that do not, even when they lead to the same final concentration. For example, Schneider and Mastrandrea (2005) calculate the probability of at least temporarily exceeding a target of 2°C above pre-industrial (1.4°C above 'current') by 2200 to be 70% higher (77% instead of 45%) for an overshoot scenario rising to 600 ppm CO<sub>2</sub>-equivalent and then stabilising in several centuries at 500 ppm CO<sub>2</sub>-equivalent, compared with a non-overshoot scenario stabilising at the same level (Figure 19.2, top panel). Overshoot scenarios induce higher transient temperature increases, increasing the probability of temporary or

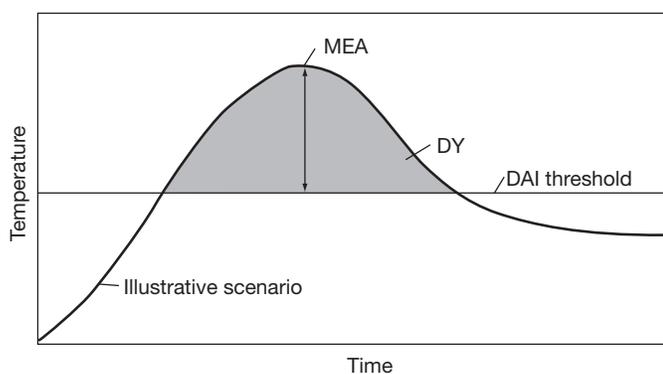
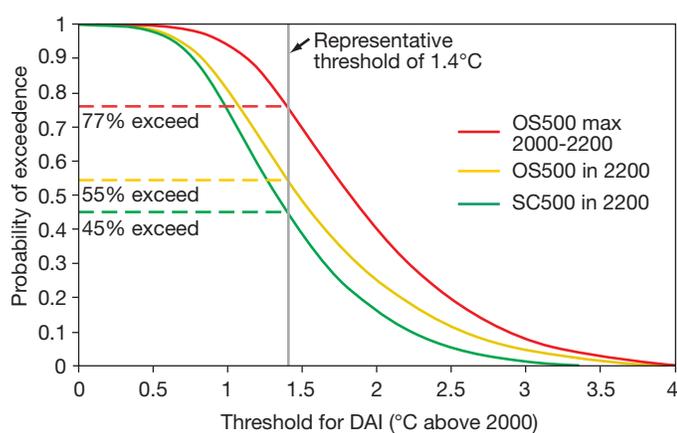


**Figure 19.1.** Probability (see 'Key caveat' above on low confidence for specific quantitative results) of exceeding an equilibrium global warming of 2°C above pre-industrial (1.4°C above 1990 levels), for a range of CO<sub>2</sub>-equivalent stabilisation levels. Source: Hare and Meinshausen (2005).

permanent exceedence of thresholds for key vulnerabilities or DAI (e.g., Hammitt and Shlyakhter, 1999; Harvey, 2004; O'Neill and Oppenheimer, 2004; Hare and Meinshausen, 2005; Knutti et al., 2005). With this in mind, Schneider and Mastrandrea (2005) suggested two metrics – maximum exceedence amplitude and degree years – for characterising the maximum and cumulative magnitude of overshoot of a temperature threshold for DAI, as shown for an illustrative scenario in Figure 19.2 (bottom panel). Since the rate of temperature rise is important to adaptive capacity (see Section 19.4.1) and thus impacts, the time delay between now and the date of occurrence of the maximum temperature (year of MEA on Figure 19.2b) is also relevant to the likelihood of creating key vulnerabilities or exceeding specified DAI thresholds.

### 19.4.2.3 Guardrail analysis

Guardrail analysis comprises two types of inverse analysis that first define targets for climate change or climate impacts to



**Figure 19.2.** Top panel: Probability of exceedence of a range of temperature thresholds for overshoot (OS500) and non-overshoot (SC500) scenarios, derived from probability distributions for climate sensitivity (see ‘Key caveat’ above on low confidence for specific quantitative results). OS500 Max is derived from the maximum overshoot temperature that occurs during the transient response before 2200, whereas OS500 in 2200 and SC500 in 2200 are derived from temperatures in 2200. While model-dependent, these results demonstrate the importance of considering transient temperature change when evaluating mitigation strategies to avoid key vulnerabilities. Bottom panel: Visualisation of maximum exceedence amplitude (MEA) and degree years (DY) for an illustrative overshoot temperature profile. Source: Schneider and Mastrandrea (2005).

be avoided and then determine the range of emissions that are compatible with these targets: tolerable windows analysis (Toth, 2003) and safe landing analysis (Swart et al., 1998). The tolerable windows approach allows the assessment of the implications of multiple competing climate policy goals on the mid-term and long-term ranges of permissible greenhouse gas emissions. It has initially been applied to several normative thresholds for climate impacts, which are analysed together with socio-economic constraints that aim at excluding unacceptable mitigation policies. Toth et al. (2003) analyse the interplay between thresholds for the global transformation of ecosystems, regional mitigation costs and the timing of mitigation. They show that following a business-as-usual scenario of GHG emissions (which resembles the SRES A2 scenario) until 2040 precludes the possibility of limiting the worldwide transformation of ecosystems to 30%, even under optimistic assumptions regarding willingness to pay for the mitigation of GHG emissions afterwards. Toth et al. (2003) show that mitigation of GHG emissions has to start no later than 2015 if a reduction in agricultural yield potential in South Asia of more than 10% is to be avoided. This result, however, is contingent on the regional climate change projection of the specific GCM applied in this analysis (HadCM2) and the accuracy of the impact models. The consideration of regional and local climate impacts in inverse analyses raises challenges as to the treatment of the significant uncertainties associated with them.

The tolerable windows approach has also been applied in connection with systematic climate thresholds, predominantly for probabilistic analyses of the stability of the thermohaline ocean circulation (Zickfeld and Bruckner, 2003; Bruckner and Zickfeld, 2004; Rahmstorf and Zickfeld, 2005). Rahmstorf and Zickfeld (2005) conclude that the SRES A2 emissions scenario exceeds the range of emissions corresponding to a 5% and 10% likelihood of inducing a commitment to a circulation shutdown around 2035 and 2065, respectively. A 2% risk of shutdown can no longer be avoided, even with very stringent emission reductions, given the assumptions in their models.

### 19.4.2.4 Cost–benefit analysis

Cost–benefit analyses (CBAs) of climate change in general are reviewed in Fisher et al., 2007 Section 3.5.3.3. The discussion here focuses on the suitability of CBA for avoiding key vulnerabilities and DAI. Most early cost–benefit analyses of climate change have assumed that climate change will be a gradual and smooth process. This assumption has prevented these analyses from determining a robust optimal policy solution (Hall and Behl, 2006), as it neglects important key vulnerabilities. Recognising the restrictions of this assumption, an extensive literature has developed extending cost–benefit analyses and related decision-making (e.g., Jones, 2003) in the context of Article 2, with a particular emphasis on abrupt change at global and regional scales (Schneider and Azar, 2001; Higgins et al., 2002; Azar and Lindgren, 2003; Baranzini et al., 2003; Wright and Erickson, 2003).

Several papers have focused on incorporating damages from large-scale climate instabilities identified as key vulnerabilities, such as climate-change-induced slowing or shutdown of the MOC (Keller et al., 2000, 2004; Mastrandrea and Schneider,

2001; Link and Tol, 2004). For example, quantifying market-based damages associated with MOC changes is a difficult task, and current analyses should be interpreted as order-of-magnitude estimates, with none carrying high confidence. These preliminary analyses suggest that significant reductions in anthropogenic greenhouse gas emissions are economically efficient even if the damages associated with a MOC slowing or collapse are less than 1% of gross world product. However, model results are very dependent on assumptions about climate sensitivity, the damage functions for smooth and abrupt climate change and time discounting, and are thus designed primarily to demonstrate frameworks for analysis and order-of-magnitude outcomes rather than high-confidence quantitative projections.

Several researchers have implemented probabilistic treatments of uncertainty in cost–benefit analyses; recent examples include Mastrandrea and Schneider (2004) and Hope (2006). These probabilistic analyses consistently suggest more aggressive mitigation policies compared with deterministic analyses, since probabilistic analyses allow the co-occurrence of high climate sensitivities (see *Key caveat* in Section 19.4.2.2 on low confidence for specific quantitative results) with high climate-damage functions.

#### 19.4.2.5 Cost-effectiveness analysis

Cost-effectiveness analysis involves determining cost-minimising policy strategies that are compatible with pre-defined probabilistic or deterministic constraints on future climate change or its impacts. Comparison of cost-minimal strategies for alternative climate constraints has been applied to explore the trade-offs between climate change impacts and the associated cost of emissions mitigation (e.g., Keller et al., 2004; McInerney and Keller, 2006). The reductions in greenhouse-gas emissions determined by cost-effectiveness analyses incorporating such constraints are typically much larger than those suggested by most earlier cost–benefit analyses, which often do not consider the key vulnerabilities underlying such constraints in their damage functions. In addition, cost–benefit analysis assumes perfect substitutability between all costs and benefits of a policy strategy, whereas the hard constraints in a cost-effectiveness analysis do not allow for such substitution.

Some cost-effectiveness (as well as cost–benefit) analyses have explored sequential decision strategies in combination with the avoidance of key vulnerabilities or thresholds for global temperature change. These strategies allow for the resolution of key uncertainties in the future through additional observations and/or improved modelling. The quantitative results of these analyses cannot carry high confidence, as most studies represent uncertain parameters by two to three discrete values only and/or employ rather arbitrary assumptions about learning (e.g., Hammitt et al., 1992; Keller et al., 2004; Yohe et al., 2004). In a systematic analysis, Webster et al. (2003) finds that the ability to learn about damages from climate change and costs of reducing greenhouse gas emissions in the future can lead to either less restrictive or more restrictive policies today. All studies report the opinions of their authors to be that the scientific uncertainty by itself does not provide justification for doing nothing today to mitigate potential climate damages.

### 19.4.3 Synthesis

The studies reviewed in this section diverge widely in their methodological approach, in the sophistication with which uncertainties are considered in geophysical, biological and social systems, and in how closely they approach an explicit examination of key vulnerabilities or DAI. The models involved range from stand-alone carbon cycle and climate models to comprehensive integrated assessment frameworks describing emissions, technologies, mitigation, climate change and impacts. Some frameworks incorporate approximations of vulnerability but none contains a well-established representation of adaptation processes in the global context.

It is not possible to draw a simple summary from the diverse set of studies reviewed in this section. The following conclusions from literature since the TAR, however, are more robust.

- A growing literature considers response strategies that aim at preventing damage to particular key elements and processes in geophysical, biological and socio-economic systems that are sensitive to climate change and have limited adaptation potential; policy-makers may want to consider insights from the literature reviewed here in helping them to design policies to prevent DAI.
- In a majority of the literature, key impacts are associated with long-term increases in equilibrium global mean surface temperature above the pre-industrial equilibrium or an increase above 1990-2000 levels. Transient temperature changes are more instructive for the analyses of key vulnerabilities, but the literature is sparse on transient assessments relative to equilibrium analyses. Many studies provide global mean temperature thresholds that would lead sooner or later to a specific key impact, i.e., to disruption/shutdown of a vulnerable process. Such thresholds are not known precisely, and are characterised in the literature by a range of values (or occasionally by probability functions). Assessments of whether emissions pathways/GHG concentration profiles exceed given temperature thresholds are characterised by significant uncertainty. Therefore, deterministic studies alone cannot provide sufficient information for a full analysis of response strategies, and probabilistic approaches should be considered. Risk analyses given in some recent studies suggest that there is no longer high confidence that certain large-scale events (e.g., deglaciation of major ice sheets) can be avoided, given historical climate change and the inertia of the climate system (Wigley, 2004, 2006; Rahmstorf and Zickfeld, 2005). Similar conclusions could also be applied to risks for social systems, though the literature often suggests that any thresholds for these are at least as uncertain.
- Meehl et al., 2007 Table 10.8 provide likely ranges of equilibrium global mean surface temperature increase for different CO<sub>2</sub>-equivalent stabilisation levels, based on their expert assessment that equilibrium climate sensitivity is likely to lie in the range 2-4.5°C (Meehl et al., 2007 Executive Summary). They present the following likely

ranges (which have been converted from temperature increase above pre-industrial to equilibrium temperature increase above 1990-2000 levels – see Box 19.2); 350 ppm CO<sub>2</sub>-equivalent: 0-0.8°C above 1990-2000 levels; 450 ppm CO<sub>2</sub>-equivalent: 0.8-2.5°C above 1990-2000 levels; 550 ppm CO<sub>2</sub>-equivalent: 1.3-3.8°C above 1990-2000 levels; 650 ppm CO<sub>2</sub>-equivalent: 1.8-4.9°C above 1990-2000 levels; 750 ppm CO<sub>2</sub>-equivalent: 2.2-5.8°C above 1990-2000 levels. Some studies suggest that climate sensitivities larger than this likely range (which would suggest greater warming) cannot be ruled out (Meehl et al., 2007 Section 10.7.2), and the WGI range implies a 5-17% chance that climate sensitivity falls above 4.5°C (see *Key caveat* in Section 19.4.2.2 for further information).

- While future global mean temperature trajectories associated with different emissions pathways are not projected to diverge considerably in the next two to four decades, the literature shows that mitigation activities involving near-term emissions reductions will have a significant effect on concentration and temperature profiles over the next century. Later initiation of stabilisation efforts has been shown to require higher rates of reduction if they are to reduce the likelihood of crossings levels of DAI (Semenov, 2004a,b; Izrael and Semenov, 2005, 2006). Substantial delay (several decades or more) in mitigation activities makes achievement of the lower range of stabilisation targets (e.g., 500 ppm CO<sub>2</sub>-equivalent and lower) infeasible, except via overshoot scenarios (see Figure 19.2, bottom panel). Overshoot scenarios induce higher transient temperature increases, increasing the probability of temporary or permanent exceedence of thresholds for key vulnerabilities (Hammit, 1999; Harvey, 2004; O'Neill and Oppenheimer, 2004; Hare and Meinshausen, 2005; Knutti et al., 2005; Schneider and Mastrandrea, 2005).
- There is considerable potential for adaptation to climate change for market and social systems, but the costs and institutional capacities to adapt are insufficiently known and appear to be unequally distributed across world regions. For biological and geophysical systems, the adaptation potential is much lower. Therefore, some key impacts will be unavoidable without mitigation.

#### 19.4.4 Research needs

The knowledge-base for the assessment of key vulnerabilities and risks from climate change is evolving rapidly. At the same time, there are significant gaps in our knowledge with regard to impacts, the potential and nature of adaptation, and vulnerabilities of human and natural systems. However, as this chapter has tried to bring out, a growing base of information that is likely to be of significance and value to the ongoing policy dialogue does exist.

In this concluding section of the chapter, some of the research priorities from the different domains are highlighted. Clearly, this can only be an indicative list, suggesting areas where new knowledge may have immediate utility and relevance as far as the objective of this chapter is concerned.

This chapter has suggested that key vulnerabilities may be a useful concept for informing the dialogue on dangerous anthropogenic interference. Further elucidation of this concept requires highly interdisciplinary, integrative approaches that are able to capture bio-geophysical and socio-economic processes. In particular, it is worth noting that the socio-economic conditions which determine vulnerability (e.g., number of people at risk, wealth, technology, institutions) change rapidly. Better understanding of the underlying dynamics of these changes at varying scales is essential to improve understanding of key vulnerabilities to climate change. The relevant research questions in this context are not so much how welfare is affected by changing socio-economic conditions, but rather how much change in socio-economic conditions affects vulnerability to climate change. In other words, a key question is how future development paths could increase or decrease vulnerability to climate change.

As this chapter has brought out through the criteria for identifying key vulnerabilities, the responses of human and natural systems, both autonomous and anticipatory, are quite important. Consequently, it is important that the extant literature on this issue is enriched with contributions from disciplines as diverse as political economy and decision theory. In particular, one of the central problems is a better understanding of adaptation and adaptive capacity, and of the practical, institutional, and technical obstacles to the implementation of adaptation strategies. This improvement in understanding will require a richer characterisation of the perception–evaluation–response process at various levels and scales of decision-making, from individuals to households, communities and nations. In this context, it is worth noting that new research approaches may be required. For example, with regard to adaptation, a learning-by-doing approach may be required so that the development of theory occurs in parallel with, and supported by, experience from practice.

A significant category of key vulnerabilities is associated with large-scale, irreversible and systemic changes in geophysical systems. Large-scale changes such as changes in the West Antarctic and Greenland ice sheets, could lead to significant impacts, particularly due to long-term large sea-level rise. Therefore, to obtain improved estimates of impacts from both 21st-century and long-term sea-level rise, new modelling approaches incorporating a better understanding of dynamic processes in ice sheets are urgently needed, as already noted by WGI. Furthermore, central to nearly all the assessments of key vulnerabilities is the need to improve knowledge of climate sensitivity – particularly in the context of risk management – the right-hand tail of the climate sensitivity probability distribution, where the greatest potential for key impacts lies.

Finally, the elucidation and determination of dangerous anthropogenic interference is a complex socio-political process, involving normative judgments. While information on key vulnerabilities will inform and enrich this process, there may be useful insights from the social sciences that might support this process, such as better knowledge of institutional and organisational dynamics, and diverse stakeholder inputs. Also needed are assessments of vulnerability and adaptation that combine top-down climate models with bottom-up social vulnerability assessments.

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**UNITED  
NATIONS****Framework Convention  
on Climate Change**Distr.  
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**CONFERENCE OF THE PARTIES****Report of the Conference of the Parties  
on its fifteenth session, held in Copenhagen  
from 7 to 19 December 2009****Addendum****Part Two: Action taken by the Conference of the Parties  
at its fifteenth session****CONTENTS****Decisions adopted by the Conference of the Parties**

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## Decision 1/CP.15

### Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention

*The Conference of the Parties,*

*Recalling* its decision 1/CP.13,

*Committed* to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012,

*Having considered* the outcome of the work of the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention pursuant to paragraph 2 of decision 1/CP.13,

1. *Decides* to extend the mandate of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to enable it to continue its work with a view to presenting the outcome of its work to the Conference of the Parties for adoption at its sixteenth session;
2. *Requests* the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention to continue its work drawing on the report of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention presented to the Conference of the Parties at its fifteenth session,<sup>1</sup> as well as work undertaken by the Conference of the Parties on the basis of that report;
3. *Mandates* the host country of the next session of the Conference of the Parties to make the necessary arrangements in order to facilitate the work towards the success of that session.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

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<sup>1</sup> FCCC/AWGLCA/2009/17, annex I.

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**Decision 2/CP.15**  
**Copenhagen Accord**

*The Conference of the Parties,*

*Takes note of the Copenhagen Accord of 18 December 2009.*

## Copenhagen Accord

**The Heads of State, Heads of Government, Ministers, and other heads of the following delegations present at the United Nations Climate Change Conference 2009 in Copenhagen:<sup>1</sup>**

Albania, Algeria, Armenia, Australia, Austria, Bahamas, Bangladesh, Belarus, Belgium, Benin, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Cambodia, Canada, Central African Republic, Chile, China, Colombia, Congo, Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Democratic Republic of the Congo, Denmark, Djibouti, Eritrea, Estonia, Ethiopia, European Union, Fiji, Finland, France, Gabon, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Guyana, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kiribati, Lao People's Democratic Republic, Latvia, Lesotho, Liechtenstein, Lithuania, Luxembourg, Madagascar, Malawi, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mexico, Monaco, Mongolia, Montenegro, Morocco, Namibia, Nepal, Netherlands, New Zealand, Norway, Palau, Panama, Papua New Guinea, Peru, Poland, Portugal, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Rwanda, Samoa, San Marino, Senegal, Serbia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Swaziland, Sweden, Switzerland, the former Yugoslav Republic of Macedonia, Tonga, Trinidad and Tobago, Tunisia, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, **United States of America**, Uruguay and Zambia,

*In pursuit* of the ultimate objective of the Convention as stated in its Article 2,

*Being guided* by the principles and provisions of the Convention,

*Noting* the results of work done by the two Ad hoc Working Groups,

*Endorsing* decision 1/CP.15 on the Ad hoc Working Group on Long-term Cooperative Action and decision 1/CMP.5 that requests the Ad hoc Working Group on Further Commitments of Annex I Parties under the Kyoto Protocol to continue its work,

*Have agreed* on this Copenhagen Accord which is operational immediately.

1. We underline that climate change is one of the greatest challenges of our time. We emphasise our strong political will to urgently combat climate change in accordance with the principle of common but differentiated responsibilities and respective capabilities. **To achieve the ultimate objective of the Convention to stabilize greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, we shall, recognizing the scientific view that the increase in global temperature should be below 2 degrees Celsius, on the basis of equity and in the context of sustainable development, enhance our long-term cooperative action to combat climate change.** We recognize the critical impacts of climate change and the potential impacts of response measures on countries particularly vulnerable to its adverse effects and stress the need to establish a comprehensive adaptation programme including international support.

2. **We agree that deep cuts in global emissions are required according to science, and as documented by the IPCC Fourth Assessment Report with a view to reduce global emissions so as to hold the increase in global temperature below 2 degrees Celsius, and take action to meet this objective consistent with science and on the basis of equity. We should cooperate in achieving the peaking of global and national emissions as soon as possible,** recognizing that the time frame for peaking will be longer in developing countries and bearing in mind that social and economic development and poverty

<sup>1</sup> Some Parties listed above stated in their communications to the secretariat specific understandings on the nature of the Accord and related matters, based on which they have agreed to be listed here. The full text of the letters received from Parties in relation to the Copenhagen Accord, including the specific understandings, can be found at <http://unfccc.int/meetings/items/5276.php>.

eradication are the first and overriding priorities of developing countries and that a low-emission development strategy is indispensable to sustainable development.

3. Adaptation to the adverse effects of climate change and the potential impacts of response measures is a challenge faced by all countries. Enhanced action and international cooperation on adaptation is urgently required to ensure the implementation of the Convention by enabling and supporting the implementation of adaptation actions aimed at reducing vulnerability and building resilience in developing countries, especially in those that are particularly vulnerable, especially least developed countries, small island developing States and Africa. We agree that developed countries shall provide adequate, predictable and sustainable financial resources, technology and capacity-building to support the implementation of adaptation action in developing countries.

4. Annex I Parties commit to implement individually or jointly the quantified economy-wide emissions targets for 2020, to be submitted in the format given in Appendix I by Annex I Parties to the secretariat by 31 January 2010 for compilation in an INF document. Annex I Parties that are Party to the Kyoto Protocol will thereby further strengthen the emissions reductions initiated by the Kyoto Protocol. Delivery of reductions and financing by developed countries will be measured, reported and verified in accordance with existing and any further guidelines adopted by the Conference of the Parties, and will ensure that accounting of such targets and finance is rigorous, robust and transparent.

5. Non-Annex I Parties to the Convention will implement mitigation actions, including those to be submitted to the secretariat by non-Annex I Parties in the format given in Appendix II by 31 January 2010, for compilation in an INF document, consistent with Article 4.1 and Article 4.7 and in the context of sustainable development. Least developed countries and small island developing States may undertake actions voluntarily and on the basis of support. Mitigation actions subsequently taken and envisaged by Non-Annex I Parties, including national inventory reports, shall be communicated through national communications consistent with Article 12.1(b) every two years on the basis of guidelines to be adopted by the Conference of the Parties. Those mitigation actions in national communications or otherwise communicated to the Secretariat will be added to the list in appendix II. Mitigation actions taken by Non-Annex I Parties will be subject to their domestic measurement, reporting and verification the result of which will be reported through their national communications every two years. Non-Annex I Parties will communicate information on the implementation of their actions through National Communications, with provisions for international consultations and analysis under clearly defined guidelines that will ensure that national sovereignty is respected. Nationally appropriate mitigation actions seeking international support will be recorded in a registry along with relevant technology, finance and capacity building support. Those actions supported will be added to the list in appendix II. These supported nationally appropriate mitigation actions will be subject to international measurement, reporting and verification in accordance with guidelines adopted by the Conference of the Parties.

6. We recognize the crucial role of reducing emission from deforestation and forest degradation and the need to enhance removals of greenhouse gas emission by forests and agree on the need to provide positive incentives to such actions through the immediate establishment of a mechanism including REDD-plus, to enable the mobilization of financial resources from developed countries.

7. We decide to pursue various approaches, including opportunities to use markets, to enhance the cost-effectiveness of, and to promote mitigation actions. Developing countries, especially those with low emitting economies should be provided incentives to continue to develop on a low emission pathway.

8. Scaled up, new and additional, predictable and adequate funding as well as improved access shall be provided to developing countries, in accordance with the relevant provisions of the Convention, to enable and support enhanced action on mitigation, including substantial finance to reduce emissions from deforestation and forest degradation (REDD-plus), adaptation, technology development

and transfer and capacity-building, for enhanced implementation of the Convention. The collective commitment by developed countries is to provide new and additional resources, including forestry and investments through international institutions, approaching USD 30 billion for the period 2010–2012 with balanced allocation between adaptation and mitigation. Funding for adaptation will be prioritized for the most vulnerable developing countries, such as the least developed countries, small island developing States and Africa. In the context of meaningful mitigation actions and transparency on implementation, developed countries commit to a goal of mobilizing jointly USD 100 billion dollars a year by 2020 to address the needs of developing countries. This funding will come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance. New multilateral funding for adaptation will be delivered through effective and efficient fund arrangements, with a governance structure providing for equal representation of developed and developing countries. A significant portion of such funding should flow through the Copenhagen Green Climate Fund.

9. To this end, a High Level Panel will be established under the guidance of and accountable to the Conference of the Parties to study the contribution of the potential sources of revenue, including alternative sources of finance, towards meeting this goal.

10. We decide that the Copenhagen Green Climate Fund shall be established as an operating entity of the financial mechanism of the Convention to support projects, programme, policies and other activities in developing countries related to mitigation including REDD-plus, adaptation, capacity-building, technology development and transfer.

11. In order to enhance action on development and transfer of technology we decide to establish a Technology Mechanism to accelerate technology development and transfer in support of action on adaptation and mitigation that will be guided by a country-driven approach and be based on national circumstances and priorities.

12. We call for an assessment of the implementation of this Accord to be completed by 2015, including in light of the Convention's ultimate objective. This would include consideration of strengthening the long-term goal referencing various matters presented by the science, including in relation to temperature rises of 1.5 degrees Celsius.





## **Decision 3/CP.15**

### **Amendment to Annex I to the Convention**

*The Conference of the Parties,*

*Recalling* Articles 15 and 16 of the Convention,

*Taking note* of the proposal by Malta to amend Annex I to the Convention by adding the name of Malta,<sup>1</sup>

1. *Decides* to amend Annex I to the Convention by including the name of Malta;
2. *Notes* that in accordance with Article 16, paragraph 4, the entry into force of this amendment to Annex I to the Convention shall be subject to the same procedure as that for the entry into force of annexes to the Convention provided for in Article 16, paragraph 3, of the Convention.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

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<sup>1</sup> FCCC/CP/2009/2.

## Decision 4/CP.15

### **Methodological guidance for activities relating to reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries**

*The Conference of the Parties,*

*Recalling* decisions 1/CP.13 and 2/CP.13,

*Acknowledging* the importance of reducing emissions from deforestation and forest degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries,

*Noting* the progress made by the Subsidiary Body for Scientific and Technological Advice in its programme of work on methodological issues related to a range of policy approaches and positive incentives,

*Also noting* the range of ongoing activities and cooperative efforts being undertaken by Parties and international organizations, in accordance with decision 2/CP.13, paragraphs 1, 2, 3 and 5,

*Recognizing* the need for full and effective engagement of indigenous peoples and local communities in, and the potential contribution of their knowledge to, monitoring and reporting of activities relating to decision 1/CP.13, paragraph 1 (b) (iii),

*Recognizing* the importance of promoting sustainable management of forests and co-benefits, including biodiversity, that may complement the aims and objectives of national forest programmes and relevant international conventions and agreements,

*Noting* experiences and lessons learned from ongoing activities and efforts in capacity-building, testing methodologies and monitoring approaches, and a range of policy approaches and positive incentives, including those guided by the indicative guidance contained in the annex to decision 2/CP.13,

1. *Requests* developing country Parties, on the basis of work conducted on the methodological issues set out in decision 2/CP.13, paragraphs 7 and 11, to take the following guidance into account for activities relating to decision 2/CP.13, and without prejudging any further relevant decisions of the Conference of the Parties, in particular those relating to measurement and reporting:

- (a) To identify drivers of deforestation and forest degradation resulting in emissions and also the means to address these;
- (b) To identify activities within the country that result in reduced emissions and increased removals, and stabilization of forest carbon stocks;
- (c) To use the most recent Intergovernmental Panel on Climate Change guidance and guidelines, as adopted or encouraged by the Conference of the Parties, as appropriate, as a basis for estimating anthropogenic forest-related greenhouse gas emissions by sources and removals by sinks, forest carbon stocks and forest area changes;

- (d) To establish, according to national circumstances and capabilities, robust and transparent national forest<sup>1</sup> monitoring systems and, if appropriate, sub-national systems as part of national monitoring systems that:
- (i) Use a combination of remote sensing and ground-based forest carbon inventory approaches for estimating, as appropriate, anthropogenic forest-related greenhouse gas emissions by sources and removals by sinks, forest carbon stocks and forest area changes;
  - (ii) Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties, taking into account national capabilities and capacities;
  - (iii) Are transparent and their results are available and suitable for review as agreed by the Conference of the Parties;

2. *Recognizes* that further work may need to be undertaken by the Intergovernmental Panel on Climate Change, in accordance with any relevant decisions by the Conference of the Parties;

3. *Encourages*, as appropriate, the development of guidance for effective engagement of indigenous peoples and local communities in monitoring and reporting;

4. *Encourages* all Parties in a position to do so to support and strengthen the capacities of developing countries to collect and access, analyse and interpret data, in order to develop estimates;

5. *Invites* Parties in a position to do so and relevant international organizations to enhance capacity-building in relation to using the guidance and guidelines referred in to paragraph 1 (c) above, taking into account the work of the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention;

6. *Requests* the secretariat, subject to availability of supplementary funding, to enhance coordination of the activities referred to in paragraph 5 above, in the context of existing initiatives;

7. *Recognizes* that developing country Parties in establishing forest reference emission levels and forest reference levels should do so transparently taking into account historic data, and adjust for national circumstances, in accordance with relevant decisions of the Conference of the Parties;

8. *Invites* Parties to share lessons learned and experiences gained in the application of the guidance referred to in paragraph 1 above and the annex to decision 2/CP.13 through the web platform on the UNFCCC website;

9. *Urges* relevant international organizations, non-governmental organizations and stakeholders to integrate and coordinate their efforts in order to avoid duplication and enhance synergy with regard to activities relating to decision 2/CP.13.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

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<sup>1</sup> Taking note of, if appropriate, the guidance on consistent representation of land in the Intergovernmental Panel on Climate Change *Good Practice Guidance for Land Use, Land-Use Change and Forestry*.

## Decision 5/CP.15

### Work of the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention

*The Conference of the Parties,*

*Recalling* the relevant provisions of the Convention, in particular Article 4, paragraphs 1, 3 and 7, and Article 12, paragraphs 1, 4, 5 and 7,

*Recalling also* decisions 8/CP.5, 3/CP.8, 17/CP.8 and 8/CP.11,

*Acknowledging* that the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention has made a substantial contribution to improving the process of preparation of national communications from Parties not included in Annex I to the Convention (non-Annex I Parties) by providing technical advice and support and therefore enhancing the capacity of such Parties to prepare their national communications,

*Emphasizing* the importance of providing relevant technical advice and support for the process of preparation of national communications, as well as the importance of providing a forum for non-Annex I Parties to share experiences of this process,

*Recognizing* that the preparation of national communications is a continuing process,

1. *Decides* to reconstitute the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention for a period of three years from 2010 to 2012;
2. *Also decides* that membership of the Consultative Group of Experts shall be the same as in decision 3/CP.8, annex, paragraphs 3–8;
3. *Further decides* that the Consultative Group of Experts shall be composed of experts drawn from the UNFCCC roster of experts with expertise in greenhouse gas inventories, vulnerability and adaptation assessment, mitigation and other matters related to the process of preparation of national communications;
4. *Encourages* regional groups, in nominating their experts to the Consultative Group of Experts, to make all efforts to ensure balanced representation in the areas of expertise indicated in paragraph 3 above;
5. *Decides* that the Consultative Group of Experts, in fulfilling its mandate, shall function in accordance with the terms of reference contained in the annex to this decision;
6. *Also decides* that the term and the mandate of the Consultative Group of Experts and the need for continuation of the group shall be reviewed by the Conference of the Parties at its seventeenth session;
7. *Requests* the secretariat to facilitate the work of the Consultative Group of Experts, in accordance with Article 8, paragraph 2(c), of the Convention and decision 17/CP.8, by:
  - (a) Organizing meetings and workshops of the Consultative Group of Experts and compiling reports of its meetings and workshops for consideration by the Subsidiary Body for Implementation;

- (b) Providing technical support to the Consultative Group of Experts as required, particularly in the areas of national greenhouse gas inventories, vulnerability and adaptation assessment, mitigation assessment, research and systematic observation, education, training and public awareness, technology transfer and capacity-building, as they relate to the process of and the preparation of national communications, in accordance with the provisions in the budget;
- (c) Disseminating the information materials and technical reports prepared by the Consultative Group of Experts to Parties, relevant experts and organizations;

8. *Invites* Parties included in Annex II to the Convention to contribute financial resources to support the work of the Consultative Group of Experts.

## ANNEX

**Terms of reference of the Consultative Group of Experts  
on National Communications from Parties not included  
in Annex I to the Convention**

1. The Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention shall have the objective of improving the process of and preparation of national communications from Parties not included in Annex I to the Convention (non-Annex I Parties), by providing technical advice and support to non-Annex I Parties, including those Parties that have not yet completed their initial national communications.
2. The Consultative Group of Experts, in fulfilling its mandate, shall:
  - (a) Provide technical assistance to non-Annex I Parties for the regular development of national greenhouse gas (GHG) inventories, vulnerability and adaptation assessment, mitigation assessment, research and systematic observation, education, training and public awareness, technology transfer and capacity-building, with a view to improving the accuracy, consistency and transparency of information in their national communications;
  - (b) Provide recommendations, as appropriate, on elements to be considered in a future revision of the guidelines for the preparation of national communications from Parties not included in Annex I to the Convention, taking into account the difficulties encountered by non-Annex I Parties in the preparation of their most recent national communications;
  - (c) Provide technical advice to non-Annex I Parties to facilitate the development and long-term sustainability of processes, and the establishment and maintenance of national technical teams, for the preparation of national communications, including GHG inventories, on a continuous basis;
  - (d) Provide technical advice and support to Parties, upon request, on the provision of information on steps to integrate climate change considerations into relevant social, economic and environmental policies and actions, in accordance with Article 4, paragraph 1(f), of the Convention;
  - (e) Provide non-Annex I Parties, upon request, with information on existing activities and programmes, including bilateral, regional and multilateral sources of financial and technical assistance, to facilitate and support the preparation of national communications by non-Annex I Parties;
  - (f) Provide technical support on issues mentioned above in paragraph 2 (c) above, and to the extent possible paragraph 2 (a) above, including through workshops, hands-on training and training of trainers, building on experiences of Parties and/or lessons learned, in the preparation of national communications, subject to the availability of resources.
3. The Consultative Group of Experts shall, in defining and implementing its work programme, take into account other relevant work by expert groups under the Convention in order to avoid duplication of work.
4. The Consultative Group of Experts shall forward recommendations on matters indicated in paragraph 2 above for consideration by the Subsidiary Body for Implementation.

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5. The reconstituted Consultative Group of Experts shall develop, at its first meeting, a work programme for 2010–2012.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

## **Decision 6/CP.15**

### **Fourth review of the financial mechanism**

*The Conference of the Parties,*

1. *Requests* the Subsidiary Body for Implementation to continue its consideration of the fourth review of the financial mechanism at its thirty-second session on the basis of the draft text contained in the annex to this decision, with a view to recommending a draft decision for adoption by the Conference of the Parties at its sixteenth session;
2. *Decides* to complete the consideration of the fourth review of the financial mechanism at its sixteenth session.

## ANNEX

[ENGLISH ONLY]

**Draft decision -/CP.15****Fourth review of the financial mechanism**

*[The Conference of the Parties,*

*Recalling* Article 4, paragraphs 3, 4, 5, 8, and 9, of the Convention,

*Taking fully into account* Article 11 of the Convention, in particular its paragraph 1,

*Also recalling* decisions 11/CP.1, 12/CP.2, 3/CP.4, 6/CP.13 and 3/CP.14,

*Pursuant to* Article 7, paragraph 2(h), of the Convention,

*Noting* that multilateral and bilateral agencies have scaled up financial resources related to the implementation of the Convention,

*Also noting* the annual report of the Global Environment Facility to the Conference of the Parties,

*Further noting* the report<sup>1</sup> on the Fourth Overall Performance Study of the Global Environment Facility,

1. *Takes note* of the findings of the Fourth Overall Performance Study that:

- (a) The Global Environment Facility support continues to be in line with guidance from the Convention;
- (b) [Although developed country donors have provided new and additional funding for global environmental benefits to developing countries, this has been insufficient to cover the increasing agenda of the Global Environment Facility as agreed upon in the conventions];
- (c) The Global Environment Facility support has been crucial in enabling countries to integrate climate change into their national development agendas;
- (d) The Global Environment Facility support has assisted developing countries in introducing policies to address climate change and reduce and avoid greenhouse gas emissions;
- (e) The Resource Allocation Framework has hindered the access of group countries to the Global Environment Facility, particularly in climate change, which may explain some of the discontent of the climate change community with the Global Environment Facility;
- (f) The Global Environment Facility reporting requirements to the Conventions have generally been met, yet certain aspects require improvement;

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<sup>1</sup> Global Environment Facility Evaluation office. Fourth Overall Performance Study of the GEF Progress Toward Impact. Full report, 9 November 2009.

- (g) The move of the Global Environment Facility towards country-level programming has increased country ownership to some extent, but that the current modalities for resource allocation require improvement;
  - (h) There is scope to further simplify and streamline the Global Environment Facility procedures, particularly the project identification phase, and improve timeliness throughout the project cycle;
  - (i) The Global Environment Facility needs a knowledge management strategy to improve learning and the sharing of best practices;
  - (j) The Global Environment Facility has played an important role in scaling up resources to address climate change;
2. *Calls upon* developed country Parties and invites other Parties that make financial contributions to the Global Environment Facility to ensure a successful fifth replenishment in order to assist in providing adequate and predictable funding;
3. *Invites* the Global Environment Facility, as an operating entity of the financial mechanism, to continue to ensure active participation of recipient partners in the replenishment process;
4. *Also invites* developed country Parties to provide, through bilateral and regional and other multilateral channels, financial resources related to the implementation of the Convention;
5. *Decides* that the Global Environment Facility has provided and should continue to enhance its support to developing countries in:
- (a) Meeting their commitments under the Convention;
  - (b) Strengthening national capacity-building;
  - (c) Applying and diffusing technologies, practices and processes for mitigation;
  - (d) [Taking into account low-carbon development and adaptation needs across all GEF focal areas, as appropriate;] [All focal areas, taking into account low-carbon development and adaptation needs;]
  - (e) [Developing synergies between the Multilateral Environmental Agreements;] [addressing the interaction between the components of the climate system;]
6. *Requests* the GEF to continue improving its modalities to increase the responsiveness, effectiveness and efficiency of its support, including:
- (a) Being responsive to new guidance from the Conference of the Parties;
  - (b) Reporting from the Global Environment Facility to the convention should include a critical assessment of its experience with implementation of projects, as well as its experience with incorporating guidance from the Conference of the Parties into its strategies and programme priorities;
  - (c) Enhancing modalities which reinforce country ownership and improve the allocation of resources;
  - (d) The future resource allocation system in the Global Environment Facility should [exclude] [prioritize] funding for [the agreed full cost of national communications] [communications to the convention, since they are mandatory and are supposed to be paid in full by the Global Environment Facility];

- (e) Further simplifying and improving its procedures, particularly those for the identification, preparation and approval of activities;
- (f) Ensuring that access to resources is expeditious and timely;
- (g) Enabling country-level programming, where appropriate;
- (h) Ensuring consistency and complementarity with other financing activities;
- (i) Promoting private-sector financing and investment to address climate change activities;
- (j) Strengthening its knowledge management approach to share best practice;

7. *Decides* that the Global Environment Facility should continue to provide and enhance support for the implementation of adaptation activities, including the implementation of national adaptation plans of action, through the Least Developed Country Fund and Special Climate Change Fund;

8. [*Decides*] [that the Global Environment Facility] [*Urges* all Parties [in a position to do so] [to] examine all options available, to scale up the funding available for the implementation of obligations under Articles 4, paragraphs 3, 4 and 5, of the Convention;

9. [*Further reiterates* decision 7/CP.7 to the Convention that predictable and adequate levels of funding shall be made available to Parties not included in Annex I [to meet the agreed full incremental cost of complying with their obligations under the convention]];

10. *Requests* the Global Environment Facility, in its regular report to the Conference of the Parties, to include information on the steps it has taken to implement the guidance provided in paragraphs 3, 5, 6 [and 7] above;

11. *Also requests* the Subsidiary Body for Implementation to initiate the fifth review of the financial mechanism at its thirty-seventh session in accordance with the criteria contained in the guidelines annexed to decisions 3/CP.4 and 6/CP.13, or as these guidelines may be subsequently amended, and to report on the outcome to the Conference of the Parties at its nineteenth session.]

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

## **Decision 7/CP.15**

### **Additional guidance to the Global Environment Facility**

*The Conference of the Parties,*

*Noting* the report of the Global Environment Facility to the Conference of the Parties,<sup>1</sup>

*Recalling* its decision to provide annual guidance to the Global Environment Facility in accordance with the annex to decision 12/CP.2,

*Requests* the Subsidiary Body for Implementation to continue its consideration of additional guidance to the Global Environment Facility at its thirty-second session, with a view to recommending a draft decision for adoption by the Conference of the Parties at its sixteenth session.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

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<sup>1</sup> FCCC/CP/2009/9.

## **Decision 8/CP.15**

### **Capacity-building under the Convention**

*The Conference of the Parties,*

*Recalling* decision 6/CP.14,

1. *Requests* the Subsidiary Body for Implementation to continue its consideration of the second comprehensive review of the implementation of the framework for capacity-building in developing countries at its thirty-second session, with a view to preparing a draft decision on the outcome of this review for adoption by the Conference of Parties at its sixteenth session;

2. *Decides* to complete the consideration of the second comprehensive review at its sixteenth session.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

## Decision 9/CP.15

### Systematic climate observations

*The Conference of the Parties,*

*Recalling* Article 4, paragraph 1(g–h), and Article 5 of the Convention,

*Further recalling* decisions 8/CP.3, 14/CP.4, 5/CP.5, 11/CP.9, 5/CP.10 and 11/CP.13,

*Having considered* the conclusions of the Subsidiary Body for Scientific and Technological Advice at its thirtieth session,

*Noting* the important role of the Global Climate Observing System in meeting the need for climate observation under the Convention,

1. *Expresses its appreciation:*
  - (a) To the secretariat and sponsoring agencies of the Global Climate Observing System for preparing the report on progress with the *Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC* (hereinafter referred to as the Global Climate Observing System implementation plan);
  - (b) To the secretariat and sponsoring agencies of the Global Terrestrial Observing System for developing a framework for the preparation of guidance materials, standards and reporting guidelines for terrestrial observing systems for climate;
  - (c) To the Committee on Earth Observation Satellites for its coordinated response, on behalf of Parties that support space agencies involved in global observations, to the needs expressed in the Global Climate Observing System implementation plan;
2. *Recognizes* the significant progress made during 2004–2008 in improving the observing systems for climate relevant to the Convention;
3. *Notes* that, despite the progress made, only limited advances have been made in achieving long-term continuity for several in situ observing systems and that there are still large areas, in Africa for example, for which in situ observations and measurements are not available;
4. *Also notes* that not all climate information needs under the Convention are being met;
5. *Urges* Parties to work towards addressing the priorities and gaps identified in the report on progress with the Global Climate Observing System implementation plan, in particular the implementation of the regional action plans that were developed during 2001–2006, and ensuring sustained long-term operation of essential in situ networks, especially for the oceanic and terrestrial domains, including through provision of the necessary resources;
6. *Invites* relevant United Nations agencies and international organizations to do the same;
7. *Encourages* Parties in a position to do so to support activities aimed at sustaining climate observations over the long term in developing countries, especially the least developed countries and small island developing States;
8. *Invites* the Global Climate Observing System secretariat, under the guidance of the Global Climate Observing System Steering Committee, to update, by the thirty-third session of the Subsidiary Body for Scientific and Technological Advice, the Global Climate Observing System

implementation plan, taking into account emerging needs in climate observation, in particular those relating to adaptation activities;

9. *Encourages* the secretariat and the sponsoring agencies of the Global Terrestrial Observing System to implement the framework for the preparation of guidance materials, standards and reporting guidelines for terrestrial observing systems for climate, as a joint terrestrial framework mechanism between relevant agencies of the United Nations and the International Organization for Standardization;

10. *Encourages* the Committee on Earth Observation Satellites to continue coordinating and supporting the implementation of the satellite component of the Global Climate Observing System;

11. *Urges* Parties that support space agencies involved in global observations to enable these agencies to continue to implement, in a coordinated manner through the Committee on Earth Observation Satellites, the actions identified in the updated report of the Committee on Earth Observation Satellites,<sup>1</sup> in order to meet the relevant needs of the Convention, in particular by ensuring long-term continuity of observations and data availability.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

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<sup>1</sup> FCCC/SBSTA/2008/MISC.11.

## Decision 10/CP.15

### **Updated training programme for greenhouse gas inventory review experts for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention**

*The Conference of the Parties,*

*Recalling* Articles 4, 7 and 12 of the Convention,

*Further recalling* decisions 19/CP.8 and 12/CP.9,

*Having considered* the relevant recommendations of the Subsidiary Body for Scientific and Technological Advice,

*Recognizing* the importance of the training programme for greenhouse gas inventory review experts for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention,

1. *Requests* the secretariat to develop and implement the updated training programme for greenhouse gas inventory review experts for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention, as outlined in the annex, including the examination of experts, and to give priority to organizing an annual seminar for the basic course;
2. *Encourages* Parties included in Annex I to the Convention in a position to do so to provide financial support for enhancing the training programme;
3. *Requests* the secretariat to include, in its annual report on inventory review activities to the Subsidiary Body for Scientific and Technological Advice, information on the training programme, in particular information on examination procedures and the selection of trainees and instructors, in order for Parties to assess the effectiveness of the programme.

## ANNEX

**Updated training programme for greenhouse gas inventory review experts for the technical review of greenhouse gas inventories of Parties included in Annex I to the Convention****A. Details of the training programme**

1. The courses are intended to train greenhouse gas (GHG) inventory review experts for the technical review of GHG inventories of Parties included in Annex I to the Convention. All training courses will be available online. For trainees without easy access to the Internet, courses will be distributed through electronic means; for courses facilitated by an instructor, trainees will communicate with the instructor by electronic means. At the request of a Party, the courses will also be made available to others interested in the review process, provided that this does not require additional resources. All courses, without instructor, will be available to trainees all year round.
2. A closing seminar for the basic course of the training programme will be offered annually for around 30 participants (new GHG inventory review experts).
3. Additional regional training seminars for new GHG inventory review experts and a refresher seminar for experienced GHG inventory review experts may be offered annually, depending on the availability of resources. The refresher seminars may be offered in conjunction with meetings of lead reviewers to complete the training for lead reviewers and other experienced GHG inventory review experts.
4. All training courses will include an examination. Examination procedures will be standardized, objective and transparent.
5. For courses which have a closing seminar, the examination will generally take place during the seminar. In exceptional circumstances, other arrangements for examinations will be made, provided that the examinations take place under the supervision of the secretariat and that this does not require additional resources. For other courses, the examination will take place online.
6. New GHG inventory review experts who successfully complete the relevant requirements of the training programme will be invited to participate in a centralized or in-country review, working alongside experienced GHG inventory review experts.
7. Experts who do not pass an examination for a course at the first attempt may retake the examination once only, provided that the expert has fulfilled all of the tasks assigned during the course in a timely manner and that the retake does not require the secretariat to incur additional costs.
8. Experts with relevant inventory expertise will be invited to act as instructors for courses of the training programme, ensuring that their collective skills cover the subjects addressed in each course. They will provide advice and support by e-mail or other electronic means. The secretariat will seek to achieve a geographical balance among the instructors participating in the training programme.
9. When selecting new GHG inventory review experts for courses facilitated by instructors, the secretariat will give priority to national GHG inventory review experts, nominated to the UNFCCC roster of experts, from Parties that have not participated in review activities before.

## B. Courses of the training programme

### 1. Basic course for the review of greenhouse gas inventories of Annex I Parties

**Description:** This course covers UNFCCC review guidelines and procedures and general Intergovernmental Panel on Climate Change (IPCC) inventory guidance (the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF)<sup>1</sup> as well as specific aspects of the review of the IPCC sectors energy, fugitive emissions, industrial processes, agriculture, land use, land-use change and forestry, and waste. This course also provides guidance on making review reports substantive, consistent among review teams and reader-friendly

**Preparation:** 2009

**Implementation:** 2009–2014

**Target audience:** New GHG inventory review experts

**Type of course:** E-learning, facilitated by an instructor, with a closing seminar

**Examination requirements and format:** New GHG inventory review experts must pass the examination before participating in expert review teams. In-person examination.

### 2. Review of complex models and higher tier methods

**Description:** This course provides general guidance and procedures, as well as specific aspects for the review of emission estimates performed using complex models and higher tier methods (tier 3 methods)

**Preparation:** 2010

**Implementation:** 2011–2014

**Target audience:** Lead reviewers and GHG inventory review experts who participate in reviews, including new GHG inventory review experts

**Type of course:** E-learning, without instructor

**Examination requirements and format:** Optional. Self-check electronic examination.

### 3. Improving communication and facilitating consensus in expert review teams

**Description:** This course provides tools to improve the work of expert review teams and facilitate teamwork

**Preparation:** 2003

**Implementation:** 2009–2014

**Target audience:** New GHG inventory review experts and experienced GHG inventory review experts as a refresher course

**Type of course:** E-learning, without instructor

**Examination requirements and format:** Optional. Self-check electronic examination.

## C. Refresher seminar for experienced greenhouse gas inventory review experts

**Description:** This annual seminar provides general guidance on specific and complex aspects of the review of emission estimates. It enables experienced GHG inventory review experts to strengthen and refresh their knowledge, both for cross-cutting aspects and for sector-specific issues

**Implementation:** 2011–2014, subject to the availability of resources

<sup>1</sup> In full: *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories and Good Practice Guidance for Land Use, Land-Use Change and Forestry.*

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**Target audience:** Lead reviewers and experienced GHG inventory review experts who participate in reviews.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

## Decision 11/CP.15

### Administrative, financial and institutional matters

*The Conference of the Parties,*

*Having considered* the information in documents prepared by the secretariat on administrative, financial and institutional matters,<sup>1</sup>

*Recalling* paragraphs 11 and 19 of the financial procedures for the Conference of the Parties adopted by decision 15/CP.1,

#### I. Budget performance for the biennium 2008–2009

1. *Takes note* of the interim financial statements for the biennium 2008–2009 as at 31 December 2008, the report on budget performance for the period 1 January 2008 to 30 June 2009 and the status of contributions as at 15 May 2009 and 15 November 2009 to the Trust Fund for the Core Budget of the UNFCCC, the Trust Fund for Supplementary Activities and the Trust Fund for Participation in the UNFCCC Process;

2. *Expresses appreciation* to Parties that have paid their contributions to the core budget in a timely manner;

3. *Calls upon* Parties that have not paid their contributions to the core budget to do so without delay, bearing in mind that contributions are due on 1 January of each year in accordance with the financial procedures;

4. *Expresses appreciation* for the contributions received from Parties to the Trust Fund for Participation in the UNFCCC Process and to the Trust Fund for Supplementary Activities, especially for the generous contributions for the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol and the Ad Hoc Working Group on Long-term Cooperative Action under the Convention;

5. *Reiterates* its appreciation to the Government of Germany for its annual voluntary contribution to the core budget of EUR 766,938 and its special contribution of EUR 1,789,522 as host Government to the secretariat;

#### II. Continuing review of the functions and operations of the secretariat

6. *Notes* the information relating to the functions and operations of the secretariat as contained in relevant documents, particularly in document FCCC/SBI/2009/11;

7. *Agrees* that the Subsidiary Body for Implementation should consider this matter at its thirty-third session, in keeping with its decision taken at its twenty-first session to continue to consider this matter annually.<sup>2</sup>

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

<sup>1</sup> FCCC/SBI/2009/11, FCCC/SBI/2009/INF.3, FCCC/SBI/2009/INF.7 and FCCC/SBI/2009/INF.10 and Corr.1.

<sup>2</sup> FCCC/SBI/2004/19, paragraph 105.

## Decision 12/CP.15

### Programme budget for the biennium 2010–2011

*The Conference of the Parties,*

*Recalling* paragraph 4 of the financial procedures for the Conference of the Parties to the United Nations Framework Convention on Climate Change,<sup>1</sup>

*Having considered* the proposed programme budget for the biennium 2010–2011 submitted by the Executive Secretary,<sup>2</sup>

1. *Decides* that the programme budget shall be calculated in euros;
2. *Approves* the programme budget for the biennium 2010–2011, amounting to EUR 44,200,099 for the purposes specified in table 1;
3. *Notes with appreciation* the annual contribution of the Host Government, EUR 766,938, which offsets planned expenditures;
4. *Approves* a drawing of EUR 1,400,000 from the unspent balances or contributions (carry-over) from previous financial periods to cover part of the 2010–2011 budget;
5. *Approves* the staffing table (table 2) for the programme budget;
6. *Notes* that the programme budget contains elements relating to the Convention, as well as to the Kyoto Protocol;
7. *Adopts* the indicative scale of contributions for 2010 and 2011 contained in the annex to this decision, covering 63.2 per cent of the indicative contributions specified in table 1;
8. *Invites* the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, at its fifth session, to endorse the elements of the recommended budget as it applies to the Kyoto Protocol;
9. *Approves* a contingency budget for conference services, amounting to EUR 8,138,700, to be added to the programme budget for the biennium 2010–2011 in the event that the United Nations General Assembly decides not to provide resources for these activities in the United Nations regular budget (table 3);
10. *Invites* the United Nations General Assembly to decide at its sixty-fourth session on the issue of meeting the conference services expenses from its regular budget;
11. *Requests* the Executive Secretary to report to the Subsidiary Body for Implementation on the implementation of paragraph 9 above, as necessary;
12. *Authorizes* the Executive Secretary to make transfers between each of the main appropriation lines set out in table 1, up to an aggregate limit of 15 per cent of total estimated expenditure for those appropriation lines, provided that a further limitation of up to minus 25 per cent of each such appropriation line shall apply;
13. *Decides* to maintain the level of the working capital reserve at 8.3 per cent of the estimated expenditure;

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<sup>1</sup> Decision 15/CP.1, annex I.

<sup>2</sup> FCCC/SBI/2009/2 and Add.1–3.

14. *Invites* all Parties to the Convention to note that contributions to the core budget are due on 1 January of each year in accordance with paragraph 8 (b) of the financial procedures and to pay promptly and in full, for each of the years 2010 and 2011, the contributions required to finance expenditures approved under paragraph 2 above and any contributions required to finance the expenditures arising from the decisions referred to in paragraph 9 above;

15. *Authorizes* the Executive Secretary to implement decisions taken by the Conference of the Parties at its fifteenth session for which provisions are not made under the approved budget, using voluntary contributions and resources available under the core budget;

16. *Urges* Parties to make voluntary contributions as necessary for the timely implementation of the decisions referred to in paragraph 15 above;

17. *Takes note* of the proposed contingency budget for resource requirements for work related to agreed outcomes under the Bali Road Map contained in document FCCC/SBI/2009/2;

18. *Requests* the Executive Secretary to propose, for consideration by the Subsidiary Body for Implementation at its first session following the fifteenth session of the Conference of the Parties, an additional budget to cover potential activities related to decisions taken by the Conference of the Parties at its fifteenth session for which financial provisions are not made;

19. *Requests* the Subsidiary Body for Implementation to recommend at its first session following the fifteenth session of the Conference of the Parties, an additional budget as referred to in paragraph 17 above for adoption by the Conference of the Parties at its sixteenth session and/or the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its sixth session, as appropriate;

20. *Also requests* the Subsidiary Body for Implementation to authorize the Executive Secretary to notify Parties of their possible contributions based on the recommended additional budget;

21. *Takes note* of the accrued liability, related to staff entitlements, of USD 21.5 million as at 31 December 2008, of which approximately USD 10.4 million relates to the Trust Fund for the Core Budget of the UNFCCC;

22. *Agrees* to continue making provisions in the core budget to cover current funding commitments relating to after-service health insurance and repatriation grants on a 'pay-as-you-go' basis;

23. *Requests* the Executive Secretary to continue exploring ways to make a provision for this liability in the future, based on best practices and in line with recent developments on this matter within the United Nations system;

24. *Authorizes* the Executive Secretary to use, to the extent possible and in consultation with Parties and the Office of Human Resources Management of the United Nations, available balances from the existing reserves and surplus balances in the event that the secretariat needs to address its liability, as estimated in the actuarial study and the financial statements for the biennium 2008–2009;<sup>3</sup>

25. *Encourages* the Executive Secretary to continue to implement initiatives to reduce the level of greenhouse gas emissions of the secretariat's operations and activities;

26. *Authorizes* the Executive Secretary to make provisions under the relevant source of funding, within available resources, for efforts to offset the greenhouse gas emissions of the secretariat's operations and activities;

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<sup>3</sup> A breakdown of the liability by fund is provided in the interim financial statements for the biennium 2008–2009 contained in document FCCC/SBI/2009/INF.3.

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27. *Takes note* of the funding estimates for the Trust Fund for Participation in the UNFCCC Process specified by the Executive Secretary (table 4), and invites Parties to make contributions to this fund;

28. *Takes note* of the funding estimates for the Trust Fund for Supplementary Activities specified by the Executive Secretary (EUR 24,154,170 for the biennium 2010–2011) (table 5), and invites Parties to make contributions to this fund;

29. *Requests* the Executive Secretary to report to the Conference of the Parties at its sixteenth session on income and budget performance, and to propose any adjustments that might be needed in the programme budget for the biennium 2010–2011.

**Table 1. Core programme budget for 2010–2011 by programme**

Expenditure	2010	2011	Total 2010–2011	
	(EUR)	(EUR)	(EUR)	(USD <sup>a</sup> )
<b>A. Programme appropriations<sup>b</sup></b>				
EDM	1 975 013	1 975 013	3 950 026	5 648 537
RDA	4 148 327	4 078 397	8 226 724	11 764 215
FTS	2 588 319	2 556 850	5 145 169	7 357 592
ATS	2 208 655	2 263 788	4 472 443	6 395 593
SDM	425 755	425 755	851 510	1 217 659
LA	1 557 922	1 557 922	3 115 844	4 455 657
CAS	1 445 629	1 445 629	2 891 258	4 134 499
IS	3 725 976	3 725 976	7 451 952	10 656 291
AS <sup>c</sup>	--	--	--	--
<b>B. Secretariat-wide operating costs<sup>d</sup></b>	1 449 784	1 326 708	2 776 492	3 970 384
<b>Programme expenditures (A + B)</b>	<b>19 525 380</b>	<b>19 356 038</b>	<b>38 881 418</b>	<b>55 600 427</b>
C. Programme support costs (overheads) <sup>e</sup>	2 538 300	2 516 285	5 054 585	7 228 057
D. Working capital reserve <sup>f</sup>	264 096	-	264 096	377 658
<b>TOTAL (A + B + C + D)</b>	<b>22 327 776</b>	<b>21 872 323</b>	<b>44 200 099</b>	<b>63 206 142</b>
<b>Income</b>				
Contribution from the Host Government	766 938	766 938	1 533 876	2 193 443
Unspent balances or contributions from previous financial periods (carry-over)	700 000	700 000	1 400 000	2 002 000
Indicative contributions	<b>20 860 838</b>	<b>20 405 385</b>	<b>41 266 223</b>	<b>59 010 699</b>
<b>TOTAL INCOME</b>	<b>22 327 776</b>	<b>21 872 323</b>	<b>44 200 099</b>	<b>63 206 142</b>

<sup>a</sup> The exchange rate used (EUR 1 = USD 1.430) is the average rate for the period January 2008–March 2009.

<sup>b</sup> Programmes: Executive Direction and Management (EDM); Reporting, Data and Analysis (RDA); Financial and Technical Support (FTS); Adaptation, Technology and Science (ATS); Sustainable Development Mechanisms (SDM); Legal Affairs (LA); Conference Affairs Services (CAS); Information Services (IS); and Administrative Services (AS).

<sup>c</sup> AS is funded by overheads.

<sup>d</sup> Secretariat-wide operating costs are managed by AS.

<sup>e</sup> Standard 13 per cent applied by the United Nations for administrative support.

<sup>f</sup> In accordance with financial procedures (decision 15/CP.1, annex I, para. 14), the working capital reserve will be brought up to EUR 1,831,285 in 2010 and maintained at that level in 2011.

**Table 2. Secretariat-wide staffing from the core budget in the biennium 2010–2011**

	2009	2010	2011
<b>Professional category and above<sup>a</sup></b>			
ASG <sup>b</sup>	1	1	1
D-2 <sup>c</sup>	3	3	3
D-1	6	5	5
P-5	12	12	12
P-4	24	28	29
P-3	32	30	29
P-2	10	12	12
<b>Total Professional category and above</b>	<b>88</b>	<b>91</b>	<b>91</b>
<b>Total General Service category</b>	53.5	49.5	49.5
<b>TOTAL</b>	<b>141.5</b>	<b>140.5</b>	<b>140.5</b>

<sup>a</sup> Assistant Secretary-General (ASG); Director (D) and Professional (P).

<sup>b</sup> This position may be upgraded to Under-Secretary-General following the independent review of the secretariat by the Secretary-General of the United Nations (see document FCCC/SBI/2009/2, para. 36).

<sup>c</sup> One position may be upgraded to ASG following the independent review noted above in footnote b.

**Table 3. Resource requirements for the conference services contingency in the biennium 2010–2011**  
(thousands of euros)

Object of expenditure	2010	2011	Total 2010–2011	
	(EUR)	(EUR)	(EUR)	(USD)
Interpretation <sup>a</sup>	672.4	672.4	1 344.8	1 923.0
Documentation <sup>b</sup>				
Translation	1 307.3	1 307.3	2 614.6	3 738.8
Reproduction and distribution	1 344.5	1 344.5	2 689.0	3 845.3
Meetings services support <sup>c</sup>	133.5	133.5	267.0	381.7
<b>Subtotal</b>	<b>3 457.7</b>	<b>3 457.7</b>	<b>6 915.4</b>	<b>9 888.8</b>
Programme support costs	449.5	449.5	899.0	1 285.5
Working capital reserve	324.3	--	324.3	463.7
<b>TOTAL</b>	<b>4 231.5</b>	<b>3 907.2</b>	<b>8 138.7</b>	<b>11 638.1</b>

Note: Assumptions used for calculating the conference services contingency budget include the following:

- The expected number of meetings with interpretation does not exceed 40 per session;
- The expected documentation volume is based on the calculations provided by the United Nations Office at Geneva;
- Meetings services support includes staff normally provided by United Nations Office at Geneva conference services for the in-session coordination and support of interpretation, translation and reproduction services;
- Overall, the figures used are conservative and have been applied on the assumption that there will be no major increase in requirements during the biennium.

<sup>a</sup> Includes salaries, travel and daily subsistence allowance for interpreters.

<sup>b</sup> Includes all costs relating to the processing of pre-, in- and post-session documentation; translation costs include revision and typing of documents.

<sup>c</sup> Includes salaries, travel and daily subsistence allowance for meetings services support staff, and costs for shipment and telecommunications.

**Table 4. Resource requirements for the Trust Fund for Participation in the UNFCCC Process in the biennium 2010–2011**  
(thousands)

Number of delegates	Cost for each session	
	(EUR)	(USD) <sup>a</sup>
Support for one delegate from each eligible Party to participate in organized sessions	807.7	1 155.0
Support for one delegate from each eligible Party plus a second delegate from each least developed country and each small island developing State to participate in organized sessions	1 230.8	1 760.0
Support for two delegates from each eligible Party to participate in organized sessions	1 615.4	2 310.0

<sup>a</sup> The exchange rate used (EUR 1 = USD 1.430) is the average rate for the period January 2008–March 2009.

**Table 5. Resource requirements for the Trust Fund for Supplementary Activities in the biennium 2010–2011**

Activities to be undertaken by the secretariat	Cost (EUR)	Cost (USD) <sup>a</sup>
<b>Convention</b>		
Full-scale implementation of financial needs assessments	588 314	841 289
Regional capacity-building for sustainable national greenhouse gas inventory management systems in South-East Asia	125 000	178 750
Regional capacity-building for sustainable national greenhouse gas inventory management systems in Africa	350 000	500 500
Support to national communications from Parties not included in Annex I to the Convention and to the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention	60 000	85 800
Support to the implementation and review of the amended New Delhi work programme on Article 6 of the Convention	575 000	822 250
Support to the Least Developed Countries Expert Group	703 314	1 005 739
Support to the implementation of the technology transfer framework and the work of the Expert Group on Technology Transfer	1 047 314	1 497 659
Nairobi work programme on impacts, vulnerability and adaptation to climate change	1 643 256	2 349 856
Supporting the follow-up to the Buenos Aires programme of work on adaptation and response measures	301 314	430 879
Update of the <i>United Nations Framework Convention on Climate Change Handbook</i>	435 000	622 050
<b>Subtotal</b>	<b>5 828 512</b>	<b>8 334 772</b>
<b>Kyoto Protocol</b>		
Development and maintenance of the database system for the annual compilation and accounting of emission inventories and assigned amounts under the Kyoto Protocol	214 657	306 960
Support to operations relating to joint implementation	4 862 396	6 953 226
Support to the Compliance Committee	591 000	845 130
<b>Subtotal</b>	<b>5 668 053</b>	<b>8 105 316</b>

**Table 5** (continued)

<b>Activities to be undertaken by the secretariat Convention and Kyoto Protocol</b>	<b>Cost (EUR)</b>	<b>Cost (USD)<sup>a</sup></b>
Activities to enhance support to the expert review process under the Convention and its Kyoto Protocol: training for expert review teams and meetings of lead reviewers including regional seminars	1 249 942	1 787 417
Development and maintenance of CRF Reporter	448 971	642 029
Development and maintenance of the greenhouse gas data interface	366 314	523 829
Activities envisaged to enable the Reporting, Data and Analysis information technology systems to implement post-Kyoto requirements	782 614	1 119 138
Support to financial cooperation and enhanced provision of financial resources	511 314	731 179
Support to capacity-building for developing countries	217 000	310 310
Fellowship programme to strengthen capacity-building in developing countries, in particular small island developing States and the least developed countries	189 000	270 270
Activities relating to land use, land-use change and forestry: reducing emissions from deforestation and forest degradation, enhancement of carbon sinks, and the role of sinks in future mitigation action	1 008 314	1 441 889
Climate change information outreach activities and products	823 942	1 178 237
Strategic communications, including outreach to the business and investment sector	819 942	1 172 517
Spanish portal on the UNFCCC website	105 000	150 150
Implementation of integrated secretariat-wide information systems, including the electronic content management system and a contacts relationship management system	1 644 884	2 352 184
Enhanced library services	193 314	276 439
Information and communication technology support to meetings held under the Convention and the Kyoto Protocol	938 256	1 341 706
Information and communication technology business continuity and disaster recovery services	580 000	829 400
<b>Subtotal</b>	<b>9 878 807</b>	<b>14 126 694</b>
<b>Total estimated expenditures</b>	<b>21 375 372</b>	<b>30 566 782</b>
<i>Programme support costs (13 per cent)</i>	<i>2 778 798</i>	<i>3 973 682</i>
<b>GRAND TOTAL</b>	<b>24 154 170</b>	<b>34 540 464</b>

<sup>a</sup> The exchange rate used (EUR 1 = USD 1.430) is the average rate for the period January 2008–March 2009.

## ANNEX

**Indicative scale of contributions from Parties to the Convention  
for the biennium 2010–2011<sup>a</sup>**

<b>Party</b>	<b>United Nations scale of assessments for 2009</b>	<b>UNFCCC adjusted scale of assessments for 2010</b>	<b>UNFCCC adjusted scale of assessments for 2011</b>
Afghanistan	0.001	0.001	0.001
Albania	0.006	0.006	0.006
Algeria	0.085	0.083	0.083
Angola	0.003	0.003	0.003
Antigua and Barbuda	0.002	0.002	0.002
Argentina	0.325	0.317	0.317
Armenia	0.002	0.002	0.002
Australia	1.787	1.743	1.743
Austria	0.887	0.865	0.865
Azerbaijan	0.005	0.005	0.005
Bahamas	0.016	0.016	0.016
Bahrain	0.033	0.032	0.032
Bangladesh	0.010	0.010	0.010
Barbados	0.009	0.009	0.009
Belarus	0.020	0.020	0.020
Belgium	1.102	1.075	1.075
Belize	0.001	0.001	0.001
Benin	0.001	0.001	0.001
Bhutan	0.001	0.001	0.001
Bolivia	0.006	0.006	0.006
Bosnia and Herzegovina	0.006	0.006	0.006
Botswana	0.014	0.014	0.014
Brazil	0.876	0.854	0.854
Brunei Darussalam	0.026	0.025	0.025
Bulgaria	0.020	0.020	0.020
Burkina Faso	0.002	0.002	0.002
Burundi	0.001	0.001	0.001
Cambodia	0.001	0.001	0.001
Cameroon	0.009	0.009	0.009
Canada	2.977	2.903	2.903
Cape Verde	0.001	0.001	0.001
Central African Republic	0.001	0.001	0.001
Chad	0.001	0.001	0.001
Chile	0.161	0.157	0.157
China	2.667	2.601	2.601
Colombia	0.105	0.102	0.102
Comoros	0.001	0.001	0.001
Congo	0.001	0.001	0.001
Cook Islands	0.001	0.001	0.001
Costa Rica	0.032	0.031	0.031
Côte d'Ivoire	0.009	0.009	0.009
Croatia	0.050	0.049	0.049
Cuba	0.054	0.053	0.053
Cyprus	0.044	0.043	0.043
Czech Republic	0.281	0.274	0.274
Democratic People's Republic of Korea	0.007	0.007	0.007

<b>Party</b>	<b>United Nations scale of assessments for 2009</b>	<b>UNFCCC adjusted scale of assessments for 2010</b>	<b>UNFCCC adjusted scale of assessments for 2011</b>
Democratic Republic of the Congo	0.003	0.003	0.003
Denmark	0.739	0.721	0.721
Djibouti	0.001	0.001	0.001
Dominica	0.001	0.001	0.001
Dominican Republic	0.024	0.023	0.023
Ecuador	0.021	0.020	0.020
Egypt	0.088	0.086	0.086
El Salvador	0.020	0.020	0.020
Equatorial Guinea	0.002	0.002	0.002
Eritrea	0.001	0.001	0.001
Estonia	0.016	0.016	0.016
Ethiopia	0.003	0.003	0.003
European Union	2.500	2.500	2.500
Fiji	0.003	0.003	0.003
Finland	0.564	0.550	0.550
France	6.301	6.145	6.145
Gabon	0.008	0.008	0.008
Gambia	0.001	0.001	0.001
Georgia	0.003	0.003	0.003
Germany	8.577	8.364	8.364
Ghana	0.004	0.004	0.004
Greece	0.596	0.581	0.581
Grenada	0.001	0.001	0.001
Guatemala	0.032	0.031	0.031
Guinea	0.001	0.001	0.001
Guinea-Bissau	0.001	0.001	0.001
Guyana	0.001	0.001	0.001
Haiti	0.002	0.002	0.002
Honduras	0.005	0.005	0.005
Hungary	0.244	0.238	0.238
Iceland	0.037	0.036	0.036
India	0.450	0.439	0.439
Indonesia	0.161	0.157	0.157
Iran (Islamic Republic of)	0.180	0.176	0.176
Ireland	0.445	0.434	0.434
Israel	0.419	0.409	0.409
Italy	5.079	4.953	4.953
Jamaica	0.010	0.010	0.010
Japan	16.624	16.212	16.212
Jordan	0.012	0.012	0.012
Kazakhstan	0.029	0.028	0.028
Kenya	0.010	0.010	0.010
Kiribati	0.001	0.001	0.001
Kuwait	0.182	0.177	0.177
Kyrgyzstan	0.001	0.001	0.001
Lao People's Democratic Republic	0.001	0.001	0.001
Latvia	0.018	0.018	0.018
Lebanon	0.034	0.033	0.033
Lesotho	0.001	0.001	0.001
Liberia	0.001	0.001	0.001
Libyan Arab Jamahiriya	0.062	0.060	0.060

<b>Party</b>	<b>United Nations scale of assessments for 2009</b>	<b>UNFCCC adjusted scale of assessments for 2010</b>	<b>UNFCCC adjusted scale of assessments for 2011</b>
Liechtenstein	0.010	0.010	0.010
Lithuania	0.031	0.030	0.030
Luxembourg	0.085	0.083	0.083
Madagascar	0.002	0.002	0.002
Malawi	0.001	0.001	0.001
Malaysia	0.190	0.185	0.185
Maldives	0.001	0.001	0.001
Mali	0.001	0.001	0.001
Malta	0.017	0.017	0.017
Marshall Islands	0.001	0.001	0.001
Mauritania	0.001	0.001	0.001
Mauritius	0.011	0.011	0.011
Mexico	2.257	2.201	2.201
Micronesia (Federated States of)	0.001	0.001	0.001
Monaco	0.003	0.003	0.003
Mongolia	0.001	0.001	0.001
Montenegro	0.001	0.001	0.001
Morocco	0.042	0.041	0.041
Mozambique	0.001	0.001	0.001
Myanmar	0.005	0.005	0.005
Namibia	0.006	0.006	0.006
Nauru	0.001	0.001	0.001
Nepal	0.003	0.003	0.003
Netherlands	1.873	1.827	1.827
New Zealand	0.256	0.250	0.250
Nicaragua	0.002	0.002	0.002
Niger	0.001	0.001	0.001
Nigeria	0.048	0.047	0.047
Niue	0.001	0.001	0.001
Norway	0.782	0.763	0.763
Oman	0.073	0.071	0.071
Pakistan	0.059	0.058	0.058
Palau	0.001	0.001	0.001
Panama	0.023	0.022	0.022
Papua New Guinea	0.002	0.002	0.002
Paraguay	0.005	0.005	0.005
Peru	0.078	0.076	0.076
Philippines	0.078	0.076	0.076
Poland	0.501	0.489	0.489
Portugal	0.527	0.514	0.514
Qatar	0.085	0.083	0.083
Republic of Korea	2.173	2.119	2.119
Romania	0.070	0.068	0.068
Republic of Moldova	0.001	0.001	0.001
Russian Federation	1.200	1.170	1.170
Rwanda	0.001	0.001	0.001
Saint Kitts and Nevis	0.001	0.001	0.001
Saint Lucia	0.001	0.001	0.001
Saint Vincent and the Grenadines	0.001	0.001	0.001
Samoa	0.001	0.001	0.001
San Marino	0.003	0.003	0.003

<b>Party</b>	<b>United Nations scale of assessments for 2009</b>	<b>UNFCCC adjusted scale of assessments for 2010</b>	<b>UNFCCC adjusted scale of assessments for 2011</b>
Sao Tome and Principe	0.001	0.001	0.001
Saudi Arabia	0.748	0.729	0.729
Senegal	0.004	0.004	0.004
Serbia	0.021	0.020	0.020
Seychelles	0.002	0.002	0.002
Sierra Leone	0.001	0.001	0.001
Singapore	0.347	0.338	0.338
Slovakia	0.063	0.061	0.061
Slovenia	0.096	0.094	0.094
Solomon Islands	0.001	0.001	0.001
South Africa	0.290	0.283	0.283
Spain	2.968	2.894	2.894
Sri Lanka	0.016	0.016	0.016
Sudan	0.010	0.010	0.010
Suriname	0.001	0.001	0.001
Swaziland	0.002	0.002	0.002
Sweden	1.071	1.044	1.044
Switzerland	1.216	1.186	1.186
Syrian Arab Republic	0.016	0.016	0.016
Tajikistan	0.001	0.001	0.001
Thailand	0.186	0.181	0.181
The former Yugoslav Republic of Macedonia	0.005	0.005	0.005
Timor-Leste	0.001	0.001	0.001
Togo	0.001	0.001	0.001
Tonga	0.001	0.001	0.001
Trinidad and Tobago	0.027	0.026	0.026
Tunisia	0.031	0.030	0.030
Turkey	0.381	0.372	0.372
Turkmenistan	0.006	0.006	0.006
Tuvalu	0.001	0.001	0.001
Uganda	0.003	0.003	0.003
Ukraine	0.045	0.044	0.044
United Arab Emirates	0.302	0.295	0.295
United Kingdom of Great Britain and Northern Ireland	6.642	6.477	6.477
United Republic of Tanzania	0.006	0.006	0.006
United States of America	22.000	21.454	21.454
Uruguay	0.027	0.026	0.026
Uzbekistan	0.008	0.008	0.008
Vanuatu	0.001	0.001	0.001
Venezuela (Bolivarian Republic of)	0.200	0.195	0.195
Viet Nam	0.024	0.023	0.023
Yemen	0.007	0.007	0.007
Zambia	0.001	0.001	0.001
Zimbabwe	0.008	0.008	0.008
<b>TOTAL</b>	<b>102.478</b>	<b>100.000</b>	<b>100.000</b>

<sup>a</sup> Scale may be adjusted following a review by the United Nations General Assembly in December 2009.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

## Decision 13/CP.15

### Dates and venues of future sessions

*The Conference of the Parties,*

*Recalling* Article 7, paragraph 4, of the Convention,

*Also recalling* United Nations General Assembly resolution 40/243 of 18 December 1985 on the pattern of conferences,

*Further recalling* rule 22, paragraph 1, of the draft rules of procedure being applied<sup>1</sup> regarding the rotation of the office of President among the five regional groups,

*Noting* that in keeping with the principle of rotation among regional groups, and in the light of recent consultations among the groups, the President of the sixteenth session of the Conference of the Parties would come from the Group of Latin America and the Caribbean, the President of the seventeenth session would come from the African Group<sup>2</sup> and the President of the eighteenth session would come from the Asian Group,

#### **A. Date and venue of the sixteenth session of the Conference of the Parties and the sixth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol**

1. *Decides* to accept with appreciation the offer by the Government of Mexico to host the sixteenth session of the Conference of the Parties and the sixth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol from 29 November 2010 to 10 December 2010, subject to confirmation by the Bureau that all logistical, technical and financial elements for hosting the sessions are available, in conformity with General Assembly resolution 40/243, and subject to the successful conclusion of a Host Country Agreement;

2. *Requests* the Executive Secretary to continue consultations with the Government of Mexico and to negotiate a Host Country Agreement for convening the sessions, with a view to concluding and signing the Host Country Agreement not later than the thirty-second sessions of the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation;

#### **B. Date and venue of the seventeenth session of the Conference of the Parties and the seventh session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol**

3. *Recalls* that the seventeenth session of the Conference of the Parties and the seventh session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol shall be held in South Africa<sup>3</sup> from 28 November to 9 December 2011;<sup>4</sup>

4. *Requests* the Executive Secretary to continue consultations with the Government of South Africa and to negotiate a Host Country Agreement for convening the sessions, with a view to concluding and signing the Host Country Agreement not later than the thirty-fourth sessions of the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation;

<sup>1</sup> FCCC/CP/1996/2.

<sup>2</sup> FCCC/SBI/2008/8, paragraph 141.

<sup>3</sup> Decision 9/CP.14, paragraph 4.

<sup>4</sup> Decision 9/CP.12, paragraph 14.

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**C. Date and venue of the eighteenth session of the Conference of the Parties and the eighth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol**

5. *Invites* Parties to come forward with offers to host the eighteenth session of the Conference of the Parties and the eighth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

## **Resolution 1/CP.15**

### **Expression of gratitude to the Government of the Kingdom of Denmark and the people of the city of Copenhagen**

*The Conference of the Parties and the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol,*

*Having met* in Copenhagen from 7 to 18 December 2009 at the invitation of the Government of the Kingdom of Denmark,

1. *Express their profound gratitude* to the Government of the Kingdom of Denmark for having made it possible for the fifteenth session of the Conference of the Parties and the fifth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol to be held in Copenhagen;

2. *Request* the Government of the Kingdom of Denmark to convey to the people of Copenhagen the gratitude of the Conference of the Parties and the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol for the hospitality and warmth extended to the participants.

*9<sup>th</sup> plenary meeting  
18–19 December 2009*

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**Conference of the Parties****Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011****Addendum****Part Two: Action taken by the Conference of the Parties at its seventeenth session**

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## Decision 1/CP.17

### Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action

*The Conference of the Parties,*

*Recognizing* that climate change represents an urgent and potentially irreversible threat to human societies and the planet and thus requires to be urgently addressed by all Parties, and acknowledging that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions,

*Noting with grave concern* the significant gap between the aggregate effect of Parties' mitigation pledges in terms of global annual emissions of greenhouse gases by 2020 and aggregate emission pathways consistent with having a likely chance of holding the increase in global average temperature below 2 °C or 1.5 °C above pre-industrial levels,

*Recognizing* that fulfilling the ultimate objective of the Convention will require strengthening of the multilateral, rules-based regime under the Convention,

*Noting* decision 1/CMP.7,

*Also noting* decision 2/CP.17,

1. *Decides* to extend the Ad Hoc Working Group on Long-term Cooperative Action under the Convention for one year in order for it to continue its work and reach the agreed outcome pursuant to decision 1/CP.13 (Bali Action Plan) through decisions adopted by the sixteenth, seventeenth and eighteenth sessions of the Conference of the Parties, at which time the Ad Hoc Working Group on Long-term Cooperative Action under the Convention shall be terminated;
2. *Also decides* to launch a process to develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties, through a subsidiary body under the Convention hereby established and to be known as the Ad Hoc Working Group on the Durban Platform for Enhanced Action;
3. *Further decides* that the Ad Hoc Working Group on the Durban Platform for Enhanced Action shall start its work as a matter of urgency in the first half of 2012 and shall report to future sessions of the Conference of the Parties on the progress of its work;
4. *Decides* that the Ad Hoc Working Group on the Durban Platform for Enhanced Action shall complete its work as early as possible but no later than 2015 in order to adopt this protocol, another legal instrument or an agreed outcome with legal force at the twenty-first session of the Conference of the Parties and for it to come into effect and be implemented from 2020;
5. *Also decides* that the Ad Hoc Working Group on the Durban Platform for Enhanced Action shall plan its work in the first half of 2012, including, inter alia, on mitigation, adaptation, finance, technology development and transfer, transparency of action and support, and capacity-building, drawing upon submissions from Parties and relevant technical, social and economic information and expertise;

6. *Further decides* that the process shall raise the level of ambition and shall be informed, inter alia, by the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, the outcomes of the 2013–2015 review and the work of the subsidiary bodies;
7. *Decides* to launch a workplan on enhancing mitigation ambition to identify and to explore options for a range of actions that can close the ambition gap with a view to ensuring the highest possible mitigation efforts by all Parties;
8. *Requests* Parties and observer organizations to submit by 28 February 2012 their views on options and ways for further increasing the level of ambition and decides to hold an in-session workshop at the first negotiating session in 2012 to consider options and ways for increasing ambition and possible further actions.

*10<sup>th</sup> plenary meeting  
11 December 2011*

## Decision 2/CP.17

### Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention

*The Conference of the Parties,*

#### I. A shared vision for long-term cooperative action

*Recalling* decision 1/CP.13 (the Bali Action Plan) and decision 1/CP.16, elaborating on a shared vision for long-term cooperative action, in particular the mandate contained in decision 1/CP.16, paragraphs 5 and 6, with regard to working towards identifying a global goal for substantially reducing global emissions by 2050 and a time frame for a global peaking of greenhouse gas emissions,

1. *Agrees*, in the context of the long-term goal and the ultimate objective of the Convention and the Bali Action Plan, to continue to work towards identifying a global goal for substantially reducing global emissions by 2050, and to consider it at its eighteenth session;
2. *Also agrees* to continue to work, in the context of the provisions of decision 1/CP.16, paragraph 6, towards identifying a time frame for the global peaking of greenhouse gas emissions based on the best available scientific knowledge and equitable access to sustainable development, and to consider it at its eighteenth session;
3. *Further agrees* that consideration of a global goal for substantially reducing global emissions by 2050 and the time frame for global peaking of greenhouse gas emissions cannot be undertaken in the abstract and will necessarily involve matters related to the context for such considerations;
4. *Requests* the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to consider the issue of equitable access to sustainable development, as contained in decision 1/CP.16, through a workshop at its next session; the Ad Hoc Working Group on Long-term Cooperative Action under the Convention shall report on the workshop to the Conference of the Parties as part of its work;

#### II. Enhanced action on mitigation

##### A. Nationally appropriate mitigation commitments or actions by developed country Parties

###### Matters relating to decision 1/CP.16, paragraphs 36–38

*Recalling* decision 1/CP.16, which recognizes that climate change represents an urgent and potentially irreversible threat to human societies and the planet, and thus requires to be urgently addressed by all Parties,

*Also recalling* decision 1/CP.13 in relation to ensuring the comparability of mitigation efforts among all developed country Parties in a measurable, reportable and verifiable manner,

*Recognizing* that deep cuts in global greenhouse gas emissions are required according to science, as documented in the Fourth Assessment Report of the

Intergovernmental Panel on Climate Change, with a view to reducing global greenhouse gas emissions so as to hold the increase in global average temperature below 2 °C above pre-industrial levels, and that Parties should take urgent action to meet this long-term goal, consistent with science and on the basis of equity; also recognizing the need to consider, in the context of the first review of the long-term global goal, as referred to in decision 1/CP.16, paragraph 138, strengthening the long-term global goal on the basis of the best available scientific knowledge, including in relation to a global average temperature rise of 1.5 °C,

*Acknowledging* that there is a gap between the aggregate level of reduction in emissions of greenhouse gases to be achieved through global mitigation efforts and the reduction needed as part of the global effort to achieve the range indicated in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,

*Recognizing* that the clarification of developed country Parties' quantified economy-wide emission reduction targets builds confidence and trust among Parties,

*Urging* developed country Parties to increase the ambition of their economy-wide emission reduction targets, with a view to reducing their aggregate anthropogenic emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol to a level consistent with the ranges documented in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change and subsequent assessment reports of the Intergovernmental Panel on Climate Change,

*Noting* the quantified economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention (Annex I Parties) as communicated by them and contained in document FCCC/SB/2011/INF.1/Rev.1,

5. *Decides* to continue in 2012 the process of clarifying the developed country Parties' quantified economy-wide emission reduction targets contained in document FCCC/SB/2011/INF.1/Rev.1, with the objective of understanding the assumptions and conditions related to the individual targets, in particular in relation to the base year, global warming potential values, coverage of gases, coverage of sectors, expected emission reductions, and the role of land use, land-use change and forestry, and carbon credits from market-based mechanisms, and associated assumptions and conditions related to the ambition of the pledges; this process shall include the following:

(a) Submission of relevant information by developed country Parties, using a common template, to the secretariat by 5 March 2012 to be compiled into a miscellaneous document;

(b) In-session workshops;

(c) An update of document FCCC/TP/2011/1;

6. *Requests* the secretariat to compile additional information relating to the quantified economy-wide emission reduction targets submitted by developed country Parties in a miscellaneous document;

7. *Also requests* the secretariat to organize the workshops referred to in paragraph 5(b) above in conjunction with the thirty-sixth sessions of the subsidiary bodies and to prepare a written workshop report in a structured manner;

8. *Further requests* the secretariat to prepare the technical paper referred to in paragraph 5(c) above, compiling all the information contained in Parties' submissions in a structured manner, and to further update that paper as new information is provided by Parties;

9. *Acknowledges* the value of ex ante information, and the need to elaborate rigorous, robust and transparent approaches in a systematic manner to measure progress towards the

achievement of economy-wide emission reduction targets, building on existing processes, practices and experiences;

10. *Decides* to hold workshops to explore the assumptions and conditions related to targets, including the elements listed in paragraph 5 above, and requests the secretariat to produce a technical paper exploring the commonalities and differences of approaches;

11. *Requests* developed country Parties to share experiences with the development of low-emission development strategies during the in-session workshops referred to in paragraph 5(b) above, and invites developed country Parties to submit information related to progress towards the formulation of their low-emission development strategies;

#### **UNFCCC biennial reporting guidelines for developed country Parties**

*Recalling* the relevant provisions of the Convention, in particular Articles 4, 5, 7, 10 and 12, and decisions 9/CP.2, 11/CP.4 and 4/CP.5 on national communications from Annex I Parties,

*Also recalling* that by decision 1/CP.16 it decided to enhance reporting in national communications of Annex I Parties, and on progress in achieving emission reductions and on the provision of financial, technology and capacity-building support to Parties not included in Annex I to the Convention (non-Annex I Parties), building on existing reporting and review guidelines, processes and experiences,

12. *Adopts* the guidelines contained in annex I on the preparation of biennial reports by developed country Parties (the “UNFCCC biennial reporting guidelines for developed country Parties”);

13. *Decides* that developed country Parties shall use the “UNFCCC biennial reporting guidelines for developed country Parties” for the preparation of their first biennial reports, taking into account their national circumstances, and shall submit their first biennial reports to the secretariat by 1 January 2014, and their second and subsequent biennial reports two years after the due date of a full national communication (i.e. in 2016, 2020);

14. *Also decides* that Annex I Parties shall submit a full national communication every four years, noting that the next due date after adoption of this decision is 1 January 2014 according to decision 9/CP.16;

15. *Further decides* that in the years when the full national communications are submitted, developed country Parties should present the biennial reports as an annex to the national communications or as a separate report;

16. *Decides* to establish a work programme under the Subsidiary Body for Scientific and Technological Advice on the development of a common tabular format for the electronic reporting of information according to the reporting guidelines referred to in paragraph 12 above, with a view to adopting the format by the Conference of the Parties at its eighteenth session;

17. *Invites* Annex I Parties to make submissions of views by 1 March 2014 on their experience with reporting the first biennial reports;

18. *Requests* the Subsidiary Body for Implementation to begin, at its fortieth session, the revision of the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”, based on the experiences gained in preparing the first biennial reports and other information, with a view to adopting the revised guidelines by the Conference of the Parties at its twentieth session;

19. *Also requests* the Subsidiary Body for Scientific and Technological Advice to develop, taking into account existing international methodologies, and based on the

experiences gained in preparing the first biennial reports, methodologies for reporting financial information with a view to recommending a decision on this matter to the Conference of the Parties at its twentieth session;

20. *Requests* the secretariat to prepare a technical paper based on the submissions of views by Parties referred to in paragraph 17 above, with the aim of facilitating consideration by the Subsidiary Body for Implementation, at its forty-first session, of the matters referred to in paragraph 18 above;

21. *Also requests* the secretariat to prepare a compilation and synthesis report on the information reported by developed country Parties in the biennial reports referred to in paragraph 13 above, for consideration by the Conference of the Parties at its twentieth session and subsequent sessions, according to Article 7, paragraph 2(g), of the Convention;

22. *Encourages* Parties included in Annex II to the Convention (Annex II Parties) to assist Annex I Parties with economies in transition and those Annex I Parties whose special circumstances are recognized under the Convention, as necessary, through appropriate bilateral or multilateral channels, with technical aspects of the preparation of their biennial reports;

#### **Modalities and procedures for international assessment and review**

*Recalling* decisions 2/CP.1, 9/CP.2, 6/CP.3, 6/CP.5, 33/CP.7, 19/CP.8, 12/CP.9, 18/CP.10 and 1/CP.13,

*Also recalling* decision 1/CP.16, establishing a process for the international assessment and review of emissions and removals related to developed country Parties' quantified economy-wide emission reduction targets under the Subsidiary Body for Implementation, taking into account national circumstances, in a rigorous, robust and transparent manner, with a view to promoting comparability and building confidence,

*Responding* to the work programme launched by decision 1/CP.16 to develop modalities and procedures for international assessment and review, and building on existing review guidelines, processes and experiences,

*Recognizing* that the international assessment and review process should promote the comparability of efforts among all developed country Parties, including in relation to their quantified economy-wide emission limitation and reduction targets,

*Also recognizing* the need to have an efficient, cost-effective and practical international assessment and review process which does not impose an excessive burden on Parties and on the secretariat,

23. *Decides* that the international assessment and review process will be conducted through a technical review of information and a multilateral assessment of the implementation of quantified economy-wide emission reduction targets;

24. *Adopts* the modalities and procedures for international assessment and review as contained in annex II, and decides to use them until any revisions are decided upon by the Conference of the Parties;

25. *Agrees* that the first round of international assessment and review should commence two months after the submission of the first round of biennial reports by developed country Parties, and should be conducted in accordance with the modalities and procedures referred to in paragraph 24 above;

26. *Decides* to revise the modalities and procedures prescribed herein on the basis of the experience gained in the first round of international assessment and review, no later than 2016;

27. *Also decides* that the review of annual national greenhouse gas inventories will continue on an annual basis, and that international assessment and review will be conducted every two years for the biennial reports, whether independently or in conjunction with a national communication;
28. *Further decides* to establish a work programme under the Subsidiary Body for Scientific and Technological Advice, with a view to concluding the revision of the guidelines for the review of biennial reports and national communications, including national inventory reviews to be concluded no later than the nineteenth session of the Conference of the Parties;
29. *Requests* the secretariat to enhance coordination between different review processes in such a way as to ensure effective and efficient processes and procedures;
30. *Agrees* that the outputs of the multilateral assessment will comprise, for each Party, a record prepared by the secretariat, which will include in-depth review reports, the summary report of the Subsidiary Body for Implementation, questions submitted by Parties and responses provided, and any other observations of the Party under review that are submitted within two months of the working group session of the Subsidiary Body for Implementation;
31. *Also agrees* that any revision of the modalities and procedures for international assessment and review should take into account any future agreement on a compliance regime for mitigation targets under the Convention;

## **B. Nationally appropriate mitigation actions by developing country Parties**

### **Matters relating to decision 1/CP.16, paragraphs 48–51**

*Recalling* decision 1/CP.16, which recognizes that climate change represents an urgent and potentially irreversible threat to human societies and the planet, and thus requires to be urgently addressed by all Parties,

*Recognizing* that deep cuts in global greenhouse gas emissions are required according to science, and as documented in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, with a view to reducing global greenhouse gas emissions so as to hold the increase in global average temperature below 2 °C above pre-industrial levels, and that Parties should take urgent action to meet this long-term goal, consistent with science and on the basis of equity; also recognizing the need to consider, in the context of the first review, as referred to in decision 1/CP.16, paragraph 138, strengthening the long-term global goal on the basis of the best available scientific knowledge, including in relation to a global average temperature rise of 1.5 °C,

*Acknowledging* that there is a gap between the aggregate level of reduction in emissions of greenhouse gases to be achieved through global mitigation efforts and the reduction needed as part of the global effort to achieve the range indicated in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,

*Recognizing* that understanding the diversity of mitigation actions submitted by developing country Parties, their underlying assumptions and methodologies, builds confidence and trust among Parties,

*Also recognizing* that developing country Parties are already contributing and will continue to contribute to a global mitigation effort in accordance with the principles and provisions of the Convention, and could enhance their mitigation actions, depending on provision of finance, technology and capacity-building support by developed country Parties,

*Reaffirming* that social and economic development and poverty eradication are the first and overriding priorities of developing country Parties, and that a low-emission development strategy is central to sustainable development, and that the share of global emissions originating in developing countries will grow to meet their social and development needs,

*Also reaffirming* that, in accordance with Article 4, paragraph 3, of the Convention, developed country Parties shall provide enhanced financial, technology and capacity-building support for the preparation and implementation of nationally appropriate mitigation actions of developing country Parties,

*Noting* the nationally appropriate mitigation actions to be implemented by non-Annex I Parties, as communicated by them and contained in the document FCCC/AWGLCA/2011/INF.1,

32. *Encourages* developing country Parties that are yet to submit information on nationally appropriate mitigation actions pursuant to decision 1/CP.16, paragraph 50, to do so, noting the need to extend flexibility to small island developing States and the least developed country Parties;

33. *Decides* to continue, in 2012, workshops, in a structured manner, to further the understanding of the diversity of mitigation actions as communicated and contained in document FCCC/AWGLCA/2011/INF.1, underlying assumptions and any support needed for the implementation of these actions, noting different national circumstances and the respective capabilities of developing country Parties;

34. *Invites* developing country Parties, with a view to providing input to the process referred to in paragraph 33 above, to submit, subject to availability, more information relating to nationally appropriate mitigation actions, including underlying assumptions and methodologies, sectors and gases covered, global warming potential values used, support needs for the implementation of nationally appropriate mitigation actions and estimated mitigation outcomes;

35. *Also invites* developing country Parties to submit this information to the secretariat, by 5 March 2012, to be compiled into a miscellaneous document;

36. *Requests* the secretariat to organize the in-session workshops referred to in paragraph 33 above in conjunction with the thirty-sixth session of the subsidiary bodies and to prepare written workshop summary reports;

37. *Also requests* the Subsidiary Body for Scientific and Technological Advice to develop general guidelines for domestic measurement, reporting and verification of domestically-supported nationally appropriate mitigation actions;

38. *Encourages* developing country Parties to develop low-emission development strategies, recognizing the need for financial and technical support by developed country Parties for the formulation of these strategies, and invites interested developing country Parties to share their experience with the formulation of low-emission development strategies during the in-session workshops referred to in paragraph 36 above;

#### **UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention**

*Recalling* the relevant provisions of the Convention, in particular Article 4, paragraphs 1, 3 and 7, Article 5, Article 7, paragraph 2(a), (b), (d) and (e), Article 9, paragraph 2(b), Article 10, paragraph 2(a) and (c), and Article 12, paragraphs 1, 5, 6 and 7,

*Also recalling* decisions on national communications from non-Annex I Parties in particular decisions 10/CP.2, 2/CP.4, 12/CP.4, 8/CP.5, 31/CP.7, 32/CP.7, 17/CP.8 and 8/CP.11,

*Further recalling* that, by decision 1/CP.16, paragraph 60, the Conference of the Parties decided to enhance the reporting in national communications, including inventories from non-Annex I Parties, on mitigation actions and their effects, and support received, with additional flexibility to be given to the least developed country Parties and small island developing States,

*Recalling* that the Conference of the Parties, through decision 1/CP.16, paragraph 60(c), decided that developing country Parties, consistent with their capabilities and the level of support provided for reporting, should submit biennial update reports containing updates of national greenhouse gas inventories, including a national inventory report and information on mitigation actions, needs and support received,

*Recognizing* the difficulties faced by non-Annex I Parties in reporting under the Convention and the need to take into account national capabilities and circumstances, and to build capacity, and the need for the provision of financial support in a timely manner to non-Annex I Parties to facilitate the timely preparation of biennial update reports,

*Urging* Annex II Parties and other developed country Parties in a position to do so to provide support for the preparation of biennial update reports,

*Recognizing* that the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention could also play an important role in facilitating technical advice and support for the preparation and submission of the first biennial update report,

*Also recognizing* that, by decision 1/CP.16, the Conference of the Parties agreed on a work programme for developing the guidelines for the preparation of biennial update reports from non-Annex I Parties, as a part of their national communications,

39. *Adopts* the guidelines, contained in annex III, for the preparation of biennial update reports by non-Annex I Parties (hereinafter referred to as the Guidelines);

40. *Affirms* that the Guidelines shall respect the diversity of mitigation actions and provide flexibility for non-Annex I Parties to report information, while providing an understanding of actions taken;

41. *Decides*:

(a) That non-Annex I Parties, consistent with their capabilities and the level of support provided for reporting, should submit their first biennial update report by December 2014; the least developed country Parties and small island developing States may submit biennial update reports at their discretion;

(b) That in using the Guidelines, non-Annex I Parties should take into account their development priorities, objectives, capacities and national circumstances;

(c) That the Guidelines should be used as a basis to provide guidance to an operating entity of the financial mechanism for funding the preparation of biennial update reports from non-Annex I Parties and, in the case of the first biennial update report, to the Global Environment Facility;

(d) To urge non-Annex I Parties to submit their requests to the Global Environment Facility for support, in a timely manner;

(e) That enhanced support for the preparation of biennial update reports should be ensured by developed country Parties and other developed Parties included in Annex II

to the Convention by means of resources, in accordance with Article 4, paragraph 3, of the Convention, on the basis of agreed full-cost funding;

(f) That non-Annex I Parties shall submit a biennial update report every two years, either as a summary of parts of their national communication in the year in which the national communication is submitted or as a stand-alone update report; the least developed country Parties and small island developing States may submit biennial update reports at their discretion;

(g) That the first biennial update report submitted by non-Annex I Parties shall cover, at a minimum, the inventory for the calendar year no more than four years prior to the date of the submission, or more recent years if information is available, and that subsequent biennial update reports shall cover a calendar year that does not precede the submission date by more than four years;

42. *Also decides* that these guidelines should be reviewed and revised as appropriate, in accordance with decisions of the Conference of the Parties;

43. *Requests* the secretariat to facilitate assistance to non-Annex I Parties, on request, in the preparation of their biennial update reports, in accordance with Article 8, paragraph 2(c), of the Convention;

44. *Urges* and requests the Global Environment Facility to make available support to non-Annex I Parties preparing their first biennial update reports as early as possible in 2012 and on the basis of agreed full-cost funding;

### **Registry**

*Recalling* decision 1/CP.13,

*Also recalling* decision 1/CP.16, paragraphs 53–59, by which the Conference of the Parties decided to set up a registry to record the nationally appropriate mitigation actions seeking international support, to facilitate the matching of financial, technology and capacity-building support for these actions, and to recognize nationally appropriate mitigation actions of developing country Parties in a separate section of the registry,

*Further recalling* the same decision, by which the Conference of the Parties agreed to develop modalities for the facilitation of support through the registry, including any functional relationship with the financial mechanism,

*Recognizing* the need for support for enabling activities to assist developing country Parties in the identification and preparation of nationally appropriate mitigation actions for submission to the registry, and support for their implementation,

45. *Decides* that:

(a) The registry should be developed as a dynamic, web-based platform managed by a dedicated team in the secretariat;

(b) Participation in the registry shall be voluntary and only information submitted expressly for inclusion in the registry should be recorded;

(c) The registry should be structured in a flexible manner that clearly reflects the full range of the diversity of nationally appropriate mitigation actions, and a range of types of support;

46. *Invites* developing country Parties to submit, as appropriate, to the secretariat the following information on individual nationally appropriate mitigation actions seeking international support:

- (a) A description of the mitigation action and the national implementing entity, including contact information;
- (b) The expected time frame for the implementation of the mitigation action;
- (c) The estimated full cost of the preparation;
- (d) The estimated full cost and/or incremental cost of the implementation of the mitigation action;
- (e) The amount and type of support (financial, technology and capacity-building) required to prepare and/or implement the mitigation action;
- (f) The estimated emission reductions;
- (g) Other indicators of implementation;
- (h) Other relevant information, including the co-benefits for local sustainable development, if information thereon exists;

47. *Also invites* developing country Parties to submit to the secretariat information on other individual nationally appropriate mitigation actions, to be recorded in a separate section of the registry, for their recognition;

48. *Further invites* developed country Parties, the entity or entities entrusted with the operation of the financial mechanism, including the Global Environment Facility and the Green Climate Fund, multilateral, bilateral and other public donors, and private and non-governmental organizations that are in position to do so, to submit to the secretariat, as appropriate, the following information on financial, technology and capacity-building support available and/or provided for the preparation and/or implementation of nationally appropriate mitigation actions:

- (a) Whether the support available is for the preparation and/or implementation of nationally appropriate mitigation actions;
- (b) The source of the support, including, where applicable, the name of the developed country Parties in question and the executing entity channelling the support, including contact information;
- (c) The amount and type of support available, and whether it is financial (e.g. grant or facilitated loan), technology and/or capacity-building support;
- (d) The status of delivery;
- (e) The types of action that may be supported and the process for the provision of support;

49. *Invites* Parties and entities referred to in paragraphs 46 and 48 above to provide the secretariat, subsequent to the matching of action with support, information on both internationally supported mitigation actions and associated support;

50. *Requests* the secretariat, pursuant to decision 1/CP.16, paragraphs 53–59, to record and regularly update, in separate sections of the registry, information provided in accordance with paragraphs 46–49 above;

51. *Decides* that the registry will facilitate the matching of actions seeking international support with support available by providing and directing information to Parties that submitted information on nationally appropriate mitigation actions seeking support, and Parties and entities that have submitted information on the support available;

52. *Requests* the secretariat, subject to the availability of resources:

(a) To provide assistance to developing country Parties requesting information on the available sources of support in the registry;

(b) To provide information on the operation of the registry to the Conference of the Parties annually, in order to inform the discussions on the financial mechanism;

53. *Notes* that the financial mechanism may make use of information available in the registry when considering the provision of support for the preparation and implementation of individual nationally appropriate mitigation actions which are seeking support;

54. *Requests* the secretariat to develop a prototype of the registry by the thirty-sixth session of the Subsidiary Body for Implementation in order to present the prototype to Parties for their consideration;

55. *Also requests* the secretariat, if applicable, to improve the design of the prototype based on the views expressed by Parties at the thirty-sixth session of the Subsidiary Body for Implementation, in order to enable Parties to start using the prototype of the registry as soon as possible and within two months thereafter, with a view to finalizing the registry through a decision at the eighteenth session of the Conference of the Parties, taking into account the lessons learned from the initial experience gained;

#### **Modalities and guidelines for international consultation and analysis**

*Recalling*, in particular, Article 4, paragraphs 1, 3, and 7, Article 10, paragraph 2(a), and Article 12, paragraphs 1, 5 and 7, of the Convention,

*Also recalling* decisions on communications from non-Annex I Parties and, in particular, decisions 10/CP.2, 12/CP.4, 8/CP.5, 31/CP.7, 32/CP.7, 17/CP.8 and 8/CP.11,

*Noting* decision 1/CP.16, by which a process of international consultation and analysis of biennial update reports will be conducted under the Subsidiary Body for Implementation, aiming to increase the transparency of mitigation actions and their effects,

*Also noting* decision 1/CP.16, paragraph 60(c), by which developing country Parties, consistent with their capabilities and the level of support provided for reporting, should also submit biennial update reports containing updates of national greenhouse gas inventories, including a national inventory report and information on mitigation actions, needs and support received,

*Recognizing* that the guidelines for international measurement, reporting and verification referred to in decision 1/CP.16, paragraph 61, correspond to the guidelines determined for the international consultation and analysis of nationally appropriate mitigation actions of developing country Parties,

*Also recognizing* the need to have an efficient, cost-effective and practical international consultation and analysis process, which does not impose an excessive burden on Parties, and on the secretariat,

*Noting* that international consultation and analysis is non-intrusive, non-punitive, and respectful of national sovereignty,

56. *Adopts* the modalities and guidelines for international consultation and analysis as contained in annex IV;

57. *Recognizes* that the extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology;

58. *Decides*:

(a) That the first rounds of international consultation and analysis will be conducted for developing country Parties, commencing within six months of the submission of the first round of biennial update reports by developing country Parties;

(b) That the frequency of participation in subsequent rounds of international consultation and analysis by developing country Parties, based on their respective capabilities and national circumstances, and special flexibility for small island developing States and the least developed country Parties, will be determined by the frequency of the submission of biennial update reports;

(c) To revise the modalities and guidelines prescribed herein based on experiences gained in the first round of international consultation and analysis, no later than 2017;

(d) That small island developing States and the least developed country Parties may undergo international consultation and analysis as a group of Parties at their discretion;

59. *Urges* developed country Parties and other developed Parties included in Annex II to the Convention to provide new and additional financial resources at the agreed full cost in accordance with Article 4, paragraph 3, of the Convention with a view to supporting any reporting needed for international consultations and analysis;

60. *Aims* to facilitate the universal participation of developing country Parties in the international consultation and analysis process;

61. *Invites* Parties to submit to the secretariat, by 5 March 2012, their views on the composition, modalities and procedures of the team of technical experts referred to in annex IV, paragraph 1;

62. *Requests* the secretariat to compile these submissions into a miscellaneous document for consideration by the Subsidiary Body for Implementation at its thirty-sixth session, with a view to adopting a decision on the matter referred to in paragraph 61 above at the eighteenth session of the Conference of the Parties;

**C. Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries**

*Recalling* the principles and provisions set forth in decision 1/CP.16 and its appendices I and II on policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries,

*Also recalling* decisions 1/CP.13, 2/CP.13, 4/CP.15 and 12/CP.17,

*Further recalling* decision 1/CP.16, paragraphs 68–74 and 76–78,

*Reaffirming* that, in the context of the provision of adequate and predictable support to developing country Parties, Parties should collectively aim to slow, halt and reverse forest cover and carbon loss, in accordance with national circumstances, consistent with the ultimate objective of the Convention, as stated in its Article 2,

*Also reaffirming* decision 1/CP.16, appendix I, paragraph 1,

*Affirming* that efforts are already being made and actions being taken to reduce emissions from deforestation and forest degradation, and to maintain and enhance forest carbon stocks in developing countries,

*Recognizing* the importance of effective and continuing support for the activities referred to in decision 1/CP.16, paragraphs 73 and 76,

*Also recognizing* that policy approaches and positive incentives for mitigation actions in the forest sector, as referred to in decision 1/CP.16, paragraph 70, can promote poverty alleviation and biodiversity benefits, ecosystem resilience and the linkages between adaptation and mitigation, and should promote and support the safeguards referred to in decision 1/CP.16, appendix I, paragraph 2(c–e),

*Being aware of* the relevance of the work being undertaken by relevant international conventions and agreements,

63. *Agrees* that, regardless of the source or type of financing, the activities referred to in decision 1/CP.16, paragraph 70, should be consistent with the relevant provisions included in decision 1/CP.16, including the safeguards in its appendix I, in accordance with relevant decisions of the Conference of the Parties;

64. *Recalls* that for developing country Parties undertaking the results-based actions<sup>1</sup> referred to in decision 1/CP.16, paragraphs 73 and 77, to obtain and receive results-based finance, these actions should be fully measured, reported and verified,<sup>2</sup> and developing country Parties should have the elements referred to in decision 1/CP.16, paragraph 71, in accordance with any decisions taken by the Conference of the Parties on this matter;

65. *Agrees* that results-based finance provided to developing country Parties that is new, additional and predictable may come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources;

66. *Considers* that, in the light of the experience gained from current and future demonstration activities, appropriate market-based approaches could be developed by the Conference of the Parties to support the results-based actions by developing country Parties referred to in decision 1/CP.16, paragraph 73, ensuring that environmental integrity is preserved, that the provisions of decision 1/CP.16, appendices I and II, are fully respected, and should be consistent with the relevant provisions of decisions 1/CP.16 and 12/CP.17 and any future decision by the Conference of the Parties on these matters;

67. *Notes* that non-market-based approaches, such as joint mitigation and adaptation approaches for the integral and sustainable management of forests as a non-market alternative that supports and strengthens governance, the application of safeguards as referred to in decision 1/CP.16, appendix I, paragraph 2(c–e), and the multiple functions of forests, could be developed;

68. *Encourages* the operating entities of the financial mechanism of the Convention to provide results-based finance for the actions referred to in decision 1/CP.16, paragraph 73;

69. *Invites* Parties and admitted observer organizations to submit to the secretariat, by 5 March 2012, their views on modalities and procedures for financing results-based actions and considering activities related to decision 1/CP.16, paragraphs 68–70 and 72;

70. *Requests* the secretariat to compile the submissions by Parties into a miscellaneous document for consideration by the Ad Hoc Working Group on Long-term Cooperative Action under the Convention at its session to be held in conjunction with the thirty-sixth session of the Subsidiary Body for Scientific and Technological Advice;

71. *Also requests* the secretariat to prepare, subject to the availability of supplementary resources, a technical paper, based on submissions by Parties and admitted observer

<sup>1</sup> In accordance with decision 1/CP.16, appendix II.

<sup>2</sup> As agreed by the Conference of the Parties.

organizations on the issues referred to in paragraphs 69 and 70 above, as an input for the workshop referred to in paragraph 72 below;

72. *Further requests* the secretariat to organize, subject to the availability of supplementary resources, a workshop taking into account the submissions by Parties and admitted observer organizations referred to in paragraph 69 above, the technical paper referred to in paragraph 71 above, and the conclusions on this matter by the Ad Hoc Working Group on Long-term Cooperative Action under the Convention at its session to be held in conjunction with the thirty-sixth session of the Subsidiary Body for Scientific and Technological Advice, before the session of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to be held in conjunction with the eighteenth session of the Conference of the Parties;

73. *Requests* the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to consider the submissions by Parties and admitted observer organizations referred to in paragraph 69 above, the technical paper referred to in paragraph 71 above and the report on the outcomes of the workshop referred to in paragraph 72 above with the aim of reporting on progress made and any recommendations to the Conference of the Parties at its eighteenth session.

#### **D. Cooperative sectoral approaches and sector-specific actions, in order to enhance the implementation of Article 4, paragraph 1(c), of the Convention**

##### **General framework**

74. *Agrees* to continue its consideration of a general framework for cooperative sectoral approaches and sector-specific actions with a view to adopting a decision on this matter at its eighteenth session, as appropriate;

##### **Agriculture**

75. *Requests* the Subsidiary Body for Scientific and Technological Advice to consider issues related to agriculture at its thirty-sixth session, with the aim of exchanging views and the Conference of the Parties adopting a decision on this matter at its eighteenth session;

76. *Invites* Parties and admitted observer organizations to submit to the secretariat, by 5 March 2012, their views on the issues referred to in paragraph 75 above;

77. *Requests* the secretariat to compile the submissions referred to in paragraph 76 above by Parties into a miscellaneous document for consideration by the Subsidiary Body for Scientific and Technological Advice at its thirty-sixth session;

##### **International aviation and maritime transport**

78. *Agrees* to continue its consideration of issues related to addressing emissions from international aviation and maritime transport;

#### **E. Various approaches, including opportunities for using markets, to enhance the cost-effectiveness of, and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries**

*Recalling* decisions 1/CP.13 and 1/CP.16,

*Also recalling* Article 1, paragraph 1, Article 3, paragraph 1, and Article 4, paragraphs 1, 2(a), 3, 7, 8 and 10, of the Convention,

*Affirming* the need to maintain consistency with the principles and commitments of the Convention, particularly that Parties should protect the climate system in accordance with their common but differentiated responsibilities and respective capabilities,

*Undertaking* to maintain and build upon the existing flexibility mechanisms established under the Kyoto Protocol,

*Recognizing* the role of public sources of finance in the implementation of mitigation activities,

*Acknowledging* the role of various approaches, including opportunities for using markets, to enhance the cost-effectiveness of, and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries,

*Noting* that Parties may, individually or jointly, develop and implement such approaches in accordance with their national circumstances,

79. *Emphasizes* that various approaches, including opportunities for using markets, to enhance the cost-effectiveness of, and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries, must meet standards that deliver real, permanent, additional and verified mitigation outcomes, avoid double counting of effort, and achieve a net decrease and/or avoidance of greenhouse gas emissions;

80. *Requests* the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to conduct a work programme to consider a framework for such approaches, with a view to recommending a decision to the Conference of the Parties at its eighteenth session;

81. *Invites* Parties and admitted observer organizations to submit to the secretariat, by 5 March 2012, their views on the matters referred to in paragraphs 79 and 80 above, including their experiences, positive and negative, with existing approaches and mechanisms as well as lessons learned;

82. *Requests* the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to conduct one or more workshops with Parties, experts and other stakeholders, including an in-session workshop at its session to be held in conjunction with the thirty-sixth sessions of the subsidiary bodies, to consider the submissions referred to in paragraph 81 above and to discuss the matters referred to in paragraphs 79 and 80 above;

83. *Defines* a new market-based mechanism, operating under the guidance and authority of the Conference of the Parties, to enhance the cost-effectiveness of, and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries, which is guided by decision 1/CP.16, paragraph 80, and which, subject to conditions to be elaborated, may assist developed countries to meet part of their mitigation targets or commitments under the Convention;

84. *Requests* the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to conduct a work programme to elaborate modalities and procedures for the mechanism referred to in paragraph 83 above, with a view to recommending a decision to the Conference of the Parties at its eighteenth session;

85. *Invites* Parties and admitted observer organizations to submit to the secretariat, by 5 March 2012, their views on the matters referred to in paragraphs 83 and 84 above, including their experiences, positive and negative, with existing approaches and mechanisms as well as lessons learned;

86. *Requests* the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to conduct one or more workshops with Parties, experts and other stakeholders, including an in-session workshop at its session to be held in conjunction with the thirty-sixth sessions of the subsidiary bodies, to consider the submissions referred to in paragraph 85 above and to discuss the matters referred to in paragraphs 83 and 84 above;

## **F. Economic and social consequences of response measures**

*Recalling* the ultimate objective of the Convention,

*Also recalling* and *reaffirming* decisions 1/CP.13 and 1/CP.16,

*Also reaffirming* the importance of the objective of the Convention, and the relevant principles and provisions of the Convention related to the economic and social consequences of response measures, in particular its Articles 2, 3 and 4,

*Affirming* that there is a need to give full consideration to what actions are necessary, including actions related to funding, insurance and the transfer of technology, to meet the specific needs and concerns of developing country Parties arising from the impact of the implementation of response measures,

*Acknowledging* that response measures to combat climate change may have negative environmental, social and economic consequences, and that all developing countries face economic and social consequences of response measures to climate change,

*Reaffirming* the principle of sovereignty of States in international cooperation to address climate change,

*Noting* that policies and measures to address climate change should be supportive of the economic and social development of developing country Parties,

*Reaffirming* that developed country Parties should take the lead in combating climate change and the adverse effects thereof,

*Also reaffirming* that developed country Parties are urged to strive to implement policies and measures to respond to climate change in such a way as to avoid negative social and economic consequences for developing country Parties, taking into account Article 3 of the Convention, and to assist these Parties to address such consequences by providing support, including financial resources, transfer of technology and capacity-building, in accordance with Article 4 of the Convention, to build up the resilience of societies and economies negatively affected by response measures,

87. *Recognizes* that social and economic development and poverty eradication are the first and overriding priorities of developing countries;

88. *Urges* Parties in implementing their policies and measures to promote a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities and strategies;

89. *Also urges* developed country Parties to assist developing country Parties to promote economic diversification in the context of sustainable development, especially for those listed in Article 4, paragraphs 8 and 9, of the Convention;

90. *Further urges* Parties to give full consideration to the positive and negative impacts of the implementation of response measures to mitigate climate change on society and on all vulnerable groups, in particular women and children;

91. *Recognizes* decision 8/CP.17 that establishes the Forum to Implement the Work Programme on the Impact of the Implementation of Response Measures, and consolidates all progressive discussions related to response measures under the Convention.

### III. Enhanced action on adaptation

*Recalling* the relevant provisions of the Convention,

*Also recalling* decision 1/CP.16, which established the Cancun Adaptation Framework and the Adaptation Committee,

92. *Affirms* that the Adaptation Committee shall be the overall advisory body to the Conference of the Parties on adaptation to the adverse effects of climate change;

93. *Also affirms* that the Adaptation Committee was established to promote the implementation of enhanced action on adaptation in a coherent manner under the Convention, as provided for by the Cancun Adaptation Framework, inter alia through the following functions:

(a) Providing technical support and guidance to the Parties, respecting the country-driven approach, with a view to facilitating the implementation of adaptation activities, including those listed in decision 1/CP.16, paragraphs 14 and 15, where appropriate;

(b) Strengthening, consolidating and enhancing the sharing of relevant information, knowledge, experience and good practices, at the local, national, regional and international levels, taking into account, as appropriate, traditional knowledge and practices;

(c) Promoting synergy and strengthening engagement with national, regional and international organizations, centres and networks, in order to enhance the implementation of adaptation actions, in particular in developing country Parties;

(d) Providing information and recommendations, drawing on adaptation good practices, for consideration by the Conference of the Parties when providing guidance on means to incentivize the implementation of adaptation actions, including finance, technology and capacity-building, and other ways to enable climate-resilient development and reduce vulnerability, including to the operating entities of the financial mechanism of the Convention, as appropriate;

(e) Considering information communicated by Parties on their monitoring and review of adaptation actions, support provided and received, possible needs and gaps and other relevant information, including information communicated under the Convention, with a view to recommending what further actions may be required, as appropriate;

94. *Decides* that the Adaptation Committee should make use of the following modalities in exercising its functions:

(a) Workshops and meetings;

(b) Expert groups;

(c) Compilation, review, synthesis, analysis reports of information, knowledge, experience and good practice;

(d) Channels for sharing information, knowledge and expertise;

(e) Coordination and linkages with all relevant bodies, programmes, institutions and networks, within and outside the Convention;

95. *Also decides* that the Adaptation Committee shall operate under the authority of, and be accountable to, the Conference of the Parties, which should decide on its policies in line with relevant decisions;
96. *Requests* the Adaptation Committee to report annually to the Conference of the Parties, through the subsidiary bodies, including on its activities, the performance of its functions, guidance, recommendations and other relevant information arising from its work, and, as appropriate, on further action that may be required under the Convention, for consideration by the Conference of the Parties;
97. *Also requests* the Adaptation Committee during its first year to develop a three-year plan for its work, which should include milestones, activities, deliverables and resource requirements, in accordance with its agreed functions, employing the modalities listed in paragraph 94 above, considering the indicative list of activities included in annex V, for approval by the Conference of the Parties at its eighteenth session;
98. *Further requests* the Adaptation Committee, in addition to developing its workplan, to initiate some of the activities contained in annex V during its first year;
99. *Requests* the Adaptation Committee to engage and develop linkages through the Conference of the Parties with all adaptation-related work programmes, bodies and institutions under the Convention, including the Least Developed Countries Expert Group, the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention, the Technology Executive Committee, the Nairobi work programme on impacts, vulnerability and adaptation to climate change, the work programme on loss and damage and the operating entities of the financial mechanism of the Convention, as appropriate;
100. *Also requests* the Adaptation Committee to engage with, and draw on the expertise of, relevant institutions, organizations, frameworks, networks and centres outside of the Convention, including those at the intergovernmental, regional, national and, through them, subnational levels, where appropriate;
101. *Decides* that the Adaptation Committee shall comprise 16 members, who shall serve in their personal capacity, and will be nominated by Parties in their respective groups or constituencies and elected by the Conference of the Parties, with the aim of achieving a fair, equitable and balanced representation as follows:
- (a) Two members from each of the five United Nations regional groups;
  - (b) One member from a small island developing State;
  - (c) One member from a least developed country Party;
  - (d) Two members from Annex I Parties;
  - (e) Two members from non-Annex I Parties;
102. *Urges* regional groups in making their nominations to consider the special needs and concerns of particularly vulnerable developing countries;
103. *Encourages* Parties to nominate experts to the Adaptation Committee with a diversity of experience and knowledge relevant to adaptation to climate change, while also taking into account the need to achieve gender balance in accordance with decision 36/CP.7;
104. *Agrees* that the chairs of the Least Developed Countries Expert Group, the Technology Executive Committee and the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention could be invited to attend meetings of the Adaptation Committee, as appropriate;

105. *Also agrees* that the Adaptation Committee should seek input from intergovernmental, international, regional, national and subnational organizations, centres and networks, the private sector and civil society, in undertaking its work, and to invite advisers drawn from them to participate in its meetings as expert advisers on specific issues as they arise;

106. *Decides* that members shall serve for a term of two years and shall be eligible to serve a maximum of two consecutive terms of office, and that the following rules shall apply:

(a) Half of the members shall be elected initially for a term of three years and half of the members shall be elected for a term of two years;

(b) Thereafter, the Conference of the Parties shall elect members for a term of two years;

(c) The members shall remain in office until their successors have been elected;

107. *Also decides* that if a member of the Adaptation Committee resigns or is otherwise unable to complete the assigned term of office or to perform the functions of that office, the Adaptation Committee may decide, bearing in mind the proximity of the next session of the Conference of the Parties, to appoint another member from the same group or constituency to replace said member for the remainder of that member's mandate, in which case the appointment shall count as one term;

108. *Further decides* that the Adaptation Committee shall elect annually a chair and a vice-chair from among its members to serve for a term of one year each, with one being a member from an Annex I Party and the other being a member from a non-Annex I Party, and that the positions of chair and vice-chair shall alternate annually between a member from an Annex I Party and a member from a non-Annex I Party;

109. *Decides* that if the chair is temporarily unable to fulfil the obligations of the office, the vice-chair shall serve as the chair. In the absence of the chair and the vice-chair at a particular meeting, any other member designated by the Adaptation Committee shall temporarily serve as the chair of that meeting;

110. *Also decides* that if the chair or the vice-chair is unable to complete the term of office, the Adaptation Committee shall elect a replacement to complete that term of office;

111. *Further decides* that decisions of the Adaptation Committee shall be taken by consensus;

112. *Decides* that the Adaptation Committee shall meet at least twice a year, where possible in conjunction with other adaptation-related UNFCCC meetings, while retaining its flexibility to adjust the number of meetings to suit its needs;

113. *Encourages* the Adaptation Committee to establish subcommittees, panels, thematic advisory groups or task-focused ad hoc working groups, if required, to provide, inter alia, expert advice in different sectors and areas, in order to assist the Adaptation Committee in performing its functions and achieving its objectives;

114. *Decides* that the meetings of the Adaptation Committee shall be open to attendance by admitted observer organizations, except where otherwise decided by the Adaptation Committee, with a view to encouraging a balanced representation of observers from Annex I Parties and from non-Annex I Parties;

115. *Also decides* that the Adaptation Committee shall convene its first meeting soon after the seventeenth session of the Conference of the Parties;

116. *Further decides* that English shall be the working language of the Adaptation Committee;

117. *Decides* that outputs of the Adaptation Committee shall be made publicly available on the UNFCCC website;

118. *Also decides* that the secretariat shall support and facilitate the work of the Adaptation Committee, subject to the availability of resources;

119. *Further decides* to review the progress and performance of the Adaptation Committee at its twenty-second session, with a view to adopting an appropriate decision on the outcome of this review;

## IV. Finance

### Standing Committee

*Recalling* Articles 4 and 11 of the Convention,

*Having established* the Standing Committee under the Conference of the Parties as provided for in decision 1/CP.16, paragraph 112,

120. *Decides* that the Standing Committee shall report and make recommendations to the Conference of the Parties, for its consideration, at each ordinary session of the Conference of the Parties on all aspects of its work;

121. *Also decides* that the Standing Committee shall assist the Conference of the Parties in exercising its functions with respect to the financial mechanism of the Convention in terms of improving coherence and coordination in the delivery of climate change financing, rationalization of the financial mechanism, mobilization of financial resources, and measurement, reporting and verification of the support provided to developing country Parties through activities, such as the following:

(a) Organizing a forum for the communication and continued exchange of information among bodies and entities dealing with climate change finance in order to promote linkages and coherence;

(b) Maintaining linkages with the Subsidiary Body for Implementation and the thematic bodies of the Convention;

(c) Providing to the Conference of the Parties draft guidance for the operating entities of the financial mechanism of the Convention, with a view to improving the consistency and practicality of such guidance, taking into account the annual reports of the operating entities as well as submissions from Parties;

(d) Making recommendations on how to improve the coherence, effectiveness and efficiency of the operating entities of the financial mechanism;

(e) Providing expert input, including through independent reviews and assessments, into the preparation and conduct of the periodic reviews of the financial mechanism by the Conference of the Parties;

(f) Preparing a biennial assessment, overview of climate finance flows, to include information on the geographical and thematic balance of such flows, drawing on available sources of information, including national communications and biennial reports of both developed and developing country Parties, information provided in the registry, information provided by Parties on assessments of their needs, reports prepared by the operating entities of the financial mechanism, and information available from other entities providing climate change finance;

122. *Further decides* that the Standing Committee shall perform any other functions that may be assigned to it by the Conference of the Parties;
123. *Requests* the Standing Committee to develop a work programme based on the activities outlined in paragraph 121 above for presentation to the Conference of the Parties at its eighteenth session;
124. *Decides* that the cost of meetings and the participation of members from developing country Parties will be included in the consideration of the core budget of the secretariat;
125. *Also decides* to adopt the composition and working modalities of the Standing Committee as contained in annex VI;

### **Long-term finance**

*Recalling* Articles 4 and 11 of the Convention,

*Also recalling* decision 1/CP.13, paragraph 1(e),

*Further recalling* decision 1/CP.16, paragraphs 18 and 97–101,

*Welcoming* the fast-start finance provided by developed countries as part of their collective commitment to provide new and additional resources approaching USD 30 billion for the period 2010–2012,

*Recalling* that developed country Parties commit, in the context of meaningful mitigation actions and transparency on implementation, to a goal of mobilizing jointly USD 100 billion per year by 2020 to address the needs of developing countries,

126. *Affirms* the importance of continuing to provide ongoing support beyond 2012;
127. *Decides* to undertake a work programme on long-term finance in 2012, including workshops, to progress on long-term finance in the context of decision 1/CP.16, paragraphs 97-101;
128. *Invites* the President of the Conference of the Parties to appoint two co-chairs, one from a developing country Party and one from a developed country Party, for the work programme mentioned in paragraph 127 above;
129. *Requests* the secretariat, to assist the co-chairs in supporting the workshops mentioned in paragraph 127 above;
130. *Decides* that the aim of the work programme referred to in paragraph 127 above is to contribute to the on-going efforts to scale up the mobilization of climate change finance after 2012; the work programme will analyse options for the mobilization of resources from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources and relevant analytical work on the climate-related financing needs of developing countries; the analysis will draw upon relevant reports including that of the High-level Advisory Group on Climate Financing and the report on mobilizing climate finance for the Group of Twenty and the assessment criteria in the reports, and will also take into account lessons learned from fast-start finance;
131. *Requests* the co-chairs, supported by the secretariat, to prepare a report on the workshops referred to in paragraph 127 above for consideration by the Conference of the Parties at its eighteenth session;
132. *Notes* the information provided by developed country Parties on the fast-start finance they have provided and urges them to continue to enhance the transparency of their reporting on the fulfilment of their fast-start finance commitments;

## V. Technology development and transfer

### Arrangements to make the Technology Mechanism fully operational in 2012

*Recalling* the commitments under the Convention, in particular Article 4, paragraphs 1, 3, 5, 7, 8 and 9,

*Also recalling* decision 1/CP.13, paragraph 1(d), to enhance action on technology development and transfer to support action on mitigation and adaptation,

*Reaffirming* that the objective of enhanced action on technology development and transfer is to support action on mitigation and adaptation in order to achieve the full implementation of the Convention and that, in pursuit of this objective, the identification of technology needs will be based on a country-driven approach and national circumstances and priorities,

*Underlining* the importance of nationally determined technology needs, based on national circumstances and priorities, the setting of appropriate enabling environments to scale up the development and transfer of technologies in developing countries and the need to accelerate action at different stages of the technology cycle,

*Noting* the establishment of a Technology Executive Committee, and a Climate Technology Centre and Network in decision 1 CP/16, and their respective functions,

*Recalling* decision 1/CP.16, paragraph 128, on the work programme for the Ad Hoc Working Group on Long-term Cooperative Action under the Convention on technology development and transfer with a view to the Conference of the Parties taking a decision on, inter alia, a call for proposals to host the Climate Technology Centre and Network and the criteria to be used to evaluate and select a host of the Climate Technology Centre and Network at its seventeenth session in order to make the Technology Mechanism fully operational in 2012,

*Stressing* the importance of making its two components, the Technology Executive Committee and the Climate Technology Centre and Network, fully operational as soon as possible in 2012 in order to promote and enhance the research, development, deployment and diffusion of environmentally sound technologies in support of action on mitigation and adaptation in developing countries, in order to achieve the ultimate objective of the Convention,

*Recalling* that the Climate Technology Centre and Network and the Technology Executive Committee shall relate so as to promote coherence and synergy,

*Reaffirming* that both components of the Technology Mechanism shall facilitate the implementation of the objective set out in decision 1/CP.16, paragraph 113, in line with their respective functions agreed in decision 1/CP.16 and consistent with the mandate of the Technology Executive Committee in decision 1/CP.16, appendix IV, and the terms of reference of the Climate Technology Centre and Network contained in annex VII,

*Recalling* the need to further pursue the implementation of the Technology Mechanism and its two components with a view to making the Technology Mechanism fully operational as early as possible in 2012,

133. *Adopts* the terms of reference of the Climate Technology Centre and Network as contained in annex VII;

134. *Decides* that the Climate Technology Centre and Network shall begin its activities with an achievable scope of work so as to meet the needs of developing countries and be

flexible so that it can learn, adapt and adjust its scope and reach over time in response to the technology needs of developing countries and the demands of the emerging international climate change regime;

135. *Requests* the Climate Technology Centre and Network, once it is operational, to elaborate its modalities and procedures based on the terms of reference of the Climate Technology Centre and Network contained in annex VII and decision 1/CP.16, paragraph 123, and taking into account decision 1/CP.16, paragraph 120, and to report to the Conference of the Parties, through the subsidiary bodies at their thirty-eighth sessions, with a view to making a decision on this matter at the nineteenth session of the Conference of the Parties, including, *inter alia*, consideration of the following roles of the Climate Technology Centre and Network:

- (a) Identifying currently available climate-friendly technologies for mitigation and adaptation that meet their key low-carbon and climate-resilient development needs;
- (b) Facilitating the preparation of project proposals for the deployment, utilization and financing of existing technologies for mitigation and adaptation;
- (c) Facilitating adaptation and the deployment of currently available technologies to meet local needs and circumstances;
- (d) Facilitating research, development and demonstration of new climate-friendly technologies for mitigation and adaptation, which are required to meet the key objectives of sustainable development;
- (e) Enhancing national and regional human and institutional capacity to manage the technology cycle, and to support the challenges for activities listed in paragraphs 135 (a–d) above;
- (f) Helping to facilitate the financing of the activities listed in paragraphs 135 (a–e) above, through various sources in accordance with paragraph 139 below;

136. *Decides* that the selection process for the host of the Climate Technology Centre shall be launched upon the conclusion of the seventeenth session of the Conference of the Parties and shall be conducted in an open, transparent, fair and neutral manner in accordance with the process outlined in this decision, and informed by United Nations practices, in order to make the Technology Mechanism become fully operational in 2012;

137. *Requests* the secretariat:

- (a) To prepare and issue the call for proposals in accordance with this decision by 16 January 2012, including the preparation of the sample requests as referred to in annex VIII, paragraph 8(c), and invite interested organizations, including consortia of organizations, to submit their proposals in response to the call for proposals by 16 March 2012;
- (b) To provide responses to inquiries from interested organizations in consultation with the evaluation panel referred to in paragraph 137(d) below, as appropriate;
- (c) To compile the executive summaries contained in the submitted proposals and make them available simultaneously on the UNFCCC website;
- (d) To convene an evaluation panel, consisting of three members from Annex I Parties and three from non-Annex I Parties as nominated by the Technology Executive Committee from within its membership, by the end of February 2012:
  - (i) To conduct an assessment of the proposals received based on the methodology described in the criteria to be used to evaluate and select the host of the Climate Technology Centre contained in annex VIII, paragraph 9;

(ii) To prepare an evaluation report with a shortlist ranking up to five proponents, including information on how the criteria for the evaluation have been applied, and make it available for consideration by the Subsidiary Body for Implementation at its thirty-sixth session;

(e) To discuss the key elements of the potential host agreement with the top-ranked proponent, and, if needed, with the second-ranked and third-ranked proponents as agreed by the Subsidiary Body for Implementation at its thirty-sixth session and referred to in paragraph 138(a) below;

(f) To report the outcome of its discussion on the key elements of the potential host agreement to the Subsidiary Body for Implementation at its thirty-seventh session for its consideration, with a view to recommending it for consideration and approval by the Conference of the Parties at its eighteenth session;

138. *Requests* the Subsidiary Body for Implementation:

(a) To agree on, at its thirty-sixth session, a ranked list of up to three proponents based on the outcome of the assessment conducted by the evaluation panel referred to in paragraph 137(d)(i) above;

(b) To recommend the host of the Climate Technology Centre and Network to the Conference of the Parties for approval at its eighteenth session;

(c) To consider, at its thirty-sixth session, the constitution of the advisory board referred to in annex VII, paragraph 7, with a view to making a recommendation to the Conference of the Parties for consideration and adoption at its eighteenth session;

139. *Decides* that the costs associated with the Climate Technology Centre and the mobilization of the services of the Network should be funded from various sources, including the financial mechanism of the Convention, bilateral, multilateral and private-sector channels, philanthropic sources as well as financial and in-kind contributions from the host organization and participants in the Network;

140. *Requests* the Global Environment Facility to support the operationalization and activities of the Climate Technology Centre and Network without prejudging any selection of the host;

141. *Invites* Parties in a position to do so to support the Climate Technology Centre and Network through the provision of financial and other resources;

142. *Requests* the Technology Executive Committee and the Climate Technology Centre to establish procedures for preparing a joint annual report;

143. *Also requests* the secretariat to make available the joint annual report referred to in paragraph 142 above for consideration by the Conference of the Parties through its subsidiary bodies;

## VI. Capacity-building

*Recalling* decisions 2/CP.7, 2/CP.10, 4/CP.12 and 1/CP.16,

*Also recalling* decision 1/CP.16, paragraphs 136 and 137, which request the consideration of ways to further enhance the monitoring and review of the effectiveness of capacity-building, and to further elaborate the modalities regarding institutional arrangements for capacity-building, for consideration by the Conference of the Parties at its seventeenth session,

*Reaffirming* that capacity-building is essential in enabling developing country Parties to participate fully in addressing the challenges of climate change, and to implement effectively their commitments under the Convention,

*Also reaffirming* that capacity-building should be a continuous, progressive and iterative process that is participatory, country-driven and consistent with national priorities and circumstances,

*Further reaffirming* the importance of taking into account gender aspects and acknowledging the role and needs of youth and persons with disabilities in capacity-building activities,

*Acknowledging* that capacity-building is cross-cutting in nature and an integral part of enhanced action on mitigation, adaptation, technology development and transfer, and access to financial resources,

*Noting with appreciation* the progress made across the bodies established under the Convention and the operating entities of the financial mechanism, including those agreed to in decision 1/CP.16, in integrating capacity-building into enhanced action on mitigation, adaptation, technology development and transfer, and access to financial resources,

*Also noting* decision 1/CP.16, paragraph 65, which encourages Parties to develop low-carbon development strategies or plans in the context of sustainable development, welcoming those Parties that have already begun the process of developing these strategies, and noting the important capacity-building outcomes that this process and related partnerships can provide,

*Further noting* that, while progress has been made, gaps still remain in addressing the priority issues identified in the framework for capacity-building in developing countries as contained in decision 2/CP.7,

144. *Requests* the Subsidiary Body for Implementation to further enhance the monitoring and review of the effectiveness of capacity-building by organizing an annual in-session Durban Forum for in-depth discussion on capacity-building with the participation of Parties, representatives of the relevant bodies established under the Convention, and relevant experts and practitioners, with a view to sharing their experiences and exchanging ideas, best practices and lessons learned regarding the implementation of capacity-building activities;

145. *Decides* that the Durban Forum should include as inputs, inter alia, any capacity-building elements contained in the reports prepared since the most recent session of the Durban Forum by the relevant bodies established under the Convention;

146. *Requests* the secretariat to compile and synthesize the reports prepared since the most recent session of the Durban Forum by the relevant bodies established under the Convention;

147. *Also requests* the secretariat to prepare a summary report on the Durban Forum for consideration by the Subsidiary Body for Implementation;

148. *Encourages* Parties to continue to provide information through the appropriate channels, including national communications, on the progress made in enhancing the capacity to address climate change;

149. *Invites* developing country Parties to report on progress made and measures taken in implementing and improving their enabling environments to build national capacity for mitigation and adaptation, and to include the needs relevant to enhancing the progress made on such measures in their communications on capacity-building priorities;

150. *Requests* the secretariat to continue to compile and synthesize the information provided by Annex I Parties and to summarize the information provided by non-Annex I Parties in their national communications and submissions, and to compile and synthesize information on capacity-building activities, including lessons learned, provided by the relevant bodies established under the Convention and by international and regional organizations;

151. *Also requests* the Subsidiary Body for Implementation, in its consideration of the third and subsequent comprehensive reviews of the implementation of the framework for capacity-building in developing countries, to include the reports of relevant bodies established under the Convention, as well as the summary reports on the Durban Forum referred to in paragraph 147 above, as additional inputs to these reviews;

152. *Encourages* the relevant bodies established under the Convention, including, inter alia, the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention, the Least Developed Countries Expert Group and the Global Environment Facility as an operating entity of the financial mechanism, to continue to elaborate and carry out work on capacity-building in an integrated manner, as appropriate, within their respective mandates;

153. *Recognizes* that there may be ways to further enhance the monitoring and review of the effectiveness of capacity-building;

154. *Decides* that, in addition to the topics outlined in paragraph 144 above, the first meeting of the Durban Forum, organized during the thirty-sixth session of the Subsidiary Body for Implementation, shall explore potential ways to further enhance monitoring and review of the effectiveness of capacity-building;

155. *Also decides* that the financial resources for enhanced action on capacity-building in developing country Parties should be provided by Parties included in Annex II to the Convention and other Parties in a position to do so through the current and any future operating entities of the financial mechanism, as well as through various bilateral, regional and other multilateral channels, as appropriate;

156. *Requests* that the actions of the secretariat called for in this decision be undertaken subject to the availability of financial resources;

## **VII. Review: further definition of its scope and development of its modalities**

*Recalling* decision 1/CP.16, paragraphs 4 and 138–140,

157. *Reaffirms* that the review should periodically assess the adequacy of the long-term global goal, in the light of the ultimate objective of the Convention, and the overall progress made towards achieving it, in accordance with the relevant principles and provisions of the Convention;

158. *Confirms* that the first review should start in 2013 and should be concluded by 2015, when the Conference of the Parties shall take appropriate action based on the review;

159. *Agrees* that Parties will continue working on the scope of the review and considering its further definition, with a view to taking a decision at the Conference of the Parties at its eighteenth session;

160. *Also agrees* that the review should be guided by the principles of equity and common but differentiated responsibilities and respective capabilities and should take into account, inter alia, the following:

- (a) The best available scientific knowledge, including the assessment reports of the Intergovernmental Panel on Climate Change;
- (b) Observed impacts of climate change;
- (c) An assessment of the overall aggregate effect of the steps taken by Parties in order to achieve the ultimate objective of the Convention;
- (d) Consideration of strengthening the long-term global goal, referencing various matters presented by the science, including in relation to temperature rise of 1.5 degrees Celsius;

161. *Further agrees* that the review should be based on information from various sources, including the following:

- (a) The assessment and special reports and technical papers of the Intergovernmental Panel on Climate Change;
- (b) Submissions from Parties, national communications, first biennial update reports from developing country Parties and biennial reports from developed country Parties, national inventories, reports on international consultation and analysis, international analysis and review, and other relevant reports from Parties and processes under the Convention;
- (c) Other relevant reports from United Nations agencies and other international organizations, including reports on emission projections, technology development, access, transfer and deployment, and reports on gross domestic product, including projections;
- (d) Scientific information on the observed impacts of climate change, including that from reports coordinated by relevant regional and subregional agencies;

162. *Decides* that the review referred to in decision 1/CP.16, paragraphs 4 and 138, will be conducted with the assistance of the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation, and that the work shall be supported by expert consideration of the inputs referred to in paragraph 161 above, inter alia, through workshops and other in-session and intersessional activities, as appropriate;

163. *Agrees* to further define, at its eighteenth session, the expert consideration of inputs referred to in paragraph 162 above, including the possible establishment of a review expert group, to provide technical support to the review;

164. *Decides* that the review should consist of several phases, including information gathering and compilation, technical assessment through the organization of workshops, technical studies and the preparation of synthesis reports;

165. *Requests* the subsidiary bodies to organize workshops, including for the consideration of the information referred to in paragraph 161 above;

166. *Also requests* the subsidiary bodies to report on their considerations and findings to the Conference of the Parties, which should address those considerations and provide any further guidance, as appropriate;

167. *Decides* that subsequent reviews should take place following the adoption of an assessment report of the Intergovernmental Panel on Climate Change or at least every seven years;

## VIII. Other matters

### A. Matters related to Parties included in Annex I to the Convention undergoing the process of transition to a market economy

*Taking into account* that Annex I Parties undergoing the process of transition to a market economy are still lacking the appropriate means, knowledge and experience to develop and perform their national low-carbon development strategies with a view to achieving their quantified economy-wide emission reduction objectives as well as to implement their national action plans on adaptation,

*Recognizing* that the Parties, in spite of the consequences of the severe socio-economic crisis in the early 1990s, have made significant efforts through their targeted policies and measures to fully implement their commitments under the Convention and its Kyoto Protocol,

*Acknowledging* also that these Parties made their initial pledges with regard to green-house gas emission reduction levels to be achieved in the post-2012 period in the context of a comprehensive climate change framework,

168. *Invites* Annex I Parties that are in a position to do so, through multilateral agencies, including through the Global Environment Facility within its mandate, bilateral agencies and the private sector or through any further arrangements, as appropriate, to make available the capacity- building, financial, technical and technology transfer assistance for Annex I Parties undergoing the process of transition to a market economy in order to assist these Parties in the development and implementation of their national low-carbon development strategies and action plans consistent with their national priorities and with their emission reduction targets;

169. *Also invites* multilateral and bilateral agencies to coordinate their activities in support of the implementation of this assistance;

### B. Matters related to Parties included in Annex I to the Convention whose special circumstances are recognized by the Conference of the Parties

*Recalling* decision 26/CP.7 and decision 1/CP.16, which recognized that Turkey is in a situation different from that of other Annex I Parties,

170. *Agrees* to continue with the discussion on modalities for the provision of support for mitigation, adaptation, technology development and transfer, capacity-building and finance to Parties whose special circumstances are recognized by the Conference of the Parties in order to assist these Parties in the implementation of the Convention;

171. *Requests* that the actions of the secretariat called for in paragraphs 1–170 above be undertaken subject to the availability of financial resources.

## Annex I

### UNFCCC biennial reporting guidelines for developed country Parties

#### I. Objectives

1. The objectives of these guidelines for preparing the biennial reports are the following:

(a) To assist Parties included in Annex I to the Convention (Annex I Parties) in meeting their commitments for reporting under Articles 4 and 12 of the Convention enhanced by decision 1/CP.16;

(b) To ensure the provision of consistent, transparent, comparable, accurate and complete information by developed country Parties;

(c) To ensure that the biennial reports include information on the progress made by Annex I Parties in achieving their quantified economy-wide emission reduction targets, projected emissions, and the provision of financial, technological and capacity-building support to Parties not included in Annex I to the Convention (non-Annex I Parties);

(d) To facilitate the international assessment of emissions and removals related to progress towards the achievement of the quantified economy-wide emission reduction targets;<sup>1</sup>

(e) To facilitate reporting by Annex I Parties of information on any economic and social consequences of response measures.

#### II. Information on greenhouse gas emissions and trends

2. Summary information from the national greenhouse gas (GHG) inventory on emissions and emission trends prepared according to the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC Annex I inventory reporting guidelines) shall be prepared for the period from 1990 to the latest year in the most recent inventory submission available. The information provided in the biennial report should be consistent with that provided in the most recent annual inventory submission, and any differences should be fully explained.

3. Annex I Parties shall provide summary information on their national inventory arrangements in accordance with the reporting requirements related to national inventory arrangements contained in the UNFCCC Annex I inventory reporting guidelines, and on the changes to these national inventory arrangements since their last national communication or biennial report.

#### III. Quantified economy-wide emission reduction target

4. Each Annex I Party shall describe its quantified economy-wide emission reduction target, including any conditions or assumptions that are relevant to the attainment of that

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<sup>1</sup> Decision 1/CP.16, paragraph 44.

target, as communicated to the secretariat and contained in document FCCC/SB/2011/INF.1/Rev.1 or any update to that document.

5. The description of the Party's economy-wide emission reduction target shall include the following information, taking into consideration any relevant decisions of the Conference of the Parties (COP):

- (a) Base year;
- (b) Gases and sectors covered;
- (c) Global warming potential values as established by the relevant decisions adopted by the COP;
- (d) Approach to counting emissions and removals from the land use, land-use change and forestry (LULUCF) sector, taking into consideration any relevant decisions adopted by the COP;
- (e) Use of international market-based mechanisms in achieving its emission reduction target, taking into consideration any relevant decisions adopted by the COP, including a description of each source of international units and/or allowances from market-based mechanisms and the possible scale of the contributions of each;
- (f) Any other information, including relevant accounting rules, taking into consideration any relevant decisions of the COP, where appropriate.

#### **IV. Progress in achievement of quantified economy-wide emission reduction targets and relevant information**

##### **A. Mitigation actions and their effects**

6. Each Annex I Party shall provide information on its mitigation actions, including on the policies and measures it has implemented or plans to implement since its last national communication or biennial report to achieve its economy-wide emission reduction target. To the extent appropriate, Parties shall organize the reporting of mitigation actions by sector (energy, industrial processes and product use, agriculture, LULUCF, waste and other sectors) and by gas (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride).

7. Each Annex I Party shall provide information on changes in its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress towards its economy-wide emission reduction target.

8. Each Annex I Party is encouraged to provide, to the extent possible, detailed information on the assessment of the economic and social consequences of response measures.

##### **B. Estimates of emission reductions and removals and the use of units from the market-based mechanisms and land use, land-use change and forestry activities**

9. For the base year, information reported on the emission reduction target shall include the following:

- (a) Total GHG emissions, excluding emissions and removals from the LULUCF sector;
  - (b) Emissions and/or removals from the LULUCF sector based on the accounting approach applied taking into consideration any relevant decisions of the COP and the activities and/or lands that will be accounted for;
  - (c) Total GHG emissions, including emissions and removals from the LULUCF sector;
10. For each reported year, information reported on progress made towards the emission reduction targets shall include, in addition to the information noted in paragraph 9(a–c) above, information on the use of units from market-based mechanisms.

## V. Projections

11. Each Annex I Party shall report the updated projections for 2020 and 2030 consistent with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications” (hereinafter referred to as the UNFCCC Annex I reporting guidelines on national communications).
12. Each Annex I Party should report on the changes since its most recent national communication in the model or methodologies used for the preparation of projections and should provide supporting documentation.

## VI. Provision of financial, technological and capacity-building support to developing country Parties

13. Parties included in Annex II to the Convention (Annex II Parties) shall provide information on the provision of financial, technological and capacity-building support to non-Annex I Parties consistent with the requirements contained in section VIII of the UNFCCC Annex I reporting guidelines on national communications following common reporting formats,<sup>2</sup> including information to show how this support is new and additional. In reporting such information, Parties should distinguish, to the extent possible, between support provided to non-Annex I Parties for mitigation and adaptation activities, noting the capacity-building elements of such activities, where relevant. For activities with multiple objectives, the funding could be reported as a contribution allocated partially to the other relevant objectives.
14. Each Annex II Party shall provide a description of its national approach for tracking of the provision of financial, technological and capacity-building support to non-Annex I Parties, if appropriate. This description shall also include information on indicators and delivery mechanisms used and allocation channels tracked. If this information was already reported in the national communication, the biennial report should only report changes to this information.
15. In reporting information in accordance with paragraphs 17 and 18 below, Annex II Parties shall use any methodology to be developed under the Convention, taking into account international experience. Annex II Parties shall describe the methodology used in their biennial reports. Annex II Parties shall report in a rigorous, robust and transparent

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<sup>2</sup> To be developed.

manner the underlying assumptions and methodologies used to produce information on finance.

## A. Finance

16. Each Annex II Party shall describe, to the extent possible, how it seeks to ensure that the resources it provides effectively address the needs of non-Annex I Parties with regard to climate change adaptation and mitigation.

17. Each Annex II Party shall provide information on the financial support it has provided, committed and/or pledged for the purpose of assisting non-Annex I Parties to mitigate GHG emissions and adapt to the adverse effects of climate change and any economic and social consequences of response measures, and for capacity-building and technology transfer in the areas of mitigation and adaptation, where appropriate. To that end, each Annex II Party shall provide summary information in a textual and tabular format on allocation channels and annual contributions for the previous two calendar or financial years without overlapping with the previous reporting periods, including, as appropriate, the following:

- (a) The Global Environment Facility, the Least Developed Countries Fund, the Special Climate Change Fund, the Adaptation Fund, the Green Climate Fund and the Trust Fund for Supplementary Activities;
- (b) Other multilateral climate change funds;
- (c) Multilateral financial institutions, including regional development banks;
- (d) Specialized United Nations bodies;
- (e) Contributions through bilateral, regional and other channels;

18. Each Annex II Party shall provide the summary information, referred to in paragraph 17 above, for the previous two calendar or financial years in a textual and tabular format on the annual financial support that it has provided for the purpose of assisting non-Annex I Parties, including the following:

- (a) The amount of financial resources (including the amount in original currency and its equivalent in United States dollars/international currency);
- (b) The type of support (for mitigation and adaptation activities);
- (c) The source of funding;
- (d) The financial instrument;
- (e) The sector;
- (f) An indication of what new and additional financial resources they have provided pursuant to Article 4, paragraph 3, of the Convention; Parties shall clarify how they have determined that such resources are new and additional;

19. Recognizing that the goal of mobilizing the financial resources referred to in decision 1/CP.16, paragraph 98, includes private financial sources, Annex II Parties should report, to the extent possible, on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties, and should report on policies and measures that promote the scaling up of private investment in mitigation and adaptation activities in developing country Parties.

20. Annex II Parties should specify the types of instruments used in the provision of their assistance, such as grants and concessional loans.

## **B. Technology development and transfer**

21. Each Annex II Party shall provide information on measures taken to promote, facilitate and finance the transfer of, access to and the deployment of climate-friendly technologies for the benefit of non-Annex I Parties, and for the support of the development and enhancement of endogenous capacities and technologies of non-Annex I Parties. Parties may also provide information on success and failure stories.

22. Each Annex II Party shall provide, in textual and tabular formats, information on measures and activities related to technology transfer implemented or planned since its last national communication or biennial report. In reporting such measures and activities, Annex II Parties shall, to the extent possible, provide information on the recipient country, the target area of mitigation or adaptation, the sector involved and the sources of technology transfer from the public or private sectors, and shall distinguish between activities undertaken by the public and private sectors.

## **C. Capacity-building**

23. Each Annex II Party shall provide information, to the extent possible, on how it has provided capacity-building support that responds to the existing and emerging capacity-building needs identified by non-Annex I Parties in the areas of mitigation, adaptation, and technology development and transfer. Information should be reported in a textual and tabular format as a description of individual measures and activities.

## **VII. Other reporting matters**

24. Annex I Parties are encouraged to report, to the extent possible, on the domestic arrangements established for the process of the self-assessment of compliance with emission reductions in comparison with emission reduction commitments or the level of emission reduction that is required by science. Annex I Parties are encouraged to report, to the extent possible, on the progress made in the establishment of national rules for taking local action against domestic non-compliance with emission reduction targets.

25. Annex I Parties are encouraged to report any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its biennial report.

## **VIII. Reporting**

26. The information identified in these guidelines shall be communicated electronically by Annex I Parties to the secretariat and shall be in one of the official languages of the United Nations. Parties are encouraged to submit an English translation of the biennial report to facilitate its use in the review process.

## **IX. Updating of the guidelines**

27. These guidelines shall be revised, as appropriate, taking into consideration any relevant decisions of the COP.

## Annex II

### Modalities and procedures for international assessment and review

#### I. Objectives of the international assessment and review process

1. The overall objectives of the international assessment and review (IAR) process are to review the progress made in achieving emission reductions and assess the provision of financial, technological, and capacity-building support to developing country Parties, and to assess emissions and removals related to quantified economy-wide emission reduction targets under the Subsidiary Body for Implementation (SBI), taking into account national circumstances, in a rigorous, robust and transparent manner, with a view to promoting comparability and building confidence.
2. In addition, the IAR process aims at assessing the implementation of methodological and reporting requirements.

#### II. Process and scope

##### A. Process

3. The IAR process will be conducted in the following steps:
  - (a) A technical review of biennial reports, where relevant in conjunction with the annual greenhouse gas (GHG) inventories, and national communications of developed country Parties, which will result in an individual review report for each developed country Party;
  - (b) A multilateral assessment of developed country Parties' progress in implementation towards the achievement of emission reductions and removals related to their quantified economy-wide emission reduction targets.

##### B. Scope

4. Building upon relevant elements of the existing review process under the Convention, for each developed country Party, the following will be reviewed:
  - (a) All emissions and removals related to its quantified economy-wide emission reduction target;
  - (b) Assumptions, conditions and methodologies related to the attainment of its quantified economy-wide emission reduction target;
  - (c) Progress towards the achievement of its quantified economy-wide emission reduction target;
  - (d) Its provision of financial, technological and capacity-building support to developing country Parties;
5. For each developed country Party the following elements will be multilaterally assessed:

- (a) All emissions and removals related to its quantified economy-wide emission reduction target;
- (b) Assumptions, conditions and methodologies related to the attainment of its quantified economy-wide emission reduction target;
- (c) Progress towards the achievement of its quantified economy-wide emission reduction target.

### III. Technical review

6. Each developed country Party's biennial report will be reviewed, where relevant in conjunction with the annual GHG inventory and national communication review processes, as follows:

- (a) The technical review will be conducted in accordance with existing and revised guidelines and procedures under the Convention;
- (b) The technical expert review will examine the consistency of the annual GHG inventory with the biennial report and national communication but will not include in-depth examination of the inventory itself;
- (c) The Party concerned can respond to the questions or suggestions of the expert review team as well as propose and share any additional information or views;
- (d) In addition to the tasks set forth in decisions 2/CP.1, 9/CP.2, 6/CP.3 and 33/CP.7 and their related annexes, the expert review teams should also review progress in emission reductions and removals related to the quantified economy-wide emission reduction target. Additional experts may be added to the review team where necessary;

7. The output of the technical review will be a technical review report building on existing reporting standards and including an examination of the Party's progress in achieving its economy-wide emission reduction target.

### IV. Multilateral assessment

8. The multilateral assessment will be carried out for each developed country Party on the basis of the following:

- (a) The technical review report referred to in paragraph 7 above and any other relevant review reports of the annual GHG inventory and national communication;
- (b) The biennial report, the national GHG inventory, including the national inventory report, and the national communication;
- (c) Supplementary information on the achievement of the Party's quantified economy-wide emission reduction target, including on the role of land use, land-use change and forestry, and carbon credits from market-based mechanisms;

9. Each developed country Party will be assessed during an SBI session.

10. The multilateral assessment should entail the following:

- (a) Any Party may submit electronically through the secretariat written questions to the Party concerned in advance of the international assessment;
- (b) The Party under assessment should endeavour to respond to those questions, through the secretariat, within two months. The secretariat will compile the questions and answers and publish them on the UNFCCC website;

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(c) During the SBI session, developed country Parties will undergo the assessment with the participation of all Parties. The Party under review may make a brief oral presentation, which will be followed by oral questions by Parties and responses by the Party under review.

11. The outputs of the international assessment for each Party will include the following: a record prepared by the secretariat which includes in-depth review reports, the summary report of the SBI, questions submitted by Parties and responses provided, and any other observations by the Party under review that are submitted within two months of the working group session of the SBI.

12. The SBI will forward conclusions based on the record referred to in paragraph 11 above to relevant bodies under the Convention as appropriate.

## Annex III

### **UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention**

#### **I. Objectives**

1. The objectives of the guidelines for the preparation of the biennial update reports from Parties not included in Annex I to the Convention (non-Annex I Parties) are as follows:

(a) To assist non-Annex I Parties in meeting their reporting requirements under Article 4, paragraph 1(a), and Article 12 of the Convention and decision 1/CP.16;

(b) To encourage the presentation of information in a consistent, transparent, complete, accurate and timely manner, taking into account specific national and domestic circumstances;

(c) To enable enhanced reporting by non-Annex I Parties on mitigation actions and their effects, needs and support received, in accordance with their national circumstances, capacities and respective capabilities, and the availability of support;

(d) To provide policy guidance to an operating entity of the financial mechanism for the timely provision of financial support needed by developing country Parties in order to meet the agreed full costs of preparing their biennial update reports;

(e) To facilitate the presentation of information on finance, technology and capacity-building support needed and received, including for the preparation of biennial update reports;

(f) To facilitate reporting by non-Annex I Parties, to the extent possible, on any economic and social consequences of response measures;

#### **II. Scope**

2. The scope of biennial update reports is to provide an update to the most recently submitted national communication in the following areas:

(a) Information on national circumstances and institutional arrangements relevant to the preparation of the national communications on a continuous basis;

(b) The national inventory of anthropogenic emissions by sources and removal by sinks of all greenhouse gases (GHGs) not controlled by the Montreal Protocol, including a national inventory report;

(c) Information on mitigation actions and their effects, including associated methodologies and assumptions;

(d) Constraints and gaps, and related financial, technical and capacity needs, including a description of support needed and received;

(e) Information on the level of support received to enable the preparation and submission of biennial update reports;

(f) Information on domestic measurement reporting and verification;

(g) Any other information that the non-Annex I Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its biennial update report.

### III. National greenhouse gas inventory

3. Non-Annex I Parties should submit updates of national GHG inventories according to paragraphs 8–24 in the “Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention” (hereinafter referred to as the UNFCCC guidelines for the preparation of national communications from non-Annex I Parties) as contained in the annex to decision 17/CP.8. The scope of the updates on national GHG inventories should be consistent with capacities, time constraints, data availabilities and the level of support provided by developed countries Parties for biennial update reporting.

4. Non-Annex I Parties should use the methodologies established by the latest UNFCCC guidelines for the preparation of national communications from non-Annex I Parties approved by the Conference of the Parties (COP) or those determined by any future decision of the COP on this matter.

5. The updates of the sections on the national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol should contain updated data on activity levels based on the best information available using the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, and the *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF); any change to the emission factor may be made in the subsequent full national communication.

6. Non-Annex I Parties are encouraged to include, as appropriate and to the extent that capacities permit, in the inventory section of the biennial update report, tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF and the sectoral report tables annexed to the Revised 1996 IPCC Guidelines.

7. Each non-Annex I Party is encouraged to provide a consistent time series back to the years reported in the previous national communications.

8. Non-Annex I Parties which have previously reported on their national GHG inventories contained in their national communications are encouraged to submit summary information tables of inventories for previous submission years (e.g. for 1994 and 2000).

9. The inventory section of the biennial update report should consist of a national inventory report as a summary or as an update of the information contained in chapter III (National greenhouse gas inventories) of the annex to decision 17/CP.8, including table 1, on “National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors”, and table 2, on “National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF<sub>6</sub>”.

10. Additional or supporting information, including sector-specific information, may be supplied in a technical annex.

## **IV. Mitigation actions**

11. Non-Annex I Parties should provide information, in a tabular format, on actions to mitigate climate change, by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol.

12. For each mitigation action or groups of mitigation actions including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing country Parties shall provide the following information to the extent possible:

(a) Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), quantitative goals and progress indicators;

(b) Information on methodologies and assumptions;

(c) Objectives of the action and steps taken or envisaged to achieve that action;

(d) Information on the progress of implementation of the mitigation actions and the underlying steps taken or envisaged, and the results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;

(e) Information on international market mechanisms.

13. Parties should provide information on the description of domestic measurement, reporting and verification arrangements.

## **V. Finance, technology and capacity-building needs and support received**

14. Non-Annex I Parties should provide updated information on constraints and gaps, and related financial, technical and capacity-building needs.

15. Non-Annex I Parties should also provide updated information on financial resources, technology transfer, capacity-building and technical support received from the Global Environment Facility, Parties included in Annex II to the Convention and other developed country Parties, the Green Climate Fund and multilateral institutions for activities relating to climate change, including for the preparation of the current biennial update report.

16. With regard to the development and transfer of technology, non-Annex I Parties should provide information on technology needs, which must be nationally determined, and on technology support received.

## **VI. Submission**

17. The information provided in accordance with these guidelines should be communicated by each non-Annex I Party to the COP, through the secretariat, in a single document, in electronic format.

18. Non-Annex I Parties should submit their biennial update reports in English or any one of the official United Nations languages.

19. Additional or supporting information may be supplied through other documents, such as a technical annex.

## **VII. Updating the guidelines**

20. These guidelines should be reviewed and revised, as appropriate, in accordance with decisions of the COP.

## Annex IV

### Modalities and guidelines for international consultation and analysis

#### I. Objectives

1. International consultation and analysis (ICA) of biennial update reports under the Subsidiary Body for Implementation (SBI) will be conducted in a manner that is non-intrusive, non-punitive and respectful of national sovereignty; ICA will aim to increase the transparency of mitigation actions and their effects, through analysis by technical experts in consultation with the Party concerned and through a facilitative sharing of views, and will result in a summary report.
2. Discussion on the appropriateness of such domestic policies and measures is not part of the process.

#### II. Scope and process

3. The ICA process will consist of the following two steps:
  - (a) A technical analysis of the biennial update reports submitted by Parties not included in Annex I to the Convention either, as a summary of parts of their national communication in the year in which the national communication is presented or as a stand-alone update report, by a team of technical experts in consultation with the Party, and will result in a summary report. The information considered should include the national greenhouse gas inventory report, information on mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, the progress made in their implementation and information on domestic measurement, reporting and verification, and on support received.
  - (b) A facilitative sharing of views, which will have as input the biennial update report and summary report referred to in paragraph 3(a) above.
4. The information referred to in paragraph 3(a) above shall be the input for the technical analysis by a team of technical experts. Additional technical information may be provided by the Party concerned. Prior to finalizing the report, the draft summary report prepared by the team of technical experts will be shared with the Party concerned for review and comment over the following three months, in order to respond to and incorporate Party comments in the report. The summary report, incorporating comments from the Party, shall be finalized in consultation with the Party concerned and be presented to the SBI.
5. The summary report referred to in paragraph 4 above will be noted by the SBI in its conclusions and shall be made publicly available on the UNFCCC website.
6. The SBI shall, at regular intervals, convene a workshop for the facilitative exchange of views, open to all Parties, for all Parties for which there is a biennial update report and a final summary report. Parties will be allowed to submit written questions in advance.
7. The facilitative exchange of views among Parties will consist of a one- to three-hour session for each Party or group of Parties. Parties may request to go individually or in a group of up to five Parties. The session will consist of a brief presentation by the Party or Parties concerned on their biennial update report, followed by oral questions and answers among Parties.

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8. The outcome of the ICA will be a summary report and a record of the facilitative sharing of views.

## Annex V

### Indicative list of activities for the Adaptation Committee

1. Considering relevant information and providing recommendations to the Conference of the Parties on ways to rationalize and strengthen coherence among adaptation bodies, programmes and activities under the Convention.
2. Preparing an overview of the capacities of regional centres and networks working on aspects related to adaptation to the adverse effects of climate change, drawing on relevant information, and making recommendations to the Parties on ways to enhance the role of regional centres and networks in supporting adaptation at the regional and national levels.
3. Identifying the process for and scope of overview and other periodic reports on adaptation issues relevant to the work of the Adaptation Committee.
4. Preparing periodic overview reports synthesizing information and knowledge relating to, *inter alia*, the implementation of adaptation actions and good adaptation practices, observed trends, lessons learned, gaps and needs, including in the provision of support, and areas requiring further attention, for consideration by the Conference of the Parties, drawing on information from Parties and on other relevant reports and documents, including those of other bodies under the Convention.
5. Upon request, considering technical support and guidance to the Parties as they develop national adaptation plans.
6. Also upon request, considering work in support of the work programme on loss and damage.
7. Exchanging information with relevant Convention bodies and others, including the Standing Committee and the Technology Executive Committee, on means to incentivize the implementation of adaptation actions, including finance, technology, and capacity-building, with a view to identifying opportunities and further actions for consideration by the Conference of the Parties.
8. Upon the request of the Parties, providing advice on adaptation-related matters to relevant Convention bodies, including to the operating entities of the financial mechanism, as appropriate.
9. Compiling a roster of experts on adaptation issues, building on the existing UNFCCC rosters.

## Annex VI

### Composition and working modalities of the Standing Committee

1. The Standing Committee shall be composed of the following:
  - (a) Ten members from Parties included in Annex I to the Convention (Annex I Parties);
  - (b) Ten members from Parties not included in Annex I to the Convention (non-Annex I Parties), including two members each from the African, Asia-Pacific, and the Latin America and Caribbean States, one member from a small island developing State and one member from a least developed country Party.
2. The Standing Committee shall be composed of members nominated by Parties for approval by the Conference of the Parties, who shall have the necessary experience and skills, notably in the areas of climate change, development and finance, taking into account the need to achieve gender balance in accordance with decision 36/CP.7.
3. Standing Committee members shall serve for a term of two years, with the option of seeking additional terms.
4. The Standing Committee shall elect annually a chair and a vice-chair from among its members for a term of one year each, with one being a member from a non-Annex I Party and the other being a member from an Annex I Party. The positions of chair and vice-chair shall alternate annually between a member from a developed country Party and a member from a developing country Party.
5. The Standing Committee shall develop further modalities for the participation of observers from the operating entities of the financial mechanism of the Convention, from funding entities (multilateral, bilateral and regional) involved in climate finance and from observer organizations from the private sector and civil society admitted to the Convention.
6. The Standing Committee shall draw upon additional expertise as it may deem necessary.
7. The Standing Committee shall meet at least twice a year, or more if necessary, and its first meeting shall take place prior to the thirty-sixth session of the Subsidiary Body for Implementation.
8. The Standing Committee shall reach its conclusions by consensus.
9. The secretariat shall provide administrative support for the work of the Standing Committee.
10. The Conference of the Parties will conduct a review of the functions of the Standing Committee in 2015.

## Annex VII

### Terms of reference of the Climate Technology Centre and Network

#### I. Mission

1. The mission of the Climate Technology Centre and Network is to stimulate technology cooperation and to enhance the development and transfer of technologies and to assist developing country Parties at their request, consistent with their respective capabilities and national circumstances and priorities, in order to build or strengthen their capacity to identify technology needs, to facilitate the preparation and implementation of technology projects and strategies taking into account gender considerations to support action on mitigation and adaptation and enhance low emissions and climate-resilient development.

#### II Functions

2. The Climate Technology Centre and Network shall perform the functions designated by the Conference of the Parties as contained in decision 1/CP.16, paragraph 123.

#### III. Architecture

3. The Climate Technology Centre and Network will consist of the following:

(a) A Climate Technology Centre;

(b) A Network with the participation of the relevant institutions capable of responding to requests from developing country Parties related to technology development and transfer, including national technology centres and institutions; regional climate technology centres and networks; intergovernmental, international, regional and sectoral organizations, partnerships and initiatives that may contribute to technology deployment and transfer; and research, academic, financial, non-governmental, private-sector and public-sector organizations, partnerships and initiatives.

#### IV. Roles and responsibilities

##### *Climate Technology Centre*

4. The Climate Technology Centre shall manage the process of receiving and responding to requests from developing country Parties and shall work with the Network to respond to such requests. The Climate Technology Centre will receive these requests from developing country Parties through the national entity designated for this purpose under decision 4/CP.13.

5. The Climate Technology Centre would respond to requests by developing country Parties either by itself or by identifying the appropriate organizations in the Network in consultation with the requesting developing country Party. The Centre will:

(a) Receive and assess requests and refine and prioritize those requests in conjunction with the nationally designated entity with the aim of establishing its technical feasibility;

(b) Respond to requests, through either the Centre or the Network, based on the use of the most appropriate capacity and expertise in accordance with its approved modalities and procedures.

*Network*

6. The members of the Network will undertake the substantive work to address requests made to the Climate Technology Centre by developing country Parties.

## V. Governance of the Climate Technology Centre and Network

7. The Climate Technology Centre and Network shall operate within its terms of reference and be accountable to, and under the guidance of, the Conference of the Parties through an advisory board.

8. That advisory board will determine its operational modalities and rules of procedure based on the functions outlined in decision 1/CP.16, paragraph 123.

9. The advisory board of the Climate Technology Centre and Network will:

(a) Provide guidance on:

(i) The report of the Climate Technology Centre and Network;

(ii) Prioritization criteria, taking into account the strategic considerations and recommendations provided by the Technology Executive Committee in relation to decision 1/CP.16, paragraph 120;

(b) Approve:

(i) The report of the Climate Technology Centre and Network;

(ii) Prioritization criteria for responding to requests from developing country Parties;

(iii) Criteria regarding the structure of the Network and the designation of organizations as members of the Network;

(iv) The programme of work (e.g. business plan and annual operating plan);

(c) Endorse:

(i) The appointment of the director;

(ii) The budget;

(iii) The financial statement;

(d) Ensure the application of fiduciary standards, and legal and ethical integrity;

(e) Monitor, assess and evaluate the timeliness and appropriateness of the responses of the Climate Technology Centre and Network to requests;

10. The Climate Technology Centre shall provide an annual report on the activities of the Climate Technology Centre and Network in order to facilitate the preparation of a joint annual report by the Technology Executive Committee and the Climate Technology Centre and Network on the activities of the Technology Mechanism, consisting of the report of the Climate Technology Centre and Network and the report of the Technology Executive Committee in accordance with their respective functions.

11. The constitution of the advisory board will be recommended by the subsidiary bodies to the Conference of the Parties at its eighteenth session.

12. The director of the Climate Technology Centre and Network shall be the secretary of the advisory board.

13. The host organization will provide the necessary administrative and infrastructural support for the effective functioning of the Climate Technology Centre and Network.

## **VI. Organizational structure of the Climate Technology Centre**

14. The organizational structure of the Climate Technology Centre will be designed and managed to maximize the effectiveness and efficiency of its operations.

15. The Climate Technology Centre shall have a lean cost-efficient organizational structure, within an existing institution, led by a director who will manage a small core team of professional and administrative staff, as required, to be appointed by and responsible to the host organization's governance structure in order to meet its responsibilities and to efficiently and effectively perform its functions.

16. The director will be approved by and accountable to the host governing body for the effectiveness and efficiency of the Climate Technology Centre in carrying out its functions.

17. As soon as practicable after appointment, the director will facilitate the timely recruitment of the staff of the Climate Technology Centre.

## **VII. Reporting and review**

18. The Climate Technology Centre shall provide an annual report on its activities and those of the Network and on the performance of their respective functions in accordance with decision 1/CP. 16, paragraph 126, and paragraph 10 above.

19. The report will contain all the information necessary to meet the principles of accountability and transparency required by the Convention and shall also include information on requests received and activities carried out by the Climate Technology Centre and Network, information on efficiency and effectiveness in responding to these requests, and information on ongoing work as well as lessons learned and best practices gained from that work.

20. The secretariat, subject to the availability of resources, shall commission an independent review of the effective implementation of the Climate Technology Centre and Network four years after its inception. The findings of the review, including any recommendations regarding enhancing the performance of the Climate Technology Centre and Network, will be considered by the Conference of the Parties. Subsequently, periodic independent reviews of the effectiveness of the Climate Technology Centre and Network will be conducted every four years.

## **VIII. Term of agreement**

21. The initial term of agreement to host the Climate Technology Centre will be for five years, with two four-year renewal periods, if so decided by the Conference of the Parties.

22. The renewal of agreement is subject to the host organization fulfilling its functions laid out in paragraph 2 above and its responsiveness to the direction given to it in paragraphs 4–6 above as identified in the findings of the independent review.

23. The Climate Technology Centre shall operate for initial terms until 2026, at which time the Conference of the Parties will review its functions and decide whether to extend its term.

## Annex VIII

### **Criteria to be used to evaluate and select the host of the Climate Technology Centre and Network and information required to be included in the proposals**

#### **I. Criteria to be used to evaluate and select the host of the Climate Technology Centre<sup>1</sup>**

1. The proposals will be evaluated against the following criteria in accordance with the methodology given in chapter II.

##### **A. Technical capabilities**

2. The prospective host's technical capabilities will be scored based on the following sub criteria, which are of equal importance:

(a) The proponent's comprehensive understanding of the development and transfer of technologies including in the context of the Convention, in particular the challenges and opportunities within developing countries as well as the understanding of regional, sub-regional and sectoral issues and differences regarding specific technologies;

(b) The breadth and depth of expertise as it relates to the subject areas, activities and roles and responsibilities of the Climate Technology Centre as referred to in the terms of reference of the Climate Technology Centre and Network contained in annex VII and the functions of the Climate Technology Centre contained in decision 1/CP.16, paragraph 123;

(c) Demonstrated capability to build capacity and facilitate the transfer of technology and technology diffusion in developing countries;

(d) Demonstrated capability in international multi-stakeholder cooperation, including the capability to involve the private sector (e.g. industrial enterprises) in order to maximize their contributions to Network activities in the development and transfer of environmentally sound technologies for adaptation and mitigation and the facilitation of networks.

##### **B. Technical approach**

3. The prospective host's technical approach will be scored based on the following sub criteria, which are of equal importance:

(a) The overall vision, organizational and administrative structure of the Climate Technology Centre and its ability to prioritize and respond to a high volume of requests from Parties which will have potentially broad content, in an effective and efficient manner;

(b) Demonstrated long-term commitment to host the Climate Technology Centre;

(c) Feasibility of the proposed approach and methodology for establishing and structuring the Network in order to accommodate regional and sub-regional issues, also

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<sup>1</sup> In this annex, research and development, demonstration, deployment, diffusion and transfer of technologies are referred to as technology development and transfer.

including the involvement of a wide range of relevant organizations, centres, networks, initiatives and private-sector entities;

(d) Feasibility of how the Climate Technology Centre will engage with the Network to create and maintain relationships with developing countries in order to ensure effective and efficient lines of communication and of how it will coordinate with relevant organizations to minimize redundancy;

(e) The extent to which the approach focuses on the objective of building capacity in requesting developing countries over the life of a programme.

### **C. Existing governance and management structures**

4. The prospective host's existing governance and management structures will be scored based on the following sub criteria, which are of equal importance:

(a) The effectiveness of the governance structure and the system of the proponent institution to ensure the evaluation of operational performance against the following elements: integrity; transparency; fiduciary and ethical standards, consistent with the principles of the United Nations; and reporting and accountability;

(b) Demonstrated capability to ensure fair and open international tendering for the procurement of services in line with the fiduciary and ethical standards of the United Nations;

(c) Effectiveness of the current management structure of the host organization to ensure gender sensitivity, transparency, responsiveness, flexibility, financial management, auditing and reporting functions, and the ability to provide high-quality administrative, infrastructural and logistic arrangements, and accessibility to developing country Parties, including the least developed country Parties;

(d) The ability to simultaneously manage and administer multiple and complex projects in developing countries in a timely manner, including the ability to work effectively with different clients and interest groups towards shared and complementary objectives; and the ability to evaluate the operational performance of project management and to take measures to enhance its effectiveness.

### **D. Climate Technology Centre and Network management plan**

5. The prospective host's Climate Technology Centre and Network management plan will be scored based on the following sub criteria, which are of equal importance:

(a) The feasibility of the plan and the schedule for initiating the rapid operational start-up of the Centre and the Network;

(b) The strength of the institutional management plan and the effectiveness of the management structure to ensure legal capacity, transparency, responsiveness, flexibility, and the identification and management of risks, including legal risks;

(c) The ability to evaluate the operational performance, to take measures in order to enhance its effectiveness, and to promote an independent and accountable relationship to the Conference of the Parties and to its related bodies as delegated;

(d) The quality of respective proposed key personnel as demonstrated by the extent and the appropriateness of their relevant supervisory and management experience, and their technical qualifications and experience with regard to technology transfer and diffusion in developing countries;

(e) The transparency and feasibility of the approach on how the proponent plans to engage with and coordinate the Network members to respond to requests from Parties.

## **E. Past performance**

6. The prospective host's past performance will be scored based on the following sub-criteria, which are of equal importance:

(a) The quality of the product or service, including: consistency in meeting goals and targets; cooperation and effectiveness in solving and learning from problems; timeliness of performance, including adherence to contract schedules and other time-sensitive project conditions; and effectiveness of the management at making prompt decisions and ensuring the efficient operation of tasks;

(b) A proven track record of cost control, including forecasting costs as well as accuracy in financial reporting;

(c) Experience in assembling technical assistance teams, including cross-sectoral teams of experts, in-country contractors, private-sector entities and subcontractors, placing them in the field in a timely manner and providing them with all necessary support;

(d) Demonstrated broad regional coverage, including at both the national and the local level, and the capacity in relation to technology development and transfer to respond to requests of developing countries in an expeditious manner;

(e) Experience, as it relates to the functions identified in decision 1/CP.16, paragraph 123;

(f) Demonstrated experience of setting up, organizing, coordinating and managing a network.

## **F. Budget proposal for Climate Technology Centre and Network**

7. The prospective host's budget proposal for the Climate Technology Centre and Network will be scored based on the following sub-criteria, which are of equal importance:

(a) The budget proposal should be balanced, manageable, comprehensive and scalable while providing specifics on how it will maintain fiduciary standards and legal and ethical integrity that is in line with the principles of the United Nations;

(b) The level of resource contributions to be provided in the execution of the mandate contained in the terms of reference, such as financial and in-kind contributions, including the total sum in monetary terms;

(c) The business model for the Climate Technology Centre and Network to enable cost-efficiency and financial sustainability.

## **G. Examples**

8. The prospective host's examples will be scored based on the following sub-criteria, which are of equal importance. The two scenarios in paragraphs 8(a) and (b) below are only illustrative, and do not, in any way, prejudice the actual operating budget of the Climate Technology Centre and Network:

*Example budget scenarios for the Climate Technology Centre and Network*

(a) Prospective hosts will provide two hypothetical scenarios in their proposals: one for a total annual budget of USD 10 million per year, and a second for an annual budget of USD 30 million per year. For each scenario, the proposal should detail the nature, scope and quantity of services that could be provided so as to meet requests that are in line with the functions of the Climate Technology Centre and Network as defined in decision 1/CP.16, and the terms of reference as defined in annex VII;

(b) The percentage of the overall operating budget under the hypothetical total budget scenarios of USD 10 million and USD 30 million per year to be used for administrative costs, such as infrastructure, budgetary support, human resources and overheads; proposals with lower percentages of the operative costs will be given higher scores;

*Example activities of the Climate Technology Centre and Network:*

(c) The feasibility and cost-effectiveness of the prospective host's approach to responding to the two sample requests, including management and implementation plans and a description of detailed activities required to achieve the objective of the two sample requests, accompanied by a budget.

## II. Methodology

9. The criteria listed above are presented by major category, so that prospective hosts will know which areas require emphasis in the preparation of information. These criteria serve as the standard against which all information will be evaluated, and serve to identify the significant matters which prospective hosts should address. The evaluation criteria, which contain sub criteria, and their evaluation weights are shown in the table below:

### Evaluation criteria and associated weights

<i>Major category</i>	<i>Weight</i>
Technical capabilities	20
Technical approach	20
Existing governance and management structures	13
Climate Technology Centre and Network management plan	15
Past performance	10
Budget proposal for the Climate Technology Centre and Network	10
Examples	12

10. Value for money: the criteria above will be used to assess the value for money of each proposal according to the following methodology. Proposals need to score a minimum of 50 per cent for each category, and 60 per cent overall. Best value for money will be calculated as follows: for the proposals, at, or above, the minimum levels, the total number of points scored will be divided by the overall budget proposal from the proponent as referred to in paragraph 7(a) above, for the delivery of the assigned functions of the Climate Technology Centre and Network, and the ratio will be used as input for the selection process, where the higher the ratio the more favourable the proposal will be considered.

11. All other criteria being equal, preference shall be given to a host organization located in a developing country.

### **III. Information required to be included in the proposals**

12. Prospective hosts of the Climate Technology Centre must provide information in their proposals demonstrating how they will implement the terms of reference. The proposal should be organized so as to respond to the outline of the evaluation criteria in a concise manner. Failure to include all information as specified may result in the rejection of the proposal as being non-responsive. The information required includes the following:

- (a) An executive summary;
- (b) A main proposal with relevant information organized in accordance with the evaluation and selection criteria contained in paragraphs 1–8 above;
- (c) A proposed organizational chart of the Climate Technology Centre with brief descriptions of key positions;
- (d) An outline of the terms of reference of the director of the Climate Technology Centre;
- (e) A cost sheet;
- (f) A schedule for the start-up of the Climate Technology Centre and Network;
- (g) Resumes of key staff of the proponent organization proposed to be assigned to the Climate Technology Centre and Network;
- (h) A response to the sample requests as referred to in paragraph 8(c) above;
- (i) Statements of work of past activities relevant to the functions of the Climate Technology Centre and Network, including a matrix of past performance and associated references;
- (j) Audited financial reports of the past three fiscal years;
- (k) Other relevant material (e.g. annual reports, social responsibility reports).

*10<sup>th</sup> plenary  
11 December 2011*

## Decision 3/CP.17

### Launching the Green Climate Fund

*The Conference of the Parties,*

*Recalling* decision 1/CP.16,

1. *Welcomes* the report of the Transitional Committee (FCCC/CP/2011/6 and Add.1), taking note with appreciation of the work of the Transitional Committee in responding to its mandate given in decision 1/CP.16, paragraph 109;
2. *Approves* the governing instrument for the Green Climate Fund annexed to this decision;
3. *Decides* to designate the Green Climate Fund as an operating entity of the financial mechanism of the Convention, in accordance with Article 11 of the Convention, with arrangements to be concluded between the Conference of the Parties and the Fund at the eighteenth session of the Conference of the Parties to ensure that it is accountable to and functions under the guidance of the Conference of the Parties to support projects, programmes, policies and other activities in developing country Parties;
4. *Notes* that the Green Climate Fund will be guided by the principles and provisions of the Convention;
5. *Decides* to provide guidance to the Board of the Green Climate Fund, including on matters related to policies, programme priorities and eligibility criteria and matters related thereto, taking into account the Board's annual reports to the Conference of the Parties on its activities;
6. *Requests* the Board to operationalize the Fund in an expedited manner;
7. *Also requests* the Board to develop a transparent no-objection procedure to be conducted through national designated authorities referred to in paragraph 46 of the governing instrument annexed to this decision, in order to ensure consistency with national climate strategies and plans and a country driven approach and to provide for effective direct and indirect public and private sector financing by the Green Climate Fund. Further requests the Board to determine this procedure prior to approval of funding proposals by the Fund;
8. *Requests* the Board to balance the allocation of the Green Climate Fund resources between adaptation and mitigation activities;
9. *Stresses* the need to secure funding for the Green Climate Fund, taking into account paragraphs 29 and 30 of the governing instrument, to facilitate its expeditious operationalization, and requests the Board to establish the necessary policies and procedures, which will enable an early and adequate replenishment process;
10. *Invites* Parties, through their regional groupings and constituencies, to submit their nominations for the members of the Board to the interim secretariat by 31 March 2012, in accordance with paragraph 11 of the governing instrument for the Green Climate Fund, with the 12 seats for developing country Parties to be distributed as follows:
  - (a) Three members and alternate members from the Asia-Pacific States;
  - (b) Three members and alternate members from the African States;
  - (c) Three members and alternate members from the Latin American and the Caribbean States;

- (d) One member and alternate member from small island developing States;
- (e) One member and alternate member from least developed country Parties;
- (f) One member from developing country Parties not included in the regional groups and constituencies above and one alternate member to rotate between developing country Parties included in the groups and constituencies listed above;

11. *Decides* that the Green Climate Fund be conferred juridical personality and legal capacity and shall enjoy such privileges and immunities related to the discharge and fulfilment of its functions, in accordance with paragraphs 7 and 8 of the governing instrument;

12. *Invites* Parties, in line with the objectives set forth in paragraph 12 above, to submit to the Board expressions of interest for hosting the Green Climate Fund by 15 April 2012, based on the following criteria:

- (a) The ability to confer and/or recognize juridical personality and legal capacity to the Fund for the protection of its interests and the exercise of its functions, to give effect to paragraphs 7 and 8 of the governing instrument, including but not limited to the ability to contract, acquire and dispose of immovable and movable property, and to institute legal proceedings;

- (b) The ability to provide privileges and immunities to the Fund as are necessary for the fulfilment of its purposes, and to the officials of the Fund as are necessary for the independent exercise of their official functions in connection with the Fund;

- (c) Financial arrangements, administrative and logistical support to the Fund;

- (d) Any other information that the host country wishes to provide;

13. *Requests* the Board, following the receipt of expressions of interest, to conduct an open and transparent process for the selection of the host country, and to decide on a host country for endorsement by the Conference of the Parties at its eighteenth session, in accordance with paragraph 22 of the governing instrument;

14. *Also requests* the Board and the host country of the Green Climate Fund to develop, in accordance with paragraphs 7 and 8 of the governing instrument, the legal and administrative arrangements for hosting the Fund, and to ensure that juridical personality and legal capacity are conferred to the Fund, and privileges and immunities as are necessary are granted to the Fund and its officials in an expeditious manner;

15. *Further requests* the Board to establish the independent secretariat of the Green Climate Fund in the host country in an expedited manner as soon as possible, in accordance with paragraph 19 of the governing instrument;

16. *Invites* the Board to select the trustee of the Green Climate Fund through an open, transparent and competitive bidding process in a timely manner to ensure that there is no discontinuity in trustee services;

17. *Requests* the Board to initiate a process to collaborate with the Adaptation Committee and the Technology Executive Committee, as well as other relevant thematic bodies under the Convention, to define linkages between the Fund and these bodies, as appropriate;

18. *Recognizes* the need to facilitate the immediate functioning of the Green Climate Fund and ensure its independence, requests the UNFCCC secretariat jointly with the Global Environment Facility secretariat to take the necessary administrative steps to set up the interim secretariat of the Green Climate Fund as an autonomous unit within the UNFCCC secretariat premises without undue delay after the seventeenth session of the Conference of

the Parties so that the interim secretariat can provide technical, administrative and logistical support to the Board until the independent secretariat of the Green Climate Fund is established;

19. *Decides* that the interim arrangements should terminate no later than the nineteenth session of the Conference of the Parties;
20. *Also decides* that the interim secretariat shall be fully accountable to the Board and shall function under its guidance and authority, and that its head shall report to the Board;
21. *Urges* the Board to move promptly to appoint the head of the interim secretariat;
22. *Decides* that the criteria for the selection of the head of the interim secretariat shall include, inter alia, expertise in the design or management of funds, relevant administrative and management experience, experience in or working with developing countries, and policy expertise;
23. *Requests* the interim secretariat to make arrangements for convening the first Board meeting by 30 April 2012;
24. *Welcomes* the offers made by Switzerland and the Republic of Korea to host the first and second meetings of the Board respectively, and invites Parties to host subsequent meetings;
25. *Invites* Parties to make financial contributions for the start-up of the Green Climate Fund, including administrative costs of the Board and its interim secretariat;
26. *Welcomes* the generous offers of the Republic of Korea, Germany and Denmark to contribute to the start-up cost of the Green Climate Fund.

## Annex

### Governing instrument for the Green Climate Fund

The Green Climate Fund (hereinafter the “Fund”) is hereby established and will operate in accordance with the following provisions:

#### I. Objectives and guiding principles

1. Given the urgency and seriousness of climate change, the purpose of the Fund is to make a significant and ambitious contribution to the global efforts towards attaining the goals set by the international community to combat climate change.
2. The Fund will contribute to the achievement of the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC). In the context of sustainable development, the Fund will promote the paradigm shift towards low-emission and climate-resilient development pathways by providing support to developing countries to limit or reduce their greenhouse gas emissions and to adapt to the impacts of climate change, taking into account the needs of those developing countries particularly vulnerable to the adverse effects of climate change.
3. The Fund will be guided by the principles and provisions of the Convention. The Fund will operate in a transparent and accountable manner guided by efficiency and effectiveness. The Fund will play a key role in channelling new, additional, adequate and predictable financial resources to developing countries and will catalyse climate finance, both public and private, and at the international and national levels. The Fund will pursue a country-driven approach and promote and strengthen engagement at the country level through effective involvement of relevant institutions and stakeholders. The Fund will be scalable and flexible and will be a continuously learning institution guided by processes for monitoring and evaluation. The Fund will strive to maximize the impact of its funding for adaptation and mitigation, and seek a balance between the two, while promoting environmental, social, economic and development co-benefits and taking a gender-sensitive approach.

#### II. Governance and institutional arrangements

##### A. Relationship to the Conference of the Parties

4. The Fund will be designated as an operating entity of the financial mechanism under Article 11 of the Convention and will be accountable to and function under the guidance of the Conference of the Parties (COP).
5. The Fund will be governed and supervised by a Board that will have full responsibility for funding decisions.
6. Arrangements will be concluded between the COP and the Fund, consistent with Article 11 of the Convention, to ensure that the Fund is accountable to and functions under the guidance of the COP. In order to ensure accountability to the COP, pursuant to Article 11, paragraph 3, the Board will:
  - (a) Receive guidance from the COP, including on matters related to policies, programme priorities and eligibility criteria, and matters related thereto;

- (b) Take appropriate action in response to the guidance received;
- (c) Submit annual reports to the COP for its consideration and receive further guidance.

## **B. Legal status**

7. In order to operate effectively internationally, the Fund will possess juridical personality and will have such legal capacity as is necessary for the exercise of its functions and the protection of its interests.

8. The Fund will enjoy such privileges and immunities as are necessary for the fulfilment of its purposes. The officials of the Fund will similarly enjoy such privileges and immunities as are necessary for the independent exercise of their official functions in connection with the Fund.

## **C. Rules of procedure of the Board**

### **1. Composition**

9. The Board will have 24 members, composed of an equal number of members from developing and developed country Parties. Representation from developing country Parties will include representatives of relevant United Nations regional groupings and representatives from small island developing States (SIDS) and least developed countries (LDCs).

10. Each Board member will have an alternate member, with alternate members entitled to participate in the meetings of the Board only through the principal member, without the right to vote, unless they are serving as the member. During the absence of the member from all or part of a meeting of the Board, his or her alternate will serve as the member.

### **2. Selection of Board members**

11. The members of the Board and their alternates will be selected by their respective constituency or regional group within a constituency. Members of the Board will have the necessary experience and skills, notably in the areas of climate change and development finance, with due consideration given to gender balance.

### **3. Term of membership**

12. Members and alternate members will serve for a term of three years and be eligible to serve additional terms as determined by their constituency.

### **4. Chairmanship**

13. Two co-chairs of the Board will be elected by the Board members from within their membership to serve for a period of one year, with one being a member from a developed country Party and the other being a member from a developing country Party.

### **5. Decision-making**

14. Decisions of the Board will be taken by consensus of the Board members. The Board will develop procedures for adopting decisions in the event that all efforts at reaching consensus have been exhausted.

**6. Quorum**

15. A two-thirds majority of Board members must be present at a meeting to constitute a quorum.

**7. Observers**

16. The Board will make arrangements, including developing and operating accreditation processes, to allow for effective participation by accredited observers in its meetings. The Board will invite, to participate as active observers: two civil society representatives, one each from developing and developed countries, and two private sector representatives, one each from developing and developed countries.

**8. Additional rules of procedure**

17. Additional rules of procedures will be developed by the Board.

**D. Role and functions of the Board**

18. The Board of the Fund will:

- (a) Oversee the operation of all relevant components of the Fund;
- (b) Approve operational modalities, access modalities and funding structures;
- (c) Approve specific operational policies and guidelines, including for programming, project cycle, administration, and financial management;
- (d) Approve funding in line with the Fund's principles, criteria, modalities, policies and programmes;
- (e) Develop environmental and social safeguards and fiduciary principles and standards that are internationally accepted;
- (f) Develop criteria and application processes for the accreditation of implementing entities of the Fund and accredit implementing entities and withdraw such accreditation;
- (g) Establish subcommittees and panels and define their terms of reference, as appropriate;
- (h) Establish additional thematic windows and/or substructures to address specific activities, as appropriate;
- (i) Establish a framework for the monitoring and evaluation of performance and the financial accountability of activities supported by the Fund and any necessary external audits;
- (j) Review and approve the administrative budget of the Fund and arrange for performance reviews and audits;
- (k) Appoint the Executive Director of the secretariat;
- (l) Appoint the head of the evaluation unit and the heads of all accountability units;
- (m) Receive guidance and take action in response to any guidance from the COP and prepare annual reports to the COP on its activities;
- (n) Develop working and coordination arrangements with other relevant bodies under the Convention and other relevant international institutions;

- (o) Select, appoint and enter into legal and administrative arrangements with the trustee;
- (p) Exercise such other functions as may be appropriate to fulfil the objectives of the Fund.

## **E. Secretariat**

### **1. Establishment of the secretariat**

19. The Fund will establish a secretariat, which will be fully independent. The secretariat will service and be accountable to the Board. It will have effective management capabilities to execute the day-to-day operations of the Fund.

20. The secretariat will be headed by an Executive Director with the necessary experiences and skills, who will be appointed by and be accountable to the Board. The Board will approve the job description and qualifications for the Executive Director. The Executive Director will be selected through a merit-based, open and transparent process.

21. The secretariat will be staffed with professional staff with relevant experience. The staff selection will be managed by the Executive Director and will be open, transparent and based on merit, taking into account geographical and gender balance.

22. The selection of the host country of the Fund will be an open and transparent process. The selection of the host country will be endorsed by the COP.

### **2. Functions**

23. The secretariat will be responsible for the day-to-day operations of the Fund, providing administrative, legal and financial expertise. In particular, the secretariat will:

- (a) Organize and execute all administrative duties;
- (b) Report information on the Fund's activities;
- (c) Liaise with members, implementing entities, and cooperating bilateral and multilateral institutions and agencies;
- (d) Prepare performance reports on the implementation of activities under the Fund;
- (e) Develop the work programme and annual administrative budget of the secretariat and trustee and submit them for approval by the Board;
- (f) Operationalize the project and programme cycle processes;
- (g) Prepare financial agreements related to the specific financing instrument to be concluded with an implementing entity;
- (h) Monitor the financial risks of the outstanding portfolio;
- (i) Work with the trustee to support the Board to enable it to carry out its responsibilities;
- (j) Carry out monitoring and evaluation functions;
- (k) Support the Board in arranging replenishment processes;
- (l) Establish and run effective knowledge management practices;
- (m) Perform any other functions assigned by the Board.

**F. Trustee**

24. The Fund will have a trustee with administrative competence to manage the financial assets of the Fund. The trustee will maintain appropriate financial records and will prepare financial statements and other reports required by the Board, in accordance with internationally accepted fiduciary standards.

25. The trustee will administer the assets of the Fund only for the purpose of, and in accordance with, the relevant decisions of the Board. The trustee will hold the assets of the Fund separate and apart from the assets of the trustee, but may commingle them for administrative and investment purposes with other assets maintained by the trustee. The trustee will establish and maintain separate records and accounts in order to identify the assets of the Fund.

26. The World Bank will serve as interim trustee for the Fund, subject to a review three years after the operationalization of the Fund.

27. The trustee will be accountable to the Board for the performance of its responsibilities as trustee for the Fund.

**III. Administrative costs**

28. The Fund will finance the operating costs of the Board, secretariat and trustee.

**IV. Financial inputs**

29. The Fund will receive financial inputs from developed country Parties to the Convention.

30. The Fund may also receive financial inputs from a variety of other sources, public and private, including alternative sources.

**V. Operational modalities**

31. The Fund will provide simplified and improved access to funding, including direct access, basing its activities on a country-driven approach and will encourage the involvement of relevant stakeholders, including vulnerable groups and addressing gender aspects.

32. The Board will steer the Fund's operations so that they evolve with the Fund's scale and maturity and will exercise flexibility to allow the Fund to evolve over time and become the main global fund for climate change finance.

**A. Complementarity and coherence**

33. The Fund shall operate in the context of appropriate arrangements between itself and other existing funds under the Convention, and between itself and other funds, entities, and channels of climate change financing outside the Fund.

34. The Board will develop methods to enhance complementarity between the activities of the Fund and the activities of other relevant bilateral, regional and global funding mechanisms and institutions, to better mobilize the full range of financial and technical capacities. The Fund will promote coherence in programming at the national level through

appropriate mechanisms. The Fund will also initiate discussions on coherence in climate finance delivery with other relevant multilateral entities.

## **B. Eligibility**

35. All developing country Parties to the Convention are eligible to receive resources from the Fund. The Fund will finance agreed full and agreed incremental costs for activities to enable and support enhanced action on adaptation, mitigation (including REDD-plus),<sup>1</sup> technology development and transfer (including carbon capture and storage), capacity-building and the preparation of national reports by developing countries.

36. The Fund will support developing countries in pursuing project-based and programmatic approaches in accordance with climate change strategies and plans, such as low-emission development strategies or plans, nationally appropriate mitigation actions (NAMAs), national adaptation plans of action (NAPAs), national adaptation plans (NAPs) and other related activities.

## **C. Funding windows and fund structure**

37. The Fund will have thematic funding windows. Initially, the Fund will have windows for adaptation and mitigation. An integrated approach to funding mitigation and adaptation will be used to allow for cross-cutting projects and programmes.

38. The Board shall also ensure adequate resources for capacity-building and technology development and transfer. The Fund will also provide resources for innovative and replicable approaches.

39. The Board will consider the need for additional windows. The Board will have the authority to add, modify and remove additional windows and substructures or facilities as appropriate.

### **1. Readiness and preparatory support**

40. The Fund will provide resources for readiness and preparatory activities and technical assistance, such as the preparation or strengthening of low-emission development strategies or plans, NAMAs, NAPs, NAPAs and for in-country institutional strengthening, including the strengthening of capacities for country coordination and to meet fiduciary principles and standards and environmental and social safeguards, in order to enable countries to directly access the Fund.

### **2. Private sector**

41. The Fund will have a private sector facility that enables it to directly and indirectly finance private sector mitigation and adaptation activities at the national, regional and international levels.

42. The operation of the facility will be consistent with a country-driven approach.

43. The facility will promote the participation of private sector actors in developing countries, in particular local actors, including small- and medium-sized enterprises and local financial intermediaries. The facility will also support activities to enable private sector involvement in SIDS and LDCs.

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<sup>1</sup> Reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.

44. The Board will develop the necessary arrangements, including access modalities, to operationalize the facility.

#### **D. Access modalities and accreditation**

45. Access to Fund resources will be through national, regional and international implementing entities accredited by the Board. Recipient countries will determine the mode of access and both modalities can be used simultaneously.

46. Recipient countries may designate a national authority. This national designated authority will recommend to the Board funding proposals in the context of national climate strategies and plans, including through consultation processes. The national designated authorities will be consulted on other funding proposals for consideration prior to submission to the Fund, to ensure consistency with national climate strategies and plans.

##### **1. Direct access**

47. Recipient countries will nominate competent subnational, national and regional implementing entities for accreditation to receive funding. The Board will consider additional modalities that further enhance direct access, including through funding entities with a view to enhancing country ownership of projects and programmes.

##### **2. International access**

48. Recipient countries will also be able to access the Fund through accredited international entities, including United Nations agencies, multilateral development banks, international financial institutions and regional institutions.

##### **3. Accreditation**

49. The Board will develop, manage and oversee an accreditation process for all implementing entities based on specific accreditation criteria that reflect the Fund's fiduciary principles and standards and environmental and social safeguards.

#### **E. Allocation**

50. The Board will balance the allocation of resources between adaptation and mitigation activities under the Fund and ensure appropriate allocation of resources for other activities.

51. A results-based approach will be an important criterion for allocating resources.

52. In allocating resources for adaptation, the Board will take into account the urgent and immediate needs of developing countries that are particularly vulnerable to the adverse effects of climate change, including LDCs, SIDS and African States, using minimum allocation floors for these countries as appropriate. The Board will aim for appropriate geographical balance.

#### **F. Programming and approval processes**

53. The Fund will have a streamlined programming and approval process to enable timely disbursement. The Board will develop simplified processes for the approval of proposals for certain activities, in particular small-scale activities.

## **VI. Financial instruments**

54. The Fund will provide financing in the form of grants and concessional lending, and through other modalities, instruments or facilities as may be approved by the Board. Financing will be tailored to cover the identifiable additional costs of the investment necessary to make the project viable. The Fund will seek to catalyse additional public and private finance through its activities at the national and international levels.

55. The Fund may employ results-based financing approaches, including, in particular for incentivizing mitigation actions, payment for verified results, where appropriate.

56. Financial management practices and financing agreements will be in keeping with the Fund's fiduciary principles and standards and environmental and social safeguards to be adopted by the Board. The Board will develop an appropriate risk management policy for funding and financial instruments.

## **VII. Monitoring**

57. The programmes and projects, as well as other activities, funded by the Fund will be regularly monitored for impact, efficiency and effectiveness in line with rules and procedures established by the Board. The use of participatory monitoring involving stakeholders will be encouraged.

58. A results measurement framework with guidelines and appropriate performance indicators will be approved by the Board. Performance against these indicators will be reviewed periodically in order to support the continuous improvement of the Fund's impact, effectiveness and operational performance.

## **VIII. Evaluation**

59. There will be periodic independent evaluations of the performance of the Fund in order to provide an objective assessment of the results of the Fund, including its funded activities and its effectiveness and efficiency. The purpose of these independent evaluations is to inform decision-making by the Board and to identify and disseminate lessons learned. The results of the periodic evaluations will be published.

60. To this end, the Board will establish an operationally independent evaluation unit as part of the core structure of the Fund. The head of the unit will be selected by, and will report to, the Board. The frequency and types of evaluation to be conducted will be specified by the unit in agreement with the Board.

61. Reports of the Fund's independent evaluation unit will be provided to the COP for purposes of periodic reviews of the financial mechanism of the Convention.

62. The COP may commission an independent assessment of the overall performance of the Fund, including Board performance.

## **IX. Fiduciary standards**

63. The Board will agree on, adopt, and ensure the application of best practice fiduciary principles and standards to the Fund's entities, the trustee's function related to the Fund, and to all operations, projects and programmes financed by the Fund, including the implementing entities.

64. The Fund will support the strengthening of capacities in recipient countries, where needed, to be able to meet the Fund's fiduciary principles and standards, based on modalities that will be established by the Board.

## **X. Environmental and social safeguards**

65. The Board will agree on and adopt best practice environmental and social safeguards, which shall be applied to all programmes and projects financed using the resources of the Fund.

66. The Fund will support the strengthening of capacities in recipient countries, where needed, to enable them to meet the Fund's environmental and social safeguards, based on modalities that shall be developed by the Board.

## **XI. Accountability mechanisms**

67. The Fund's operations will be subject to an information disclosure policy that will be developed by the Board.

68. The Board will establish an independent integrity unit, to work with the secretariat and report to the Board, to investigate allegations of fraud and corruption in coordination with relevant counterpart authorities.

69. The Board will establish an independent redress mechanism that will report to the Board. The mechanism will receive complaints related to the operation of the Fund and will evaluate and make recommendations.

## **XII. Expert and technical advice**

70. In carrying out its functions the Board will develop mechanisms to draw on appropriate expert and technical advice, including from the relevant thematic bodies established under the Convention, as appropriate.

## **XIII. Stakeholder input and participation**

71. The Board will develop mechanisms to promote the input and participation of stakeholders, including private-sector actors, civil society organizations, vulnerable groups, women and indigenous peoples, in the design, development and implementation of the strategies and activities to be financed by the Fund.

## **XIV. Termination of the Fund**

72. Termination of the Fund will be approved by the COP based on a recommendation of the Board.

*10<sup>th</sup> plenary meeting  
11 December 2011*

## Decision 4/CP.17

### Technology Executive Committee – modalities and procedures

*The Conference of the Parties,*

*Recalling* the relevant provisions of the Convention, in particular Article 4, paragraphs 1, 3, 5, 7, 8 and 9,

*Also recalling* decision 1/CP.16 on the establishment of a Technology Mechanism, comprising a Technology Executive Committee and a Climate Technology Centre and Network, with the objective of enhancing action on technology development and transfer to support action on mitigation and adaptation in order to achieve the full implementation of the Convention,

*Further recalling* that the Technology Executive Committee shall report, on an interim basis, to the Conference of the Parties, through the subsidiary bodies, on its activities and the performance of its functions,

1. *Welcomes* the report on modalities and procedures of the Technology Executive Committee,<sup>1</sup> for consideration by the Conference of the Parties at its seventeenth session, as requested by decision 1/CP.16;
2. *Adopts* the modalities of the Technology Executive Committee as contained in annex I to this decision;
3. *Also adopts* the rules of procedure of the Technology Executive Committee as contained in annex II to this decision;
4. *Notes* that the modalities elaborated by the Technology Executive Committee, which are based on the functions of the Technology Executive Committee as listed in decision 1/CP.16, include the following six key elements:
  - (a) Analysis and synthesis;
  - (b) Policy recommendations;
  - (c) Facilitation and catalysing;
  - (d) Linkage with other institutional arrangements;
  - (e) Engagement of stakeholders;
  - (f) Information and knowledge sharing;
5. *Stresses* the importance of engaging a broad range of stakeholders at the international, regional, national and subnational levels, including public institutions, the business community, academia and non-governmental organizations, in conducting its work, and that its work may require the establishment of institutional interfaces and communication channels at different levels, which would allow the Technology Executive Committee to mobilize and leverage a wider range of expertise and resources;
6. *Requests* the Technology Executive Committee to further elaborate its modalities on linkages with other relevant institutional arrangements under and outside the Convention, in the light of the agreed outcome of the seventeenth session of the Conference of the Parties,

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<sup>1</sup> FCCC/CP/2011/8.

and to provide such modalities for consideration by the subsidiary bodies at their thirty-sixth sessions, with a view to recommending the modalities for adoption by the Conference of the Parties at its eighteenth session;

## Activities and performance of the Technology Executive Committee for 2011

7. *Welcomes* the elected members of the Technology Executive Committee<sup>2</sup> and the election of Mr. Gabriel Blanco (Argentina) as chair and Mr. Antonio Pflüger (Germany) as vice-chair of the Technology Executive Committee for 2012 and acknowledges that Mr. Blanco and Mr. Pflüger acted as co-chairs of the first meeting of the Technology Executive Committee in 2011;

8. *Welcomes with appreciation* the report of the Technology Executive Committee on its activities and performance for 2011,<sup>3</sup> including on the outcomes of the group's first meeting, and the timely delivery of its report on modalities and procedures,<sup>4</sup> for consideration by the Conference of the Parties at its seventeenth session, as requested by decision 1/CP.16;

9. *Acknowledges* the late nomination of the members of the Technology Executive Committee for 2011 and agrees, on an exceptional basis and without setting a precedent, that the term of office of the members of the Technology Executive Committee currently in office will end immediately before the first meeting of the Technology Executive Committee in 2014 for those members serving a term of two years and immediately before the first meeting of the Technology Executive Committee in 2015 for those members serving a term of three years, as recommended by the Technology Executive Committee at its first meeting;<sup>5</sup>

10. *Also acknowledges* that the Technology Executive Committee expects to develop its rolling workplan for 2012–2013 during its next meeting, in February 2012, and requests that it make such workplan available in its report to the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation<sup>6</sup> at their thirty-sixth sessions;

11. *Encourages* Parties and relevant organizations in a position to do so to supplement the financial resources made available through the UNFCCC core budget for the implementation of the activities of the Technology Executive Committee.

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<sup>2</sup> FCCC/SB/2011/2, annex.

<sup>3</sup> FCCC/SB/2011/2.

<sup>4</sup> FCCC/CP/2011/8.

<sup>5</sup> FCCC/CP/2011/8, paragraph 13.

<sup>6</sup> Decision 1/CP.16, paragraph 126.

## Annex I

### Modalities of the Technology Executive Committee

#### I. Definitions

1. For the purpose of the modalities and procedures of the Technology Executive Committee (TEC):

- (a) The “Convention” means the United Nations Framework Convention on Climate Change (UNFCCC);
- (b) The “COP” means the Conference of the Parties to the Convention;
- (c) “Parties” means Parties to the Convention;
- (d) “Stakeholders” means the entities who have a role in the implementation of the functions of the TEC, or who may affect or be affected by the recommendations and actions of the TEC;
- (e) “National communications” means national communications submitted by Parties in accordance with Articles 4 and 12 of the Convention;
- (f) “TEC” means the Technology Executive Committee;
- (g) “Technology needs assessments” means the technology needs assessments conducted under the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention adopted by decision 4/CP.7 and enhanced by decision 3/CP.13;
- (h) “National adaptation programmes of action” means national adaptation programmes of action referred to in decision 5/CP.7, paragraph 11(c);
- (i) “Nationally appropriate mitigation actions” means nationally appropriate mitigation actions referred to in decision 1/CP.16, chapter III.B;
- (j) “National adaptation plans” means national adaptation plans referred to in decision 1/CP.16, paragraph 15;
- (k) “CTCN” means the Climate Technology Centre and Network referred to in decision 1/CP.16, paragraph 117(b);
- (l) “Observers” means the observers to the meetings of the TEC referred to in paragraphs 47 and 49 of the rules of procedure of the TEC, as referred in annex II to this decision;
- (m) “Expert advisers” means the expert advisers to the meetings of the TEC referred to in paragraph 44 of the rules of procedure of the TEC;
- (n) “TT:CLEAR” means the technology transfer information clearing house developed under the technology transfer framework;
- (o) “IPCC” means the Intergovernmental Panel on Climate Change.

#### II. Analysis and synthesis

2. For performing the functions as contained in decision 1/CP.16, paragraph 121(a), with regard to analysis and synthesis, the modalities will include, inter alia, the following:

(a) Producing periodic technology outlooks; collating, collecting and synthesizing a range of information on technology research and development and other technology-related activities from various sources, including, but not limited to, national communications, nationally determined technology needs and technology needs assessments, national adaptation programmes of action, nationally appropriate mitigation actions, national adaptation plans, and technology road maps and action plans; and examining the policy implications and opportunities for advancing technology development and transfer;

(b) Producing a series of technical papers on specific policies and technical issues, including those arising from technology needs assessments;

(c) Conducting a regular overview of existing technology development, transfer initiatives, activities and programmes with a view to identifying key achievements and gaps, good practices and lessons learned;

3. The TEC should aim to produce concise documents including executive summaries that can be useful for high-level policymakers, wherever possible.

4. The TEC should draw upon the best available expertise, liaise with existing organizations and institutions, and produce analysis that is broad-based, in order to ensure the credibility and legitimacy of its recommendations.

5. The TEC should also seek collaboration and, where appropriate, co-produce specific analysis and synthesis reports with relevant expert organizations. As a general option, the TEC could create institutional interfaces to seek inputs from relevant stakeholders in carrying out this function, which could include workshops, dialogues, ad hoc working groups and a designated website. It should also take advantage of possible institutional interfaces established with other constituted bodies under the Convention.

### III. Policy recommendations

6. To perform the functions as contained in decision 1/CP.16, paragraph 121(b), (c) and (e), with regard to policy recommendations, the modalities will include, inter alia, the following:

(a) Recommending to the COP, or other relevant bodies under the Convention, actions to promote technology development and transfer and to address barriers;

(b) Recommending guidance on policies and programme priorities related to technology development and transfer, with special consideration given to least developed country Parties;

7. The TEC may engage stakeholders in formulating the TEC recommendations for action. The stakeholders may include Parties, the COP, other relevant bodies/entities, including the CTCN, operating entities of the financial mechanism of the Convention as well as a range of individual entities that will be affected by the implementation of the recommendations.

8. The TEC could establish working groups or panels composed of relevant experts on certain matters, which could include the members of the TEC, outside experts or both, to advise the TEC in formulating its policy recommendations consistent with the rules of procedure of the TEC.

## IV. Facilitation and catalysing

9. For performing the functions as contained in decision 1/CP.16, paragraph 121(d), (f) and (g), with regard to facilitating and catalysing actions, the modalities will include, inter alia, the following:

(a) Promoting and collaborating with relevant organizations, resources permitting, in organizing workshops and forums to increase the opportunities for sharing experience with experts in developing and implementing technology road maps and action plans as well as other technology-related activities;

(b) Establishing an inventory of existing collaboration activities and a regular review process, with a view to identifying key achievements and gaps, good practices and lessons learned;

(c) Making recommendations on actions to promote collaboration;

(d) Making recommendations on best practices and relevant tools to develop technology road maps and action plans;

(e) Establishing an inventory of technology road maps and action plans;

(f) Making recommendations on concrete actions, such as an international process for the development of technology road maps and action plans as well as support required to enhance the development of these items, and in particular capacity-building programmes that may be appropriate;

10. The TEC should identify stakeholders for each technology area, taking into consideration that the CTCN, intergovernmental organizations and other technology actors at the national level would be important partners in undertaking the function of developing technology road maps, while general technology cooperation would be an area where international organizations, the private sector, non-governmental organizations and research communities could have an important role to play.

11. The TEC should establish a procedure to involve stakeholders with regard to providing information on cooperative activities including experiences shared, lessons learned and opportunities for collaboration in facilitating and catalysing specific issues on the development and transfer of technologies. The TEC could consider establishing a permanent or issue-based interface with relevant organizations with expertise on climate technologies for the sake of efficiency and effectiveness.

## V. Linkage with other institutional arrangements

12. The TEC acknowledged the need to achieve coherence and maintain interactions with other relevant institutional arrangements under and outside of the Convention as requested by decision 1/CP.16, paragraph 125. Without prejudicing the outcome of the negotiations between Parties on the possible relationships and linkages between the TEC and the CTCN, the financial mechanism and other institutional arrangements under the Convention being negotiated under the Ad Hoc Working Group on Long-term Cooperative Action under the Convention, the TEC agreed to reconsider its modalities on these matters at its first meeting to be held in 2012, in the light of an expected agreed outcome in this regard at the seventeenth session of the COP.

## **VI. Engagement of stakeholders**

13. The TEC should engage a broad range of stakeholders at the international, regional and national levels, including public institutions, the business community, academia and non-governmental organizations, in conducting its work. Stakeholder engagement would be issue-based and would be channelled through work programmes, and may require the establishment of institutional interfaces and communication channels at different levels, which would allow the TEC to mobilize and leverage a wider range of expertise and resources.

14. The TEC could engage relevant stakeholders through, inter alia, the following:

(a) Offering participation in the TEC meetings as observers or expert advisers, where applicable;

(b) Engaging stakeholders through other models that the TEC may consider establishing, such as consultative groups, stakeholder forums and technical task forces.

## **VII. Information and knowledge sharing**

15. The TEC should disseminate its outputs and facilitate knowledge sharing through a well-functioning information platform that responds to the information and knowledge service requirements of its potential users, including Parties and a wide range of technology actors, experts and stakeholders.

16. The platform would be a tool used to promote the collaboration between various actors and to seek cooperation with relevant international organizations and initiatives. It would support the efforts of the TEC in the following ways: exploring opportunities for information sharing, establishing links with existing knowledge platforms and implementing joint initiatives and programmes.

17. The TEC should consider upgrading TT:CLEAR with an expanded and more strategic focus, tailored to the functions of the TEC, and building on existing technology information networks.

## Annex II

### Rules of procedure of the Technology Executive Committee

#### I. Scope

1. These rules of procedure shall apply to the Technology Executive Committee (TEC) in accordance with decision 1/CP.16, paragraph 125, and appendix IV to that decision on the composition and mandate of the TEC, as well as with any other relevant decisions of the Conference of the Parties.

#### II. Definitions

2. For the purpose of these rules:

(a) The “Convention” means the United Nations Framework Convention on Climate Change (UNFCCC);

(b) The “COP” means the Conference of the Parties to the Convention;

(c) “CTCN” means the Climate Technology Centre and Network;

(d) “Chair” means the member of the TEC elected as chair of the TEC;

(e) “Vice-chair” means the member of the TEC elected as vice-chair of the TEC;

(f) “Observers” means observers to the meetings of the TEC;

(g) “Stakeholders” means the entities that have a role in the implementation of the functions of the TEC, or that may affect or be affected by the recommendations and actions of the TEC;

(h) “Secretariat” means the secretariat referred to in Article 8 of the Convention;

(i) “TEC” means the Technology Executive Committee.

#### III. Members

3. The COP, by decision 1/CP.16, decided that the TEC shall have the mandate and composition as contained in appendix IV to that decision.

4. The TEC shall comprise 20 expert members, elected by the COP, serving in their personal capacity and nominated by Parties with the aim of achieving a fair and balanced representation, as follows:

(a) Nine members from Parties included in Annex I to the Convention (Annex I Parties);

(b) Three members from each of the three regions of the Parties not included in Annex I to the Convention (non-Annex I Parties), namely Africa, Asia and the Pacific, and Latin America and the Caribbean; one member from a small island developing State; and one member from a least developed country Party;<sup>1</sup>

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<sup>1</sup> Decision 1/CP.16, appendix IV, paragraph 1.

5. Members shall serve for a term of two years and shall be eligible to serve a maximum of two consecutive terms of office. The following rules shall apply:
- (a) Half of the members shall be elected initially for a term of three years and half of the members shall be elected for a term of two years;
  - (b) Thereafter, the COP shall elect every year a member for a term of two years;
  - (c) The members shall remain in office until their successors are elected;<sup>2</sup>
6. The term of office of a member shall start at the first meeting of the TEC in the calendar year following his or her election and shall end immediately before the first meeting of the TEC in the calendar year in which the term ends, as applicable two or three years thereafter.
7. If a member of the TEC resigns or is otherwise unable to complete the assigned term of office or to perform the functions of that office, the TEC may decide, bearing in mind the proximity of the next session of the COP, to appoint another member from the same constituency to replace said member for the remainder of that member's mandate, in which case the appointment shall count as one term.<sup>3</sup>
8. If a member is unable to participate in two consecutive meetings of the TEC and unable to perform the functions and tasks set out by the TEC, the chair will bring this matter to the attention of the TEC and will seek clarification from the regional group that nominated that member on the status of his or her membership.

#### IV. Chair and vice-chair

9. The TEC shall elect annually a chair and a vice-chair from among its members for a term of one year each, with one being a member from an Annex I Party and the other being a member from a non-Annex I Party. The positions of chair and vice-chair shall alternate annually between a member from an Annex I Party and a member from a non-Annex I Party.<sup>4</sup>
10. If the chair is temporarily unable to fulfil the obligations of the office, the vice-chair shall serve as chair. In the absence of the chair and vice-chair at a particular meeting, any other member designated by the TEC shall temporarily serve as the chair of that meeting.<sup>5</sup>
11. If the chair or vice-chair is unable to complete the term of office, the TEC shall elect a replacement to complete the term of office, taking into account paragraph 8 above.<sup>6</sup>
12. Consistent with decision 1/CP.16, the TEC will be chaired by a chair and a vice-chair.
13. The chair and the vice-chair shall collaborate in chairing meetings of the TEC and in executing the work of the TEC throughout the year so as to ensure coherence between meetings.
14. After completion of his or her term of office, the chair will be nominated as vice-chair, and vice versa.
15. After the two-year cycle is complete, the TEC will nominate two new members for the roles, unless otherwise decided.

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<sup>2</sup> Decision 1/CP.16, appendix IV, paragraph 4.

<sup>3</sup> Decision 1/CP.16, appendix IV, paragraph 8.

<sup>4</sup> Decision 1/CP.16, appendix IV, paragraph 5.

<sup>5</sup> Decision 1/CP.16, appendix IV, paragraph 6.

<sup>6</sup> Decision 1/CP.16, appendix IV, paragraph 7.

16. If either the chair or the vice-chair resigns or is otherwise unable to complete his or her term of office, the TEC shall elect a replacement from the appropriate constituency to complete the remainder of the term.

17. The chair of the meeting shall, *inter alia*, declare the opening and closing of the meeting, ensure the observance of these rules of procedure, accord the right to speak and announce decisions. He or she shall rule on points of order and, subject to these rules, shall have complete control of the proceedings and over the maintenance of order.

18. The chair of the meeting shall call upon speakers in the order in which they signify their desire to speak. The secretariat shall maintain a list of speakers. The chair may call a speaker to order if his or her remarks are not relevant to the subject under discussion.

19. During discussion of any matter, a member may at any time raise a point of order, which shall be decided on immediately by the chair of the meeting. A member may appeal against the ruling of the chair. The appeal shall stand unless overruled by a two-thirds majority of the members, representing a two-thirds majority of members from Annex I Parties and a two-thirds majority of members from non-Annex I Parties.

20. Proposals and amendments to proposals may be introduced and submitted to the secretariat in writing by members; such proposals and amendments shall be circulated for consideration by all members of the TEC. As a general rule, no proposal shall be discussed or put forward for a decision at any meeting unless copies have been circulated to the members not later than the day preceding the meeting. However, the chair of the meeting may, with the agreement of the TEC, permit the discussion and consideration of proposals and amendments even though they have not been circulated or have been circulated only the same day.

21. The chair and/or the vice-chair, or any member designated by the TEC, shall report on behalf of the TEC to the COP and/or other subsidiary bodies as mandated by the COP.

22. The chair and/or the vice-chair, or any member designated by the TEC, shall represent the TEC at external meetings and shall report back to the TEC on those meetings.

23. The TEC may further define additional roles and responsibilities for the chair and the vice-chair.

24. The chair and the vice-chair in the exercise of their functions remain under the authority of the TEC.

## V. Secretariat

25. The secretariat shall support and facilitate the work of the TEC.<sup>7</sup>

26. The secretariat shall:

(a) Make the necessary arrangements for the meetings of the TEC, including announcing meetings, issuing invitations and making available the relevant documents;

(b) Maintain meeting records and arrange for the storage and preservation of documents of the meetings;

(c) Make documents of the meetings of the TEC available to the public, unless a specific document is deemed confidential by the TEC;

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<sup>7</sup> Decision 1/CP.16, appendix IV, paragraph 12.

27. The secretariat shall track the implementation of decisions on actions taken by the TEC and report on the progress of these actions intersessionally and at each meeting of the TEC.

28. In addition, the secretariat shall perform any other functions assigned that the TEC may require or that the COP may direct with respect to the work of the TEC.

## **VI. Meetings**

29. The TEC shall meet at least twice per year as of 2012, resources permitting. Additional meetings may be organized as necessary to enable it to discharge its responsibilities.

30. The meetings of the TEC shall take place in the country of the seat of the secretariat, unless otherwise decided by the TEC and subject to the necessary arrangements being made by the secretariat in consultation with the chair. Decisions on the location of meetings other than at the seat of the secretariat shall take into account the benefits of venue rotation, particularly venues in developing countries and those that facilitate the participation of key stakeholders of the TEC.

31. At least two thirds of the members of the TEC, representing a two-thirds majority of members from Annex I Parties and a two-thirds majority of members from non-Annex I Parties, must be present to constitute a quorum.

32. At the last Committee meeting of each calendar year, the chair and the vice-chair shall propose, for the approval of the TEC, a provisional schedule of meetings for the coming calendar year.

33. If the schedule, including dates and venue, of a meeting needs to be changed owing to unforeseen circumstances, the secretariat, with the agreement of the chair and the vice-chair, shall notify and seek agreement from the members on the new arrangement within two weeks of this notification, in accordance with paragraph 55 below. Once agreed, the secretariat shall post such information on the UNFCCC website at least eight weeks prior to the meeting in question. Where it is essential to facilitate the work of the TEC, the chair and the vice-chair may decide to shorten the notification period.

34. Members are requested to confirm their attendance at meetings of the TEC as early as possible and at least four weeks prior to a meeting for members eligible for funding for their participation to enable sufficient time for the secretariat to make the necessary travel arrangements.

## **VII. Agenda and documentation for meetings**

35. The chair shall, in consultation with the vice-chair and assisted by the secretariat, prepare the provisional agenda for each meeting as well as a draft report on the meeting.

36. The provisional agenda for each meeting shall be transmitted to members of the TEC at least four weeks in advance of the meeting.

37. Members may propose additions or changes to the provisional agenda, in writing, to the secretariat within one week of receiving the provisional agenda, and these additions or changes shall be included in a revised provisional agenda by the secretariat in agreement with the chair and the vice-chair.

38. The secretariat shall indicate the administrative and financial implications of all substantive items on the proposed agenda.

39. The secretariat shall transmit the provisional annotated agenda and any supporting documentation to the members at least two weeks prior to the meeting. Documents may be transmitted after that date with the approval of the chair and the vice-chair.

40. Documents for a meeting, unless it has been decided by the chair and the vice-chair that the documentation should be restricted for internal use by its members, shall be published on the UNFCCC website at least three weeks prior to that meeting.

41. The TEC shall, at the beginning of each meeting, adopt the meeting agenda.

## **VIII. Decision-making**

42. Decisions will be taken according to the rule of consensus.<sup>8</sup>

## **IX. Working language**

43. The working language of the TEC shall be English.

## **X. Participation of expert advisers in meetings**

44. The TEC, in performing its functions, should draw upon outside expertise, including the UNFCCC roster of experts and the CTCN, to provide advice, including as expert advisers at its meetings.<sup>9</sup>

45. The TEC should seek input from intergovernmental and international organizations and the private sector and may seek input from civil society in undertaking its work. It may invite advisers drawn from relevant intergovernmental and international organizations as well as the private sector and civil society to participate in its meetings as expert advisers on specific issues as they arise.<sup>10</sup>

46. The chair and the vice-chair may, in consultation with the TEC, invite representatives of intergovernmental and international organizations as well as the private sector and civil society to participate in a meeting of the TEC as expert advisers on specific issues under consideration at the meeting.

## **XI. Participation of observers**

47. The meetings of the TEC shall be open to attendance by accredited observer organizations and observers from Parties, except where otherwise decided by the TEC.<sup>11</sup>

48. The meetings of the TEC that are open shall be webcast through the UNFCCC website.

49. The TEC may decide on additional procedures for the participation of observer organizations other than those accredited to the UNFCCC.

50. The TEC may, in the interests of economy and efficiency, decide to limit the physical attendance of observers at its meetings, in accordance with the procedures for the participation of observer organizations referred to in paragraphs 47 and 49 above.

<sup>8</sup> Decision 1/CP.16, appendix IV, paragraph 2.

<sup>9</sup> Decision 1/CP.16, appendix IV, paragraph 9.

<sup>10</sup> Decision 1/CP.16, appendix IV, paragraph 10.

<sup>11</sup> Decision 1/CP.16, appendix IV, paragraph 11.

51. The TEC may decide at any time that a meeting or part thereof should be closed to observers.

52. The secretariat shall notify observers of the date and venue of the meeting that they may attend. Observers shall notify the secretariat at least three weeks in advance of the meeting of their intention to attend.

53. Observers may, with the agreement of the TEC, be invited to address the TEC on matters under consideration by the TEC. The chair shall notify the TEC one week in advance of the meeting of the proposed interventions by observers, if any.

54. Any observer wishing to make an intervention under particular items on the agenda at a meeting shall inform the chair through the secretariat of its interest at least two weeks in advance.

## **XII. Use of electronic means of communication**

55. The TEC shall use electronic means of communication to facilitate intersessional work and to take decisions in accordance with guidelines to be agreed by the TEC. The secretariat shall ensure that a secure and dedicated web interface is established and maintained to facilitate the work of the TEC.

## **XIII. Panels and working groups**

56. The TEC may establish panels and working groups, if required, to provide, inter alia, expert advice to assist the TEC in its work.

57. In establishing a panel or working group, the TEC shall determine its terms of reference, which shall include a workplan, the deadline for submission of documents, the criteria for selection of panel or working group members and the necessary budgetary requirements.

## **XIV. Workplan**

58. The TEC shall agree on the workplan. The secretariat shall prepare information on the financial requirements for the implementation of the workplan for consideration by the TEC. The workplan shall be kept under regular review by the TEC.

59. Newly funded activities not included in the original workplan shall be circulated by the secretariat at the request of the chair for approval by the TEC. Such approval may also be provided through electronic means, in accordance with paragraph 55 above. Committee members may provide their response and approval within two weeks of the circulation of the information by the secretariat.

60. Funding for activities included in the original workplan and for newly funded activities not included in the workplan may be accepted from Parties and the private sector, in accordance with United Nations and UNFCCC rules and regulations.<sup>12</sup>

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<sup>12</sup> Financial Regulations and Rules of the United Nations, available at <<http://www.un.org/Docs/journal/asp/ws.asp?m=ST/SGB/2003/7>>.

**XV. Amendments to the rules of procedure**

61. These rules of procedure may be amended by the TEC by consensus and, to be effective, must be approved formally by the COP. Pending formal approval, the TEC may decide to apply the amendment provisionally.

**XVI. Overriding authority of the Convention**

62. In the event of any conflict between any provision of these rules and any provision of the Convention, the Convention shall take precedence.

*10<sup>th</sup> plenary meeting  
9 December 2011*

## Decision 5/CP.17

### National adaptation plans

*The Conference of the Parties,*

*Recalling* Article 4, paragraphs 4 and 9, and relevant Articles of the Convention,

*Also recalling* decision 1/CP.16,

*Acknowledging* that national adaptation planning can enable all developing and developed country Parties to assess their vulnerabilities, to mainstream climate change risks and to address adaptation,

*Also acknowledging* that, because of their development status, climate change risks magnify development challenges for least developed countries,

*Recognizing* the need to address adaptation planning in the broader context of sustainable development planning,

#### I. Framing national adaptation plans

1. *Agrees* that the objectives of the national adaptation plan process are as follows:
  - (a) To reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience;
  - (b) To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate;
2. *Also agrees* that planning for adaptation at the national level is a continuous, progressive and iterative process, the implementation of which should be based on nationally identified priorities, including those reflected in the relevant national documents, plans and strategies, and coordinated with national sustainable development objectives, plans, policies and programmes;
3. *Further agrees* that enhanced action on adaptation should be undertaken in accordance with the Convention, should follow a country-driven, gender-sensitive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional and indigenous knowledge, and by gender-sensitive approaches, with a view to integrating adaptation into relevant social, economic and environmental policies and actions, where appropriate;
4. *Agrees* that the national adaptation plan process should not be prescriptive, nor result in the duplication of efforts undertaken in-country, but should rather facilitate country-owned, country-driven action;

## II. A process to enable least developed country Parties to formulate and implement national adaptation plans

### A. Guidelines

5. *Agrees* that the formulation of national adaptation plans should build on and complement existing adaptation planning;
6. *Decides* to adopt the initial guidelines for the formulation of national adaptation plans contained in the annex to this decision;
7. *Invites* Parties and relevant organizations to submit to the secretariat, by 13 February 2013, information on their experiences with the application of the guidelines for the national adaptation plan process for least developed country Parties, for compilation by the secretariat into a miscellaneous document for consideration by the Subsidiary Body for Implementation at its thirty-eighth session;
8. *Requests* the secretariat to prepare a synthesis report on experiences with the application of the guidelines for the national adaptation plan process in least developed country Parties, taking into account the submissions referred to in paragraph 7 above and other relevant sources of information, for consideration by the Subsidiary Body for Implementation at its thirty-eighth session;
9. *Decides* to take stock of, and if necessary revise, the guidelines mentioned in paragraph 6 above at its nineteenth session, taking into account the submissions referred to in paragraph 7 above, the synthesis report referred to in paragraph 8 above, reports of the Least Developed Country Expert Group and other relevant sources of information;
10. *Invites* least developed country Parties to use the guidelines and modalities contained in this decision, in accordance with their national circumstances, in preparing their national adaptation plans;
11. *Also invites* least developed country Parties to strive to implement institutional arrangements to facilitate their national adaptation plan process, building on existing institutions and consistent with their national circumstances;

### B. Modalities

12. *Decides* on the following modalities to support and enable least developed country Parties to formulate and implement national adaptation plans, inter alia:
  - (a) Technical guidelines for the national adaptation plans;
  - (b) Workshops and expert meetings;
  - (c) Training activities;
  - (d) Regional exchanges;
  - (e) Syntheses of experiences, best practices and lessons learned;
  - (f) Technical papers;
  - (g) Technical advice;
13. *Requests* the Least Developed Countries Expert Group to provide technical guidance and support to the national adaptation plan process, as appropriate;

14. *Also requests* the Least Developed Countries Expert Group, in carrying out its mandate to support the identification and implementation of medium- and long-term adaptation in least developed countries, to prioritize support for the formulation and implementation of national adaptation plans;
15. *Further requests* the Least Developed Countries Expert Group to prepare technical guidelines as referred to in paragraph 12(a) above for the national adaptation plan process, based on the initial guidelines, included in the annex to this decision;
16. *Requests* the Least Developed Countries Expert Group to arrange a review of the above-mentioned technical guidelines and to identify support needs for the process of formulation and implementation of the national adaptation plans, including through the modalities referred to in paragraph 12 above;
17. *Also requests* the Least Developed Countries Expert Group to invite the Adaptation Committee and other relevant bodies under the Convention to contribute to its work in support of the national adaptation plan process; and to report, as appropriate;
18. *Invites* national and regional centres and networks to strengthen their programmes and engage in support of the national adaptation plan process in least developed country Parties, at the regional, national and subnational levels, as appropriate, in a manner that is country-driven and that encourages cooperation and coordination between regional stakeholders;
19. *Also invites* Parties to strengthen their engagement with regional centres and networks, where possible, in the process of formulation and implementation of the national adaptation plan process in least developed country Parties;
20. *Requests* developed country Parties to continue to provide least developed country Parties with finance, technology and capacity-building in accordance with decision 1/CP.16, including paragraph 18, and other relevant decisions of the Conference of the Parties;

### **C. Financial arrangements for the formulation and implementation of national adaptation plans**

21. *Urges* developed country Parties to mobilize financial support for the national adaptation plan process for least developed country Parties through bilateral and multilateral channels, including through the Least Developed Countries Fund, in accordance with decision 1/CP.16;
22. *Requests* the Global Environment Facility, as an operating entity of the financial mechanism, through the Least Developed Countries Fund, to consider how to enable activities for the preparation of the national adaptation plan process for least developed countries Parties, while maintaining progress for the least developed countries work programme, which includes the national adaptation programmes of action;
23. *Invites* United Nations organizations, specialized agencies and other relevant organizations, as well as bilateral and multilateral agencies, to support the national adaptation plan process in least developed country Parties and, where possible, to consider establishing support programmes for the national adaptation plan process within their mandates, as appropriate, which could facilitate financial and technical support to least developed country Parties; and to submit to the secretariat, by 13 February 2012, information on how they have responded to this invitation;

24. *Also invites* Parties and relevant organizations as well as bilateral and multilateral agencies, to submit to the secretariat, by 13 February 2012, information on support to the national adaptation plan process in least developed countries;
25. *Further invites* the Global Environment Facility, as an operating entity of the financial mechanism for the operation of the Least Developed Countries Fund, to submit information to the Subsidiary Body for Implementation, through the secretariat, by 13 February 2012, on how they could enable activities undertaken as part of the national adaptation plan process in least developed country Parties, for compilation by the secretariat into a miscellaneous document for consideration by the Subsidiary Body for Implementation at its thirty-sixth session;
26. *Requests* the secretariat to prepare a synthesis report on the support for the national adaptation plan process for least developed country Parties, taking into account the submissions referred to in paragraphs 23–25 above and other relevant sources of information, for consideration by the Subsidiary Body for Implementation at its thirty-sixth session;
27. *Also requests* the Subsidiary Body for Implementation to consider guidance on policies and programmes to enable support for the national adaptation plan process for least developed country Parties, at its thirty-sixth session, taking into account, inter alia, the guidance in decision 27/CP.7 and the synthesis report referred to in paragraph 26 above, and taking into account other relevant decisions on financial support under the Convention, for consideration by the Conference of the Parties at its eighteenth session;

### **III. An invitation to developing country Parties that are not least developed country Parties to employ the modalities for national adaptation plans**

28. *Reiterates* the invitation to other developing country Parties to employ the modalities for national adaptation plans elaborated in this decision;
29. *Invites* interested developing country Parties that are not least developed country Parties to use the guidelines for the national adaptation plans for least developed country Parties adopted in this decision, in accordance with their national circumstances, when formulating their national adaptation plans;
30. *Requests* the Adaptation Committee, in accordance with its agreed functions, to consider, in its workplan, the relevant modalities for supporting interested developing country Parties that are not least developed country Parties, to plan, prioritize and implement their national adaptation planning measures, including through the use of the modalities contained in this decision, and to report to the Conference of the Parties at its eighteenth session;
31. *Invites* the operating entities of the financial mechanism of the Convention, bilateral and multilateral organizations and other institutions as appropriate, to provide financial and technical support to developing country Parties to plan, prioritize and implement their national adaptation planning measures, consistent with decision 1/CP.16 and relevant provisions of the Convention;

#### IV. Reporting, monitoring and evaluation

32. *Invites* Parties to provide information, through their national communications, on what measures they have undertaken and on support provided or received relevant to the national adaptation plan process;
33. *Encourages* least developed country Parties, to the extent possible, to provide information on their national adaptation plan process through their national communications, as well as other channels;
34. *Requests* the Least Developed Countries Expert Group, the Adaptation Committee and other relevant bodies under the Convention to include information in their reports on how they have responded to the requests made in this decision and on their activities relevant to the national adaptation plan process, as per their respective mandates;
35. *Invites* United Nations organizations, multilateral, intergovernmental and other international and regional organizations to provide information on their activities to support the national adaptation plan process;
36. *Requests* the secretariat, consistent with Article 8 of the Convention, to collect, compile and synthesize information needed by the Subsidiary Body for Implementation to monitor and evaluate the progress made on the national adaptation plan process, drawing upon information in accordance with paragraphs 32–35 above;
37. *Also requests* the Subsidiary Body for Implementation to monitor and evaluate progress made on the national adaptation plan process at its forty-second session, based on the reports by the secretariat referred to in paragraph 36 above, with a view to making recommendations to the Conference of the Parties, as appropriate;
38. *Further requests* the secretariat to utilize and enhance existing databases, to include information on support and other activities under the national adaptation plan process, as appropriate;
39. *Requests* that the actions of the secretariat called for in this decision be undertaken subject to the availability of financial resources.

## Annex

### **Initial guidelines for the formulation of national adaptation plans by least developed country Parties**

#### **I. Introduction**

1. The elements described in paragraphs 2–6 below are indicative of the activities that can be undertaken in the development of national adaptation plans (NAPs). The planning of such activities will depend on national circumstances and should be determined by least developed country Parties.

#### **II. Elements of national adaptation plans**

##### **A. Laying the groundwork and addressing gaps**

2. Activities undertaken under this element would be planned with a view to identifying weaknesses and gaps in enabling environments, and addressing them as necessary, to support the formulation of comprehensive adaptation plans, programmes and policies, through, inter alia:

(a) Identification and assessment of institutional arrangements, programmes, policies and capacities for overall coordination and leadership on adaptation;

(b) Assessment of available information on climate change impacts, vulnerability and adaptation, measures taken to address climate change, and gaps and needs, at the national and regional levels;

(c) Comprehensive, iterative assessments of development needs and climate vulnerabilities.

##### **B. Preparatory elements**

3. In developing NAPs, consideration would be given to identifying specific needs, options and priorities on a country-driven basis, utilizing the services of national and, where appropriate, regional institutions, and to the effective and continued promotion of participatory and gender-sensitive approaches coordinated with sustainable development objectives, policies, plans and programmes. Activities may include the following:

(a) Design and development of plans, policies and programmes by considering decision 1/CP.16, paragraph 14(a), to address the gaps and needs referred to in paragraph 2 above;

(b) Assessments of medium- and long-term adaptation needs, and, as appropriate, development needs and climate vulnerabilities;

(c) Activities aimed at integrating climate change adaptation into national and subnational development and sectoral planning;

(d) Participatory stakeholder consultations;

(e) Communication, awareness-raising and education.

**C. Implementation strategies**

4. Activities carried out as part of the implementation strategies would take into consideration the following:

- (a) Prioritizing work according to development needs and climate change vulnerability and risk;
- (b) Strengthening institutional and regulatory frameworks to support adaptation;
- (c) Training and coordination at the sectoral and subnational levels;
- (d) Public dissemination of information on the national adaptation plan process, to be made available to the public and to the UNFCCC secretariat;
- (e) Considering other relevant multilateral frameworks and international programmes and initiatives, with a view to building on and complementing existing adaptation planning.

**D. Reporting, monitoring and review**

5. These activities, including national adaptation plan documents, could be included in national strategies and plans, as appropriate.

6. Under this element, Parties should undertake a regular review, at intervals that they determine:

- (a) To address inefficiencies, incorporating the results of new assessments and emerging science and reflect lessons learned from adaptation efforts;
- (b) To monitor and review the efforts undertaken, and provide information in their national communications on the progress made and the effectiveness of the national adaptation plan process.

*10<sup>th</sup> plenary meeting  
11 December 2011*

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**United States Department of State**  
***Office of the Special Envoy for Climate Change***  
**Washington, D.C. 20520**

Mr. Yvo de Boer  
Executive Secretary  
United Nations Framework Convention on Climate Change  
P.O. Box 260124  
D-53153 Bonn

January 28, 2010

Dear Mr. de Boer:

The United States is pleased to inform you, through this letter, of its desire to be associated with the Copenhagen Accord. Attached please find the submission of the United States concerning its emissions reduction target, in the format set forth in Appendix 1 to the Copenhagen Accord, for compilation in accordance with paragraph 4 of the Accord. The U.S. listing is provided on the assumption that other Annex 1 Parties, as well as the more advanced non-Annex 1 parties, have, by January 31, associated with the Accord and submitted mitigation actions for compilation in accordance with paragraph 4 or paragraph 5 of the Accord, as the case may be.

We look forward to implementing the Accord, including those portions of the Accord that call for COP decisions.

Sincerely,

A handwritten signature in black ink, appearing to read "Todd Stern", written over a horizontal line.

Todd Stern  
U.S. Special Envoy for Climate Change

Attachment:  
U.S. Submission

Attachment:

## APPENDIX I

Annex I Parties	<i>Quantified economy-wide emissions targets for 2020</i>	
	Emissions reduction in 2020	Base year
United States of America	In the range of 17%, in conformity with anticipated U.S. energy and climate legislation, recognizing that the final target will be reported to the Secretariat in light of enacted legislation. [1]	2005

[1] The pathway set forth in pending legislation would entail a 30% reduction in 2025 and a 42% reduction in 2030, in line with the goal to reduce emissions 83% by 2050.

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# Climate Change 2007: Synthesis Report

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## Synthesis Report

### **An Assessment of the Intergovernmental Panel on Climate Change**

*This underlying report, adopted section by section at IPCC Plenary XXVII (Valencia, Spain, 12-17 November 2007), represents the formally agreed statement of the IPCC concerning key findings and uncertainties contained in the Working Group contributions to the Fourth Assessment Report.*

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Based on a draft prepared by:

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## **Introduction**

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## Introduction

This Synthesis Report is based on the assessment carried out by the three Working Groups (WGs) of the Intergovernmental Panel on Climate Change (IPCC). It provides an integrated view of climate change as the final part of the IPCC's Fourth Assessment Report (AR4).

Topic 1 summarises observed changes in climate and their effects on natural and human systems, regardless of their causes, while Topic 2 assesses the causes of the observed changes. Topic 3 presents projections of future climate change and related impacts under different scenarios.

Topic 4 discusses adaptation and mitigation options over the next few decades and their interactions with sustainable develop-

ment. Topic 5 assesses the relationship between adaptation and mitigation on a more conceptual basis and takes a longer-term perspective. Topic 6 summarises the major robust findings and remaining key uncertainties in this assessment.

A schematic framework representing anthropogenic drivers, impacts of and responses to climate change, and their linkages, is shown in Figure I.1. At the time of the Third Assessment Report (TAR) in 2001, information was mainly available to describe the linkages clockwise, i.e. to derive climatic changes and impacts from socio-economic information and emissions. With increased understanding of these linkages, it is now possible to assess the linkages also counterclockwise, i.e. to evaluate possible development pathways and global emissions constraints that would reduce the risk of future impacts that society may wish to avoid.

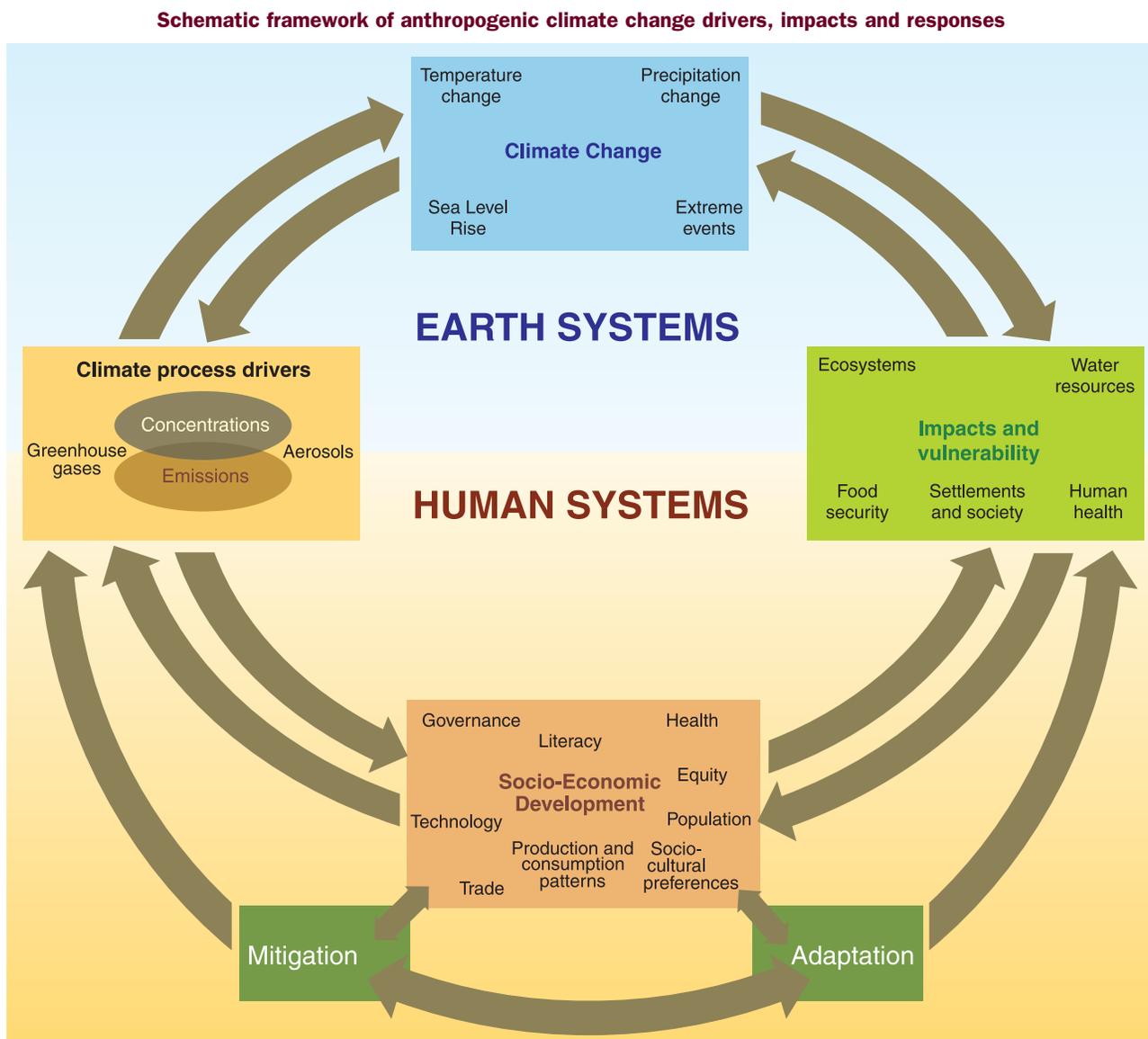


Figure I.1. Schematic framework representing anthropogenic drivers, impacts of and responses to climate change, and their linkages.

## Treatment of uncertainty

The IPCC uncertainty guidance note<sup>1</sup> defines a framework for the treatment of uncertainties across all WGs and in this Synthesis Report. This framework is broad because the WGs assess material from different disciplines and cover a diversity of approaches to the treatment of uncertainty drawn from the literature. The nature of data, indicators and analyses used in the natural sciences is generally different from that used in assessing technology development or the social sciences. WG I focuses on the former, WG III on the latter, and WG II covers aspects of both.

Three different approaches are used to describe uncertainties each with a distinct form of language. Choices among and within these three approaches depend on both the nature of the information available and the authors' expert judgment of the correctness and completeness of current scientific understanding.

Where uncertainty is assessed qualitatively, it is characterised by providing a relative sense of the amount and quality of evidence (that is, information from theory, observations or models indicating whether a belief or proposition is true or valid) and the degree of agreement (that is, the level of concurrence in the literature on a particular finding). This approach is used by WG III through a series of self-explanatory terms such as: *high agreement, much evidence*; *high agreement, medium evidence*; *medium agreement, medium evidence*; etc.

Where uncertainty is assessed more quantitatively using expert judgement of the correctness of underlying data, models or analyses, then the following scale of confidence levels is used to express the assessed chance of a finding being correct: *very high confidence* at least 9 out of 10; *high confidence* about 8 out of 10; *medium confidence* about 5 out of 10; *low confidence* about 2 out of 10; and *very low confidence* less than 1 out of 10.

Where uncertainty in specific outcomes is assessed using expert judgment and statistical analysis of a body of evidence (e.g. observations or model results), then the following likelihood ranges are used to express the assessed probability of occurrence: *virtually certain* >99%; *extremely likely* >95%; *very likely* >90%; *likely* >66%; *more likely than not* > 50%; *about as likely as not* 33% to 66%; *unlikely* <33%; *very unlikely* <10%; *extremely unlikely* <5%; *exceptionally unlikely* <1%.

WG II has used a combination of confidence and likelihood assessments and WG I has predominantly used likelihood assessments.

This Synthesis Report follows the uncertainty assessment of the underlying WGs. Where synthesised findings are based on information from more than one WG, the description of uncertainty used is consistent with that for the components drawn from the respective WG reports.

Unless otherwise stated, numerical ranges given in square brackets in this report indicate 90% uncertainty intervals (i.e. there is an estimated 5% likelihood that the value could be above the range given in square brackets and 5% likelihood that the value could be below that range). Uncertainty intervals are not necessarily symmetric around the best estimate.

<sup>1</sup> See <http://www.ipcc.ch/meetings/ar4-workshops-express-meetings/uncertainty-guidance-note.pdf>



# 1

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## **Observed changes in climate and their effects**

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## 1.1 Observations of climate change

Since the TAR, progress in understanding how climate is changing in space and time has been gained through improvements and extensions of numerous datasets and data analyses, broader geographical coverage, better understanding of uncertainties and a wider variety of measurements. *{WGI SPM}*

### Definitions of climate change

Climate change in IPCC usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC), where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.

**Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level (Figure 1.1).** *{WGI 3.2, 4.8, 5.2, 5.5, SPM}*

Eleven of the last twelve years (1995-2006) rank among the twelve warmest years in the instrumental record of global surface temperature (since 1850). The 100-year linear trend (1906-2005) of 0.74 [0.56 to 0.92]°C is larger than the corresponding trend of 0.6 [0.4 to 0.8]°C (1901-2000) given in the TAR (Figure 1.1). The linear warming trend over the 50 years from 1956 to 2005 (0.13 [0.10 to 0.16]°C per decade) is nearly twice that for the 100 years from 1906 to 2005. *{WGI 3.2, SPM}*

The temperature increase is widespread over the globe and is greater at higher northern latitudes (Figure 1.2). Average Arctic temperatures have increased at almost twice the global average rate in the past 100 years. Land regions have warmed faster than the oceans (Figures 1.2 and 2.5). Observations since 1961 show that the average temperature of the global ocean has increased to depths of at least 3000m and that the ocean has been taking up over 80% of the heat being added to the climate system. New analyses of balloon-borne and satellite measurements of lower- and mid-tropospheric temperature show warming rates similar to those observed in surface temperature. *{WGI 3.2, 3.4, 5.2, SPM}*

Increases in sea level are consistent with warming (Figure 1.1). Global average sea level rose at an average rate of 1.8 [1.3 to 2.3]mm per year over 1961 to 2003 and at an average rate of about 3.1 [2.4 to 3.8]mm per year from 1993 to 2003. Whether this faster rate for 1993 to 2003 reflects decadal variation or an increase in the longer-

term trend is unclear. Since 1993 thermal expansion of the oceans has contributed about 57% of the sum of the estimated individual contributions to the sea level rise, with decreases in glaciers and ice caps contributing about 28% and losses from the polar ice sheets contributing the remainder. From 1993 to 2003 the sum of these climate contributions is consistent within uncertainties with the total sea level rise that is directly observed. *{WGI 4.6, 4.8, 5.5, SPM, Table SPM.1}*

Observed decreases in snow and ice extent are also consistent with warming (Figure 1.1). Satellite data since 1978 show that annual average Arctic sea ice extent has shrunk by 2.7 [2.1 to 3.3]% per decade, with larger decreases in summer of 7.4 [5.0 to 9.8]% per decade. Mountain glaciers and snow cover on average have declined in both hemispheres. The maximum areal extent of seasonally frozen ground has decreased by about 7% in the Northern Hemisphere since 1900, with decreases in spring of up to 15%. Temperatures at the top of the permafrost layer have generally increased since the 1980s in the Arctic by up to 3°C. *{WGI 3.2, 4.5, 4.6, 4.7, 4.8, 5.5, SPM}*

At continental, regional and ocean basin scales, numerous long-term changes in other aspects of climate have also been observed. Trends from 1900 to 2005 have been observed in precipitation amount in many large regions. Over this period, precipitation increased significantly in eastern parts of North and South America, northern Europe and northern and central Asia whereas precipitation declined in the Sahel, the Mediterranean, southern Africa and parts of southern Asia. Globally, the area affected by drought has *likely*<sup>2</sup> increased since the 1970s. *{WGI 3.3, 3.9, SPM}*

Some extreme weather events have changed in frequency and/or intensity over the last 50 years:

- It is *very likely* that cold days, cold nights and frosts have become less frequent over most land areas, while hot days and hot nights have become more frequent. *{WGI 3.8, SPM}*
- It is *likely* that heat waves have become more frequent over most land areas. *{WGI 3.8, SPM}*
- It is *likely* that the frequency of heavy precipitation events (or proportion of total rainfall from heavy falls) has increased over most areas. *{WGI 3.8, 3.9, SPM}*
- It is *likely* that the incidence of extreme high sea level<sup>3</sup> has increased at a broad range of sites worldwide since 1975. *{WGI 5.5, SPM}*

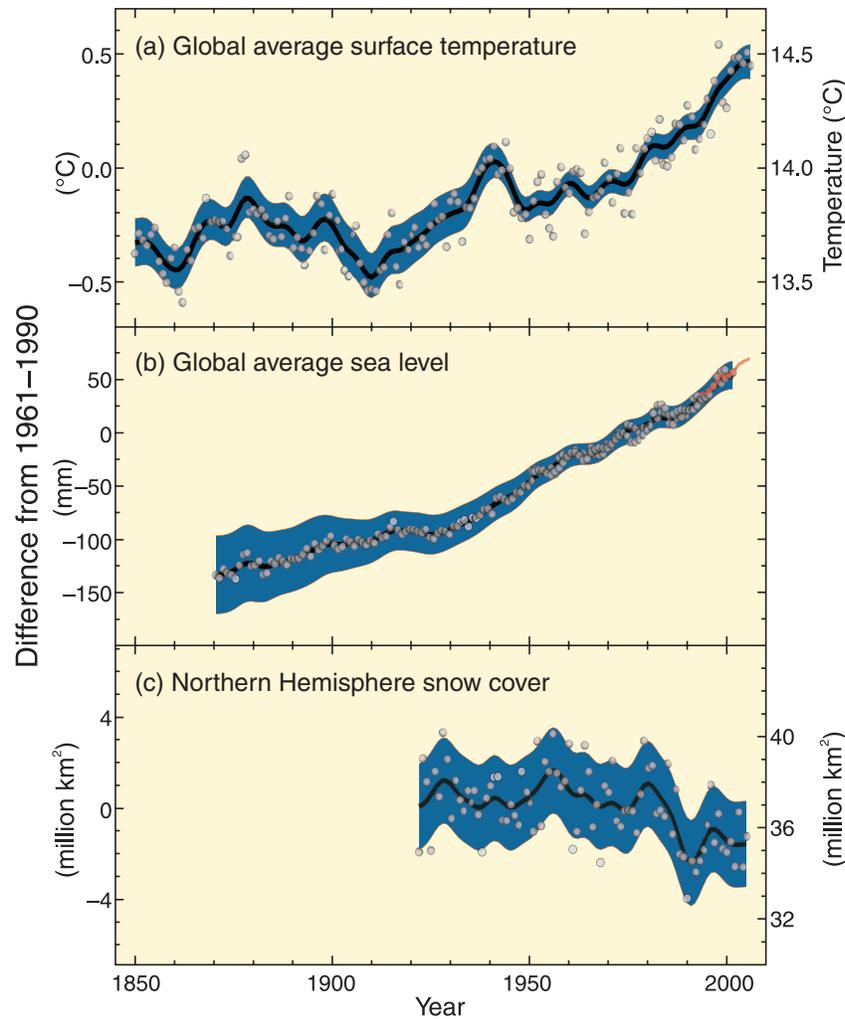
There is observational evidence of an increase in intense tropical cyclone activity in the North Atlantic since about 1970, and suggestions of increased intense tropical cyclone activity in some other regions where concerns over data quality are greater. Multi-decadal variability and the quality of the tropical cyclone records prior to routine satellite observations in about 1970 complicate the detection of long-term trends in tropical cyclone activity. *{WGI 3.8, SPM}*

Average Northern Hemisphere temperatures during the second half of the 20<sup>th</sup> century were *very likely* higher than during any other 50-year period in the last 500 years and *likely* the highest in at least the past 1300 years. *{WGI 6.6, SPM}*

<sup>2</sup> Likelihood and confidence statements in italics represent calibrated expressions of uncertainty and confidence. See Box 'Treatment of uncertainty' in the Introduction for an explanation of these terms.

<sup>3</sup> Excluding tsunamis, which are not due to climate change. Extreme high sea level depends on average sea level and on regional weather systems. It is defined here as the highest 1% of hourly values of observed sea level at a station for a given reference period.

**Changes in temperature, sea level and Northern Hemisphere snow cover**



**Figure 1.1.** Observed changes in (a) global average surface temperature; (b) global average sea level from tide gauge (blue) and satellite (red) data; and (c) Northern Hemisphere snow cover for March-April. All differences are relative to corresponding averages for the period 1961-1990. Smoothed curves represent decadal averaged values while circles show yearly values. The shaded areas are the uncertainty intervals estimated from a comprehensive analysis of known uncertainties (a and b) and from the time series (c). {WGI FAQ 3.1 Figure 1, Figure 4.2, Figure 5.13, Figure SPM.3}

**1.2 Observed effects of climate changes**

The statements presented here are based largely on data sets that cover the period since 1970. The number of studies of observed trends in the physical and biological environment and their relationship to regional climate changes has increased greatly since the TAR. The quality of the data sets has also improved. There is a notable lack of geographic balance in data and literature on observed changes, with marked scarcity in developing countries. {WGII SPM}

These studies have allowed a broader and more confident assessment of the relationship between observed warming and impacts than was made in the TAR. That assessment concluded that “there is high confidence<sup>2</sup> that recent regional changes in temperature have had discernible impacts on physical and biological systems”. {WGII SPM}

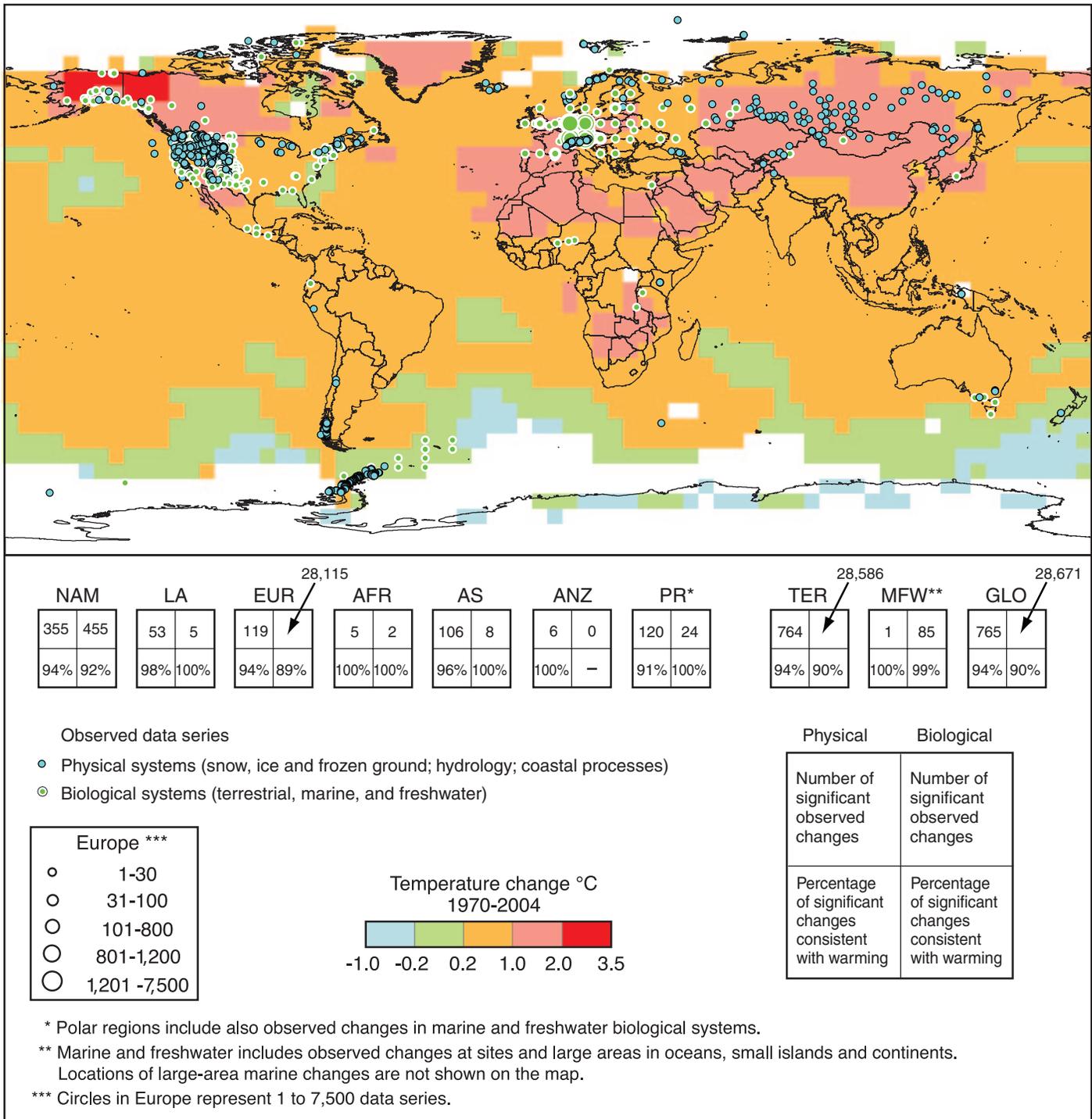
**Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases.** {WGII SPM}

There is high confidence that natural systems related to snow, ice and frozen ground (including permafrost) are affected. Examples are:

- enlargement and increased numbers of glacial lakes {WGII 1.3, SPM}
- increasing ground instability in permafrost regions and rock avalanches in mountain regions {WGII 1.3, SPM}
- changes in some Arctic and Antarctic ecosystems, including those in sea-ice biomes, and predators at high levels of the food web. {WGII 1.3, 4.4, 15.4, SPM}

Based on growing evidence, there is high confidence that the following effects on hydrological systems are occurring: increased runoff and earlier spring peak discharge in many glacier- and snow-fed rivers, and warming of lakes and rivers in many regions, with effects on thermal structure and water quality. {WGII 1.3, 15.2, SPM}

**Changes in physical and biological systems and surface temperature 1970-2004**



**Figure 1.2.** Locations of significant changes in data series of physical systems (snow, ice and frozen ground; hydrology; and coastal processes) and biological systems (terrestrial, marine, and freshwater biological systems), are shown together with surface air temperature changes over the period 1970-2004. A subset of about 29,000 data series was selected from about 80,000 data series from 577 studies. These met the following criteria: (1) ending in 1990 or later; (2) spanning a period of at least 20 years; and (3) showing a significant change in either direction, as assessed in individual studies. These data series are from about 75 studies (of which about 70 are new since the TAR) and contain about 29,000 data series, of which about 28,000 are from European studies. White areas do not contain sufficient observational climate data to estimate a temperature trend. The 2 x 2 boxes show the total number of data series with significant changes (top row) and the percentage of those consistent with warming (bottom row) for (i) continental regions: North America (NAM), Latin America (LA), Europe (EUR), Africa (AFR), Asia (AS), Australia and New Zealand (ANZ), and Polar Regions (PR) and (ii) global-scale: Terrestrial (TER), Marine and Freshwater (MFW), and Global (GLO). The numbers of studies from the seven regional boxes (NAM, ..., PR) do not add up to the global (GLO) totals because numbers from regions except Polar do not include the numbers related to Marine and Freshwater (MFW) systems. Locations of large-area marine changes are not shown on the map. {WGII Figure SPM.1, Figure 1.8, Figure 1.9; WGI Figure 3.9b}

There is *very high confidence*, based on more evidence from a wider range of species, that recent warming is strongly affecting terrestrial biological systems, including such changes as earlier timing of spring events, such as leaf-unfolding, bird migration and egg-laying; and poleward and upward shifts in ranges in plant and animal species. Based on satellite observations since the early 1980s, there is *high confidence* that there has been a trend in many regions towards earlier ‘greening’ of vegetation in the spring linked to longer thermal growing seasons due to recent warming. *{WGII 1.3, 8.2, 14.2, SPM}*

There is *high confidence*, based on substantial new evidence, that observed changes in marine and freshwater biological systems are associated with rising water temperatures, as well as related changes in ice cover, salinity, oxygen levels and circulation. These include: shifts in ranges and changes in algal, plankton and fish abundance in high-latitude oceans; increases in algal and zooplankton abundance in high-latitude and high-altitude lakes; and range changes and earlier fish migrations in rivers. While there is increasing evidence of climate change impacts on coral reefs, separating the impacts of climate-related stresses from other stresses (e.g. over-fishing and pollution) is difficult. *{WGII 1.3, SPM}*

**Other effects of regional climate changes on natural and human environments are emerging, although many are difficult to discern due to adaptation and non-climatic drivers.** *{WGII SPM}*

Effects of temperature increases have been documented with *medium confidence* in the following managed and human systems:

- agricultural and forestry management at Northern Hemisphere higher latitudes, such as earlier spring planting of crops, and alterations in disturbances of forests due to fires and pests *{WGII 1.3, SPM}*
- some aspects of human health, such as excess heat-related mortality in Europe, changes in infectious disease vectors in parts of Europe, and earlier onset of and increases in seasonal production of allergenic pollen in Northern Hemisphere high and mid-latitudes *{WGII 1.3, 8.2, 8.ES, SPM}*
- some human activities in the Arctic (e.g. hunting and shorter

travel seasons over snow and ice) and in lower-elevation alpine areas (such as limitations in mountain sports). *{WGII 1.3, SPM}*

Sea level rise and human development are together contributing to losses of coastal wetlands and mangroves and increasing damage from coastal flooding in many areas. However, based on the published literature, the impacts have not yet become established trends. *{WGII 1.3, 1.ES, SPM}*

### 1.3 Consistency of changes in physical and biological systems with warming

Changes in the ocean and on land, including observed decreases in snow cover and Northern Hemisphere sea ice extent, thinner sea ice, shorter freezing seasons of lake and river ice, glacier melt, decreases in permafrost extent, increases in soil temperatures and borehole temperature profiles, and sea level rise, provide additional evidence that the world is warming. *{WGI 3.9}*

Of the more than 29,000 observational data series, from 75 studies, that show significant change in many physical and biological systems, more than 89% are consistent with the direction of change expected as a response to warming (Figure 1.2). *{WGII 1.4, SPM}*

### 1.4 Some aspects of climate have not been observed to change

Some aspects of climate appear not to have changed and, for some, data inadequacies mean that it cannot be determined if they have changed. Antarctic sea ice extent shows inter-annual variability and localised changes but no statistically significant average multi-decadal trend, consistent with the lack of rise in near-surface atmospheric temperatures averaged across the continent. There is insufficient evidence to determine whether trends exist in some other variables, for example the meridional overturning circulation (MOC) of the global ocean or small-scale phenomena such as tornadoes, hail, lightning and dust storms. There is no clear trend in the annual numbers of tropical cyclones. *{WGI 3.2, 3.8, 4.4, 5.3, SPM}*



# 2

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## Causes of change

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## Causes of change

This Topic considers both natural and anthropogenic drivers of climate change, including the chain from greenhouse gas (GHG) emissions to atmospheric concentrations to radiative forcing<sup>4</sup> to climate responses and effects.

### 2.1 Emissions of long-lived GHGs

The radiative forcing of the climate system is dominated by the long-lived GHGs, and this section considers those whose emissions are covered by the UNFCCC.

**Global GHG emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004 (Figure 2.1).<sup>5</sup> {WGIII 1.3, SPM}**

Carbon dioxide (CO<sub>2</sub>) is the most important anthropogenic GHG. Its annual emissions have grown between 1970 and 2004 by about 80%, from 21 to 38 gigatonnes (Gt), and represented 77% of total anthropogenic GHG emissions in 2004 (Figure 2.1). The rate of growth of CO<sub>2</sub>-eq emissions was much higher during the recent 10-year period of 1995-2004 (0.92 GtCO<sub>2</sub>-eq per year) than during the previous period of 1970-1994 (0.43 GtCO<sub>2</sub>-eq per year). {WGIII 1.3, TS.1, SPM}

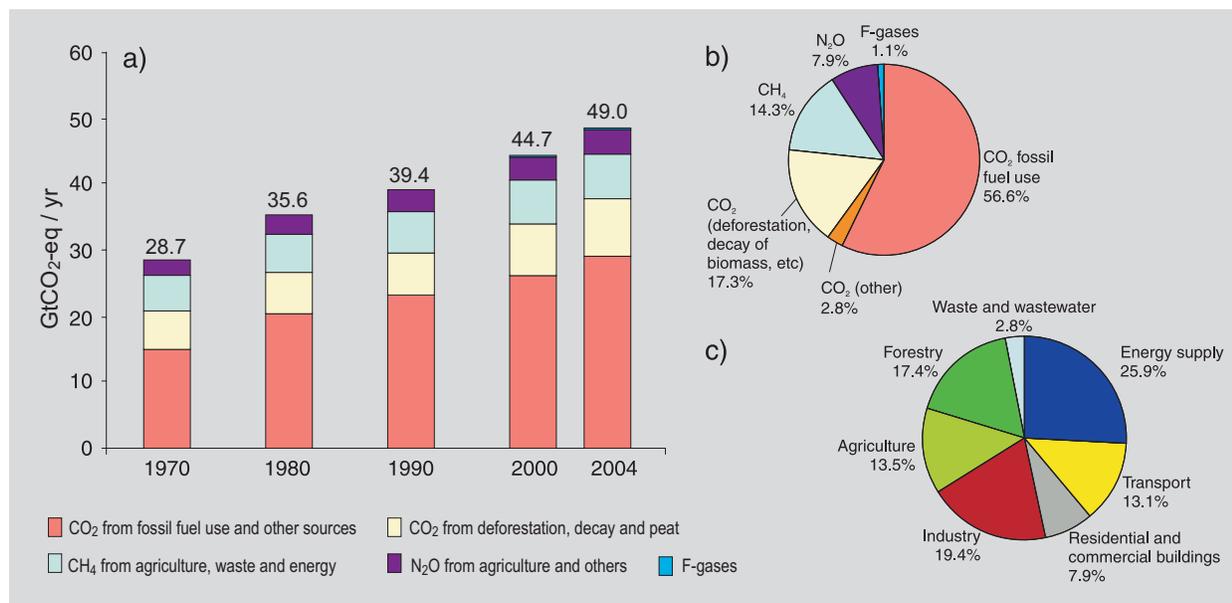
### Carbon dioxide-equivalent (CO<sub>2</sub>-eq) emissions and concentrations

GHGs differ in their warming influence (radiative forcing) on the global climate system due to their different radiative properties and lifetimes in the atmosphere. These warming influences may be expressed through a common metric based on the radiative forcing of CO<sub>2</sub>.

- **CO<sub>2</sub>-equivalent emission** is the amount of CO<sub>2</sub> emission that would cause the same time-integrated radiative forcing, over a given time horizon, as an emitted amount of a long-lived GHG or a mixture of GHGs. The equivalent CO<sub>2</sub> emission is obtained by multiplying the emission of a GHG by its Global Warming Potential (GWP) for the given time horizon.<sup>6</sup> For a mix of GHGs it is obtained by summing the equivalent CO<sub>2</sub> emissions of each gas. Equivalent CO<sub>2</sub> emission is a standard and useful metric for comparing emissions of different GHGs but does not imply the same climate change responses (see WGI 2.10).
- **CO<sub>2</sub>-equivalent concentration** is the concentration of CO<sub>2</sub> that would cause the same amount of radiative forcing as a given mixture of CO<sub>2</sub> and other forcing components.<sup>7</sup>

The largest growth in GHG emissions between 1970 and 2004 has come from energy supply, transport and industry, while residential and commercial buildings, forestry (including deforestation) and agriculture sectors have been growing at a lower rate. The

#### Global anthropogenic GHG emissions



**Figure 2.1.** (a) Global annual emissions of anthropogenic GHGs from 1970 to 2004.<sup>5</sup> (b) Share of different anthropogenic GHGs in total emissions in 2004 in terms of CO<sub>2</sub>-eq. (c) Share of different sectors in total anthropogenic GHG emissions in 2004 in terms of CO<sub>2</sub>-eq. (Forestry includes deforestation.) {WGIII Figures TS.1a, TS.1b, TS.2b}

<sup>4</sup> Radiative forcing is a measure of the influence a factor has in altering the balance of incoming and outgoing energy in the Earth-atmosphere system and is an index of the importance of the factor as a potential climate change mechanism. In this report radiative forcing values are for changes relative to pre-industrial conditions defined at 1750 and are expressed in watts per square metre (W/m<sup>2</sup>).

<sup>5</sup> Includes only carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphurhexafluoride (SF<sub>6</sub>), whose emissions are covered by the UNFCCC. These GHGs are weighted by their 100-year Global Warming Potentials (GWPs), using values consistent with reporting under the UNFCCC.

<sup>6</sup> This report uses 100-year GWPs and numerical values consistent with reporting under the UNFCCC.

<sup>7</sup> Such values may consider only GHGs, or a combination of GHGs and aerosols.

sectoral sources of GHGs in 2004 are considered in Figure 2.1c. *{WGIII 1.3, SPM}*

The effect on global emissions of the decrease in global energy intensity (-33%) during 1970 to 2004 has been smaller than the combined effect of global income growth (77%) and global population growth (69%); both drivers of increasing energy-related CO<sub>2</sub> emissions. The long-term trend of declining CO<sub>2</sub> emissions per unit of energy supplied reversed after 2000. *{WGIII 1.3, Figure SPM.2, SPM}*

Differences in per capita income, per capita emissions and energy intensity among countries remain significant. In 2004, UNFCCC Annex I countries held a 20% share in world population, produced 57% of the world's Gross Domestic Product based on Purchasing Power Parity (GDP<sub>PPP</sub>) and accounted for 46% of global GHG emissions (Figure 2.2). *{WGIII 1.3, SPM}*

## 2.2 Drivers of climate change

Changes in the atmospheric concentrations of GHGs and aerosols, land cover and solar radiation alter the energy balance of the climate system and are drivers of climate change. They affect the absorption, scattering and emission of radiation within the atmosphere and at the Earth's surface. The resulting positive or negative changes in energy balance due to these factors are expressed as radiative forcing<sup>4</sup>, which is used to compare warming or cooling influences on global climate. *{WGI TS.2}*

Human activities result in emissions of four long-lived GHGs: CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and halocarbons (a group of gases containing fluorine, chlorine or bromine). Atmospheric concentrations of GHGs increase when emissions are larger than removal processes.

**Global atmospheric concentrations of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years**

**(Figure 2.3). The atmospheric concentrations of CO<sub>2</sub> and CH<sub>4</sub> in 2005 exceed by far the natural range over the last 650,000 years. Global increases in CO<sub>2</sub> concentrations are due primarily to fossil fuel use, with land-use change providing another significant but smaller contribution. It is *very likely* that the observed increase in CH<sub>4</sub> concentration is predominantly due to agriculture and fossil fuel use. The increase in N<sub>2</sub>O concentration is primarily due to agriculture. *{WGI 2.3, 7.3, SPM}***

The global atmospheric concentration of CO<sub>2</sub> increased from a pre-industrial value of about 280ppm to 379ppm in 2005. The annual CO<sub>2</sub> concentration growth rate was larger during the last 10 years (1995-2005 average: 1.9ppm per year) than it has been since the beginning of continuous direct atmospheric measurements (1960-2005 average: 1.4ppm per year), although there is year-to-year variability in growth rates. *{WGI 2.3, 7.3, SPM; WGIII 1.3}*

The global atmospheric concentration of CH<sub>4</sub> has increased from a pre-industrial value of about 715ppb to 1732ppb in the early 1990s, and was 1774ppb in 2005. Growth rates have declined since the early 1990s, consistent with total emissions (sum of anthropogenic and natural sources) being nearly constant during this period. *{WGI 2.3, 7.4, SPM}*

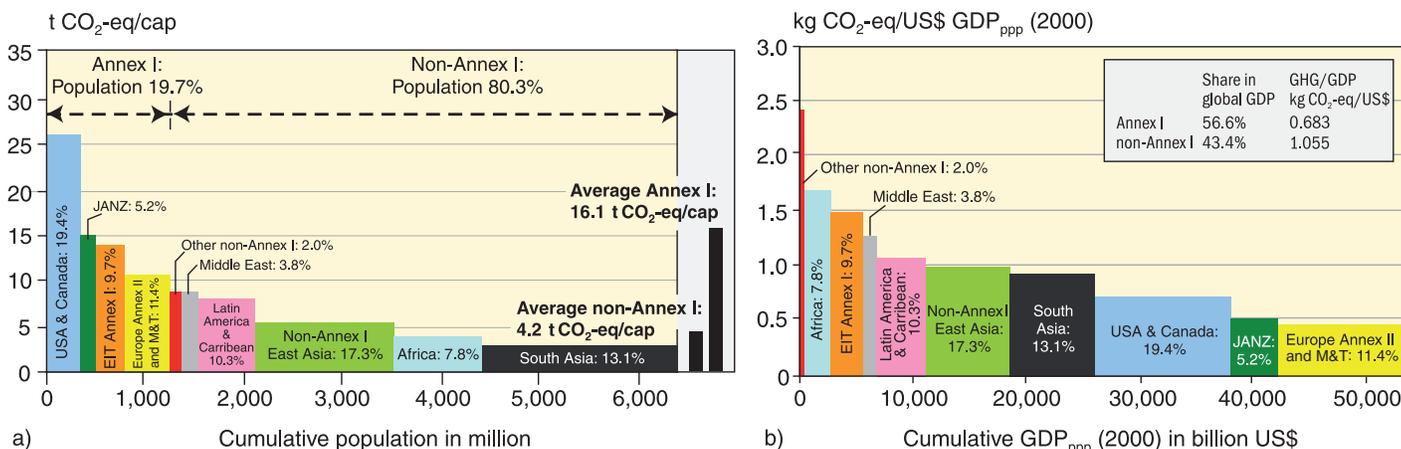
The global atmospheric N<sub>2</sub>O concentration increased from a pre-industrial value of about 270ppb to 319ppb in 2005. *{WGI 2.3, 7.4, SPM}*

Many halocarbons (including hydrofluorocarbons) have increased from a near-zero pre-industrial background concentration, primarily due to human activities. *{WGI 2.3, SPM; SROC SPM}*

**There is *very high confidence* that the global average net effect of human activities since 1750 has been one of warming, with a radiative forcing of +1.6 [+0.6 to +2.4] W/m<sup>2</sup> (Figure 2.4). *{WGI 2.3, 6.5, 2.9, SPM}***

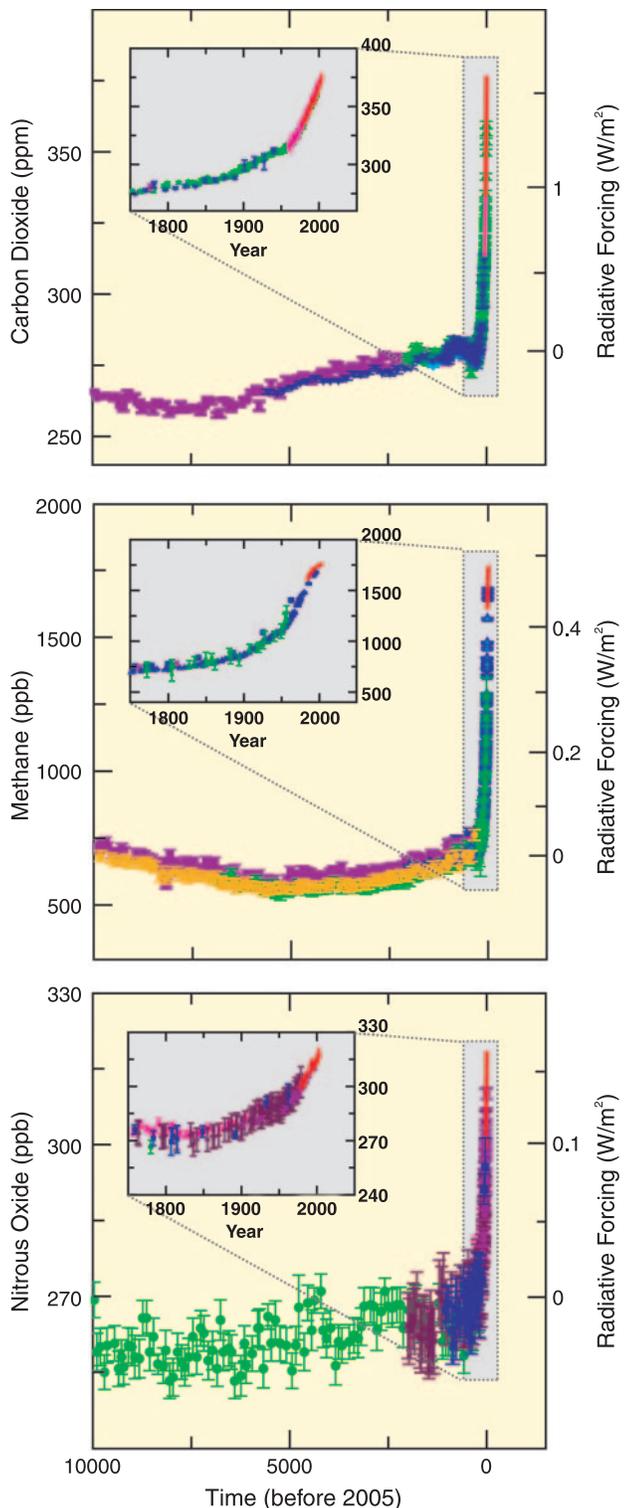
The combined radiative forcing due to increases in CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O is +2.3 [+2.1 to +2.5] W/m<sup>2</sup>, and its rate of increase during

### Regional distribution of GHG emissions by population and by GDP<sub>PPP</sub>



**Figure 2.2.** (a) Distribution of regional per capita GHG emissions according to the population of different country groupings in 2004 (see appendix for definitions of country groupings). (b) Distribution of regional GHG emissions per US\$ of GDP<sub>PPP</sub> over the GDP of different country groupings in 2004. The percentages in the bars in both panels indicate a region's share in global GHG emissions. *{WGIII Figures SPM.3a, SPM.3b}*

## Changes in GHGs from ice core and modern data



**Figure 2.3.** Atmospheric concentrations of  $\text{CO}_2$ ,  $\text{CH}_4$  and  $\text{N}_2\text{O}$  over the last 10,000 years (large panels) and since 1750 (inset panels). Measurements are shown from ice cores (symbols with different colours for different studies) and atmospheric samples (red lines). The corresponding radiative forcings relative to 1750 are shown on the right hand axes of the large panels. {WGI Figure SPM.1}

the industrial era is *very likely* to have been unprecedented in more than 10,000 years (Figures 2.3 and 2.4). The  $\text{CO}_2$  radiative forcing increased by 20% from 1995 to 2005, the largest change for any decade in at least the last 200 years. {WGI 2.3, 6.4, SPM}

Anthropogenic contributions to aerosols (primarily sulphate, organic carbon, black carbon, nitrate and dust) together produce a cooling effect, with a total direct radiative forcing of  $-0.5$  [ $-0.9$  to  $-0.1$ ]  $\text{W/m}^2$  and an indirect cloud albedo forcing of  $-0.7$  [ $-1.8$  to  $-0.3$ ]  $\text{W/m}^2$ . Aerosols also influence precipitation. {WGI 2.4, 2.9, 7.5, SPM}

In comparison, changes in solar irradiance since 1750 are estimated to have caused a small radiative forcing of  $+0.12$  [ $+0.06$  to  $+0.30$ ]  $\text{W/m}^2$ , which is less than half the estimate given in the TAR. {WGI 2.7, SPM}

## 2.3 Climate sensitivity and feedbacks

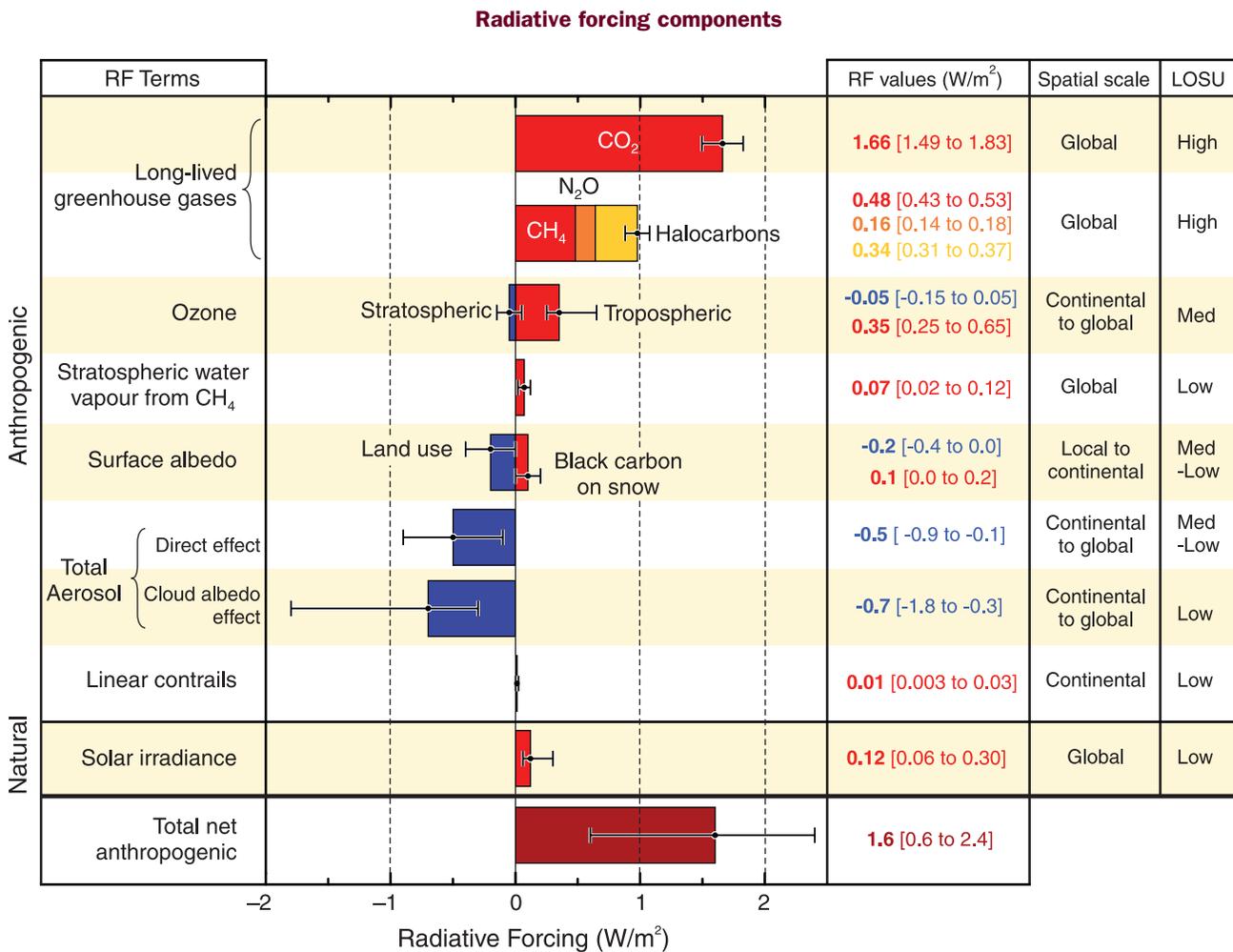
The equilibrium climate sensitivity is a measure of the climate system response to sustained radiative forcing. It is defined as the equilibrium global average surface warming following a doubling of  $\text{CO}_2$  concentration. Progress since the TAR enables an assessment that climate sensitivity is *likely* to be in the range of  $2$  to  $4.5^\circ\text{C}$  with a best estimate of about  $3^\circ\text{C}$ , and is *very unlikely* to be less than  $1.5^\circ\text{C}$ . Values substantially higher than  $4.5^\circ\text{C}$  cannot be excluded, but agreement of models with observations is not as good for those values. {WGI 8.6, 9.6, Box 10.2, SPM}

Feedbacks can amplify or dampen the response to a given forcing. Direct emission of water vapour (a greenhouse gas) by human activities makes a negligible contribution to radiative forcing. However, as global average temperature increases, tropospheric water vapour concentrations increase and this represents a key positive feedback but not a forcing of climate change. Water vapour changes represent the largest feedback affecting equilibrium climate sensitivity and are now better understood than in the TAR. Cloud feedbacks remain the largest source of uncertainty. Spatial patterns of climate response are largely controlled by climate processes and feedbacks. For example, sea-ice albedo feedbacks tend to enhance the high latitude response. {WGI 2.8, 8.6, 9.2, TS.2.1.3, TS.2.5, SPM}

Warming reduces terrestrial and ocean uptake of atmospheric  $\text{CO}_2$ , increasing the fraction of anthropogenic emissions remaining in the atmosphere. This positive carbon cycle feedback leads to larger atmospheric  $\text{CO}_2$  increases and greater climate change for a given emissions scenario, but the strength of this feedback effect varies markedly among models. {WGI 7.3, TS.5.4, SPM; WGI 4.4}

## 2.4 Attribution of climate change

Attribution evaluates whether observed changes are quantitatively consistent with the expected response to external forcings (e.g. changes in solar irradiance or anthropogenic GHGs) and inconsistent with alternative physically plausible explanations. {WGI TS.4, SPM}



**Figure 2.4.** Global average radiative forcing (RF) in 2005 (best estimates and 5 to 95% uncertainty ranges) with respect to 1750 for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and other important agents and mechanisms, together with the typical geographical extent (spatial scale) of the forcing and the assessed level of scientific understanding (LOSU). Aerosols from explosive volcanic eruptions contribute an additional episodic cooling term for a few years following an eruption. The range for linear contrails does not include other possible effects of aviation on cloudiness. {WGI Figure SPM.2}

**Most of the observed increase in global average temperatures since the mid-20<sup>th</sup> century is very likely due to the observed increase in anthropogenic GHG concentrations.<sup>8</sup> This is an advance since the TAR’s conclusion that “most of the observed warming over the last 50 years is likely to have been due to the increase in GHG concentrations” (Figure 2.5). {WGI 9.4, SPM}**

The observed widespread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is *extremely unlikely* that global climate change of the past 50 years can be explained without external forcing and *very likely* that it is not due to known natural causes alone. During this period, the sum of solar and volcanic forcings would *likely* have produced cooling, not warming. Warming of the climate system has been detected in changes in surface and atmospheric temperatures and in temperatures of the upper several hundred metres of the ocean. The observed pattern of tropospheric warming and stratospheric cooling

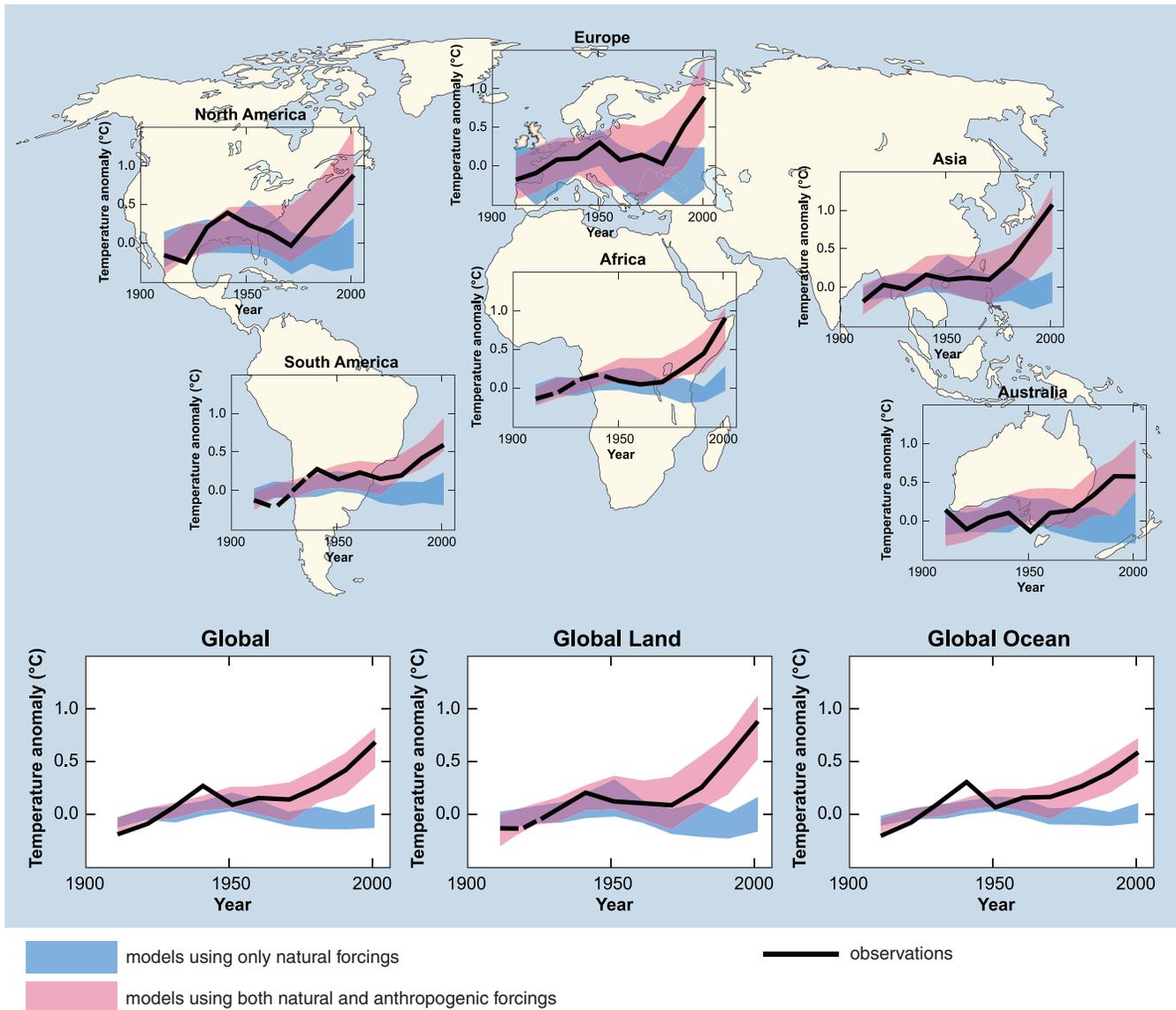
is *very likely* due to the combined influences of GHG increases and stratospheric ozone depletion. It is *likely* that increases in GHG concentrations alone would have caused more warming than observed because volcanic and anthropogenic aerosols have offset some warming that would otherwise have taken place. {WGI 2.9, 3.2, 3.4, 4.8, 5.2, 7.5, 9.4, 9.5, 9.7, TS.4.1, SPM}

**It is likely that there has been significant anthropogenic warming over the past 50 years averaged over each continent (except Antarctica) (Figure 2.5). {WGI 3.2, 9.4, SPM}**

The observed patterns of warming, including greater warming over land than over the ocean, and their changes over time, are simulated only by models that include anthropogenic forcing. No coupled global climate model that has used natural forcing only has reproduced the continental mean warming trends in individual continents (except Antarctica) over the second half of the 20<sup>th</sup> century. {WGI 3.2, 9.4, TS.4.2, SPM}

<sup>8</sup> Consideration of remaining uncertainty is based on current methodologies.

Global and continental temperature change



**Figure 2.5.** Comparison of observed continental- and global-scale changes in surface temperature with results simulated by climate models using either natural or both natural and anthropogenic forcings. Decadal averages of observations are shown for the period 1906-2005 (black line) plotted against the centre of the decade and relative to the corresponding average for the 1901-1950. Lines are dashed where spatial coverage is less than 50%. Blue shaded bands show the 5 to 95% range for 19 simulations from five climate models using only the natural forcings due to solar activity and volcanoes. Red shaded bands show the 5 to 95% range for 58 simulations from 14 climate models using both natural and anthropogenic forcings. {WGI Figure SPM.4}

Difficulties remain in simulating and attributing observed temperature changes at smaller scales. On these scales, natural climate variability is relatively larger, making it harder to distinguish changes expected due to external forcings. Uncertainties in local forcings, such as those due to aerosols and land-use change, and feedbacks also make it difficult to estimate the contribution of GHG increases to observed small-scale temperature changes. {WGI 8.3, 9.4, SPM}

**Advances since the TAR show that discernible human influences extend beyond average temperature to other aspects of climate, including temperature extremes and wind patterns. {WGI 9.4, 9.5, SPM}**

Temperatures of the most extreme hot nights, cold nights and cold days are *likely* to have increased due to anthropogenic forcing. It is *more likely than not* that anthropogenic forcing has increased the risk of heat waves. Anthropogenic forcing is *likely* to have contributed to changes in wind patterns, affecting extra-tropical storm tracks and temperature patterns in both hemispheres. However, the observed changes in the Northern Hemisphere circulation are larger than simulated by models in response to 20<sup>th</sup> century forcing change. {WGI 3.5, 3.6, 9.4, 9.5, 10.3, SPM}

It is *very likely* that the response to anthropogenic forcing contributed to sea level rise during the latter half of the 20<sup>th</sup> century. There is some evidence of the impact of human climatic influence

on the hydrological cycle, including the observed large-scale patterns of changes in land precipitation over the 20<sup>th</sup> century. It is *more likely than not* that human influence has contributed to a global trend towards increases in area affected by drought since the 1970s and the frequency of heavy precipitation events. {WGI 3.3, 5.5, 9.5, TS.4.1, TS.4.3}

**Anthropogenic warming over the last three decades has likely had a discernible influence at the global scale on observed changes in many physical and biological systems. {WGII 1.4}**

A synthesis of studies strongly demonstrates that the spatial agreement between regions of significant warming across the globe and the locations of significant observed changes in many natural systems consistent with warming is *very unlikely* to be due solely to natural variability of temperatures or natural variability of the

systems. Several modelling studies have linked some specific responses in physical and biological systems to anthropogenic warming, but only a few such studies have been performed. Taken together with evidence of significant anthropogenic warming over the past 50 years averaged over each continent (except Antarctica), it is *likely* that anthropogenic warming over the last three decades has had a discernible influence on many natural systems. {WGI 3.2, 9.4, SPM; WGII 1.4, SPM}

Limitations and gaps currently prevent more complete attribution of the causes of observed natural system responses to anthropogenic warming. The available analyses are limited in the number of systems, length of records and locations considered. Natural temperature variability is larger at the regional than the global scale, thus affecting identification of changes to external forcing. At the regional scale, other non-climate factors (such as land-use change, pollution and invasive species) are influential. {WGII 1.2, 1.3, 1.4, SPM}



# 3

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## **Climate change and its impacts in the near and long term under different scenarios**

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### 3.1 Emissions scenarios

There is *high agreement and much evidence*<sup>9</sup> that with current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades. Baseline emissions scenarios published since the IPCC Special Report on Emissions Scenarios (SRES, 2000) are comparable in range to those presented in SRES (see Box on SRES scenarios and Figure 3.1).<sup>10</sup> {WGIII 1.3, 3.2, SPM}

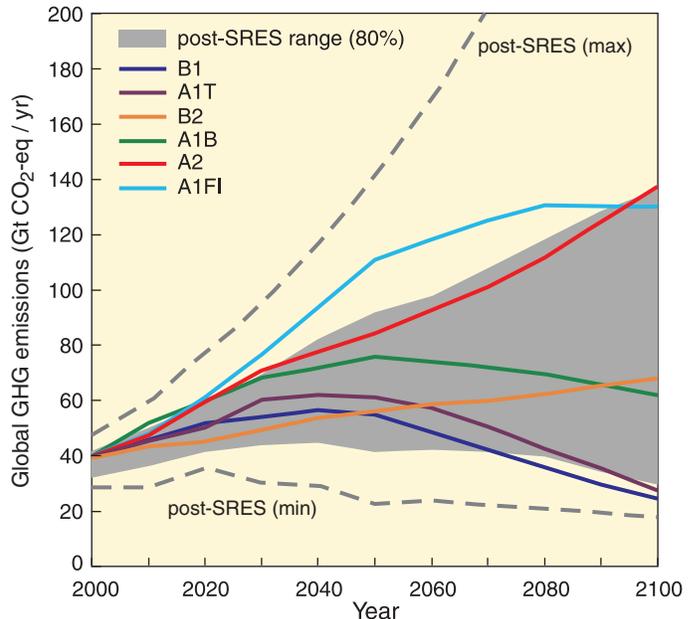
The SRES scenarios project an increase of baseline global GHG emissions by a range of 9.7 to 36.7 GtCO<sub>2</sub>-eq (25 to 90%) between 2000 and 2030. In these scenarios, fossil fuels are projected to maintain their dominant position in the global energy mix to 2030 and beyond. Hence CO<sub>2</sub> emissions from energy use between 2000 and 2030 are projected to grow 40 to 110% over that period. {WGIII 1.3, SPM}

Studies published since SRES (i.e. post-SRES scenarios) have used lower values for some drivers for emissions, notably population projections. However, for those studies incorporating these new population projections, changes in other drivers, such as economic growth, result in little change in overall emission levels. Economic growth projections for Africa, Latin America and the Middle East to 2030 in post-SRES baseline scenarios are lower than in SRES, but this has only minor effects on global economic growth and overall emissions. {WGIII 3.2, TS.3, SPM}

Aerosols have a net cooling effect and the representation of aerosol and aerosol precursor emissions, including sulphur dioxide, black carbon and organic carbon, has improved in the post-SRES scenarios. Generally, these emissions are projected to be lower than reported in SRES. {WGIII 3.2, TS.3, SPM}

Available studies indicate that the choice of exchange rate for Gross Domestic Product (GDP) (Market Exchange Rate, MER or

#### Scenarios for GHG emissions from 2000 to 2100 in the absence of additional climate policies



**Figure 3.1.** Global GHG emissions (in GtCO<sub>2</sub>-eq per year) in the absence of additional climate policies: six illustrative SRES marker scenarios (coloured lines) and 80<sup>th</sup> percentile range of recent scenarios published since SRES (post-SRES) (gray shaded area). Dashed lines show the full range of post-SRES scenarios. The emissions include CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and F-gases. {WGIII 1.3, 3.2, Figure SPM.4}

Purchasing Power Parity, PPP) does not appreciably affect the projected emissions, when used consistently.<sup>11</sup> The differences, if any, are small compared to the uncertainties caused by assumptions on other parameters in the scenarios, e.g. technological change. {WGIII 3.2, TS.3, SPM}

#### SRES scenarios

SRES refers to the scenarios described in the IPCC Special Report on Emissions Scenarios (SRES, 2000). The SRES scenarios are grouped into four scenario families (A1, A2, B1 and B2) that explore alternative development pathways, covering a wide range of demographic, economic and technological driving forces and resulting GHG emissions. The SRES scenarios do not include additional climate policies above current ones. The emissions projections are widely used in the assessments of future climate change, and their underlying assumptions with respect to socio-economic, demographic and technological change serve as inputs to many recent climate change vulnerability and impact assessments. {WGI 10.1; WGII 2.4; WGIII TS.1, SPM}

The A1 storyline assumes a world of very rapid economic growth, a global population that peaks in mid-century and rapid introduction of new and more efficient technologies. A1 is divided into three groups that describe alternative directions of technological change: fossil intensive (A1FI), non-fossil energy resources (A1T) and a balance across all sources (A1B). B1 describes a convergent world, with the same global population as A1, but with more rapid changes in economic structures toward a service and information economy. B2 describes a world with intermediate population and economic growth, emphasising local solutions to economic, social, and environmental sustainability. A2 describes a very heterogeneous world with high population growth, slow economic development and slow technological change. No likelihood has been attached to any of the SRES scenarios. {WGIII TS.1, SPM}

<sup>9</sup> Agreement/evidence statements in italics represent calibrated expressions of uncertainty and confidence. See Box 'Treatment of uncertainty' in the Introduction for an explanation of these terms.

<sup>10</sup> Baseline scenarios do not include additional climate policies above current ones; more recent studies differ with respect to UNFCCC and Kyoto Protocol inclusion. Emission pathways of mitigation scenarios are discussed in Topic 5.

<sup>11</sup> Since the TAR, there has been a debate on the use of different exchange rates in emissions scenarios. Two metrics are used to compare GDP between countries. Use of MER is preferable for analyses involving internationally traded products. Use of PPP is preferable for analyses involving comparisons of income between countries at very different stages of development. Most of the monetary units in this report are expressed in MER. This reflects the large majority of emissions mitigation literature that is calibrated in MER. When monetary units are expressed in PPP, this is denoted by GDP<sub>PPP</sub>. {WGIII SPM}

## 3.2 Projections of future changes in climate

**For the next two decades a warming of about 0.2°C per decade is projected for a range of SRES emissions scenarios. Even if the concentrations of all GHGs and aerosols had been kept constant at year 2000 levels, a further warming of about 0.1°C per decade would be expected. Afterwards, temperature projections increasingly depend on specific emissions scenarios (Figure 3.2). {WGI 10.3, 10.7; WGIII 3.2}**

Since the IPCC’s first report in 1990, assessed projections have suggested global averaged temperature increases between about 0.15 and 0.3°C per decade from 1990 to 2005. This can now be compared with observed values of about 0.2°C per decade, strengthening confidence in near-term projections. {WGI 1.2, 3.2}

### 3.2.1 21<sup>st</sup> century global changes

**Continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21<sup>st</sup> century that would very likely be larger than those observed during the 20<sup>th</sup> century. {WGI 10.3}**

Advances in climate change modelling now enable best estimates and *likely* assessed uncertainty ranges to be given for projected warming for different emissions scenarios. Table 3.1 shows best estimates and *likely* ranges for global average surface air warming for the six SRES marker emissions scenarios (including climate-carbon cycle feedbacks). {WGI 10.5}

Although these projections are broadly consistent with the span quoted in the TAR (1.4 to 5.8°C), they are not directly comparable. Assessed upper ranges for temperature projections are larger than in the TAR mainly because the broader range of models now available suggests stronger climate-carbon cycle feedbacks. For the A2 scenario, for example, the climate-carbon cycle feedback increases the corresponding global average warming at 2100 by more than 1°C. Carbon feedbacks are discussed in Topic 2.3. {WGI 7.3, 10.5, SPM}

Because understanding of some important effects driving sea level rise is too limited, this report does not assess the likelihood, nor provide a best estimate or an upper bound for sea level rise. Model-based projections of global average sea level rise at the end of the 21<sup>st</sup> century (2090-2099) are shown in Table 3.1. For each scenario, the mid-point of the range in Table 3.1 is within 10% of the TAR model average for 2090-2099. The ranges are narrower than in the TAR mainly because of improved information about some uncertainties in the projected contributions.<sup>12</sup> The sea level projections do not include uncertainties in climate-carbon cycle feedbacks nor do they include the full effects of changes in ice sheet flow, because a basis in published literature is lacking. Therefore the upper values of the ranges given are not to be considered upper bounds for sea level rise. The projections include a contribution due to increased ice flow from Greenland and Antarctica at the rates observed for 1993-2003, but these flow rates could increase or decrease in the future. If this contribution were to grow linearly with global average temperature change, the upper ranges of sea level rise for SRES scenarios shown in Table 3.1 would increase by 0.1 to 0.2m.<sup>13</sup> {WGI 10.6, SPM}

**Table 3.1. Projected global average surface warming and sea level rise at the end of the 21<sup>st</sup> century. {WGI 10.5, 10.6, Table 10.7, Table SPM.3}**

Case	Temperature change (°C at 2090-2099 relative to 1980-1999) <sup>a, d</sup>		Sea level rise (m at 2090-2099 relative to 1980-1999)
	Best estimate	Likely range	Model-based range excluding future rapid dynamical changes in ice flow
Constant year 2000 concentrations <sup>b</sup>	0.6	0.3 – 0.9	Not available
B1 scenario	1.8	1.1 – 2.9	0.18 – 0.38
A1T scenario	2.4	1.4 – 3.8	0.20 – 0.45
B2 scenario	2.4	1.4 – 3.8	0.20 – 0.43
A1B scenario	2.8	1.7 – 4.4	0.21 – 0.48
A2 scenario	3.4	2.0 – 5.4	0.23 – 0.51
A1FI scenario	4.0	2.4 – 6.4	0.26 – 0.59

Notes:

- a) These estimates are assessed from a hierarchy of models that encompass a simple climate model, several Earth Models of Intermediate Complexity, and a large number of Atmosphere-Ocean General Circulation Models (AOGCMs) as well as observational constraints.
- b) Year 2000 constant composition is derived from AOGCMs only.
- c) All scenarios above are six SRES marker scenarios. Approximate CO<sub>2</sub>-eq concentrations corresponding to the computed radiative forcing due to anthropogenic GHGs and aerosols in 2100 (see p. 823 of the WGI TAR) for the SRES B1, AIT, B2, A1B, A2 and A1FI illustrative marker scenarios are about 600, 700, 800, 850, 1250 and 1550ppm, respectively.
- d) Temperature changes are expressed as the difference from the period 1980-1999. To express the change relative to the period 1850-1899 add 0.5°C.

<sup>12</sup> TAR projections were made for 2100, whereas the projections for this report are for 2090-2099. The TAR would have had similar ranges to those in Table 3.1 if it had treated uncertainties in the same way.

<sup>13</sup> For discussion of the longer term see Sections 3.2.3 and 5.2.

### 3.2.2 21<sup>st</sup> century regional changes

**There is now higher confidence than in the TAR in projected patterns of warming and other regional-scale features, including changes in wind patterns, precipitation and some aspects of extremes and sea ice.** {WGI 8.2, 8.3, 8.4, 8.5, 9.4, 9.5, 10.3, 11.1}

Projected warming in the 21<sup>st</sup> century shows scenario-independent geographical patterns similar to those observed over the past several decades. Warming is expected to be greatest over land and at most high northern latitudes, and least over the Southern Ocean (near Antarctica) and northern North Atlantic, continuing recent observed trends (Figure 3.2 right panels). {WGI 10.3, SPM}

Snow cover area is projected to contract. Widespread increases in thaw depth are projected over most permafrost regions. Sea ice is projected to shrink in both the Arctic and Antarctic under all SRES scenarios. In some projections, Arctic late-summer sea ice disappears almost entirely by the latter part of the 21<sup>st</sup> century. {WGI 10.3, 10.6, SPM; WGII 15.3.4}

It is *very likely* that hot extremes, heat waves and heavy precipitation events will become more frequent. {SYR Table 3.2; WGI 10.3, SPM}

Based on a range of models, it is *likely* that future tropical cyclones (typhoons and hurricanes) will become more intense, with larger peak wind speeds and more heavy precipitation associated with ongoing increases of tropical sea-surface temperatures. There is less confidence in projections of a global decrease in numbers of tropical cyclones. The apparent increase in the proportion of very

intense storms since 1970 in some regions is much larger than simulated by current models for that period. {WGI 3.8, 9.5, 10.3, SPM}

Extra-tropical storm tracks are projected to move poleward, with consequent changes in wind, precipitation and temperature patterns, continuing the broad pattern of observed trends over the last half-century. {WGI 3.6, 10.3, SPM}

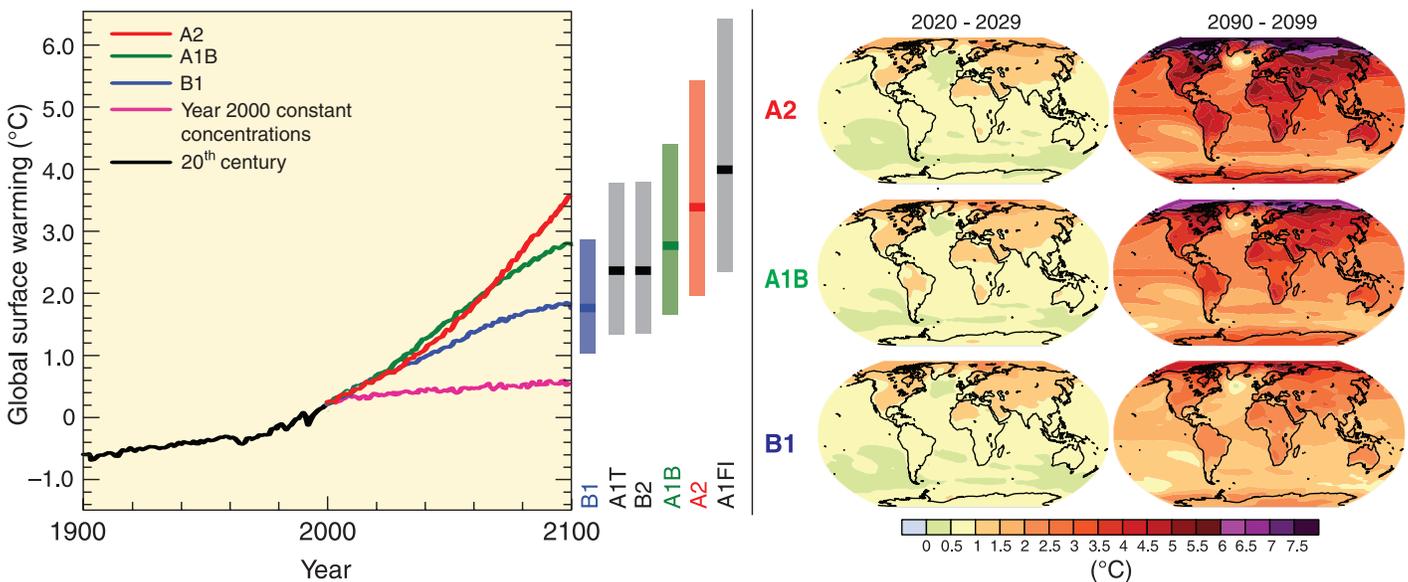
Since the TAR there is an improving understanding of projected patterns of precipitation. Increases in the amount of precipitation are *very likely* in high-latitudes, while decreases are *likely* in most subtropical land regions (by as much as about 20% in the A1B scenario in 2100, Figure 3.3), continuing observed patterns in recent trends. {WGI 3.3, 8.3, 9.5, 10.3, 11.2-11.9, SPM}

### 3.2.3 Changes beyond the 21<sup>st</sup> century

**Anthropogenic warming and sea level rise would continue for centuries due to the time scales associated with climate processes and feedbacks, even if GHG concentrations were to be stabilised.** {WGI 10.4, 10.5, 10.7, SPM}

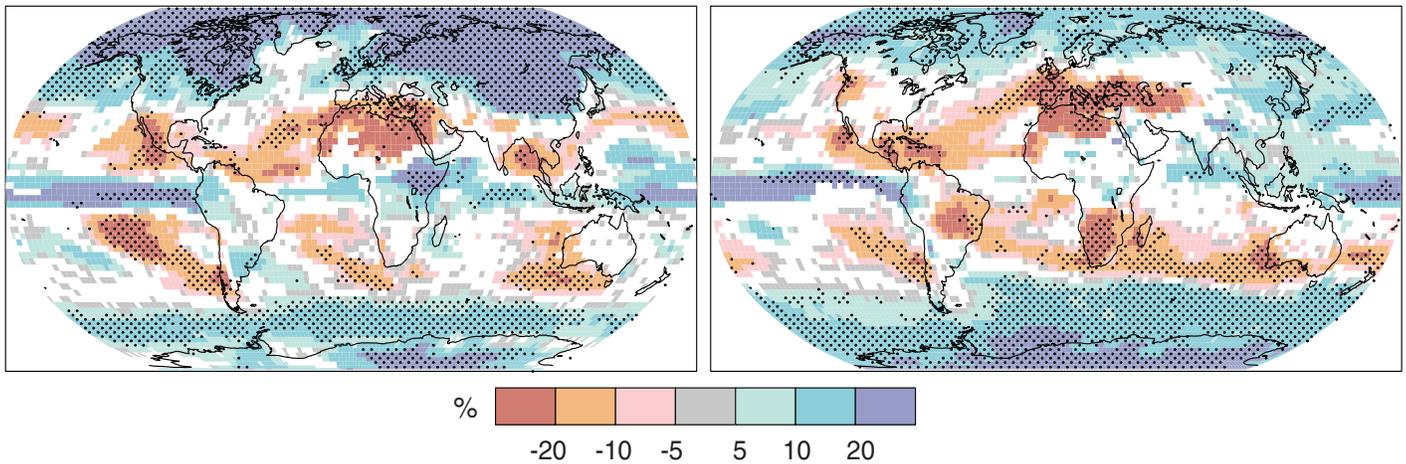
If radiative forcing were to be stabilised, keeping all the radiative forcing agents constant at B1 or A1B levels in 2100, model experiments show that a further increase in global average temperature of about 0.5°C would still be expected by 2200. In addition, thermal expansion alone would lead to 0.3 to 0.8m of sea level rise by 2300 (relative to 1980-1999). Thermal expansion would continue for many centuries, due to the time required to transport heat into the deep ocean. {WGI 10.7, SPM}

**Atmosphere-Ocean General Circulation Model projections of surface warming**



**Figure 3.2. Left panel:** Solid lines are multi-model global averages of surface warming (relative to 1980-1999) for the SRES scenarios A2, A1B and B1, shown as continuations of the 20<sup>th</sup> century simulations. The orange line is for the experiment where concentrations were held constant at year 2000 values. The bars in the middle of the figure indicate the best estimate (solid line within each bar) and the likely range assessed for the six SRES marker scenarios at 2090-2099 relative to 1980-1999. The assessment of the best estimate and likely ranges in the bars includes the Atmosphere-Ocean General Circulation Models (AOGCMs) in the left part of the figure, as well as results from a hierarchy of independent models and observational constraints. **Right panels:** Projected surface temperature changes for the early and late 21<sup>st</sup> century relative to the period 1980-1999. The panels show the multi-AOGCM average projections for the A2 (top), A1B (middle) and B1 (bottom) SRES scenarios averaged over decades 2020-2029 (left) and 2090-2099 (right). {WGI 10.4, 10.8, Figures 10.28, 10.29, SPM}

**Multi-model projected patterns of precipitation changes**



**Figure 3.3.** Relative changes in precipitation (in percent) for the period 2090-2099, relative to 1980-1999. Values are multi-model averages based on the SRES A1B scenario for December to February (left) and June to August (right). White areas are where less than 66% of the models agree in the sign of the change and stippled areas are where more than 90% of the models agree in the sign of the change. {WGI Figure 10.9, SPM}

Contraction of the Greenland ice sheet is projected to continue to contribute to sea level rise after 2100. Current models suggest ice mass losses increase with temperature more rapidly than gains due to increased precipitation and that the surface mass balance becomes negative (net ice loss) at a global average warming (relative to pre-industrial values) in excess of 1.9 to 4.6°C. If such a negative surface mass balance were sustained for millennia, that would lead to virtually complete elimination of the Greenland ice sheet and a resulting contribution to sea level rise of about 7m. The corresponding future temperatures in Greenland (1.9 to 4.6°C global) are comparable to those inferred for the last interglacial period 125,000 years ago, when palaeoclimatic information suggests reductions of polar land ice extent and 4 to 6m of sea level rise. {WGI 6.4, 10.7, SPM}

Dynamical processes related to ice flow – which are not included in current models but suggested by recent observations –

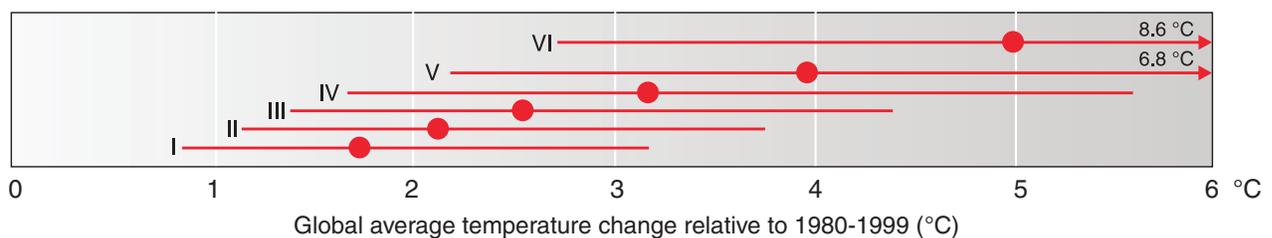
could increase the vulnerability of the ice sheets to warming, increasing future sea level rise. Understanding of these processes is limited and there is no consensus on their magnitude. {WGI 4.6, 10.7, SPM}

Current global model studies project that the Antarctic ice sheet will remain too cold for widespread surface melting and gain mass due to increased snowfall. However, net loss of ice mass could occur if dynamical ice discharge dominates the ice sheet mass balance. {WGI 10.7, SPM}

Both past and future anthropogenic CO<sub>2</sub> emissions will continue to contribute to warming and sea level rise for more than a millennium, due to the time scales required for the removal of this gas from the atmosphere. {WGI 7.3, 10.3, Figure 7.12, Figure 10.35, SPM}

Estimated long-term (multi-century) warming corresponding to the six AR4 WG III stabilisation categories is shown in Figure 3.4.

**Estimated multi-century warming relative to 1980-1999 for AR4 stabilisation categories**



**Figure 3.4.** Estimated long-term (multi-century) warming corresponding to the six AR4 WG III stabilisation categories (Table 5.1). The temperature scale has been shifted by -0.5°C compared to Table 5.1 to account approximately for the warming between pre-industrial and 1980-1999. For most stabilisation levels global average temperature is approaching the equilibrium level over a few centuries. For GHG emissions scenarios that lead to stabilisation at levels comparable to SRES B1 and A1B by 2100 (600 and 850 ppm CO<sub>2</sub>-eq; category IV and V), assessed models project that about 65 to 70% of the estimated global equilibrium temperature increase, assuming a climate sensitivity of 3°C, would be realised at the time of stabilisation. For the much lower stabilisation scenarios (category I and II, Figure 5.1), the equilibrium temperature may be reached earlier. {WGI 10.7.2}

### 3.3 Impacts of future climate changes

**More specific information is now available across a wide range of systems and sectors concerning the nature of future impacts, including some fields not covered in previous assessments. {WGII TS.4, SPM}**

The following is a selection of key findings<sup>14</sup> regarding the impacts of climate change on systems, sectors and regions, as well as some findings on vulnerability<sup>15</sup>, for the range of climate changes projected over the 21<sup>st</sup> century. Unless otherwise stated, the confidence level in the projections is *high*. Global average temperature increases are given relative to 1980-1999. Additional information on impacts can be found in the WG II report. {WGII SPM}

#### 3.3.1 Impacts on systems and sectors

##### Ecosystems

- The resilience of many ecosystems is *likely* to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g. flooding, drought, wildfire, insects, ocean acidification) and other global change drivers (e.g. land-use change, pollution, fragmentation of natural systems, over-exploitation of resources). {WGII 4.1-4.6, SPM}
- Over the course of this century, net carbon uptake by terrestrial ecosystems is *likely* to peak before mid-century and then weaken or even reverse<sup>16</sup>, thus amplifying climate change. {WGII 4.ES, Figure 4.2, SPM}
- Approximately 20 to 30% of plant and animal species assessed so far are *likely* to be at increased risk of extinction if increases in global average temperature exceed 1.5 to 2.5°C (*medium confidence*). {WGII 4.ES, Figure 4.2, SPM}
- For increases in global average temperature exceeding 1.5 to 2.5°C and in concomitant atmospheric CO<sub>2</sub> concentrations, there are projected to be major changes in ecosystem structure and function, species' ecological interactions and shifts in species' geographical ranges, with predominantly negative consequences for biodiversity and ecosystem goods and services, e.g. water and food supply. {WGII 4.4, Box TS.6, SPM}

##### Food

- Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1 to 3°C depending on the crop, and then decrease beyond that in some regions (*medium confidence*). {WGII 5.4, SPM}
- At lower latitudes, especially in seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1 to 2°C), which would increase the risk of hunger (*medium confidence*). {WGII 5.4, SPM}
- Globally, the potential for food production is projected to increase with increases in local average temperature over a range

of 1 to 3°C, but above this it is projected to decrease (*medium confidence*). {WGII 5.4, 5.5, SPM}

##### Coasts

- Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas (*very high confidence*). {WGII 6.3, 6.4, SPM}
- By the 2080s, many millions more people than today are projected to experience floods every year due to sea level rise. The numbers affected will be largest in the densely populated and low-lying megadeltas of Asia and Africa while small islands are especially vulnerable (*very high confidence*). {WGII 6.4, 6.5, Table 6.11, SPM}

##### Industry, settlements and society

- The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring. {WGII 7.1, 7.3, 7.4, 7.5, SPM}
- Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. {WGII 7.2, 7.4, 5.4, SPM}

##### Health

- The health status of millions of people is projected to be affected through, for example, increases in malnutrition; increased deaths, diseases and injury due to extreme weather events; increased burden of diarrhoeal diseases; increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone in urban areas related to climate change; and the altered spatial distribution of some infectious diseases. {WGI 7.4, Box 7.4; WGII 8.ES, 8.2, 8.4, SPM}
- Climate change is projected to bring some benefits in temperate areas, such as fewer deaths from cold exposure, and some mixed effects such as changes in range and transmission potential of malaria in Africa. Overall it is expected that benefits will be outweighed by the negative health effects of rising temperatures, especially in developing countries. {WGII 8.4, 8.7, 8.ES, SPM}
- Critically important will be factors that directly shape the health of populations such as education, health care, public health initiatives, and infrastructure and economic development. {WGII 8.3, SPM}

##### Water

- Water impacts are key for all sectors and regions. These are discussed below in the Box 'Climate change and water'.

<sup>14</sup> Criteria of choice: magnitude and timing of impact, confidence in the assessment, representative coverage of the system, sector and region.

<sup>15</sup> Vulnerability to climate change is the degree to which systems are susceptible to, and unable to cope with, adverse impacts.

<sup>16</sup> Assuming continued GHG emissions at or above current rates and other global changes including land-use changes.

## Climate change and water

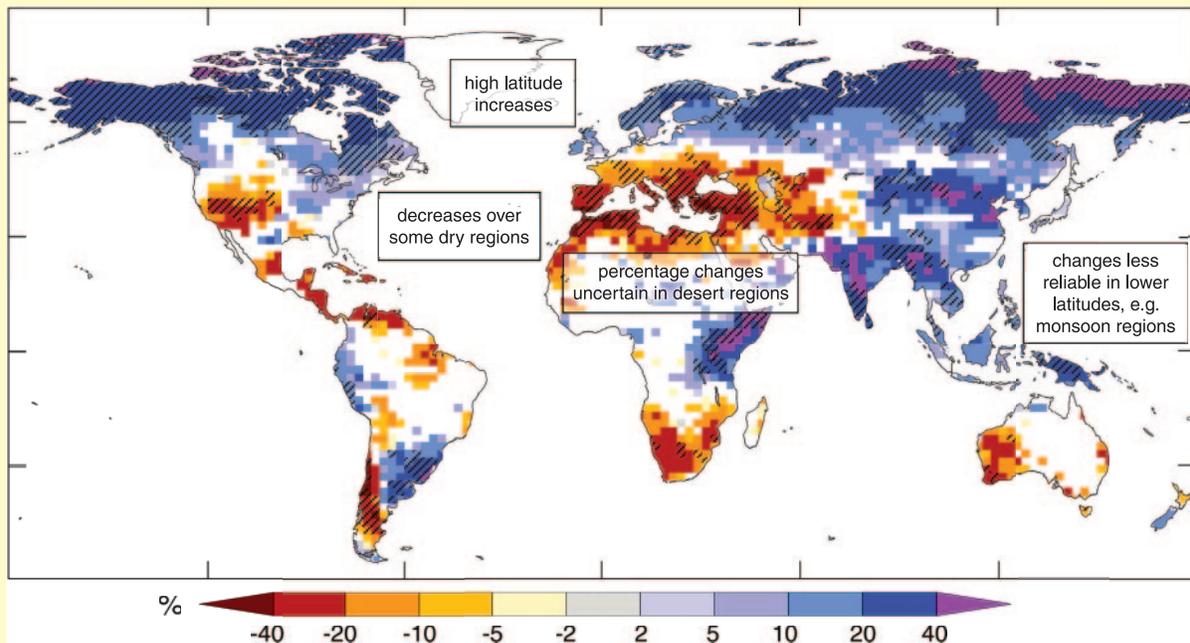
Climate change is expected to exacerbate current stresses on water resources from population growth and economic and land-use change, including urbanisation. On a regional scale, mountain snow pack, glaciers and small ice caps play a crucial role in freshwater availability. Widespread mass losses from glaciers and reductions in snow cover over recent decades are projected to accelerate throughout the 21<sup>st</sup> century, reducing water availability, hydropower potential, and changing seasonality of flows in regions supplied by meltwater from major mountain ranges (e.g. Hindu-Kush, Himalaya, Andes), where more than one-sixth of the world population currently lives. {WGI 4.1, 4.5; WGII 3.3, 3.4, 3.5}

Changes in precipitation (Figure 3.3) and temperature (Figure 3.2) lead to changes in runoff (Figure 3.5) and water availability. Runoff is projected with *high confidence* to increase by 10 to 40% by mid-century at higher latitudes and in some wet tropical areas, including populous areas in East and South-East Asia, and decrease by 10 to 30% over some dry regions at mid-latitudes and dry tropics, due to decreases in rainfall and higher rates of evapotranspiration. There is also *high confidence* that many semi-arid areas (e.g. the Mediterranean Basin, western United States, southern Africa and north-eastern Brazil) will suffer a decrease in water resources due to climate change. Drought-affected areas are projected to increase in extent, with the potential for adverse impacts on multiple sectors, e.g. agriculture, water supply, energy production and health. Regionally, large increases in irrigation water demand as a result of climate changes are projected. {WGI 10.3, 11.2-11.9; WGII 3.4, 3.5, Figure 3.5, TS.4.1, Box TS.5, SPM}

The negative impacts of climate change on freshwater systems outweigh its benefits (*high confidence*). Areas in which runoff is projected to decline face a reduction in the value of the services provided by water resources (*very high confidence*). The beneficial impacts of increased annual runoff in some areas are *likely* to be tempered by negative effects of increased precipitation variability and seasonal runoff shifts on water supply, water quality and flood risk. {WGII 3.4, 3.5, TS.4.1}

Available research suggests a significant future increase in heavy rainfall events in many regions, including some in which the mean rainfall is projected to decrease. The resulting increased flood risk poses challenges to society, physical infrastructure and water quality. It is *likely* that up to 20% of the world population will live in areas where river flood potential could increase by the 2080s. Increases in the frequency and severity of floods and droughts are projected to adversely affect sustainable development. Increased temperatures will further affect the physical, chemical and biological properties of freshwater lakes and rivers, with predominantly adverse impacts on many individual freshwater species, community composition and water quality. In coastal areas, sea level rise will exacerbate water resource constraints due to increased salinisation of groundwater supplies. {WGI 11.2-11.9; WGII 3.2, 3.3, 3.4, 4.4}

### Projections and model consistency of relative changes in runoff by the end of the 21st century



**Figure 3.5.** Large-scale relative changes in annual runoff (water availability, in percent) for the period 2090-2099, relative to 1980-1999. Values represent the median of 12 climate models using the SRES A1B scenario. White areas are where less than 66% of the 12 models agree on the sign of change and hatched areas are where more than 90% of models agree on the sign of change. The quality of the simulation of the observed large-scale 20<sup>th</sup> century runoff is used as a basis for selecting the 12 models in the multi-model ensemble. The global map of annual runoff illustrates a large scale and is not intended to refer to smaller temporal and spatial scales. In areas where rainfall and runoff is very low (e.g. desert areas), small changes in runoff can lead to large percentage changes. In some regions, the sign of projected changes in runoff differs from recently observed trends. In some areas with projected increases in runoff, different seasonal effects are expected, such as increased wet season runoff and decreased dry season runoff. Studies using results from few climate models can be considerably different from the results presented here. {WGII Figure 3.4, adjusted to match the assumptions of Figure SYR 3.3; WGII 3.3.1, 3.4.1, 3.5.1}

### Studies since the TAR have enabled more systematic understanding of the timing and magnitude of impacts related to differing amounts and rates of climate change. {WGII SPM}

Examples of this new information for systems and sectors are presented in Figure 3.6. The upper panel shows impacts increasing with increasing temperature change. Their estimated magnitude and timing is also affected by development pathways (lower panel). {WGII SPM}

Depending on circumstances, some of the impacts shown in Figure 3.6 could be associated with 'key vulnerabilities', based on a number of criteria in the literature (magnitude, timing, persistence/reversibility, the potential for adaptation, distributional aspects, likelihood and 'importance' of the impacts) (see Topic 5.2). {WGII SPM}

### 3.3.2 Impacts on regions<sup>17</sup>

#### Africa

- By 2020, between 75 and 250 million of people are projected to be exposed to increased water stress due to climate change. {WGII 9.4, SPM}
- By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition. {WGII 9.4, SPM}
- Towards the end of the 21<sup>st</sup> century, projected sea level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5 to 10% of GDP. {WGII 9.4, SPM}
- By 2080, an increase of 5 to 8% of arid and semi-arid land in Africa is projected under a range of climate scenarios (*high confidence*). {WGII Box TS.6, 9.4.4}

#### Asia

- By the 2050s, freshwater availability in Central, South, East and South-East Asia, particularly in large river basins, is projected to decrease. {WGII 10.4, SPM}
- Coastal areas, especially heavily populated megadelta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea and, in some megadeltas, flooding from the rivers. {WGII 10.4, SPM}
- Climate change is projected to compound the pressures on natural resources and the environment associated with rapid urbanisation, industrialisation and economic development. {WGII 10.4, SPM}
- Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East, South and South-East Asia due to projected changes in the hydrological cycle. {WGII 10.4, SPM}

#### Australia and New Zealand

- By 2020, significant loss of biodiversity is projected to occur in some ecologically rich sites, including the Great Barrier Reef and Queensland Wet Tropics. {WGII 11.4, SPM}

- By 2030, water security problems are projected to intensify in southern and eastern Australia and, in New Zealand, in Northland and some eastern regions. {WGII 11.4, SPM}
- By 2030, production from agriculture and forestry is projected to decline over much of southern and eastern Australia, and over parts of eastern New Zealand, due to increased drought and fire. However, in New Zealand, initial benefits are projected in some other regions. {WGII 11.4, SPM}
- By 2050, ongoing coastal development and population growth in some areas of Australia and New Zealand are projected to exacerbate risks from sea level rise and increases in the severity and frequency of storms and coastal flooding. {WGII 11.4, SPM}

#### Europe

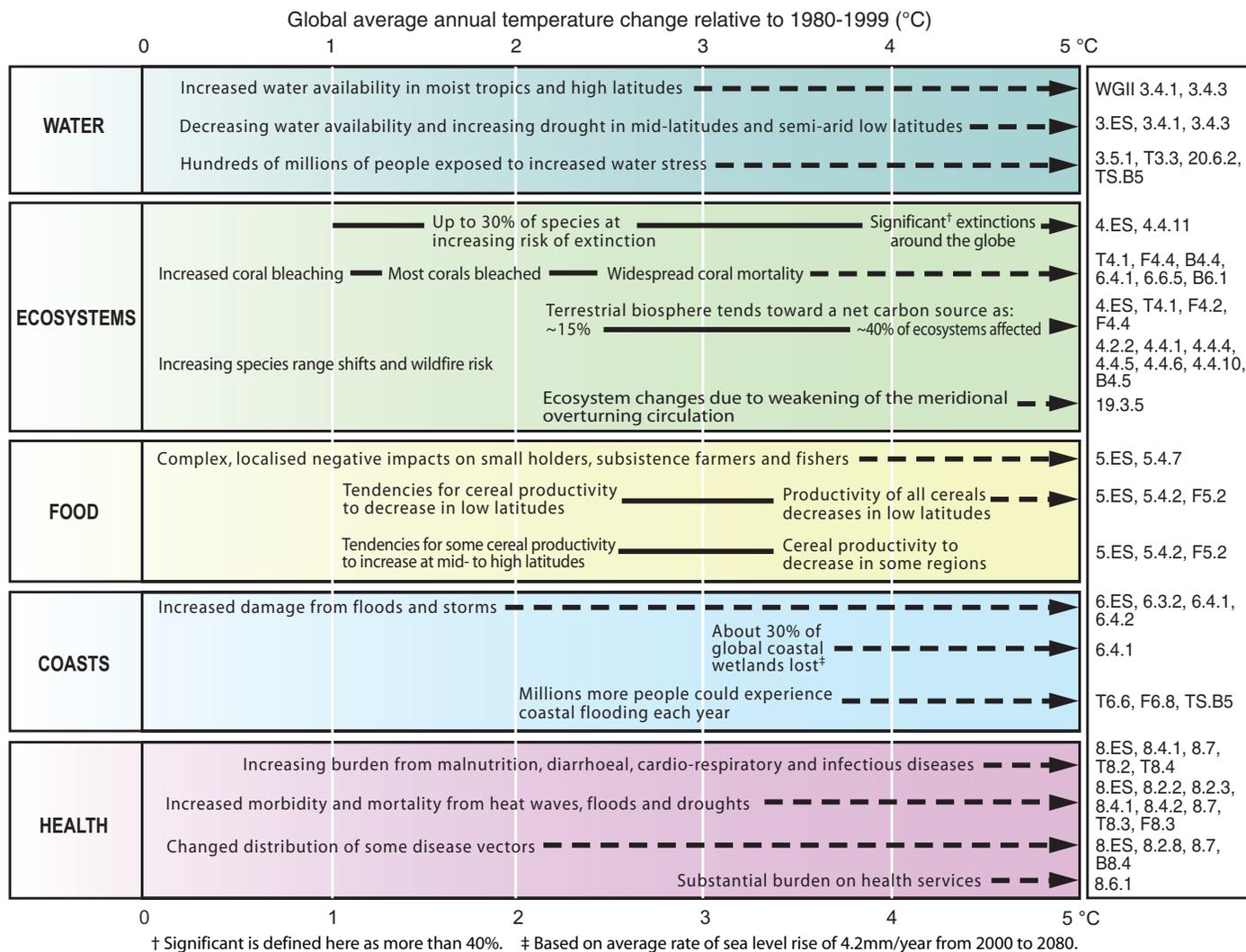
- Climate change is expected to magnify regional differences in Europe's natural resources and assets. Negative impacts will include increased risk of inland flash floods and more frequent coastal flooding and increased erosion (due to storminess and sea level rise). {WGII 12.4, SPM}
- Mountainous areas will face glacier retreat, reduced snow cover and winter tourism, and extensive species losses (in some areas up to 60% under high emissions scenarios by 2080). {WGII 12.4, SPM}
- In southern Europe, climate change is projected to worsen conditions (high temperatures and drought) in a region already vulnerable to climate variability, and to reduce water availability, hydropower potential, summer tourism and, in general, crop productivity. {WGII 12.4, SPM}
- Climate change is also projected to increase the health risks due to heat waves and the frequency of wildfires. {WGII 12.4, SPM}

#### Latin America

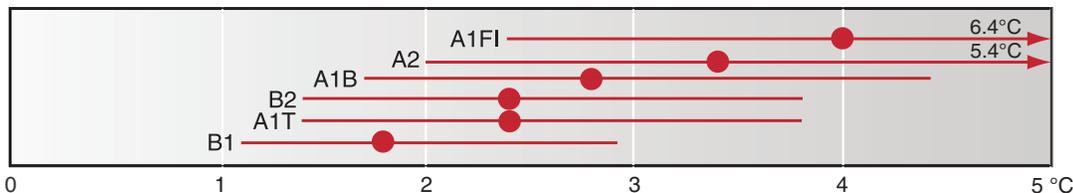
- By mid-century, increases in temperature and associated decreases in soil water are projected to lead to gradual replacement of tropical forest by savanna in eastern Amazonia. Semi-arid vegetation will tend to be replaced by arid-land vegetation. {WGII 13.4, SPM}
- There is a risk of significant biodiversity loss through species extinction in many areas of tropical Latin America. {WGII 13.4, SPM}
- Productivity of some important crops is projected to decrease and livestock productivity to decline, with adverse consequences for food security. In temperate zones, soybean yields are projected to increase. Overall, the number of people at risk of hunger is projected to increase (*medium confidence*). {WGII 13.4, Box TS.6}
- Changes in precipitation patterns and the disappearance of glaciers are projected to significantly affect water availability for human consumption, agriculture and energy generation. {WGII 13.4, SPM}

<sup>17</sup> Unless stated explicitly, all entries are from WG II SPM text, and are either *very high confidence* or *high confidence* statements, reflecting different sectors (agriculture, ecosystems, water, coasts, health, industry and settlements). The WG II SPM refers to the source of the statements, timelines and temperatures. The magnitude and timing of impacts that will ultimately be realised will vary with the amount and rate of climate change, emissions scenarios, development pathways and adaptation.

**Examples of impacts associated with global average temperature change**  
**(Impacts will vary by extent of adaptation, rate of temperature change and socio-economic pathway)**



**Warming by 2090-2099 relative to 1980-1999 for non-mitigation scenarios**



**Figure 3.6.** Examples of impacts associated with global average temperature change. **Upper panel:** Illustrative examples of global impacts projected for climate changes (and sea level and atmospheric CO<sub>2</sub> where relevant) associated with different amounts of increase in global average surface temperature in the 21<sup>st</sup> century. The black lines link impacts; broken-line arrows indicate impacts continuing with increasing temperature. Entries are placed so that the left-hand side of text indicates the approximate level of warming that is associated with the onset of a given impact. Quantitative entries for water scarcity and flooding represent the additional impacts of climate change relative to the conditions projected across the range of SRES scenarios A1FI, A2, B1 and B2. Adaptation to climate change is not included in these estimations. Confidence levels for all statements are high. The upper right panel gives the WG II references for the statements made in the upper left panel.\* **Lower panel:** Dots and bars indicate the best estimate and likely ranges of warming assessed for the six SRES marker scenarios for 2090-2099 relative to 1980-1999. {WGI Figure SPM.5, 10.7; WGII Figure SPM.2; WGIII Table TS.2, Table 3.10}

\*Where ES = Executive Summary, T = Table, B = Box and F = Figure. Thus B4.5 indicates Box 4.5 in Chapter 4 and 3.5.1 indicates Section 3.5.1 in Chapter 3.

## North America

- Warming in western mountains is projected to cause decreased snowpack, more winter flooding and reduced summer flows, exacerbating competition for over-allocated water resources. *{WGII 14.4, SPM}*
- In the early decades of the century, moderate climate change is projected to increase aggregate yields of rain-fed agriculture by 5 to 20%, but with important variability among regions. Major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilised water resources. *{WGII 14.4, SPM}*
- Cities that currently experience heat waves are expected to be further challenged by an increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts. *{WGII 14.4, SPM}*
- Coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution. *{WGII 14.4, SPM}*

## Polar Regions

- The main projected biophysical effects are reductions in thickness and extent of glaciers, ice sheets and sea ice, and changes in natural ecosystems with detrimental effects on many organisms including migratory birds, mammals and higher predators. *{WGII 15.4, SPM}*
- For human communities in the Arctic, impacts, particularly those resulting from changing snow and ice conditions, are projected to be mixed. *{WGII 15.4, SPM}*
- Detrimental impacts would include those on infrastructure and traditional indigenous ways of life. *{WGII 15.4, SPM}*
- In both polar regions, specific ecosystems and habitats are projected to be vulnerable, as climatic barriers to species invasions are lowered. *{WGII 15.4, SPM}*

## Small Islands

- Sea level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards, thus threatening vital infrastructure, settlements and facilities that support the livelihood of island communities. *{WGII 16.4, SPM}*
- Deterioration in coastal conditions, for example through erosion of beaches and coral bleaching, is expected to affect local resources. *{WGII 16.4, SPM}*
- By mid-century, climate change is expected to reduce water resources in many small islands, e.g. in the Caribbean and Pacific, to the point where they become insufficient to meet demand during low-rainfall periods. *{WGII 16.4, SPM}*
- With higher temperatures, increased invasion by non-native species is expected to occur, particularly on mid- and high-latitude islands. *{WGII 16.4, SPM}*

## 3.3.3 Especially affected systems, sectors and regions

**Some systems, sectors and regions are likely to be especially affected by climate change.**<sup>18</sup> *{WGII TS.4.5}*

Systems and sectors: *{WGII TS.4.5}*

- particular ecosystems:
  - terrestrial: tundra, boreal forest and mountain regions because of sensitivity to warming; mediterranean-type ecosystems because of reduction in rainfall; and tropical rainforests where precipitation declines
  - coastal: mangroves and salt marshes, due to multiple stresses
  - marine: coral reefs due to multiple stresses; the sea-ice biome because of sensitivity to warming
- water resources in some dry regions at mid-latitudes<sup>19</sup> and in the dry tropics, due to changes in rainfall and evapotranspiration, and in areas dependent on snow and ice melt
- agriculture in low latitudes, due to reduced water availability
- low-lying coastal systems, due to threat of sea level rise and increased risk from extreme weather events
- human health in populations with low adaptive capacity.

Regions: *{WGII TS.4.5}*

- the Arctic, because of the impacts of high rates of projected warming on natural systems and human communities
- Africa, because of low adaptive capacity and projected climate change impacts
- small islands, where there is high exposure of population and infrastructure to projected climate change impacts
- Asian and African megadeltas, due to large populations and high exposure to sea level rise, storm surges and river flooding.

Within other areas, even those with high incomes, some people (such as the poor, young children and the elderly) can be particularly at risk, and also some areas and some activities. *{WGII 7.1, 7.2, 7.4, 8.2, 8.4, TS.4.5}*

## 3.3.4 Ocean acidification

The uptake of anthropogenic carbon since 1750 has led to the ocean becoming more acidic with an average decrease in pH of 0.1 units. Increasing atmospheric CO<sub>2</sub> concentrations lead to further acidification. Projections based on SRES scenarios give a reduction in average global surface ocean pH of between 0.14 and 0.35 units over the 21<sup>st</sup> century. While the effects of observed ocean acidification on the marine biosphere are as yet undocumented, the progressive acidification of oceans is expected to have negative impacts on marine shell-forming organisms (e.g. corals) and their dependent species. *{WGI SPM; WGII SPM}*

## 3.3.5 Extreme events

**Altered frequencies and intensities of extreme weather, together with sea level rise, are expected to have mostly adverse effects on natural and human systems (Table 3.2).** *{WGII SPM}*

Examples for selected extremes and sectors are shown in Table 3.2.

<sup>18</sup> Identified on the basis of expert judgement of the assessed literature and considering the magnitude, timing and projected rate of climate change, sensitivity and adaptive capacity.

<sup>19</sup> Including arid and semi-arid regions.

**Table 3.2.** Examples of possible impacts of climate change due to changes in extreme weather and climate events, based on projections to the mid- to late 21<sup>st</sup> century. These do not take into account any changes or developments in adaptive capacity. The likelihood estimates in column two relate to the phenomena listed in column one. {WGII Table SPM.1}

Phenomenon <sup>a</sup> and direction of trend	Likelihood of future trends based on projections for 21 <sup>st</sup> century using SRES scenarios	Examples of major projected impacts by sector			
		Agriculture, forestry and ecosystems {WGII 4.4, 5.4}	Water resources {WGII 3.4}	Human health {WGII 8.2, 8.4}	Industry, settlement and society {WGII 7.4}
Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	<i>Virtually certain<sup>b</sup></i>	Increased yields in colder environments; decreased yields in warmer environments; increased insect outbreaks	Effects on water resources relying on snowmelt; effects on some water supplies	Reduced human mortality from decreased cold exposure	Reduced energy demand for heating; increased demand for cooling; declining air quality in cities; reduced disruption to transport due to snow, ice; effects on winter tourism
Warm spells/heat waves. Frequency increases over most land areas	<i>Very likely</i>	Reduced yields in warmer regions due to heat stress; increased danger of wildfire	Increased water demand; water quality problems, e.g. algal blooms	Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially isolated	Reduction in quality of life for people in warm areas without appropriate housing; impacts on the elderly, very young and poor
Heavy precipitation events. Frequency increases over most areas	<i>Very likely</i>	Damage to crops; soil erosion, inability to cultivate land due to waterlogging of soils	Adverse effects on quality of surface and groundwater; contamination of water supply; water scarcity may be relieved	Increased risk of deaths, injuries and infectious, respiratory and skin diseases	Disruption of settlements, commerce, transport and societies due to flooding; pressures on urban and rural infrastructures; loss of property
Area affected by drought increases	<i>Likely</i>	Land degradation; lower yields/crop damage and failure; increased livestock deaths; increased risk of wildfire	More widespread water stress	Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water- and food-borne diseases	Water shortage for settlements, industry and societies; reduced hydropower generation potentials; potential for population migration
Intense tropical cyclone activity increases	<i>Likely</i>	Damage to crops; windthrow (uprooting) of trees; damage to coral reefs	Power outages causing disruption of public water supply	Increased risk of deaths, injuries, water- and food-borne diseases; post-traumatic stress disorders	Disruption by flood and high winds; withdrawal of risk coverage in vulnerable areas by private insurers; potential for population migrations; loss of property
Increased incidence of extreme high sea level (excludes tsunamis) <sup>c</sup>	<i>Likely<sup>d</sup></i>	Salinisation of irrigation water, estuaries and fresh-water systems	Decreased fresh-water availability due to saltwater intrusion	Increased risk of deaths and injuries by drowning in floods; migration-related health effects	Costs of coastal protection versus costs of land-use relocation; potential for movement of populations and infrastructure; also see tropical cyclones above

Notes:

- a) See WGI Table 3.7 for further details regarding definitions.
- b) Warming of the most extreme days and nights each year.
- c) Extreme high sea level depends on average sea level and on regional weather systems. It is defined as the highest 1% of hourly values of observed sea level at a station for a given reference period.
- d) In all scenarios, the projected global average sea level at 2100 is higher than in the reference period. The effect of changes in regional weather systems on sea level extremes has not been assessed. {WGI 10.6}

### 3.4 Risk of abrupt or irreversible changes

**Anthropogenic warming could lead to some impacts that are abrupt or irreversible, depending upon the rate and magnitude of the climate change. {WGII 12.6, 19.3, 19.4, SPM}**

Abrupt climate change on decadal time scales is normally thought of as involving ocean circulation changes. In addition on

longer time scales, ice sheet and ecosystem changes may also play a role. If a large-scale abrupt climate change were to occur, its impact could be quite high (see Topic 5.2). {WGI 8.7, 10.3, 10.7; WGII 4.4, 19.3}

Partial loss of ice sheets on polar land and/or the thermal expansion of seawater over very long time scales could imply metres of sea level rise, major changes in coastlines and inundation of low-lying areas, with greatest effects in river deltas and low-lying

islands. Current models project that such changes would occur over very long time scales (millennial) if a global temperature increase of 1.9 to 4.6°C (relative to pre-industrial) were to be sustained. Rapid sea level rise on century time scales cannot be excluded. {SYR 3.2.3; WGI 6.4, 10.7; WGII 19.3, SPM}

Climate change is *likely* to lead to some irreversible impacts. There is *medium confidence* that approximately 20 to 30% of species assessed so far are *likely* to be at increased risk of extinction if increases in global average warming exceed 1.5 to 2.5°C (relative to 1980-1999). As global average temperature increase exceeds about 3.5°C, model projections suggest significant extinctions (40 to 70% of species assessed) around the globe. {WGII 4.4, Figure SPM.2}

Based on current model simulations, it is *very likely* that the meridional overturning circulation (MOC) of the Atlantic Ocean will slow down during the 21<sup>st</sup> century; nevertheless temperatures in the region are projected to increase. It is *very unlikely* that the MOC will undergo a large abrupt transition during the 21<sup>st</sup> century. Longer-term changes in the MOC cannot be assessed with confidence. {WGI 10.3, 10.7; WGII Figure, Table TS.5, SPM.2}

Impacts of large-scale and persistent changes in the MOC are *likely* to include changes in marine ecosystem productivity, fisheries, ocean CO<sub>2</sub> uptake, oceanic oxygen concentrations and terrestrial vegetation. Changes in terrestrial and ocean CO<sub>2</sub> uptake may feed back on the climate system. {WGII 12.6, 19.3, Figure SPM.2}

# 4

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## **Adaptation and mitigation options and responses, and the inter-relationship with sustainable development, at global and regional levels**

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## 4.1 Responding to climate change

Societies can respond to climate change by adapting to its impacts and by reducing GHG emissions (mitigation), thereby reducing the rate and magnitude of change. This Topic focuses on adaptation and mitigation options that can be implemented over the next two to three decades, and their inter-relationship with sustainable development. These responses can be complementary. Topic 5 addresses their complementary roles on a more conceptual basis over a longer timeframe.

The capacity to adapt and mitigate is dependent on socio-economic and environmental circumstances and the availability of information and technology<sup>20</sup>. However, much less information is available about the costs and effectiveness of adaptation measures than about mitigation measures. {WGII 17.1, 17.3; WGIII 1.2}

## 4.2 Adaptation options

**Adaptation can reduce vulnerability, both in the short and the long term.** {WGII 17.2, 18.1, 18.5, 20.3, 20.8}

Vulnerability to climate change can be exacerbated by other stresses. These arise from, for example, current climate hazards, poverty, unequal access to resources, food insecurity, trends in economic globalisation, conflict and incidence of diseases such as HIV/AIDS. {WGII 7.2, 7.4, 8.3, 17.3, 20.3, 20.4, 20.7, SPM}

Societies across the world have a long record of adapting and reducing their vulnerability to the impacts of weather- and climate-related events such as floods, droughts and storms. Nevertheless, additional adaptation measures will be required at regional and local levels to reduce the adverse impacts of projected climate change and variability, regardless of the scale of mitigation undertaken over the next two to three decades. However, adaptation alone is not expected to cope with all the projected effects of climate change, especially not over the long term as most impacts increase in magnitude. {WGII 17.2, SPM; WGIII 1.2}

A wide array of adaptation options is available, but more extensive adaptation than is currently occurring is required to reduce vulnerability to climate change. There are barriers, limits and costs, which are not fully understood. Some planned adaptation is already occurring on a limited basis. Table 4.1 provides examples of planned

adaptation options by sector. Many adaptation actions have multiple drivers, such as economic development and poverty alleviation, and are embedded within broader development, sectoral, regional and local planning initiatives such as water resources planning, coastal defence and disaster risk reduction strategies. Examples of this approach are the Bangladesh National Water Management Plan and the coastal defence plans of The Netherlands and Norway, which incorporate specific climate change scenarios. {WGII 1.3, 5.5.2, 11.6, 17.2}

Comprehensive estimates of the costs and benefits of adaptation at the global level are limited in number. However, the number of adaptation cost and benefit estimates at the regional and project levels for impacts on specific sectors, such as agriculture, energy demand for heating and cooling, water resources management and infrastructure, is growing. Based on these studies there is *high confidence* that there are viable adaptation options that can be implemented in some of these sectors at low cost and/or with high benefit-cost ratios. Empirical research also suggests that higher benefit-cost ratios can be achieved by implementing some adaptation measures at an early stage compared to retrofitting long-lived infrastructure at a later date. {WGII 17.2}

**Adaptive capacity is intimately connected to social and economic development, but it is not evenly distributed across and within societies.** {WGII 7.1, 7.2, 7.4, 17.3}

The capacity to adapt is dynamic and is influenced by a society's productive base, including natural and man-made capital assets, social networks and entitlements, human capital and institutions, governance, national income, health and technology. It is also affected by multiple climate and non-climate stresses, as well as development policy. {WGII 17.3}

Recent studies reaffirm the TAR finding that adaptation will be vital and beneficial. However, financial, technological, cognitive, behavioural, political, social, institutional and cultural constraints limit both the implementation and effectiveness of adaptation measures. Even societies with high adaptive capacity remain vulnerable to climate change, variability and extremes. For example, a heat wave in 2003 caused high levels of mortality in European cities (especially among the elderly), and Hurricane Katrina in 2005 caused large human and financial costs in the United States. {WGII 7.4, 8.2, 17.4}

<sup>20</sup> Technology is defined as the practical application of knowledge to achieve particular tasks that employs both technical artefacts (hardware, equipment) and (social) information ('software', know-how for production and use of artefacts).

Table 4.1. Selected examples of planned adaptation by sector.

Sector	Adaptation option/strategy	Underlying policy framework	Key constraints and opportunities to implementation (Normal font = constraints; italics = opportunities)
<b>Water</b> {WGII 5.5, 16.4; Tables 3.5, 11.6, 17.1}	Expanded rainwater harvesting; water storage and conservation techniques; water reuse; desalination; water-use and irrigation efficiency	National water policies and integrated water resources management	Financial, human resources and physical barriers; <i>integrated water resources management; synergies with other sectors</i>
<b>Agriculture</b> {WGII 10.5, 13.5; Table 10.8}	Adjustment of planting dates and crop variety; crop relocation; improved land management, e.g. erosion control and soil protection through tree planting	R&D policies; institutional reform; land tenure and land reform; training; capacity building; crop insurance; financial incentives, e.g. subsidies and tax credits	Technological and financial constraints; access to new varieties; markets; <i>longer growing season in higher latitudes; revenues from 'new' products</i>
<b>Infrastructure/settlement (including coastal zones)</b> {WGII 3.6, 11.4; Tables 6.11, 17.1}	Relocation; seawalls and storm surge barriers; dune reinforcement; land acquisition and creation of marshlands/wetlands as buffer against sea level rise and flooding; protection of existing natural barriers	Standards and regulations that integrate climate change considerations into design; land-use policies; building codes; insurance	Financial and technological barriers; availability of relocation space; <i>integrated policies and management; synergies with sustainable development goals</i>
<b>Human health</b> {WGII 14.5, Table 10.8}	Heat-health action plans; emergency medical services; improved climate-sensitive disease surveillance and control; safe water and improved sanitation	Public health policies that recognise climate risk; strengthen health services; regional and international cooperation	Limits to human tolerance (vulnerable groups); knowledge limitations; financial capacity; <i>upgraded health services; improved quality of life</i>
<b>Tourism</b> {WGII 12.5, 15.5, 17.5; Table 17.1}	Diversification of tourism attractions and revenues; shifting ski slopes to higher altitudes and glaciers; artificial snow-making	Integrated planning (e.g. carrying capacity; linkages with other sectors); financial incentives, e.g. subsidies and tax credits	Appeal/marketing of new attractions; financial and logistical challenges; potential adverse impact on other sectors (e.g. artificial snow-making may increase energy use); <i>revenues from 'new' attractions; involvement of wider group of stakeholders</i>
<b>Transport</b> {WGII 7.6, 17.2}	Realignment/relocation; design standards and planning for roads, rail and other infrastructure to cope with warming and drainage	Integrating climate change considerations into national transport policy; investment in R&D for special situations, e.g. permafrost areas	Financial and technological barriers; availability of less vulnerable routes; <i>improved technologies and integration with key sectors (e.g. energy)</i>
<b>Energy</b> {WGII 7.4, 16.2}	Strengthening of overhead transmission and distribution infrastructure; underground cabling for utilities; energy efficiency; use of renewable sources; reduced dependence on single sources of energy	National energy policies, regulations, and fiscal and financial incentives to encourage use of alternative sources; incorporating climate change in design standards	Access to viable alternatives; financial and technological barriers; acceptance of new technologies; <i>stimulation of new technologies; use of local resources</i>

Note:  
Other examples from many sectors would include early warning systems.

### 4.3 Mitigation options

Both bottom-up and top-down studies<sup>21</sup> indicate that there is *high agreement and much evidence of substantial economic potential*<sup>21</sup> for the mitigation of global GHG emissions over the coming decades that could offset the projected growth of global emissions or reduce emissions below current levels. {WGIII 11.3, SPM}

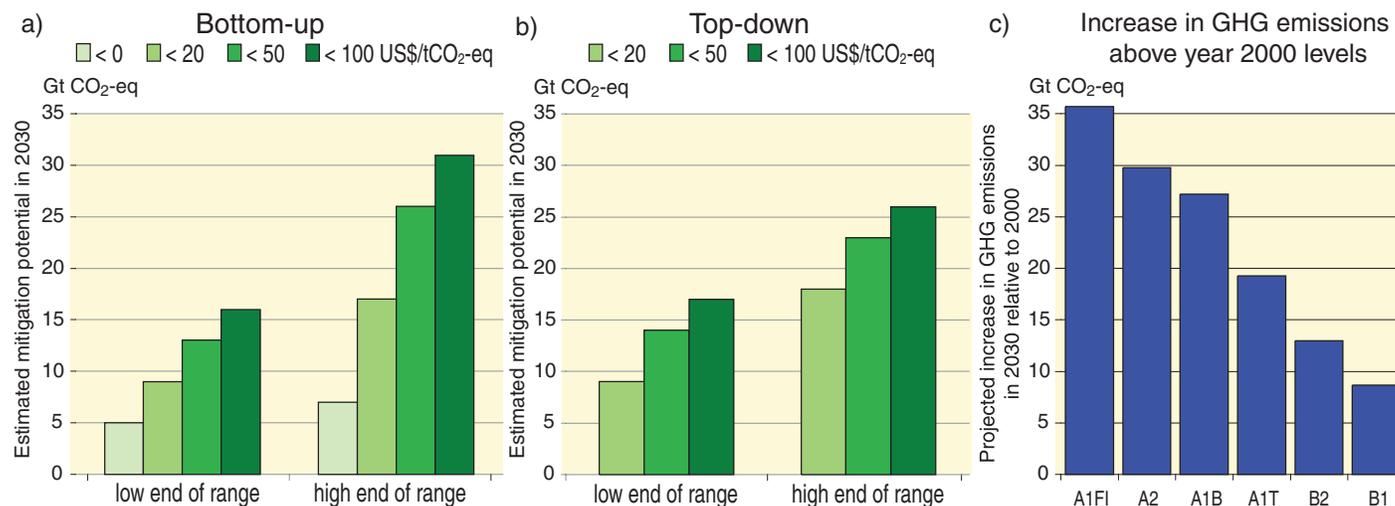
Figure 4.1 compares global economic mitigation potential in 2030 with the projected emissions increase from 2000 to 2030. Bottom-up studies suggest that mitigation opportunities with net negative costs<sup>22</sup> have the potential to reduce emissions by about 6 GtCO<sub>2</sub>-eq/yr in 2030. Realising these requires dealing with implementation barriers. The economic mitigation potential, which is generally greater than the market mitigation potential, can only be achieved when adequate policies are in place and barriers removed.<sup>21</sup> {WGIII 11.3, SPM}

Sectoral estimates of economic mitigation potential and marginal costs derived from bottom-up studies corrected for double counting of mitigation potential are shown in Figure 4.2. While top-down and bottom-up studies are in line at the global level, there are considerable differences at the sectoral level. {WGIII 11.3, SPM}

No single technology can provide all of the mitigation potential in any sector. Table 4.2 lists selected examples of key technologies, policies, constraints and opportunities by sector. {WGIII SPM}

Future energy infrastructure investment decisions, expected to total over US\$20 trillion<sup>23</sup> between 2005 and 2030, will have long-term impacts on GHG emissions, because of the long lifetimes of energy plants and other infrastructure capital stock. The widespread diffusion of low-carbon technologies may take many decades, even if early investments in these technologies are made attractive. Initial estimates show that returning global energy-related CO<sub>2</sub> emissions to 2005 levels by 2030 would require a large shift in the pattern of investment, although the net additional investment required ranges from negligible to 5 to 10%. {WGIII 4.1, 4.4, 11.6, SPM}

#### Comparison between global economic mitigation potential and projected emissions increase in 2030



**Figure 4.1.** Global economic mitigation potential in 2030 estimated from bottom-up (Panel a) and top-down (Panel b) studies, compared with the projected emissions increases from SRES scenarios relative to year 2000 GHG emissions of 40.8 GtCO<sub>2</sub>-eq (Panel c). Note: GHG emissions in 2000 are exclusive of emissions of decay of above-ground biomass that remains after logging and deforestation and from peat fires and drained peat soils, to ensure consistency with the SRES emissions results. {WGIII Figures SPM.4, SPM.5a, SPM.5b}

<sup>21</sup> The concept of 'mitigation potential' has been developed to assess the scale of GHG reductions that could be made, relative to emission baselines, for a given level of carbon price (expressed in cost per unit of carbon dioxide equivalent emissions avoided or reduced). Mitigation potential is further differentiated in terms of 'market mitigation potential' and 'economic mitigation potential'.

**Market mitigation potential** is the mitigation potential based on private costs and private discount rates (reflecting the perspective of private consumers and companies), which might be expected to occur under forecast market conditions, including policies and measures currently in place, noting that barriers limit actual uptake.

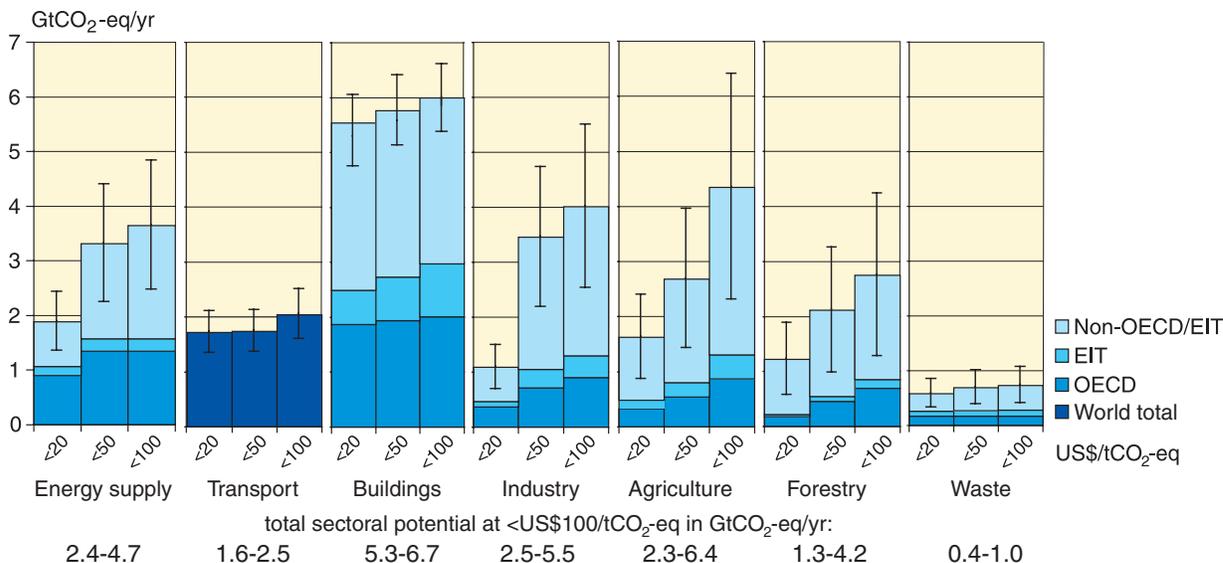
**Economic mitigation potential** is the mitigation potential that takes into account social costs and benefits and social discount rates (reflecting the perspective of society; social discount rates are lower than those used by private investors), assuming that market efficiency is improved by policies and measures and barriers are removed.

Mitigation potential is estimated using different types of approaches. **Bottom-up studies** are based on assessment of mitigation options, emphasising specific technologies and regulations. They are typically sectoral studies taking the macro-economy as unchanged. **Top-down studies** assess the economy-wide potential of mitigation options. They use globally consistent frameworks and aggregated information about mitigation options and capture macro-economic and market feedbacks.

<sup>22</sup> Net negative costs (no regrets opportunities) are defined as those options whose benefits such as reduced energy costs and reduced emissions of local/regional pollutants equal or exceed their costs to society, excluding the benefits of avoided climate change.

<sup>23</sup> 20 trillion = 20,000 billion = 20×10<sup>12</sup>

**Economic mitigation potentials by sector in 2030 estimated from bottom-up studies**



**Figure 4.2.** Estimated economic mitigation potential by sector and region using technologies and practices expected to be available in 2030. The potentials do not include non-technical options such as lifestyle changes. {WGIII Figure SPM.6}

**Notes:**

- a) The ranges for global economic potentials as assessed in each sector are shown by vertical lines. The ranges are based on end-use allocations of emissions, meaning that emissions of electricity use are counted towards the end-use sectors and not to the energy supply sector.
- b) The estimated potentials have been constrained by the availability of studies particularly at high carbon price levels.
- c) Sectors used different baselines. For industry the SRES B2 baseline was taken, for energy supply and transport the World Energy Outlook (WEO) 2004 baseline was used; the building sector is based on a baseline in between SRES B2 and A1B; for waste, SRES A1B driving forces were used to construct a waste-specific baseline; agriculture and forestry used baselines that mostly used B2 driving forces.
- d) Only global totals for transport are shown because international aviation is included.
- e) Categories excluded are non-CO<sub>2</sub> emissions in buildings and transport, part of material efficiency options, heat production and cogeneration in energy supply, heavy duty vehicles, shipping and high-occupancy passenger transport, most high-cost options for buildings, wastewater treatment, emission reduction from coal mines and gas pipelines, and fluorinated gases from energy supply and transport. The underestimation of the total economic potential from these emissions is of the order of 10 to 15%.

**While studies use different methodologies, there is high agreement and much evidence that in all analysed world regions near-term health co-benefits from reduced air pollution, as a result of actions to reduce GHG emissions, can be substantial and may offset a substantial fraction of mitigation costs. {WGIII 11.8, SPM}**

Energy efficiency and utilisation of renewable energy offer synergies with sustainable development. In least developed countries, energy substitution can lower mortality and morbidity by reducing indoor air pollution, reduce the workload for women and children and decrease the unsustainable use of fuelwood and related deforestation. {WGIII 11.8, 11.9, 12.4}

**Literature since the TAR confirms with high agreement and medium evidence that there may be effects from Annex I countries' action on the global economy and global emissions, although the scale of carbon leakage remains uncertain. {WGIII 11.7, SPM}**

Fossil fuel exporting nations (in both Annex I and non-Annex I countries) may expect, as indicated in the TAR, lower demand and prices and lower GDP growth due to mitigation policies. The extent of this spillover depends strongly on assumptions related to policy decisions and oil market conditions. {WGIII 11.7, SPM}

Critical uncertainties remain in the assessment of carbon leakage. Most equilibrium modelling supports the conclusion in the TAR of economy-wide leakage from Kyoto action in the order of 5 to 20%, which would be less if competitive low-emissions technologies were effectively diffused. {WGIII 11.7, SPM}

**There is also high agreement and medium evidence that changes in lifestyle and behaviour patterns can contribute to climate change mitigation across all sectors. Management practices can also have a positive role. {WGIII SPM}**

Examples that can have positive impacts on mitigation include changes in consumption patterns, education and training, changes in building occupant behaviour, transport demand management and management tools in industry. {WGIII 4.1, 5.1, 6.7, 7.3, SPM}

**Policies that provide a real or implicit price of carbon could create incentives for producers and consumers to significantly invest in low-GHG products, technologies and processes. {WGIII SPM}**

An effective carbon-price signal could realise significant mitigation potential in all sectors. Modelling studies show that global carbon prices rising to US\$20-80/tCO<sub>2</sub>-eq by 2030 are consistent with stabilisation at around 550ppm CO<sub>2</sub>-eq by 2100. For the same

Table 4.2 Selected examples of key sectoral mitigation technologies and practices currently commercially available. Key mitigation technologies and practices projected to be commercialised before 2030 shown in italics.

Sector	Key mitigation technologies and practices currently commercially available. Key mitigation technologies and practices projected to be commercialised before 2030 shown in italics.	Policies, measures and instruments shown to be environmentally effective	Key constraints or opportunities (Normal font = constraints; <i>italics</i> = opportunities)
<b>Energy Supply</b> {WGIII 4.3, 4.4}	Improved supply and distribution efficiency; fuel switching from coal to gas; nuclear power; renewable heat and power (hydropower, solar, wind, geothermal and bioenergy); combined heat and power; early applications of carbon dioxide capture and storage (CCS) (e.g. storage of removed CO <sub>2</sub> from natural gas); CCS for gas, biomass and coal-fired electricity generating facilities; advanced nuclear power; advanced renewable energy, including tidal and wave energy, concentrating solar, and solar photovoltaics	Reduction of fossil fuel subsidies; taxes or carbon charges on fossil fuels Feed-in tariffs for renewable energy technologies; renewable energy obligations; producer subsidies	Resistance by vested interests may make them difficult to implement <i>May be appropriate to create markets for low-emissions technologies</i>
<b>Transport</b> {WGIII 5.4}	More fuel-efficient vehicles; hybrid vehicles; cleaner diesel vehicles; biofuels; modal shifts from road transport to rail and public transport systems; non-motorised transport (cycling, walking); land-use and transport planning; <i>second generation biofuels; higher efficiency aircraft; advanced electric and hybrid vehicles with more powerful and reliable batteries</i>	Mandatory fuel economy; biofuel blending and CO <sub>2</sub> standards for road transport Taxes on vehicle purchase, registration, use and motor fuels; road and parking pricing	Partial coverage of vehicle fleet may limit effectiveness Effectiveness may drop with higher incomes
<b>Buildings</b> {WGIII 6.5}	Efficient lighting and daylighting; more efficient electrical appliances and heating and cooling devices; improved cook stoves, improved insulation; passive and active solar design for heating and cooling; alternative refrigeration fluids, recovery and recycling of fluorinated gases; <i>integrated design of commercial buildings including technologies, such as intelligent meters that provide feedback and control; solar photovoltaics integrated in buildings</i>	Appliance standards and labelling Building codes and certification	Particularly appropriate for countries that are building up their transportation systems Periodic revision of standards needed <i>Attractive for new buildings. Enforcement can be difficult</i>
<b>Industry</b> {WGIII 7.5}	More efficient end-use electrical equipment; heat and power recovery; material recycling and substitution; control of non-CO <sub>2</sub> gas emissions; and a wide array of process-specific technologies; <i>advanced energy efficiency; CCS for cement, ammonia, and iron manufacture; inert electrodes for aluminium manufacture</i>	Demand-side management programmes Public sector leadership programmes, including procurement Incentives for energy service companies (ESCOs)	Need for regulations so that utilities may profit <i>Government purchasing can expand demand for energy-efficient products</i> <i>Success factor: Access to third party financing</i>
<b>Agriculture</b> {WGIII 8.4}	Improved crop and grazing land management to increase soil carbon storage; restoration of cultivated peaty soils and degraded lands; improved rice cultivation techniques and livestock and manure management to reduce CH <sub>4</sub> emissions; dedicated nitrogen fertiliser application techniques to reduce N <sub>2</sub> O emissions; improved energy crops to replace fossil fuel use; improved energy efficiency; <i>improvements of crop yields</i>	Tradable permits Voluntary agreements	Predictable allocation mechanisms and stable price signals important for investments Success factors include: clear targets, a baseline scenario, third-party involvement in design and review and formal provisions of monitoring, close cooperation between government and industry
<b>Forestry/forests</b> {WGIII 9.4}	Afforestation; reforestation; forest management; reduced deforestation; harvested wood product management; use of forestry products for bioenergy to replace fossil fuel use; <i>tree species improvement to increase biomass productivity and carbon sequestration; improved remote sensing technologies for analysis of vegetation/soil carbon sequestration potential and mapping land-use change</i>	Financial incentives and regulations for improved land management; maintaining soil carbon content; efficient use of fertilisers and irrigation	<i>May encourage synergy with sustainable development and with reducing vulnerability to climate change, thereby overcoming barriers to implementation</i>
<b>Waste</b> (WGIII 10.4)	Landfill CH <sub>4</sub> recovery; waste incineration with energy recovery; composting of organic waste; controlled wastewater treatment; recycling and waste minimisation; <i>biocovers and biofilters to optimise CH<sub>4</sub> oxidation</i>	Financial incentives (national and international) to increase forest area, to reduce deforestation and to maintain and manage forests; land-use regulation and enforcement Financial incentives for improved waste and wastewater management Renewable energy incentives or obligations Waste management regulations	Constraints include lack of investment capital and land tenure issues. <i>Can help poverty alleviation.</i> <i>May stimulate technology diffusion</i> Local availability of low-cost fuel Most effectively applied at national level with enforcement strategies

stabilisation level, studies since the TAR that take into account induced technological change may lower these price ranges to US\$5-65/tCO<sub>2</sub>-eq in 2030.<sup>24</sup> {WGIII 3.3, 11.4, 11.5, SPM}

**There is high agreement and much evidence that a wide variety of national policies and instruments are available to governments to create the incentives for mitigation action. Their applicability depends on national circumstances and an understanding of their interactions, but experience from implementation in various countries and sectors shows there are advantages and disadvantages for any given instrument.** {WGIII 13.2, SPM}

Four main criteria are used to evaluate policies and instruments: environmental effectiveness, cost effectiveness, distributional effects including equity, and institutional feasibility. {WGIII 13.2, SPM}

General findings about the performance of policies are: {WGIII 13.2, SPM}

- **Integrating climate policies in broader development policies** makes implementation and overcoming barriers easier.
- **Regulations and standards** generally provide some certainty about emission levels. They may be preferable to other instruments when information or other barriers prevent producers and consumers from responding to price signals. However, they may not induce innovations and more advanced technologies.
- **Taxes and charges** can set a price for carbon, but cannot guarantee a particular level of emissions. Literature identifies taxes as an efficient way of internalising costs of GHG emissions.
- **Tradable permits** will establish a carbon price. The volume of allowed emissions determines their environmental effectiveness, while the allocation of permits has distributional consequences. Fluctuation in the price of carbon makes it difficult to estimate the total cost of complying with emission permits.
- **Financial incentives** (subsidies and tax credits) are frequently used by governments to stimulate the development and diffusion of new technologies. While economic costs are generally higher than for the instruments listed above, they are often critical to overcome barriers.
- **Voluntary agreements** between industry and governments are politically attractive, raise awareness among stakeholders and have played a role in the evolution of many national policies. The majority of agreements have not achieved significant emissions reductions beyond business as usual. However, some recent agreements, in a few countries, have accelerated the application of best available technology and led to measurable emission reductions.
- **Information instruments** (e.g. awareness campaigns) may positively affect environmental quality by promoting informed choices and possibly contributing to behavioural change, however, their impact on emissions has not been measured yet.

- **Research, development and demonstration (RD&D)** can stimulate technological advances, reduce costs and enable progress toward stabilisation.

Some corporations, local and regional authorities, NGOs and civil groups are adopting a wide variety of voluntary actions. These voluntary actions may limit GHG emissions, stimulate innovative policies and encourage the deployment of new technologies. On their own, they generally have limited impact on national- or regional-level emissions. {WGIII 13.4, SPM}

#### 4.4 Relationship between adaptation and mitigation options and relationship with sustainable development

**There is growing understanding of the possibilities to choose and implement climate response options in several sectors to realise synergies and avoid conflicts with other dimensions of sustainable development.** {WGIII SPM}

Climate change policies related to energy efficiency and renewable energy are often economically beneficial, improve energy security and reduce local pollutant emissions. Reducing both loss of natural habitat and deforestation can have significant biodiversity, soil and water conservation benefits, and can be implemented in a socially and economically sustainable manner. Forestation and bioenergy plantations can restore degraded land, manage water runoff, retain soil carbon and benefit rural economies, but could compete with food production and may be negative for biodiversity, if not properly designed. {WGII 20.3, 20.8; WGIII 4.5, 9.7, 12.3, SPM}

There is growing evidence that decisions about macro-economic policy, agricultural policy, multilateral development bank lending, insurance practices, electricity market reform, energy security and forest conservation, for example, which are often treated as being apart from climate policy, can significantly reduce emissions (Table 4.3). Similarly, non-climate policies can affect adaptive capacity and vulnerability. {WGII 20.3; WGIII SPM, 12.3}

**Both synergies and trade-offs exist between adaptation and mitigation options.** {WGII 18.4.3; WGIII 11.9}

Examples of synergies include properly designed biomass production, formation of protected areas, land management, energy use in buildings, and forestry, but synergies are rather limited in other sectors. Potential trade-offs include increased GHG emissions due to increased consumption of energy related to adaptive responses. {WGII 18.4.3, 18.5, 18.7, TS.5.2; WGIII 4.5, 6.9, 8.5, 9.5, SPM}

<sup>24</sup> Studies on mitigation portfolios and macro-economic costs assessed in this report are based on top-down modelling. Most models use a global least-cost approach to mitigation portfolios, with universal emissions trading, assuming transparent markets, no transaction cost, and thus perfect implementation of mitigation measures throughout the 21<sup>st</sup> century. Costs are given for a specific point in time. Global modelled costs will increase if some regions, sectors (e.g. land use), options or gases are excluded. Global modelled costs will decrease with lower baselines, use of revenues from carbon taxes and auctioned permits, and if induced technological learning is included. These models do not consider climate benefits and generally also co-benefits of mitigation measures, or equity issues. Significant progress has been achieved in applying approaches based on induced technological change to stabilisation studies; however, conceptual issues remain. In the models that consider induced technological change, projected costs for a given stabilisation level are reduced; the reductions are greater at lower stabilisation level.

**Table 4.3.** Integrating climate change considerations into development policies – selected examples in the area of mitigation. {WGIII 12.2.4.6}

Selected sectors	Non-climate change policy instruments and actions	Potentially affects:
Macro-economy	Implement non-climate taxes/subsidies and/or other fiscal and regulatory policies that promote sustainable development	Total global GHG emissions
Forestry	Adoption of forest conservation and sustainable management practices	GHG emissions from deforestation
Electricity	Adoption of cost-effective renewables, demand-side management programmes, and transmission and distribution loss reduction	Electricity sector CO <sub>2</sub> emissions
Petroleum imports	Diversifying imported and domestic fuel mix and reducing economy's energy intensity to improve energy security	Emissions from crude oil and product imports
Insurance for building, transport sectors	Differentiated premiums, liability insurance exclusions, improved terms for green products	Transport and building sector GHG emissions
International finance	Country and sector strategies and project lending that reduces emissions	Emissions from developing countries

### 4.5 International and regional cooperation

There is *high agreement and much evidence* that notable achievements of the UNFCCC and its Kyoto Protocol are the establishment of a global response to the climate change problem, stimulation of an array of national policies, the creation of an international carbon market and the establishment of new institutional mechanisms that may provide the foundation for future mitigation efforts. Progress has also been made in addressing adaptation within the UNFCCC and additional initiatives have been suggested. {WGII 18.7; WGIII 13.3, SPM}

The impact of the Protocol's first commitment period relative to global emissions is projected to be limited. Its economic impacts on participating Annex-B countries are projected to be smaller than presented in the TAR, which showed 0.2 to 2% lower GDP in 2012 without emissions trading and 0.1 to 1.1% lower GDP with emissions trading among Annex-B countries. To be more environmentally effective, future mitigation efforts would need to achieve deeper reductions covering a higher share of global emissions (see Topic 5). {WGIII 1.4, 11.4, 13.3, SPM}

The literature provides *high agreement and much evidence* of many options for achieving reductions of global GHG emissions at the international level through cooperation. It also suggests that successful agreements are environmentally effective, cost-effective, incorporate distributional considerations and equity, and are institutionally feasible. {WGIII 13.3, SPM}

Greater cooperative efforts to reduce emissions will help to reduce global costs for achieving a given level of mitigation, or will improve environmental effectiveness. Improving and expanding the scope of market mechanisms (such as emission trading, Joint Implementation and Clean Development Mechanism) could reduce overall mitigation costs. {WGIII 13.3, SPM}

Efforts to address climate change can include diverse elements such as emissions targets; sectoral, local, sub-national and regional actions; RD&D programmes; adopting common policies; implementing development-oriented actions; or expanding financing instruments. These elements can be implemented in an integrated fashion, but comparing the efforts made by different countries quantitatively would be complex and resource intensive. {WGIII 13.3, SPM}

Actions that could be taken by participating countries can be differentiated both in terms of when such action is undertaken, who participates and what the action will be. Actions can be binding or non-binding, include fixed or dynamic targets, and participation can be static or vary over time. {WGIII 13.3, SPM}

# 5

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**The long-term perspective: scientific and socio-economic aspects relevant to adaptation and mitigation, consistent with the objectives and provisions of the Convention, and in the context of sustainable development**

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## 5.1 Risk management perspective

**Responding to climate change involves an iterative risk management process that includes both mitigation and adaptation, taking into account actual and avoided climate change damages, co-benefits, sustainability, equity and attitudes to risk. {WGII 20.9, SPM; WGIII SPM}**

Risk management techniques can explicitly accommodate sectoral, regional and temporal diversity, but their application requires information about not only impacts resulting from the most likely climate scenarios, but also impacts arising from lower-probability but higher-consequence events and the consequences of proposed policies and measures. Risk is generally understood to be the product of the likelihood of an event and its consequences. Climate change impacts depend on the characteristics of natural and human systems, their development pathways and their specific locations. {SYR 3.3, Figure 3.6; WGII 20.2, 20.9, SPM; WGIII 3.5, 3.6, SPM}

## 5.2 Key vulnerabilities, impacts and risks – long-term perspectives

**The five ‘reasons for concern’ identified in the TAR are now assessed to be stronger with many risks identified with higher confidence. Some are projected to be larger or to occur at lower increases in temperature. This is due to (1) better understanding of the magnitude of impacts and risks associated with increases in global average temperature and GHG concentrations, including vulnerability to present-day climate variability, (2) more precise identification of the circumstances that make systems, sectors, groups and regions especially vulnerable and (3) growing evidence that the risk of very large impacts on multiple century time scales would continue to increase as long as GHG concentrations and temperature continue to increase. Understanding about the relationship between impacts (the basis for ‘reasons for con-**

**cern’ in the TAR) and vulnerability (that includes the ability to adapt to impacts) has improved. {WGII 4.4, 5.4, 19.ES, 19.3.7, TS.4.6; WGIII 3.5, SPM}**

The TAR concluded that vulnerability to climate change is a function of exposure, sensitivity and adaptive capacity. Adaptation can reduce sensitivity to climate change while mitigation can reduce the exposure to climate change, including its rate and extent. Both conclusions are confirmed in this assessment. {WGII 20.2, 20.7.3}

No single metric can adequately describe the diversity of key vulnerabilities or support their ranking. A sample of relevant impacts is provided in Figure 3.6. The estimation of key vulnerabilities in any system, and damage implied, will depend on exposure (the rate and magnitude of climate change), sensitivity, which is determined in part and where relevant by development status, and adaptive capacity. Some key vulnerabilities may be linked to thresholds; in some cases these may cause a system to shift from one state to another, whereas others have thresholds that are defined subjectively and thus depend on societal values. {WGII 19.ES, 19.1}

The five ‘reasons for concern’ that were identified in the TAR were intended to synthesise information on climate risks and key vulnerabilities and to “aid readers in making their own determination” about risk. These remain a viable framework to consider key vulnerabilities, and they have been updated in the AR4. {TAR WGII Chapter 19; WGII SPM}

- **Risks to unique and threatened systems.** There is new and stronger evidence of observed impacts of climate change on unique and vulnerable systems (such as polar and high mountain communities and ecosystems), with increasing levels of adverse impacts as temperatures increase further. An increasing risk of species extinction and coral reef damage is projected with higher confidence than in the TAR as warming proceeds. There is *medium confidence* that approximately 20 to 30% of plant and animal species assessed so far are *likely* to be at increased risk of extinction if increases in global average temperature exceed 1.5 to 2.5°C over 1980-1999 levels. Confidence has increased that a 1 to 2°C increase in global mean temperature above 1990 levels (about 1.5 to 2.5°C above pre-indus-

### Key Vulnerabilities and Article 2 of the UNFCCC

Article 2 of the UNFCCC states:

“The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.”

Determining what constitutes “dangerous anthropogenic interference with the climate system” in relation to Article 2 of the UNFCCC involves value judgements. Science can support informed decisions on this issue, including by providing criteria for judging which vulnerabilities might be labelled ‘key’. {SYR 3.3, WGII 19.ES}

Key vulnerabilities<sup>25</sup> may be associated with many climate-sensitive systems, including food supply, infrastructure, health, water resources, coastal systems, ecosystems, global biogeochemical cycles, ice sheets and modes of oceanic and atmospheric circulation. {WGII 19.ES}

More specific information is now available across the regions of the world concerning the nature of future impacts, including for some places not covered in previous assessments. {WGII SPM}

<sup>25</sup> Key Vulnerabilities can be identified based on a number of criteria in the literature, including magnitude, timing, persistence/reversibility, the potential for adaptation, distributional aspects, likelihood and ‘importance’ of the impacts.

trial) poses significant risks to many unique and threatened systems including many biodiversity hotspots. Corals are vulnerable to thermal stress and have low adaptive capacity. Increases in sea surface temperature of about 1 to 3°C are projected to result in more frequent coral bleaching events and widespread mortality, unless there is thermal adaptation or acclimatisation by corals. Increasing vulnerability of Arctic indigenous communities and small island communities to warming is projected. {SYR 3.3, 3.4, Figure 3.6, Table 3.2; WGII 4.ES, 4.4, 6.4, 14.4.6, 15.ES, 15.4, 15.6, 16.ES, 16.2.1, 16.4, Table 19.1, 19.3.7, TS.5.3, Figure TS.12, Figure TS.14}

- **Risks of extreme weather events.** Responses to some recent extreme climate events reveal higher levels of vulnerability in both developing and developed countries than was assessed in the TAR. There is now higher confidence in the projected increases in droughts, heat waves and floods, as well as their adverse impacts. As summarised in Table 3.2, increases in drought, heat waves and floods are projected in many regions and would have mostly adverse impacts, including increased water stress and wild fire frequency, adverse effects on food production, adverse health effects, increased flood risk and extreme high sea level, and damage to infrastructure. {SYR 3.2, 3.3, Table 3.2; WGI 10.3, Table SPM.2; WGII 1.3, 5.4, 7.1, 7.5, 8.2, 12.6, 19.3, Table 19.1, Table SPM.1}
- **Distribution of impacts and vulnerabilities.** There are sharp differences across regions and those in the weakest economic position are often the most vulnerable to climate change and are frequently the most susceptible to climate-related damages, especially when they face multiple stresses. There is increasing evidence of greater vulnerability of specific groups such as the poor and elderly not only in developing but also in developed countries. There is greater confidence in the projected regional patterns of climate change (see Topic 3.2) and in the projections of regional impacts, enabling better identification of particularly vulnerable systems, sectors and regions (see Topic 3.3). Moreover, there is increased evidence that low-latitude and less-developed areas generally face greater risk, for example in dry areas and megadeltas. New studies confirm that Africa is one of the most vulnerable continents because of the range of projected impacts, multiple stresses and low adaptive capacity. Substantial risks due to sea level rise are projected particularly for Asian megadeltas and for small island communities. {SYR 3.2, 3.3, 5.4; WGI 11.2-11.7, SPM; WGII 3.4.3, 5.3, 5.4, Boxes 7.1 and 7.4, 8.1.1, 8.4.2, 8.6.1.3, 8.7, 9.ES, Table 10.9, 10.6, 16.3, 19.ES, 19.3, Table 19.1, 20.ES, TS.4.5, TS.5.4, Tables TS.1, TS.3, TS.4, SPM}
- **Aggregate impacts.** Compared to the TAR, initial net market-based benefits from climate change are projected to peak at a lower magnitude and therefore sooner than was assessed in the TAR. It is *likely* that there will be higher damages for larger magnitudes of global temperature increase than estimated in the TAR, and the net costs of impacts of increased warming are projected to increase over time. Aggregate impacts have also been quantified in other metrics (see Topic 3.3): for example,

climate change over the next century is *likely* to adversely affect hundreds of millions of people through increased coastal flooding, reductions in water supplies, increased malnutrition and increased health impacts. {SYR 3.3, Figure 3.6; WGII 19.3.7, 20.7.3, TS.5.3}

- **Risks of large-scale singularities.**<sup>26</sup> As discussed in Topic 3.4, during the current century, a large-scale abrupt change in the meridional overturning circulation is *very unlikely*. There is *high confidence* that global warming over many centuries would lead to a sea level rise contribution from thermal expansion alone that is projected to be much larger than observed over the 20<sup>th</sup> century, with loss of coastal area and associated impacts. There is better understanding than in the TAR that the risk of additional contributions to sea level rise from both the Greenland and possibly Antarctic ice sheets may be larger than projected by ice sheet models and could occur on century time scales. This is because ice dynamical processes seen in recent observations but not fully included in ice sheet models assessed in the AR4 could increase the rate of ice loss. Complete deglaciation of the Greenland ice sheet would raise sea level by 7m and could be irreversible. {SYR 3.4; WGI 10.3, Box 10.1; WGII 19.3.7, SPM}

### 5.3 Adaptation and mitigation

**There is *high confidence* that neither adaptation nor mitigation alone can avoid all climate change impacts. Adaptation is necessary both in the short term and longer term to address impacts resulting from the warming that would occur even for the lowest stabilisation scenarios assessed. There are barriers, limits and costs that are not fully understood. Adaptation and mitigation can complement each other and together can significantly reduce the risks of climate change.** {WGII 4.ES, TS 5.1, 18.4, 18.6, 20.7, SPM; WGIII 1.2, 2.5, 3.5, 3.6}

Adaptation will be ineffective for some cases such as natural ecosystems (e.g. loss of Arctic sea ice and marine ecosystem viability), the disappearance of mountain glaciers that play vital roles in water storage and supply, or adaptation to sea level rise of several metres<sup>27</sup>. It will be less feasible or very costly in many cases for the projected climate change beyond the next several decades (such as delta regions and estuaries). There is *high confidence* that the ability of many ecosystems to adapt naturally will be exceeded this century. In addition, multiple barriers and constraints to effective adaptation exist in human systems (see Topic 4.2). {SYR 4.2; WGII 17.4.2, 19.2, 19.4.1}

Unmitigated climate change would, in the long term, be *likely* to exceed the capacity of natural, managed and human systems to adapt. Reliance on adaptation alone could eventually lead to a magnitude of climate change to which effective adaptation is not possible, or will only be available at very high social, environmental and economic costs. {WGII 18.1, SPM}

<sup>26</sup> See glossary

<sup>27</sup> While it is technically possible to adapt to several metres of sea level rise, the resources required are so unevenly distributed that in reality this risk is outside the scope of adaptation. {WGII 17.4.2, 19.4.1}

**Efforts to mitigate GHG emissions to reduce the rate and magnitude of climate change need to account for inertia in the climate and socio-economic systems. {SYR 3.2; WGI 10.3, 10.4, 10.7, SPM; WGIII 2.3.4}**

After GHG concentrations are stabilised, the rate at which the global average temperature increases is expected to slow within a few decades. Small increases in global average temperature could still be expected for several centuries. Sea level rise from thermal expansion would continue for many centuries at a rate that eventually decreases from that reached before stabilisation, due to ongoing heat uptake by oceans. {SYR 3.2, WGI 10.3, 10.4, 10.7, SPM}

Delayed emission reductions significantly constrain the opportunities to achieve lower stabilisation levels and increase the risk of more severe climate change impacts. Even though benefits of mitigation measures in terms of avoided climate change would take several decades to materialise, mitigation actions begun in the short term would avoid locking in both long-lived carbon intensive infrastructure and development pathways, reduce the rate of climate change and reduce the adaptation needs associated with higher levels of warming. {WGII 18.4, 20.6, 20.7, SPM; WGIII 2.3.4, 3.4, 3.5, 3.6, SPM}

**5.4 Emission trajectories for stabilisation**

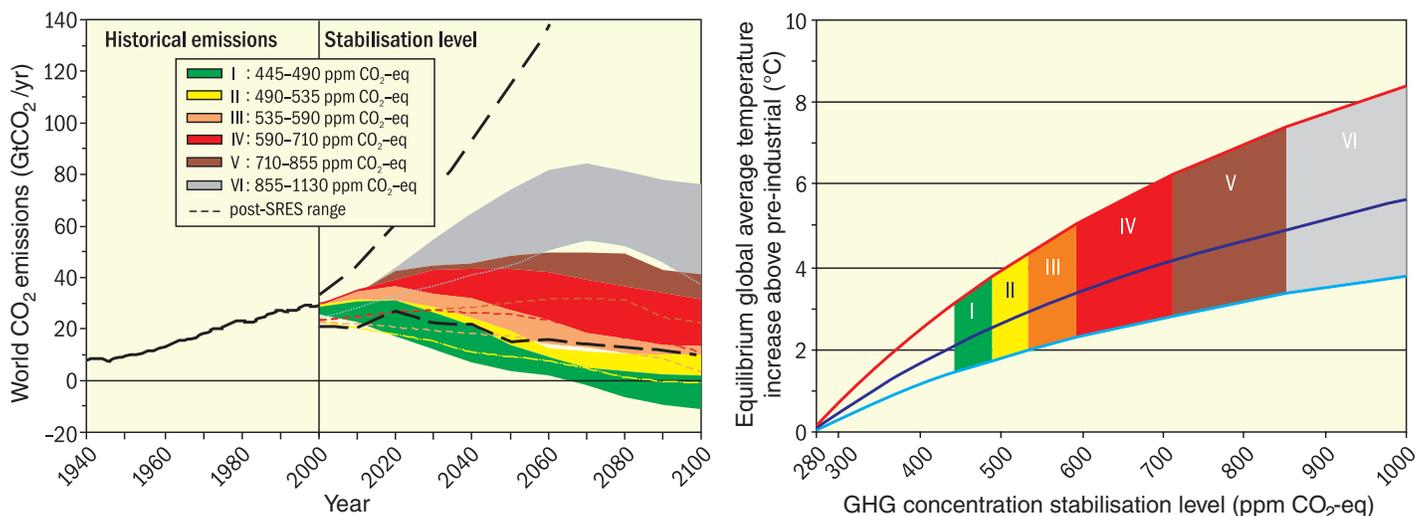
**In order to stabilise the concentration of GHGs in the atmosphere, emissions would need to peak and decline thereafter.<sup>28</sup> The lower the stabilisation level, the more quickly this peak and decline would need to occur (Figure 5.1).<sup>29</sup> {WGIII 3.3, 3.5, SPM}**

Advances in modelling since the TAR permit the assessment of multi-gas mitigation strategies for exploring the attainability and costs for achieving stabilisation of GHG concentrations. These scenarios explore a wider range of future scenarios, including lower levels of stabilisation, than reported in the TAR. {WGIII 3.3, 3.5, SPM}

**Mitigation efforts over the next two to three decades will have a large impact on opportunities to achieve lower stabilisation levels (Table 5.1 and Figure 5.1). {WGIII 3.5, SPM}**

Table 5.1 summarises the required emission levels for different groups of stabilisation concentrations and the resulting equilibrium

**CO<sub>2</sub> emissions and equilibrium temperature increases for a range of stabilisation levels**



**Figure 5.1.** Global CO<sub>2</sub> emissions for 1940 to 2000 and emissions ranges for categories of stabilisation scenarios from 2000 to 2100 (left-hand panel); and the corresponding relationship between the stabilisation target and the likely equilibrium global average temperature increase above pre-industrial (right-hand panel). Approaching equilibrium can take several centuries, especially for scenarios with higher levels of stabilisation. Coloured shadings show stabilisation scenarios grouped according to different targets (stabilisation category I to VI). The right-hand panel shows ranges of global average temperature change above pre-industrial, using (i) 'best estimate' climate sensitivity of 3°C (black line in middle of shaded area), (ii) upper bound of likely range of climate sensitivity of 4.5°C (red line at top of shaded area) (iii) lower bound of likely range of climate sensitivity of 2°C (blue line at bottom of shaded area). Black dashed lines in the left panel give the emissions range of recent baseline scenarios published since the SRES (2000). Emissions ranges of the stabilisation scenarios comprise CO<sub>2</sub>-only and multigas scenarios and correspond to the 10<sup>th</sup> to 90<sup>th</sup> percentile of the full scenario distribution. Note: CO<sub>2</sub> emissions in most models do not include emissions from decay of above ground biomass that remains after logging and deforestation, and from peat fires and drained peat soils. {WGIII Figures SPM.7 and SPM.8}

<sup>28</sup> Peaking means that the emissions need to reach a maximum before they decline later.

<sup>29</sup> For the lowest mitigation scenario category assessed, emissions would need to peak by 2015 and for the highest by 2090 (see Table 5.1). Scenarios that use alternative emission pathways show substantial differences on the rate of global climate change. {WGII 19.4}

**Table 5.1.** Characteristics of post-TAR stabilisation scenarios and resulting long-term equilibrium global average temperature and the sea level rise component from thermal expansion only.<sup>a</sup> {WGI 10.7; WGIII Table TS.2, Table 3.10, Table SPM.5}

Category	CO <sub>2</sub> concentration at stabilisation (2005 = 379 ppm) <sup>b</sup>	CO <sub>2</sub> -equivalent concentration at stabilisation including GHGs and aerosols (2005=375 ppm) <sup>b</sup>	Peaking year for CO <sub>2</sub> emissions <sup>a,c</sup>	Change in global CO <sub>2</sub> emissions in 2050 (percent of 2000 emissions) <sup>a,c</sup>	Global average temperature increase above pre-industrial at equilibrium, using 'best estimate' climate sensitivity <sup>d,e</sup>	Global average sea level rise above pre-industrial at equilibrium from thermal expansion only <sup>f</sup>	Number of assessed scenarios
	ppm	ppm	year	percent	°C	metres	
I	350 – 400	445 – 490	2000 – 2015	-85 to -50	2.0 – 2.4	0.4 – 1.4	6
II	400 – 440	490 – 535	2000 – 2020	-60 to -30	2.4 – 2.8	0.5 – 1.7	18
III	440 – 485	535 – 590	2010 – 2030	-30 to +5	2.8 – 3.2	0.6 – 1.9	21
IV	485 – 570	590 – 710	2020 – 2060	+10 to +60	3.2 – 4.0	0.6 – 2.4	118
V	570 – 660	710 – 855	2050 – 2080	+25 to +85	4.0 – 4.9	0.8 – 2.9	9
VI	660 – 790	855 – 1130	2060 – 2090	+90 to +140	4.9 – 6.1	1.0 – 3.7	5

## Notes:

- The emission reductions to meet a particular stabilisation level reported in the mitigation studies assessed here might be underestimated due to missing carbon cycle feedbacks (see also Topic 2.3).
- Atmospheric CO<sub>2</sub> concentrations were 379ppm in 2005. The best estimate of total CO<sub>2</sub>-eq concentration in 2005 for all long-lived GHGs is about 455ppm, while the corresponding value including the net effect of all anthropogenic forcing agents is 375ppm CO<sub>2</sub>-eq.
- Ranges correspond to the 15<sup>th</sup> to 85<sup>th</sup> percentile of the post-TAR scenario distribution. CO<sub>2</sub> emissions are shown so multi-gas scenarios can be compared with CO<sub>2</sub>-only scenarios (see Figure 2.1).
- The best estimate of climate sensitivity is 3°C.
- Note that global average temperature at equilibrium is different from expected global average temperature at the time of stabilisation of GHG concentrations due to the inertia of the climate system. For the majority of scenarios assessed, stabilisation of GHG concentrations occurs between 2100 and 2150 (see also Footnote 30).
- Equilibrium sea level rise is for the contribution from ocean thermal expansion only and does not reach equilibrium for at least many centuries. These values have been estimated using relatively simple climate models (one low-resolution AOGCM and several EMICs based on the best estimate of 3°C climate sensitivity) and do not include contributions from melting ice sheets, glaciers and ice caps. Long-term thermal expansion is projected to result in 0.2 to 0.6m per degree Celsius of global average warming above pre-industrial. (AOGCM refers to Atmosphere-Ocean General Circulation Model and EMICs to Earth System Models of Intermediate Complexity.)

global average temperature increases, using the 'best estimate' of climate sensitivity (see Figure 5.1 for the *likely* range of uncertainty). Stabilisation at lower concentration and related equilibrium temperature levels advances the date when emissions need to peak and requires greater emissions reductions by 2050.<sup>30</sup> Climate sensitivity is a key uncertainty for mitigation scenarios that aim to meet specific temperature levels. The timing and level of mitigation to reach a given temperature stabilisation level is earlier and more stringent if climate sensitivity is high than if it is low. {WGIII 3.3, 3.4, 3.5, 3.6, SPM}

Sea level rise under warming is inevitable. Thermal expansion would continue for many centuries after GHG concentrations have stabilised, for any of the stabilisation levels assessed, causing an eventual sea level rise much larger than projected for the 21<sup>st</sup> century (Table 5.1). If GHG and aerosol concentrations had been stabilised at year 2000 levels, thermal expansion alone would be expected to lead to further sea level rise of 0.3 to 0.8m. The eventual contributions from Greenland ice sheet loss could be several metres, and larger than from thermal expansion, should warming in excess of 1.9 to 4.6°C above pre-industrial be sustained over many centuries. These long-term consequences would have major impli-

cations for world coastlines. The long time scale of thermal expansion and ice sheet response to warming imply that mitigation strategies that seek to stabilise GHG concentrations (or radiative forcing) at or above present levels do not stabilise sea level for many centuries. {WGI 10.7}

Feedbacks between the carbon cycle and climate change affect the required mitigation and adaptation response to climate change. Climate-carbon cycle coupling is expected to increase the fraction of anthropogenic emissions that remains in the atmosphere as the climate system warms (see Topics 2.3 and 3.2.1), but mitigation studies have not yet incorporated the full range of these feedbacks. As a consequence, the emission reductions to meet a particular stabilisation level reported in the mitigation studies assessed in Table 5.1 might be underestimated. Based on current understanding of climate-carbon cycle feedbacks, model studies suggest that stabilising CO<sub>2</sub> concentrations at, for example, 450ppm<sup>31</sup> could require cumulative emissions over the 21<sup>st</sup> century to be less than 1800 [1370 to 2200] GtCO<sub>2</sub>, which is about 27% less than the 2460 [2310 to 2600] GtCO<sub>2</sub> determined without consideration of carbon cycle feedbacks. {SYR 2.3, 3.2.1; WGI 7.3, 10.4, SPM}

<sup>30</sup> Estimates for the evolution of temperature over the course of this century are not available in the AR4 for the stabilisation scenarios. For most stabilisation levels global average temperature is approaching the equilibrium level over a few centuries. For the much lower stabilisation scenarios (category I and II, Figure 5.1), the equilibrium temperature may be reached earlier.

<sup>31</sup> To stabilise at 1000ppm CO<sub>2</sub>, this feedback could require that cumulative emissions be reduced from a model average of approximately 5190 [4910 to 5460] GtCO<sub>2</sub> to approximately 4030 [3590 to 4580] GtCO<sub>2</sub>. {WGI 7.3, 10.4, SPM}

## 5.5 Technology flows and development

There is *high agreement* and *much evidence* that all stabilisation levels assessed can be achieved by deployment of a portfolio of technologies that are either currently available or expected to be commercialised in coming decades, assuming appropriate and effective incentives are in place for development, acquisition, deployment and diffusion of technologies and addressing related barriers. {WGIII SPM}

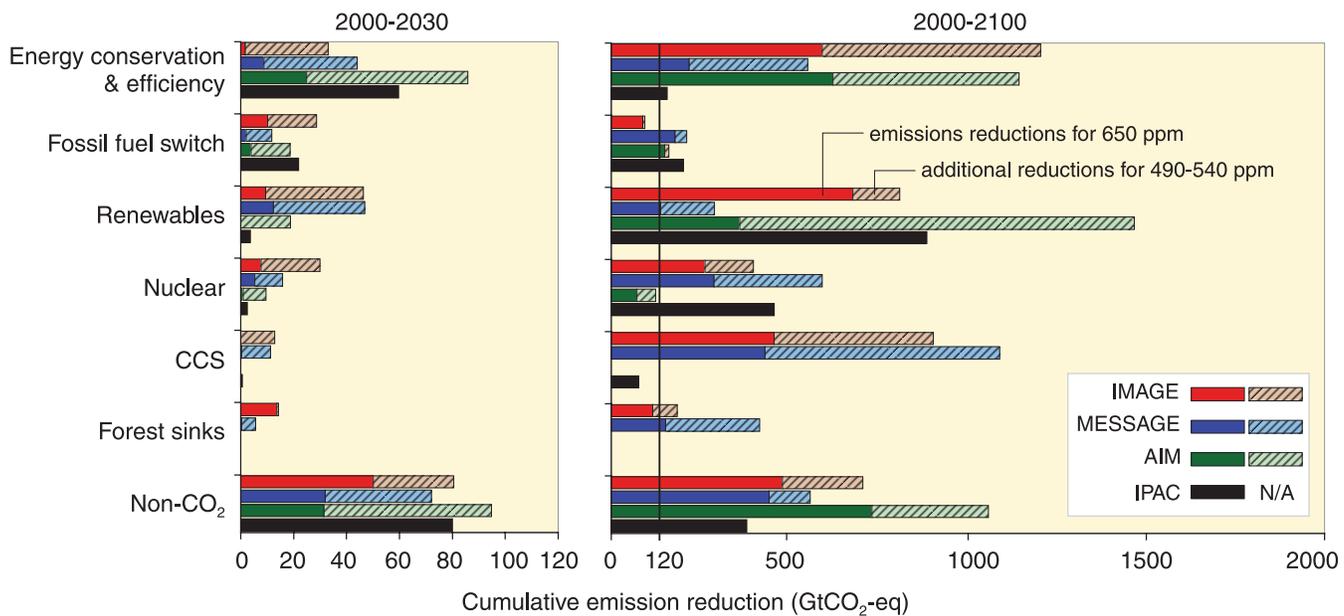
Worldwide deployment of low-GHG emission technologies as well as technology improvements through public and private RD&D would be required for achieving stabilisation targets as well as cost reduction.<sup>32</sup> Figure 5.2 gives illustrative examples of the contribution of the portfolio of mitigation options. The contribution of different technologies varies over time and region and depends on the baseline development path, available technologies and relative costs, and the analysed stabilisation levels. Stabilisation at the lower of the assessed levels (490 to 540ppm CO<sub>2</sub>-eq) requires early investments and substantially more rapid diffusion and commercialisation of advanced low-emissions technologies over the next decades

(2000-2030) and higher contributions across abatement options in the long term (2000-2100). This requires that barriers to development, acquisition, deployment and diffusion of technologies are effectively addressed with appropriate incentives. {WGIII 2.7, 3.3, 3.4, 3.6, 4.3, 4.4, 4.6, SPM}

Without sustained investment flows and effective technology transfer, it may be difficult to achieve emission reduction at a significant scale. Mobilising financing of incremental costs of low-carbon technologies is important. {WGIII 13.3, SPM}

There are large uncertainties concerning the future contribution of different technologies. However, all assessed stabilisation scenarios concur that 60 to 80% of the reductions over the course of the century would come from energy supply and use and industrial processes. Including non-CO<sub>2</sub> and CO<sub>2</sub> land-use and forestry mitigation options provides greater flexibility and cost-effectiveness. Energy efficiency plays a key role across many scenarios for most regions and time scales. For lower stabilisation levels, scenarios put more emphasis on the use of low-carbon energy sources, such as renewable energy, nuclear power and the use of CO<sub>2</sub> capture and storage (CCS). In these scenarios, improvements of carbon intensity of energy supply and the whole economy needs to be much faster than in the past (Figure 5.2). {WGIII 3.3, 3.4, TS.3, SPM}

Illustrative mitigation portfolios for achieving stabilisation of GHG concentrations



**Figure 5.2** Cumulative emissions reductions for alternative mitigation measures for 2000-2030 (left-hand panel) and for 2000-2100 (right-hand panel). The figure shows illustrative scenarios from four models (AIM, IMAGE, IPAC and MESSAGE) aiming at the stabilisation at low (490 to 540ppm CO<sub>2</sub>-eq) and intermediate levels (650ppm CO<sub>2</sub>-eq) respectively. Dark bars denote reductions for a target of 650ppm CO<sub>2</sub>-eq and light bars denote the additional reductions to achieve 490 to 540ppm CO<sub>2</sub>-eq. Note that some models do not consider mitigation through forest sink enhancement (AIM and IPAC) or CCS (AIM) and that the share of low-carbon energy options in total energy supply is also determined by inclusion of these options in the baseline. CCS includes CO<sub>2</sub> capture and storage from biomass. Forest sinks include reducing emissions from deforestation. The figure shows emissions reductions from baseline scenarios with cumulative emissions between 6000 to 7000 GtCO<sub>2</sub>-eq (2000-2100). {WGIII Figure SPM.9}

<sup>32</sup> By comparison, government funding in real absolute terms for most energy research programmes has been flat or declining for nearly two decades (even after the UNFCCC came into force) and is now about half of the 1980 level. {WGIII 2.7, 3.4, 4.5, 11.5, 13.2}

## 5.6 Costs of mitigation and long-term stabilisation targets

**The macro-economic costs of mitigation generally rise with the stringency of the stabilisation target and are relatively higher when derived from baseline scenarios characterised by high emission levels. {WGIII SPM}**

There is *high agreement* and *medium evidence* that in 2050 global average macro-economic costs for multi-gas mitigation towards stabilisation between 710 and 445ppm CO<sub>2</sub>-eq are between a 1% gain to a 5.5% decrease of global GDP (Table 5.2). This corresponds to slowing average annual global GDP growth by less than 0.12 percentage points. Estimated GDP losses by 2030 are on average lower and show a smaller spread compared to 2050 (Table 5.2). For specific countries and sectors, costs vary considerably from the global average.<sup>33</sup> {WGIII 3.3, 13.3, SPM}

## 5.7 Costs, benefits and avoided climate impacts at global and regional levels

**Impacts of climate change will vary regionally. Aggregated and discounted to the present, they are very likely to impose net annual costs, which will increase over time as global temperatures increase. {WGII SPM}**

For increases in global average temperature of less than 1 to 3°C above 1980-1999 levels, some impacts are projected to produce market benefits in some places and sectors while, at the same time, imposing costs in other places and sectors. Global mean losses could be 1 to 5% of GDP for 4°C of warming, but regional losses could be substantially higher. {WGII 9.ES, 10.6, 15.ES, 20.6, SPM}

Peer-reviewed estimates of the social cost of carbon (net economic costs of damages from climate change aggregated across the

globe and discounted to the present) for 2005 have an average value of US\$12 per tonne of CO<sub>2</sub>, but the range from 100 estimates is large (-\$3 to \$95/tCO<sub>2</sub>). The range of published evidence indicates that the net damage costs of climate change are projected to be significant and to increase over time. {WGII 20.6, SPM}

It is *very likely* that globally aggregated figures underestimate the damage costs because they cannot include many non-quantifiable impacts. It is *virtually certain* that aggregate estimates of costs mask significant differences in impacts across sectors, regions, countries and populations. In some locations and amongst some groups of people with high exposure, high sensitivity and/or low adaptive capacity, net costs will be significantly larger than the global average. {WGII 7.4, 20.ES, 20.6, 20.ES, SPM}

**Limited and early analytical results from integrated analyses of the global costs and benefits of mitigation indicate that these are broadly comparable in magnitude, but do not as yet permit an unambiguous determination of an emissions pathway or stabilisation level where benefits exceed costs. {WGIII SPM}**

Comparing the costs of mitigation with avoided damages would require the reconciliation of welfare impacts on people living in different places and at different points in time into a global aggregate measure of well-being. {WGII 18.ES}

Choices about the scale and timing of GHG mitigation involve balancing the economic costs of more rapid emission reductions now against the corresponding medium-term and long-term climate risks of delay. {WGIII SPM}

**Many impacts can be avoided, reduced or delayed by mitigation. {WGII SPM}**

Although the small number of impact assessments that evaluate stabilisation scenarios do not take full account of uncertainties in projected climate under stabilisation, they nevertheless provide indications of damages avoided and risks reduced for different

**Table 5.2. Estimated global macro-economic costs in 2030 and 2050. Costs are relative to the baseline for least-cost trajectories towards different long-term stabilisation levels. {WGIII 3.3, 13.3, Tables SPM.4 and SPM.6}**

Stabilisation levels (ppm CO <sub>2</sub> -eq)	Median GDP reduction <sup>a</sup> (%)		Range of GDP reduction <sup>b</sup> (%)		Reduction of average annual GDP growth rates (percentage points) <sup>c,e</sup>	
	2030	2050	2030	2050	2030	2050
445 – 535 <sup>d</sup>	Not available		<3	<5.5	< 0.12	< 0.12
535 – 590	0.6	1.3	0.2 to 2.5	slightly negative to 4	< 0.1	< 0.1
590 – 710	0.2	0.5	-0.6 to 1.2	-1 to 2	< 0.06	< 0.05

Notes:

Values given in this table correspond to the full literature across all baselines and mitigation scenarios that provide GDP numbers.

- a) Global GDP based on market exchange rates.
- b) The 10<sup>th</sup> and 90<sup>th</sup> percentile range of the analysed data are given where applicable. Negative values indicate GDP gain. The first row (445-535ppm CO<sub>2</sub>-eq) gives the upper bound estimate of the literature only.
- c) The calculation of the reduction of the annual growth rate is based on the average reduction during the assessed period that would result in the indicated GDP decrease by 2030 and 2050 respectively.
- d) The number of studies is relatively small and they generally use low baselines. High emissions baselines generally lead to higher costs.
- e) The values correspond to the highest estimate for GDP reduction shown in column three.

<sup>33</sup> See Footnote 24 for further details on cost estimates and model assumptions.

amounts of emissions reduction. The rate and magnitude of future human-induced climate change and its associated impacts are determined by human choices defining alternative socio-economic futures and mitigation actions that influence emission pathways. Figure 3.2 demonstrates that alternative SRES emission pathways could lead to substantial differences in climate change throughout the 21<sup>st</sup> century. Some of the impacts at the high temperature end of Figure 3.6 could be avoided by socio-economic development pathways that limit emissions and associated climate change towards the lower end of the ranges illustrated in Figure 3.6. *{SYR 3.2, 3.3; WGIII 3.5, 3.6, SPM}*

Figure 3.6 illustrates how reduced warming could reduce the risk of, for example, affecting a significant number of ecosystems, the risk of extinctions, and the likelihood that cereal productivity in some regions would tend to fall. *{SYR 3.3, Figure 3.6; WGII 4.4, 5.4, Table 20.6}*

## 5.8 Broader environmental and sustainability issues

**Sustainable development can reduce vulnerability to climate change, and climate change could impede nations' abilities to achieve sustainable development pathways. *{WGII SPM}***

It is *very likely* that climate change can slow the pace of progress toward sustainable development either directly through increased

exposure to adverse impacts or indirectly through erosion of the capacity to adapt. Over the next half-century, climate change could impede achievement of the Millennium Development Goals. *{WGII SPM}*

Climate change will interact at all scales with other trends in global environmental and natural resource concerns, including water, soil and air pollution, health hazards, disaster risk, and deforestation. Their combined impacts may be compounded in future in the absence of integrated mitigation and adaptation measures. *{WGII 20.3, 20.7, 20.8, SPM}*

**Making development more sustainable can enhance mitigative and adaptive capacities, reduce emissions, and reduce vulnerability, but there may be barriers to implementation. *{WGII 20.8; WGIII 12.2, SPM}***

Both adaptive and mitigative capacities can be enhanced through sustainable development. Sustainable development can, thereby, reduce vulnerability to climate change by reducing sensitivities (through adaptation) and/or exposure (through mitigation). At present, however, few plans for promoting sustainability have explicitly included either adapting to climate change impacts, or promoting adaptive capacity. Similarly, changing development paths can make a major contribution to mitigation but may require resources to overcome multiple barriers. *{WGII 20.3, 20.5, SPM; WGIII 2.1, 2.5, 12.1, SPM}*

# 6

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## **Robust findings, key uncertainties**

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## Robust findings, key uncertainties

As in the TAR, a robust finding for climate change is defined as one that holds under a variety of approaches, methods, models and assumptions, and is expected to be relatively unaffected by uncertainties. Key uncertainties are those that, if reduced, could lead to new robust findings. *{TAR SYR Q.9}*

Robust findings do not encompass all key findings of the AR4. Some key findings may be policy-relevant even though they are associated with large uncertainties. *{WGII 20.9}*

The robust findings and key uncertainties listed below do not represent an exhaustive list.

### 6.1 Observed changes in climate and their effects, and their causes

#### Robust findings

Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level. *{WGI 3.9, SPM}*

Many natural systems, on all continents and in some oceans, are being affected by regional climate changes. Observed changes in many physical and biological systems are consistent with warming. As a result of the uptake of anthropogenic CO<sub>2</sub> since 1750, the acidity of the surface ocean has increased. *{WGI 5.4, WGII 1.3}*

Global total annual anthropogenic GHG emissions, weighted by their 100-year GWPs, have grown by 70% between 1970 and 2004. As a result of anthropogenic emissions, atmospheric concentrations of N<sub>2</sub>O now far exceed pre-industrial values spanning many thousands of years, and those of CH<sub>4</sub> and CO<sub>2</sub> now far exceed the natural range over the last 650,000 years. *{WGI SPM; WGIII 1.3}*

Most of the global average warming over the past 50 years is *very likely* due to anthropogenic GHG increases and it is *likely* that there is a discernible human-induced warming averaged over each continent (except Antarctica). *{WGI 9.4, SPM}*

Anthropogenic warming over the last three decades has *likely* had a discernible influence at the global scale on observed changes in many physical and biological systems. *{WGII 1.4, SPM}*

#### Key uncertainties

Climate data coverage remains limited in some regions and there is a notable lack of geographic balance in data and literature on observed changes in natural and managed systems, with marked scarcity in developing countries. *{WGI SPM; WGII 1.3, SPM}*

Analysing and monitoring changes in extreme events, including drought, tropical cyclones, extreme temperatures and the frequency and intensity of precipitation, is more difficult than for climatic averages as longer data time-series of higher spatial and temporal resolutions are required. *{WGI 3.8, SPM}*

Effects of climate changes on human and some natural systems are difficult to detect due to adaptation and non-climatic drivers. *{WGII 1.3}*

Difficulties remain in reliably simulating and attributing observed temperature changes to natural or human causes at smaller than continental scales. At these smaller scales, factors such as land-use change and pollution also complicate the detection of anthropogenic warming influence on physical and biological systems. *{WGI 8.3, 9.4, SPM; WGII 1.4, SPM}*

The magnitude of CO<sub>2</sub> emissions from land-use change and CH<sub>4</sub> emissions from individual sources remain as key uncertainties. *{WGI 2.3, 7.3, 7.4; WGIII 1.3, TS.14}*

## 6.2 Drivers and projections of future climate changes and their impacts

#### Robust findings

With current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades. *{WGIII 3.2, SPM}*

For the next two decades a warming of about 0.2°C per decade is projected for a range of SRES emissions scenarios. *{WGI 10.3, 10.7, SPM}*

Continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21<sup>st</sup> century that would *very likely* be larger than those observed during the 20<sup>th</sup> century. *{WGI 10.3, 11.1, SPM}*

The pattern of future warming where land warms more than the adjacent oceans and more in northern high latitudes is seen in all scenarios. *{WGI 10.3, 11.1, SPM}*

Warming tends to reduce terrestrial ecosystem and ocean uptake of atmospheric CO<sub>2</sub>, increasing the fraction of anthropogenic emissions that remains in the atmosphere. *{WGI 7.3, 10.4, 10.5, SPM}*

Anthropogenic warming and sea level rise would continue for centuries even if GHG emissions were to be reduced sufficiently for GHG concentrations to stabilise, due to the time scales associated with climate processes and feedbacks. *{WGI 10.7, SPM}*

Equilibrium climate sensitivity is *very unlikely* to be less than 1.5°C. *{WGI 8.6, 9.6, Box 10.2, SPM}*

Some systems, sectors and regions are *likely* to be especially affected by climate change. The systems and sectors are some ecosystems (tundra, boreal forest, mountain, mediterranean-type, mangroves, salt marshes, coral reefs and the sea-ice biome), low-lying coasts, water resources in some dry regions at mid-latitudes and in the dry tropics and in areas dependent on snow and ice melt, agriculture in low-latitude regions, and human health in areas with low adaptive capacity. The regions are the Arctic, Africa, small islands and Asian and African megadeltas. Within other regions, even those with high incomes, some people, areas and activities can be particularly at risk. *{WGII TS.4.5}*

Impacts are *very likely* to increase due to increased frequencies and intensities of some extreme weather events. Recent events have demonstrated the vulnerability of some sectors and regions, including in developed countries, to heat waves, tropical cyclones, floods and drought, providing stronger reasons for concern as compared to the findings of the TAR. *{WGII Table SPM.2, 19.3}*

## Key uncertainties

Uncertainty in the equilibrium climate sensitivity creates uncertainty in the expected warming for a given CO<sub>2</sub>-eq stabilisation scenario. Uncertainty in the carbon cycle feedback creates uncertainty in the emissions trajectory required to achieve a particular stabilisation level. *{WGI 7.3, 10.4, 10.5, SPM}*

Models differ considerably in their estimates of the strength of different feedbacks in the climate system, particularly cloud feedbacks, oceanic heat uptake and carbon cycle feedbacks, although progress has been made in these areas. Also, the confidence in projections is higher for some variables (e.g. temperature) than for others (e.g. precipitation), and it is higher for larger spatial scales and longer time averaging periods. *{WGI 7.3, 8.1-8.7, 9.6, 10.2, 10.7, SPM; WGII 4.4}*

Aerosol impacts on the magnitude of the temperature response, on clouds and on precipitation remain uncertain. *{WGI 2.9, 7.5, 9.2, 9.4, 9.5}*

Future changes in the Greenland and Antarctic ice sheet mass, particularly due to changes in ice flow, are a major source of uncertainty that could increase sea level rise projections. The uncertainty in the penetration of the heat into the oceans also contributes to the future sea level rise uncertainty. *{WGI 4.6, 6.4, 10.3, 10.7, SPM}*

Large-scale ocean circulation changes beyond the 21<sup>st</sup> century cannot be reliably assessed because of uncertainties in the meltwater supply from the Greenland ice sheet and model response to the warming. *{WGI 6.4, 8.7, 10.3}*

Projections of climate change and its impacts beyond about 2050 are strongly scenario- and model-dependent, and improved projections would require improved understanding of sources of uncertainty and enhancements in systematic observation networks. *{WGII TS.6}*

Impacts research is hampered by uncertainties surrounding regional projections of climate change, particularly precipitation. *{WGII TS.6}*

Understanding of low-probability/high-impact events and the cumulative impacts of sequences of smaller events, which is required for risk-based approaches to decision-making, is generally limited. *{WGII 19.4, 20.2, 20.4, 20.9, TS.6}*

## 6.3 Responses to climate change

### Robust findings

Some planned adaptation (of human activities) is occurring now; more extensive adaptation is required to reduce vulnerability to climate change. *{WGII 17.ES, 20.5, Table 20.6, SPM}*

Unmitigated climate change would, in the long term, be *likely* to exceed the capacity of natural, managed and human systems to adapt. *{WGII 20.7, SPM}*

A wide range of mitigation options is currently available or projected to be available by 2030 in all sectors. The economic mitigation potential, at costs that range from net negative up to US\$100/tCO<sub>2</sub>-equivalent, is sufficient to offset the projected growth of global emissions or to reduce emissions to below current levels in 2030. *{WGIII 11.3, SPM}*

Many impacts can be reduced, delayed or avoided by mitigation. Mitigation efforts and investments over the next two to three decades will have a large impact on opportunities to achieve lower stabilisation levels. Delayed emissions reductions significantly constrain the opportunities to achieve lower stabilisation levels and increase the risk of more severe climate change impacts. *{WGII SPM, WGIII SPM}*

The range of stabilisation levels for GHG concentrations that have been assessed can be achieved by deployment of a portfolio of technologies that are currently available and those that are expected to be commercialised in coming decades, provided that appropriate and effective incentives are in place and barriers are removed. In addition, further RD&D would be required to improve the technical performance, reduce the costs and achieve social acceptability of new technologies. The lower the stabilisation levels, the greater the need for investment in new technologies during the next few decades. *{WGIII 3.3, 3.4}*

Making development more sustainable by changing development paths can make a major contribution to climate change mitigation and adaptation and to reducing vulnerability. *{WGII 18.7, 20.3, SPM; WGIII 13.2, SPM}*

Decisions about macro-economic and other policies that seem unrelated to climate change can significantly affect emissions. *{WGIII 12.2}*

### Key uncertainties

Understanding of how development planners incorporate information about climate variability and change into their decisions is limited. This limits the integrated assessment of vulnerability. *{WGII 18.8, 20.9}*

The evolution and utilisation of adaptive and mitigative capacity depend on underlying socio-economic development pathways. *{WGII 17.3, 17.4, 18.6, 19.4, 20.9}*

Barriers, limits and costs of adaptation are not fully understood, partly because effective adaptation measures are highly dependent on specific geographical and climate risk factors as well as institutional, political and financial constraints. *{WGII SPM}*

Estimates of mitigation costs and potentials depend on assumptions about future socio-economic growth, technological change and consumption patterns. Uncertainty arises in particular from assumptions regarding the drivers of technology diffusion and the potential of long-term technology performance and cost improvements. Also little is known about the effects of changes in behaviour and lifestyles. *{WGIII 3.3, 3.4, 11.3}*

The effects of non-climate policies on emissions are poorly quantified. *{WGIII 12.2}*





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# The Emissions Gap Report

**Are the Copenhagen  
Accord Pledges  
Sufficient to Limit  
Global Warming to 2° C or 1.5° C?**

**A preliminary assessment**

**TECHNICAL SUMMARY**

## Acknowledgements

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## Foreword

Climate change represents one of the greatest challenges but also an inordinate opportunity to catalyse a transition to a low carbon, resource-efficient Green Economy.

This report informs Governments and the wider community on how far a response to climate change has progressed over the past 12 months, and thus how far the world is on track to meet wider goals.

The pledges associated with the Copenhagen Accord of 2009 are the point of departure for this report. What might be achieved in terms of limiting a global temperature rise to 2° C or less in the twenty-first century and in terms of setting the stage for a Green Economy?

And what remains to be done—what is the gap between scientific reality and the current level of ambition of nations? The analysis focuses on where global emissions need to be in around 10 years time to be in line with what the science says is consistent with the 2° C or 1.5° C limits, and where we expect to be as a result of the pledges.

If the highest ambitions of all countries associated with the Copenhagen Accord are implemented and supported, annual emissions of greenhouse gases could be cut, on average, by around 7 gigatons (Gt) of CO<sub>2</sub> equivalent by 2020.

Without this action, it is likely that a business-as-usual scenario would see emissions rise to an average of around 56 Gt of CO<sub>2</sub> equivalent by around 2020. Cuts in annual emissions to around 49 Gt of CO<sub>2</sub> equivalent would still however leave a gap of around 5 Gt compared with where we need to be—a gap equal to the total emissions of the world's cars, buses and trucks in 2005.

That is because the experts estimate that emissions need to be around 44 Gt of CO<sub>2</sub> equivalent by 2020 to have a likely chance of pegging temperatures to 2° C or less.

However, if only the lowest ambition pledges are implemented, and if no clear rules are set in the negotiations, emissions could be around 53 Gt of CO<sub>2</sub> equivalent in 2020—not that different from business as usual—so the rules set in the negotiations clearly matter.

This report, the result of an unprecedented partnership between UNEP and individuals from 25 leading research centres, underlines the complexity of various scenarios.

*The Emissions Gap Report* emphasizes that tackling climate change is still manageable, if leadership is shown. In Cancun action on financing, mitigation and adaptation need to mature and move forward—supported perhaps by action on non-CO<sub>2</sub> pollutants such as methane from rubbish tips to black carbon emissions.

Above all, Cancun must demonstrate to society as a whole that Governments understand the gaps left by Copenhagen. But at the same time remain committed to counter climate change while meeting wider development goals.



*Achim Steiner,  
UN Under-Secretary-General,  
UNEP Executive Director*

# The Emissions Gap Report

## Are the Copenhagen Accord Pledges Sufficient to Limit Global Warming to 2° C or 1.5° C?

### A Preliminary Assessment

November 2010

The Copenhagen Accord declared that deep cuts in global emissions are required “so as to hold the increase in global temperature below 2 degrees Celsius”. The Accord called for an assessment that would consider strengthening the long-term goal including “temperature rises of 1.5 degrees”. Since December 2009, 140 countries<sup>1</sup> have associated themselves with the Copenhagen Accord. Of these, 85 countries have pledged to reduce their emissions or constrain their growth up to 2020.

The question remains, however, whether these pledges are sufficient to achieve the Accord’s temperature limits, or if there will be a gap between what is needed and what is expected as a result of the pledges.

Many scientific groups have identified global emission pathways<sup>2</sup>, or emissions trajectories, that are consistent with various temperature limits, while others have estimated global emissions in 2020 based on the Copenhagen Accord pledges. Some groups have calculated both. Not surprisingly, different groups have come up with different estimates. The range of estimates is caused, for example, by the fact that some of the pledges have conditions attached, such as the provision of finance and technology or ambitious action from other countries. This leads to a range of potential outcomes rather than a single estimate.

To understand and interpret the range of results coming from different studies, the United Nations Environment Programme (UNEP), in conjunction with the European Climate Foundation and the National Institute of Ecology, Mexico, convened a six-month preliminary assessment of these studies. This assessment aims to provide policymakers with an overview of results from various studies, as well as their areas of agreement and disagreement. Individuals from twenty-five groups have contributed to the assessment and co-authored this publication. This report is a summary of that work.

Notably, the 2020 emissions reduction pledges analysed in this report were not decided under a quantitative top-down approach to emissions management — one that starts with temperature limits for which the mitigation effort is distributed among countries by negotiation. Therefore, at this time we are only analysing the effect of the offers brought forward by countries in the form of pledges under the Copenhagen Accord.<sup>3</sup>

<sup>1</sup> As of 12 November 2010.

<sup>2</sup> An “emission pathway” shows how emissions change into the future

<sup>3</sup> We note that this is a technical report that explores possible outcomes associated with the implementation of the Copenhagen Accord. It is not intended to legitimize the Accord, nor does it constitute an endorsement of a pledge-and-review architecture vis-à-vis a target-based approach for emission reductions. In addition this report is not intended to advocate any particular policy or emissions pathway.



# COP15 COPENHAGEN

UNITED NATIONS CLIMATE CHANGE CONFERENCE 2009

# CMP5 COPENHAGEN



The final plenary meeting at COP 15, Copenhagen, Denmark  
19 December, 2009

**This assessment addresses four main questions:**

- What 2020 emission levels are consistent with the 2° C and 1.5° C limits<sup>4</sup>?
- What are the expected global emissions in 2020?
- How big is the “emissions gap”?
- How can the gap be reduced?

<sup>4</sup> Although the Copenhagen Accord is not explicit about the baseline against which temperature increase should be measured, we have assumed that it is pre-industrial levels.

## Key findings

- Studies show that emission levels of approximately 44 gigatonnes of carbon dioxide equivalent (GtCO<sub>2</sub>e) (range: 39-44 GtCO<sub>2</sub>e\*) in 2020 would be consistent with a “likely” chance of limiting global warming to 2° C.
- Under business-as-usual projections, global emissions could reach 56 GtCO<sub>2</sub>e (range: 54-60 GtCO<sub>2</sub>e) in 2020, leaving a gap of 12 GtCO<sub>2</sub>e.
- If the lowest-ambition pledges were implemented in a “lenient” fashion\*\*, emissions could be lowered slightly to 53 GtCO<sub>2</sub>e (range: 52-57 GtCO<sub>2</sub>e), leaving a significant gap of 9 GtCO<sub>2</sub>e.
- The gap could be reduced substantially by policy options being discussed in the negotiations:
  - » By countries moving to higher ambition, conditional pledges
  - » By the negotiations adopting rules that avoid a net increase in emissions from (a) “lenient” accounting of land use, land-use change and forestry activities and (b) the use of surplus emission units.
- If the above policy options were to be implemented, emissions in 2020 could be lowered to 49 GtCO<sub>2</sub>e (range: 47-51 GtCO<sub>2</sub>e), reducing the size of the gap to 5 GtCO<sub>2</sub>e. This is approximately equal to the annual global emissions from all the world’s cars, buses and transport in 2005— But this is also almost 60 per cent of the way towards reaching the 2° C target.
- It will also be important to avoid increasing the gap by “double-counting” of offsets.
- Studies show that it is feasible to bridge the remaining gap through more ambitious domestic actions, some of which could be supported by international climate finance.
- With or without a gap, current studies indicate that steep emission reductions are needed post 2020 in order to keep our chances of limiting warming to 2° C or 1.5° C.

\* Range here refers to the “majority of results”, i.e. their 20th and 80th percentile.

\*\*“Lenient” in this report is used to refer to the situation in which LULUCF accounting rules and the use of surplus emission units result in a net increase in emissions

### Box 1: Method for assessing emission levels consistent with temperature limits

In this assessment we examine two groups of pathways: (1) pathways produced by integrated assessment models (IAM), which simulate the energy-economic system including the turnover of energy infrastructure; and (2) “stylized” pathways, produced by other models that do not explicitly model the change in the energy system or feasibility of emission reduction rates. We focus on results from IAMs because they are able to actually describe the system’s response to different policies and measures and emission-related targets (see Box 2). However, we also draw on “stylized” scenarios in order to better understand the theoretical rates of emission reduction and magnitude of negative emissions needed to be consistent with particular temperature limits.

A total of 223 emission pathways produced by 15 modelling groups have been analysed<sup>5</sup>. We account for many, but not all, sources of the uncertainty of models and data by compiling results from a number of studies and identifying conclusions that appear robust.

<sup>5</sup> Detail on the studies reviewed can be found in Chapters 2 and 3 of the full report.

## What 2020 emission levels are consistent with the 2° C and 1.5° C limits?

### 1. The level of human-induced global warming is primarily determined by the cumulative emissions over time, i.e. when emissions peak, at what level, and how fast they decline thereafter.

The total stock of greenhouse gases in the atmosphere has a strong effect on climate forcing related to climate change. This stock is determined by the accumulated emissions of greenhouse gases in the atmosphere. It follows that cumulative emissions have a profound influence on the long-term increase of global temperature<sup>6</sup>.

An important point is that several different emission pathways can result in the same cumulative emissions over a period of time. But not all pathways are considered equally feasible; some are thought to be constrained by an upper ceiling on the rate of emission reductions due to technological, economic, social and political factors. Hence, the feasibility of reduction rates plays a central role in determining which 2020 emission levels are consistent with temperature limits. Also important are assumptions about the feasibility of “negative emissions”, i.e. the net removal of carbon dioxide (CO<sub>2</sub>) from the atmosphere through, for example, planting forests or capturing CO<sub>2</sub> from biomass (see Box 3).

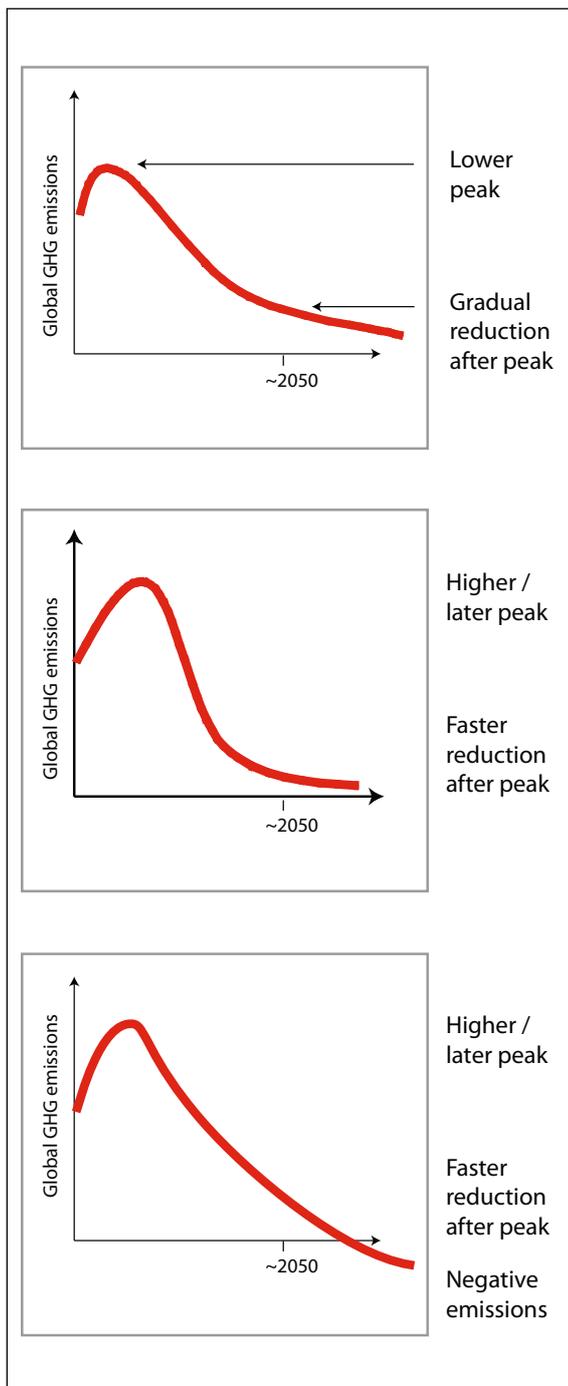
Studies show that there is a trade-off between the timing of the peak and the rate of decrease in emissions afterwards—the sooner and lower the peak, the slower the rate of decrease can be afterwards. Conversely, the longer the peak is delayed and the higher it is, the faster emissions must decline afterwards, and/or the stronger the negative emissions over the long term, in order to stay within the temperature limit (see Figure 1).

Many recent modelling studies have assumed that it would be unrealistic for global emissions to immediately start decreasing (because of political and economic factors) and therefore have focused on scenarios in which global emissions continue to increase for a few years and then decrease sharply afterwards.

<sup>6</sup> It is important to note that a number of other factors, such as the level of sulphate aerosols and the shape of the pathway, also have a significant influence on the maximum temperature increase.

**Figure 1: Illustration of different pathway types for the same temperature increase.**

See Point 1 for explanation.



### Box 2: Understanding temperature limits

A temperature increase of 2° C or 1.5° C represents an increase in global average near surface temperature compared with pre-industrial times. This is meant to be an indicator of local climate changes. Importantly, a 2° C or 1.5° C global average increase can translate into much higher temperature changes locally.

There are significant uncertainties in the relationship between temperature, emission pathways, cumulative emissions, and atmospheric concentrations. Therefore, in this assessment, each emission pathway is associated with a range of probabilities for temperature, reflecting uncertainties in the carbon cycle and many other aspects of the climate system. Hence, an emission pathway is associated with probabilities of staying within a range of different temperature changes.

To illustrate, an emission pathway that has a 50 per cent chance of limiting warming to under 2° C, may also have a 5 per cent probability that warming will exceed 3° C and, say, a 10 per cent probability of staying below 1.5° C. Similarly, an emission pathway that has a 66 per cent chance of staying under 2° C, may also have a probability of less than 3 per cent that warming will exceed 3° C and, say, a 20 per cent probability of staying below 1.5° C.

In this assessment we focus on emission pathways that lead to a global average temperature increase of less than 2° C over this century with a “likely” chance (greater than 66 per cent probability) and then explain how they would be different for a “medium” chance (50-66 per cent probability). In addition we examine pathways in which the temperature changes are below 1.5° C by the end of the century, but “overshoots” this value for part of the century.

## 2. Emission pathways consistent with a “likely” chance of meeting the 2° C limit generally peak before 2020, have emission levels in 2020 around 44 GtCO<sub>2</sub>e (range: 39-44 GtCO<sub>2</sub>e<sup>7</sup>), have steep emission reductions afterwards and/or reach negative emissions in the longer term.

Emission pathways assessed in this report that provide a “likely” (greater than 66 per cent) chance of staying within the 2° C limit, have the following characteristics:

A peak in global annual emissions<sup>8</sup> before 2020.

2020 global emission levels of around 44 GtCO<sub>2</sub>e (range: 39-44 GtCO<sub>2</sub>e).<sup>9</sup>

Average annual reduction rates of CO<sub>2</sub> from energy and industry between 2020 and 2050 of around 3

per cent (range: 2.2 - 3.1 per cent)<sup>10</sup>.

2050 global emissions that are 50-60 per cent below their 1990 levels.

In most cases, negative CO<sub>2</sub> emissions from energy and industry starting at some point in the second half of the century.

Accepting a “medium” (50-66 per cent) rather than “likely” chance of staying below the 2° C limit relaxes the constraints only slightly: emissions in 2020 could be 1 GtCO<sub>2</sub>e higher, and average rates of reduction after 2020 could be 2.5 per cent per year (range 2.2-3.0 per cent). Nevertheless, global emissions still need to peak before 2020 in the majority of cases.

See Box 1 for details on the assessment method employed in this report.

<sup>7</sup> All ranges given in this report represent the 20th and 80th percentiles of results, unless otherwise stated. This range has been chosen to reflect the majority of results of the analysis.

<sup>8</sup> Global annual emissions consist of emissions of the “Kyoto basket of gases” coming from energy, industry and land use.

<sup>9</sup> These are rounded numbers. If numbers with one decimal place were shown it would be clear that the upper end of the range is slightly greater than 44 GtCO<sub>2</sub>e and the median slightly smaller than 44. The fact that both the median and upper end of the range are 44 indicates that many of the estimates were close to 44.

<sup>10</sup> Throughout this report emission reduction rates are given for carbon dioxide emissions from energy and industry and expressed relative to 2000 emission levels except when explicitly stated otherwise.

**3. It turns out that the 2020 emission levels with a “likely” chance of staying within the 2° C limit can be about the same as those with a “medium” or lower chance of meeting the 1.5° C target. However, to have a higher chance of meeting the 1.5° C target the emission reduction rates after 2020 would have to be much faster.**

In this assessment we have identified some emission pathways that keep the increase in temperature below 1.5° C by 2100, but “overshoot” this limit by a small amount for a few decades prior to 2100. However, the chance of doing so is low (range: 27–35 per cent probability). The emission levels in 2020 of these pathways are about the same as those in Point 2 above, i.e. they are consistent with a likely chance of staying below the 2° C limit throughout the twenty-first century.<sup>11</sup>

<sup>11</sup> One IAM pathway has been identified that has a “medium” chance of complying with the 1.5° C limit by 2100 (with some overshoot for a few decades) and shows emission reduction rates considered feasible in the IAM literature. See Chapter 2, full report.

In addition, the most ambitious “stylized” pathways show that staying within the 1.5° C limit with overshoot (and with a “medium” or “likely” chance) have emission reduction rates after 2020 that are at the high end or faster than presently found in the IAM literature. Lower emission levels in 2020 would allow slower emission reduction rates after 2020.

These findings should be considered preliminary, however, as few studies have explicitly looked at the question of achieving the 1.5° C target.

**4. The range in results stems from uncertainties of assumptions and models used for calculations.**

The range in estimates of emission levels comes from model uncertainties including the omission of feedback phenomena in the climate system and (in some models) the impact of aerosols on climate forcing. The uncertainty of key assumptions, such as baseline emissions, also has an influence on calculations.

**Box 3. What are feasible emission reduction rates? What are negative emissions?**

The behaviour of the climate system dictates that future temperatures will be strongly influenced by emissions throughout the coming decades. Hence, the consistency of 2020 emissions with a given temperature limit can only be judged if emissions after 2020 are taken into account. For that reason it is important to know the feasible rates of emission reductions after 2020. Feasibility refers to whether a particular emission pathway is considered achievable. It depends upon technical, economic, political and social constraints and the extent of mitigation policy. Some of these factors, in particular technological and economic feasibility, can be represented in models such as integrated assessment models (IAM). These include assumptions about the maximum feasible rate of introducing technology, maximum costs of technologies, feasibility of specific system configurations, and limits regarding behavioural changes. Another important factor determining the maximum emissions reduction rate is the typical lifetime of machinery and infrastructure. These lifetimes are important if mitigation strategies aim to avoid premature replacement of capital, which is often considered to be very expensive. Other factors, such as political or social attitudes, might also influence the rate of emission reductions, but they are usually not taken into account by IAMs.

There are different views about feasible emission reduction rates. The highest average rate of emission reductions over the next four to five decades found in the IAM literature is around 3.5 per cent per year. This would imply a decarbonization rate (the rate of decrease in emissions per unit of GDP) of more than 6 per cent per year. Historically (1969–2009), a decarbonization rate of about one per cent has been seen globally. However, it is important to note that expectations about feasibility can change with future developments in technology, attitudes, and economics.

One of many important elements related to the feasibility of emission pathways is negative emissions. Many of the scenarios compiled in this assessment show global negative CO<sub>2</sub> emissions (from energy and industry) from mid-century onwards in order to achieve the temperature limits examined here<sup>12</sup>.

Global negative CO<sub>2</sub> emissions would occur if the removal of CO<sub>2</sub> from the atmosphere is greater than the emissions into it. This might be achievable through large-scale afforestation efforts, for example. Many models assume a large deployment of bioenergy combined with carbon-capture-and-storage (BECCS) technology in order to achieve negative emissions. The feasibility of large scale bioenergy systems is related to its sustainability, including the availability of sufficient land and water, its impact on biodiversity, and the productivity of biomass.

If negative CO<sub>2</sub> emissions at a significant scale are not possible, then the options for meeting the limits are substantially constrained.

<sup>12</sup> In this assessment, 75 per cent of scenarios with a “likely” chance of staying below 2° C and 50 per cent of the scenarios that have a “medium” chance of staying below 2° C.

## What are the expected global emissions in 2020?

**5. Global emissions in 2020 will depend on the pledges implemented and the rules surrounding them. On one hand, emissions in 2020 could be as low as 49 GtCO<sub>2</sub>e (range: 47-51 GtCO<sub>2</sub>e) when countries implement their conditional pledges with “strict” accounting rules. On the other hand, they could be as high as 53 GtCO<sub>2</sub>e (range: 52-57 GtCO<sub>2</sub>e) when countries implement unconditional pledges with “lenient” accounting rules.**

As a reference point, without pledges global greenhouse gas emissions may increase from 45 GtCO<sub>2</sub>e in 2005 to around 56 GtCO<sub>2</sub>e in 2020 (range: 54-60 GtCO<sub>2</sub>e) according to business-as-usual projections. These results come from thirteen studies that have been reviewed in this assessment.

Results show that the pledges, if implemented, are expected to reduce global emissions in 2020 compared to business-as-usual projections. How much lower will depend on:

- i. Whether countries implement their unconditional (lower ambition) or conditional (higher ambition) pledges. Conditions attached to the pledges include, for example, the provision of adequate climate finance and ambitious action from other countries.
- ii The extent to which accounting rules for land use, land-use change and forestry (LULUCF) can be used to weaken the mitigation targets of industrialized countries. This could occur if credit is given for LULUCF activities that would have happened in any case without further policy intervention.
- iii The extent to which surplus emissions units, particularly those that could be carried over from the current commitment period of the Kyoto Protocol, are used to meet industrialized country targets.

For the purposes of this report, we have developed four cases that provide a range of plausible outcomes from the UNFCCC negotiations, each with different combinations of the factors mentioned above. We use the term “lenient rules” to refer to cases in which countries maximise the use of surplus emission units and “lenient LULUCF credits”, and thereby weaken mitigation targets.<sup>13</sup> We use “strict rules” for the cases in which they do not<sup>14</sup>.

*Case 1 – Unconditional pledge, lenient rules:* If countries implement their unconditional pledges and are subject to “lenient” accounting rules (as explained in the paragraph above), global emissions are expected to be about 53 GtCO<sub>2</sub>e in 2020 (range: 52-57 GtCO<sub>2</sub>e), or about 3 GtCO<sub>2</sub>e lower than business-as-usual projections.

*Case 2 – Unconditional pledge, strict rules:* If countries implement their unconditional pledges and are subject to “strict” accounting rules (as explained in the paragraph above), global emissions are expected to drop to 52 GtCO<sub>2</sub>e (range: 50-55 GtCO<sub>2</sub>e).

*Case 3 – Conditional pledge, lenient rules:* If countries implement their higher ambition, conditional pledges and are subject to “lenient” accounting rules, global emissions are expected to drop to 51 GtCO<sub>2</sub>e (range: 49-53 GtCO<sub>2</sub>e).

*Case 4 – Conditional pledge, strict rules:* If countries implement their higher ambition, conditional pledges, and are subject to “strict” accounting rules, global emissions are expected to drop to 49 GtCO<sub>2</sub>e in 2020. (range: 47-51 GtCO<sub>2</sub>e).

Thus, under the most ambitious outcome, the pledges could result in 2020 emissions that are 7 GtCO<sub>2</sub>e lower than business as usual.

<sup>13</sup> Credits given for carbon removals from existing forests or other sinks that would have occurred without policy intervention. See Chapter 3 of the full report for more detail on the “lenient” and “strict” definitions.

<sup>14</sup> Note that surplus emission units and credits given for LULUCF activities do not necessarily weaken mitigation targets.

**6. Emissions could be lower or higher than these estimates, as a result of other factors. Emissions could be higher if offsets were to be “double-counted” towards both industrialized and developing country pledges or if pledges were to be ineffectively implemented. Emissions could be lower as a result of international climate finance for further mitigation efforts, or if countries were to strengthen their pledges, or if domestic activities went beyond their pledges.**

The estimates reflected in the four cases do not take into account all factors that could affect emissions in 2020.

Two factors could increase emissions and lessen the impact of the pledges. If industrialized countries were to use offsets to meet their targets, and the developing countries that supplied the offsets also counted them towards their pledges, then emissions would be higher than estimated in Point 5. This “double-counting” of offsets could increase emissions in 2020 by up to 1.3 GtCO<sub>2</sub>e in 2020. Similarly, if domestic policies were to be ineffective in meeting the pledges, emissions could be higher in 2020.

There are also factors that could further decrease emissions in 2020. If substantial international funds were to become available as agreed to in the Copenhagen Accord, emissions could be as much as 2.5 GtCO<sub>2</sub>e lower in 2020 than in the four cases above. Similarly, if domestic policies went beyond international pledges or if pledges were strengthened, emissions could be substantially lower.

**7. A number of uncertainties lead to a significant range in estimates of expected 2020 emissions.**

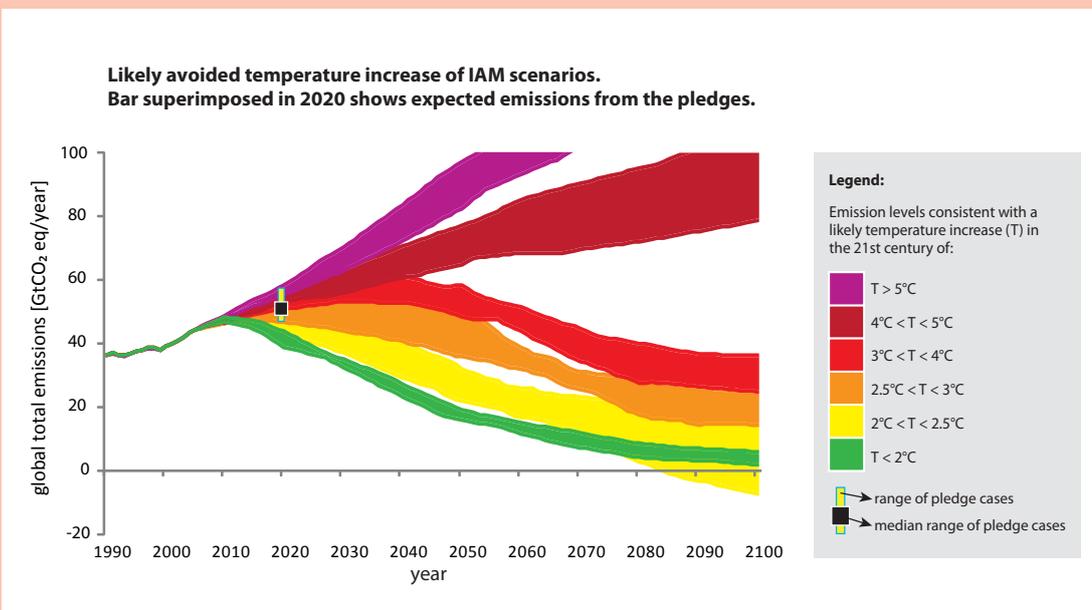
There is a large range between different groups' estimates for 2020 emission levels, even under the same assumptions regarding conditionality of pledges and accounting rules (range: -4 to +8 GtCO<sub>2</sub>e around the median estimate, depending on the case). The range of estimates is caused, for example, by differences in the underlying data sets, the treatment of emissions from LULUCF, the estimates of emissions from international transport, and the assumptions made about business-as-usual emissions growth of developing countries.

#### **Box 4. What are the temperature implications of present pledges?**

It is not possible to precisely answer the above question because the trend in temperature will strongly depend on the pathway of emissions after 2020. But results from integrated assessment models give us a hint at the range of pathways that could occur between 2020 and 2100. If we start at the level of emissions expected from the Copenhagen Accord pledges in 2020 and then follow the range of these pathways through to 2100, we find that they imply a temperature increase of between 2.5 to 5° C before the end of the century (see Figure 2). The lower bound is the case in which emissions are fairly stringently controlled after 2020, and the upper in which they are more weakly controlled. In other words, emission levels in 2020 implied by current pledges do not seem to be consistent with 2° C or 1.5° C temperature limits. To stay within these limits, emission levels would have to be lower in 2020 and then be followed by considerable reductions.

*(Box continued on next page)*

**Figure 2 – Temperature increases associated with emission pathways and compared to the expected emissions from the pledges.** Coloured bands show groups of IAM emission pathways that have approximately the same “likely” avoided temperature increase in the twenty-first century. Specifically the coloured bands show the 20th to 80th percentile range of the IAM pathways associated with those temperature increases<sup>15</sup>. Superimposed on top of the pathways is the range of estimated emissions resulting from the Copenhagen Accord pledges. The small black bar shows the range of median estimates from the four pledge cases. The thin blue bar represents the wider range of estimates associated with those four cases (the 20th to 80th percentile range).



<sup>15</sup>The gaps between the coloured bands come about because this report mainly compiled pathways from low greenhouse gas stabilisation scenario.

## How big is the “emissions gap”?

**8. A “gap” is expected in 2020 between emission levels consistent with a 2° C limit and those resulting from the Copenhagen Accord pledges. The size of the gap depends on the likelihood of a particular temperature limit, and how the pledges are implemented. If the aim is to have a “likely” chance (greater than 66 per cent) of staying below the 2° C temperature limit, the gap would range from 5-9 GtCO<sub>2</sub>e, depending on how the pledges are implemented.**

As a reference point, we saw in Point 2 that to have a “likely” chance of staying below the 2° C temperature limit, global emissions should be around 44 GtCO<sub>2</sub>e (range: 39-44 GtCO<sub>2</sub>e). But according to business-as-usual projections global emissions in 2020 may be around 56 GtCO<sub>2</sub>e (range: 54-60 GtCO<sub>2</sub>e). This leaves a gap of about 12 GtCO<sub>2</sub>e (range: 10-21 GtCO<sub>2</sub>e).

<sup>16</sup> All cases refer to emission levels consistent with a “likely” chance of staying below 2° C.

The four pledge cases, each with different assumptions about the future outcome of the UNFCCC negotiations, result in different gaps as follows<sup>16</sup>:

*Case 1 – Unconditional pledges, lenient rules.* The gap would be reduced down to 9 GtCO<sub>2</sub>e (range: 8-18 GtCO<sub>2</sub>e) or about 3 GtCO<sub>2</sub>e below business as usual.

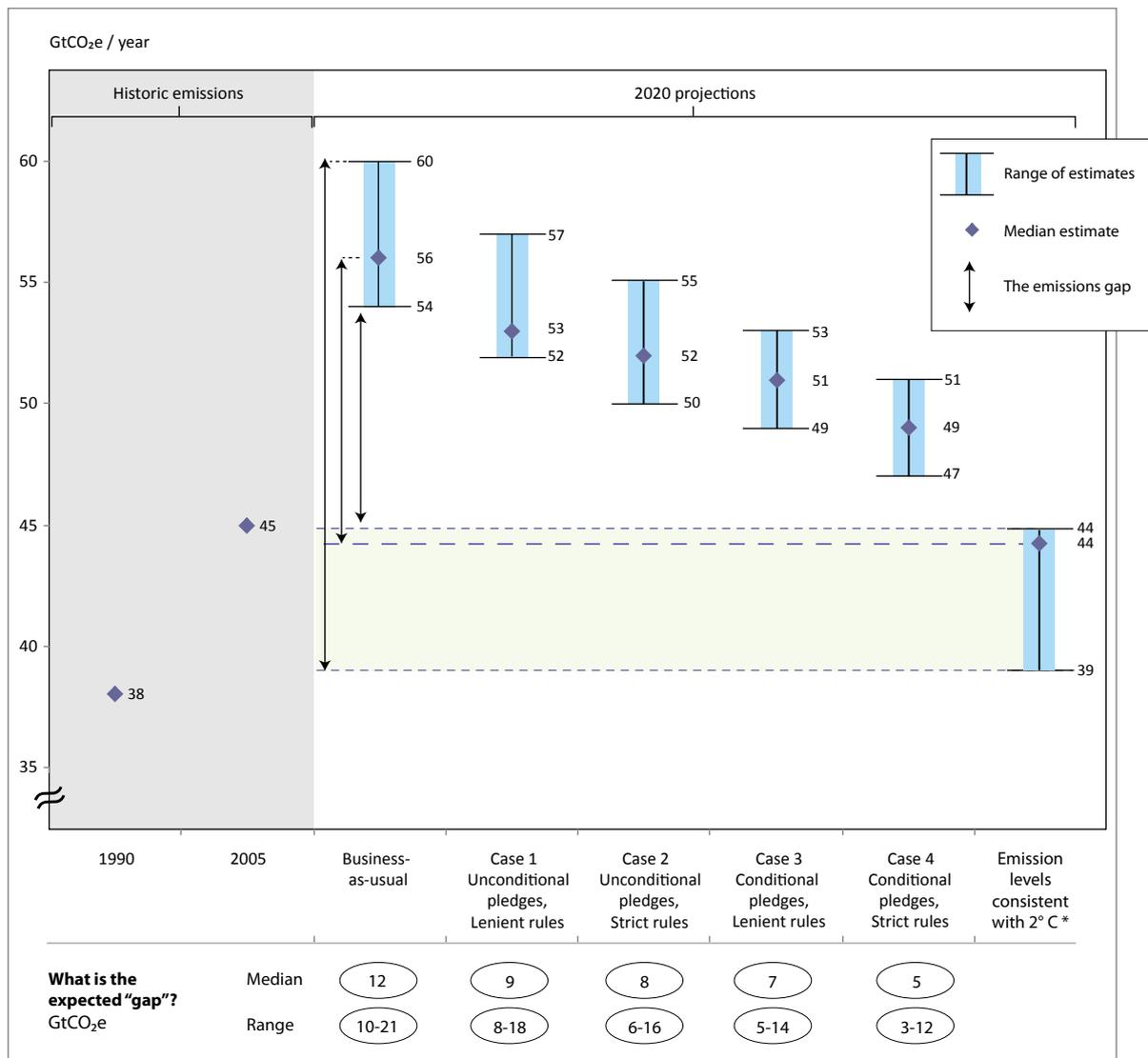
*Case 2 – Unconditional pledges, strict rules.* The gap would be about 8 GtCO<sub>2</sub>e (range: 6-16 GtCO<sub>2</sub>e), or about 4 GtCO<sub>2</sub>e below business as usual.

*Case 3 – Conditional pledges, lenient rules.* The gap would be about 7 GtCO<sub>2</sub>e (range: 5-14 GtCO<sub>2</sub>e) or about 5 GtCO<sub>2</sub>e below business as usual.

*Case 4 – Conditional pledges, strict rules.* The gap would be about 5 GtCO<sub>2</sub>e (range: 3-12 GtCO<sub>2</sub>e). This is about 7 GtCO<sub>2</sub>e lower than business as usual, and almost 60 per cent of the way to the 2° C levels. Although the gap would be considerably narrower than the business as usual case, it would still be as large as the total greenhouse gas emissions from the European Union in 2005 or from global road transport emissions in that year.

These results can be seen in Figure 3.

**Figure 3: Comparison of expected emissions in 2020 with the emission levels consistent with a “likely” chance of meeting the 2° C limit.** The figure compares the expected emissions in 2020 resulting from the four pledge cases with the emission levels consistent with a “likely” chance of meeting the 2° C limit. The median estimates and range of estimates (20th to 80th percentile) are shown. The gap between expected emissions and the 2° C levels is given below in each case.



\* A “likely” chance of limiting warming to 2° C by 2100

Double-counting of international emission offsets could also increase the gap up to 1.3 GtCO<sub>2</sub>e. This is a real risk since the Copenhagen Accord does not include rules regarding the use of international offsets.

As a final point here, to have a “medium” rather than a “likely” chance of staying within the 2° C limit, global emissions in 2020 can be about 1 GtCO<sub>2</sub>e higher and the gap also narrows by about 1 GtCO<sub>2</sub>e.

**9. There are considerable uncertainties around the estimates of the gap.**

Since the emissions gap is the difference between emission levels for different temperature targets and expected emissions in 2020, the gap also inherits the

uncertainties of these two components. The reader will note that the range around median estimates (Figure 3) is not symmetric; the lower bound extends about 1-2 GtCO<sub>2</sub>e below the median, whereas the upper bound rises 7-9 GtCO<sub>2</sub>e above it (for a “likely” chance of staying below 2° C). One way to interpret this skewed range is that the gap may turn out to be higher rather than lower than the median.

This assessment focuses on the majority (20th – 80th percentile) of emission pathways. But there are obviously also results outside of this range. In the extreme case, if we combine the highest 2° C emission levels with the lowest estimate of expected emissions, the gap disappears. At the opposite extreme, if we combine the lowest 2° C emission levels with the highest estimate of expected emissions, the gap would be greater than 20 GtCO<sub>2</sub>e.

## How can the gap be reduced?

### 10. Various international policy actions are available to close the gap.

#### *a) Reducing the gap through higher ambition pledges.*

The gap can be reduced by around 2-3 GtCO<sub>2</sub>e (with a range of estimates from 2 to 5 GtCO<sub>2</sub>e) by moving from the unconditional (lower ambition) pledges to the conditional (higher ambition) pledges.

- **Industrialized countries:** The majority of this reduction would come from industrialized countries, whose pledges are sometimes conditional on the ambitious action of other countries or on domestic legislation.
- **Developing countries:** A smaller, but still important, part of the reduction would come from developing countries, whose pledges are sometimes conditional on the adequate provision of international climate finance or technology transfer.

#### *b) Reducing the gap by tightening the rules*

The gap can be reduced by around 1-2 GtCO<sub>2</sub>e by ensuring that “strict” rules apply to the use of LULUCF credits and surplus emission units.

- **LULUCF accounting:** If industrialized countries apply “strict” accounting rules to minimise the use of what we refer to as ‘lenient LULUCF credits’<sup>17</sup>, they would strengthen the effect of their pledges and thus reduce the emissions gap by up to 0.8 GtCO<sub>2</sub>e.
- **Surplus emission units:** Likewise, if the rules governing the use of surplus emission units under the Kyoto Protocol were designed in a way that would avoid the weakening of mitigation targets, the gap could be reduced by up to 2.3 GtCO<sub>2</sub>e. These include units carried over from the current commitment period and any potential new surpluses created in the next.

We note that policy options (a) and (b) are interdependent and so their benefits cannot necessarily be added together. But we estimate that the two options combined could reduce emissions by around 4 GtCO<sub>2</sub>e in 2020 (with a range of estimates of 4-6 GtCO<sub>2</sub>e) compared with the least ambitious case (case 1).

<sup>17</sup> Credits given for carbon removals from existing forests or other sinks that would have occurred without policy intervention.

In addition, the risk of the gap increasing in size can be avoided if the negotiations set rules regarding international offsets to prevent them from being counted towards both industrialized and developing country pledges. “Double-counting” would increase the gap by up to 1.3 GtCO<sub>2</sub>e.

### 11. It is feasible to close the remaining gap through further mitigation actions by countries, some of which could be supported by international climate finance.

If the above measures were to be taken, there might still be a gap of 5 GtCO<sub>2</sub>e compared with a 2° C limit. This gap could be closed if countries were to adopt more ambitious actions or pledges. The results from integrated assessment models (IAM) suggest that it is possible to reach emission levels where there is no gap, using mitigation measures that are economically and technologically feasible.

Analysis also shows that international climate finance in line with the Copenhagen Accord could help achieve some of these reductions in developing countries.

### 12. Studies show that laying the groundwork for steep rates of emissions reduction from 2020 onwards would be necessary for staying within a limit of 2° C and even more so for 1.5° C, whatever the outcome of the pledges.

The results of the IAM pathways that have a “likely” (greater than 66 per cent) or even “medium” (50-66 per cent) chance of limiting temperature increase to 2° C show average annual emission reduction rates of greater than 2 per cent per year after 2020. Achieving this over the long-term would be unprecedented because, on the contrary, global emissions have almost continuously grown since the industrial revolution.

The higher the emissions in 2020, the faster the rate of decline required thereafter to meet temperature targets. Therefore, if targets are to be met, it will be essential to lay the groundwork now for such rates of reduction. This can be done, for example, by avoiding lock-in of high carbon infrastructure with long life-spans and developing and introducing advanced clean technologies.

## Glossary

**Double-counting:** In the context of this report, double counting refers to a situation in which the same emission reductions are counted towards meeting two countries' pledges.

**GtCO<sub>2</sub>e:** For the purpose of this report, greenhouse gas emissions are the sum of the basket of greenhouse gases listed in Annex A of the Kyoto Protocol, expressed as carbon dioxide equivalent. The carbon dioxide equivalent of the various gases is computed by using the global warming potentials published in the Second IPCC Assessment Report.

**Integrated assessment model (IAM) pathways:** emission pathways produced by models which simulate the energy-economic system including the turnover of energy infrastructure;

**"Likely" chance:** A greater than 66% likelihood. The term is used to convey the probabilities of meeting temperature limits.

**"Lenient" LULUCF credits:** Credits given for carbon removals from existing forests or other sinks that would have occurred without policy intervention and are likely to be included in the baseline assumed in model calculations.

**"Medium" chance:** A 50 to 66% likelihood. The term is used to convey the probabilities of meeting temperature limits.

**Negative emissions:** Either globally or for a particular sector, the emissions that could occur if, in a given period, the removal of greenhouse gases from the atmosphere is greater than the addition of emissions into it..

**"Stylized" pathways:** emission pathways, produced by models that do not explicitly model the change in the energy system or feasibility of emission reduction rates.

**Surplus emission units:** After the first commitment period of the Kyoto Protocol (2008-2012), according to Article 3, paragraph 13, Parties holding emission units not required for compliance with their commitments are able to carry over these units for future use or sale. There is also the possibility that new surplus emissions units will be created in the second commitment period, where targets are set below business-as-usual expectations.

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# **UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE**

**UNITED NATIONS**

**1992**

**UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE**

The Parties to this Convention,

Acknowledging that change in the Earth's climate and its adverse effects are a common concern of humankind,

Concerned that human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth's surface and atmosphere and may adversely affect natural ecosystems and humankind,

Noting that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs,

Aware of the role and importance in terrestrial and marine ecosystems of sinks and reservoirs of greenhouse gases,

Noting that there are many uncertainties in predictions of climate change, particularly with regard to the timing, magnitude and regional patterns thereof,

Acknowledging that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions,

Recalling the pertinent provisions of the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972,

Recalling also that States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction,

Reaffirming the principle of sovereignty of States in international cooperation to address climate change,

Recognizing that States should enact effective environmental legislation, that environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply,

and that standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries,

Recalling the provisions of General Assembly resolution 44/228 of 22 December 1989 on the United Nations Conference on Environment and Development, and resolutions 43/53 of 6 December 1988, 44/207 of 22 December 1989, 45/212 of 21 December 1990 and 46/169 of 19 December 1991 on protection of global climate for present and future generations of mankind,

Recalling also the provisions of General Assembly resolution 44/206 of 22 December 1989 on the possible adverse effects of sea-level rise on islands and coastal areas, particularly low-lying coastal areas and the pertinent provisions of General Assembly resolution 44/172 of 19 December 1989 on the implementation of the Plan of Action to Combat Desertification,

Recalling further the Vienna Convention for the Protection of the Ozone Layer, 1985, and the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, as adjusted and amended on 29 June 1990,

Noting the Ministerial Declaration of the Second World Climate Conference adopted on 7 November 1990,

Conscious of the valuable analytical work being conducted by many States on climate change and of the important contributions of the World Meteorological Organization, the United Nations Environment Programme and other organs, organizations and bodies of the United Nations system, as well as other international and intergovernmental bodies, to the exchange of results of scientific research and the coordination of research,

Recognizing that steps required to understand and address climate change will be environmentally, socially and economically most effective if they are based on relevant scientific, technical and economic considerations and continually re-evaluated in the light of new findings in these areas,

Recognizing that various actions to address climate change can be justified economically in their own right and can also help in solving other environmental problems,

Recognizing also the need for developed countries to take immediate action in a flexible manner on the basis of clear priorities, as a first step towards comprehensive response strategies at the global, national and, where agreed, regional levels that take into account all greenhouse gases, with due consideration of their relative contributions to the enhancement of the greenhouse effect,

Recognizing further that low-lying and other small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and

desertification, and developing countries with fragile mountainous ecosystems are particularly vulnerable to the adverse effects of climate change,

Recognizing the special difficulties of those countries, especially developing countries, whose economies are particularly dependent on fossil fuel production, use and exportation, as a consequence of action taken on limiting greenhouse gas emissions,

Affirming that responses to climate change should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty,

Recognizing that all countries, especially developing countries, need access to resources required to achieve sustainable social and economic development and that, in order for developing countries to progress towards that goal, their energy consumption will need to grow taking into account the possibilities for achieving greater energy efficiency and for controlling greenhouse gas emissions in general, including through the application of new technologies on terms which make such an application economically and socially beneficial,

Determined to protect the climate system for present and future generations,

Have agreed as follows:

**ARTICLE 1****DEFINITIONS \***

For the purposes of this Convention:

1. "Adverse effects of climate change" means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.
  2. "Climate change" means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.
  3. "Climate system" means the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.
  4. "Emissions" means the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time.
  5. "Greenhouse gases" means those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.
  6. "Regional economic integration organization" means an organization constituted by sovereign States of a given region which has competence in respect of matters governed by this Convention or its protocols and has been duly authorized, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned.
  7. "Reservoir" means a component or components of the climate system where a greenhouse gas or a precursor of a greenhouse gas is stored.
  8. "Sink" means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere.
  9. "Source" means any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere.
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\* Titles of articles are included solely to assist the reader.

**ARTICLE 2****OBJECTIVE**

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

**ARTICLE 3****PRINCIPLES**

In their actions to achieve the objective of the Convention and to implement its provisions, the Parties shall be guided, inter alia, by the following:

1. The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.
2. The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.
3. The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested Parties.

4. The Parties have a right to, and should, promote sustainable development. Policies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each Party and should be integrated with national development programmes, taking into account that economic development is essential for adopting measures to address climate change.

5. The Parties should cooperate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all Parties, particularly developing country Parties, thus enabling them better to address the problems of climate change. Measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

#### ARTICLE 4

##### COMMITMENTS

1. All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:
  - (a) Develop, periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties;
  - (b) Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and measures to facilitate adequate adaptation to climate change;
  - (c) Promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors, including the energy, transport, industry, agriculture, forestry and waste management sectors;
  - (d) Promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all

greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems;

- (e) Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods;
- (f) Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change;
- (g) Promote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system and intended to further the understanding and to reduce or eliminate the remaining uncertainties regarding the causes, effects, magnitude and timing of climate change and the economic and social consequences of various response strategies;
- (h) Promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate system and climate change, and to the economic and social consequences of various response strategies;
- (i) Promote and cooperate in education, training and public awareness related to climate change and encourage the widest participation in this process, including that of non-governmental organizations; and
- (j) Communicate to the Conference of the Parties information related to implementation, in accordance with Article 12.

2. The developed country Parties and other Parties included in Annex I commit themselves specifically as provided for in the following:

- (a) Each of these Parties shall adopt national<sup>1</sup> policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs. These policies and measures will demonstrate that developed countries are taking the lead in modifying longer-term trends in anthropogenic emissions consistent with the objective of the Convention, recognizing that the return by the end of the present decade to earlier levels of anthropogenic emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol would contribute to such modification, and taking into account the differences in these Parties' starting points and approaches, economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances, as well as the need for equitable and appropriate contributions by each of these Parties to the global effort regarding that objective. These Parties may implement such policies and measures jointly with other Parties and may assist other Parties in contributing to the achievement of the objective of the Convention and, in particular, that of this subparagraph;
- (b) In order to promote progress to this end, each of these Parties shall communicate, within six months of the entry into force of the Convention for it and periodically thereafter, and in accordance with Article 12, detailed information on its policies and measures referred to in subparagraph (a) above, as well as on its resulting projected anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol for the period referred to in subparagraph (a), with the aim of returning individually or jointly to their 1990 levels these anthropogenic emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol. This information will be reviewed by the Conference of the Parties, at its first session and periodically thereafter, in accordance with Article 7;
- (c) Calculations of emissions by sources and removals by sinks of greenhouse gases for the purposes of subparagraph (b) above should take into account the best available scientific knowledge, including of the effective capacity of sinks and the respective contributions of such gases to climate change. The Conference of the Parties shall consider and agree

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<sup>1</sup> This includes policies and measures adopted by regional economic integration organizations.

on methodologies for these calculations at its first session and review them regularly thereafter;

- (d) The Conference of the Parties shall, at its first session, review the adequacy of subparagraphs (a) and (b) above. Such review shall be carried out in the light of the best available scientific information and assessment on climate change and its impacts, as well as relevant technical, social and economic information. Based on this review, the Conference of the Parties shall take appropriate action, which may include the adoption of amendments to the commitments in subparagraphs (a) and (b) above. The Conference of the Parties, at its first session, shall also take decisions regarding criteria for joint implementation as indicated in subparagraph (a) above. A second review of subparagraphs (a) and (b) shall take place not later than 31 December 1998, and thereafter at regular intervals determined by the Conference of the Parties, until the objective of the Convention is met;
- (e) Each of these Parties shall :
  - (i) Coordinate as appropriate with other such Parties, relevant economic and administrative instruments developed to achieve the objective of the Convention; and
  - (ii) Identify and periodically review its own policies and practices which encourage activities that lead to greater levels of anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol than would otherwise occur;
- (f) The Conference of the Parties shall review, not later than 31 December 1998, available information with a view to taking decisions regarding such amendments to the lists in Annexes I and II as may be appropriate, with the approval of the Party concerned;
- (g) Any Party not included in Annex I may, in its instrument of ratification, acceptance, approval or accession, or at any time thereafter, notify the Depositary that it intends to be bound by subparagraphs (a) and (b) above. The Depositary shall inform the other signatories and Parties of any such notification.

3. The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by

developing country Parties in complying with their obligations under Article 12, paragraph 1. They shall also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are covered by paragraph 1 of this Article and that are agreed between a developing country Party and the international entity or entities referred to in Article 11, in accordance with that Article. The implementation of these commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among the developed country Parties.

4. The developed country Parties and other developed Parties included in Annex II shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects.

5. The developed country Parties and other developed Parties included in Annex II shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention. In this process, the developed country Parties shall support the development and enhancement of endogenous capacities and technologies of developing country Parties. Other Parties and organizations in a position to do so may also assist in facilitating the transfer of such technologies.

6. In the implementation of their commitments under paragraph 2 above, a certain degree of flexibility shall be allowed by the Conference of the Parties to the Parties included in Annex I undergoing the process of transition to a market economy, in order to enhance the ability of these Parties to address climate change, including with regard to the historical level of anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol chosen as a reference.

7. The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties.

8. In the implementation of the commitments in this Article, the Parties shall give full consideration to what actions are necessary under the Convention, including actions related to funding, insurance and the transfer of technology, to meet the

specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact of the implementation of response measures, especially on:

- (a) Small island countries;
- (b) Countries with low-lying coastal areas;
- (c) Countries with arid and semi-arid areas, forested areas and areas liable to forest decay;
- (d) Countries with areas prone to natural disasters;
- (e) Countries with areas liable to drought and desertification;
- (f) Countries with areas of high urban atmospheric pollution;
- (g) Countries with areas with fragile ecosystems, including mountainous ecosystems;
- (h) Countries whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels and associated energy-intensive products; and
- (i) Land-locked and transit countries.

Further, the Conference of the Parties may take actions, as appropriate, with respect to this paragraph.

9. The Parties shall take full account of the specific needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology.

10. The Parties shall, in accordance with Article 10, take into consideration in the implementation of the commitments of the Convention the situation of Parties, particularly developing country Parties, with economies that are vulnerable to the adverse effects of the implementation of measures to respond to climate change. This applies notably to Parties with economies that are highly dependent on income generated from the production, processing and export, and/or consumption of fossil fuels and associated energy-intensive products and/or the use of fossil fuels for which such Parties have serious difficulties in switching to alternatives.

## **ARTICLE 5**

### **RESEARCH AND SYSTEMATIC OBSERVATION**

In carrying out their commitments under Article 4, paragraph 1(g), the Parties shall:

- (a) Support and further develop, as appropriate, international and intergovernmental programmes and networks or organizations aimed at defining, conducting, assessing and financing research, data collection and systematic observation, taking into account the need to minimize duplication of effort;
- (b) Support international and intergovernmental efforts to strengthen systematic observation and national scientific and technical research capacities and capabilities, particularly in developing countries, and to promote access to, and the exchange of, data and analyses thereof obtained from areas beyond national jurisdiction; and
- (c) Take into account the particular concerns and needs of developing countries and cooperate in improving their endogenous capacities and capabilities to participate in the efforts referred to in subparagraphs (a) and (b) above.

**ARTICLE 6****EDUCATION, TRAINING AND PUBLIC AWARENESS**

In carrying out their commitments under Article 4, paragraph 1(i), the Parties shall:

- (a) Promote and facilitate at the national and, as appropriate, subregional and regional levels, and in accordance with national laws and regulations, and within their respective capacities:
  - (i) The development and implementation of educational and public awareness programmes on climate change and its effects;
  - (ii) Public access to information on climate change and its effects;
  - (iii) Public participation in addressing climate change and its effects and developing adequate responses; and
  - (iv) Training of scientific, technical and managerial personnel.
- (b) Cooperate in and promote, at the international level, and, where appropriate, using existing bodies:
  - (i) The development and exchange of educational and public awareness material on climate change and its effects; and
  - (ii) The development and implementation of education and training programmes, including the strengthening of national institutions and the exchange or secondment of personnel to train experts in this field, in particular for developing countries.

**ARTICLE 7****CONFERENCE OF THE PARTIES**

1. A Conference of the Parties is hereby established.

2. The Conference of the Parties, as the supreme body of this Convention, shall keep under regular review the implementation of the Convention and any related legal instruments that the Conference of the Parties may adopt, and shall make, within its mandate, the decisions necessary to promote the effective implementation of the Convention. To this end, it shall:

- (a) Periodically examine the obligations of the Parties and the institutional arrangements under the Convention, in the light of the objective of the Convention, the experience gained in its implementation and the evolution of scientific and technological knowledge;
- (b) Promote and facilitate the exchange of information on measures adopted by the Parties to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under the Convention;
- (c) Facilitate, at the request of two or more Parties, the coordination of measures adopted by them to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under the Convention;
- (d) Promote and guide, in accordance with the objective and provisions of the Convention, the development and periodic refinement of comparable methodologies, to be agreed on by the Conference of the Parties, inter alia, for preparing inventories of greenhouse gas emissions by sources and removals by sinks, and for evaluating the effectiveness of measures to limit the emissions and enhance the removals of these gases;
- (e) Assess, on the basis of all information made available to it in accordance with the provisions of the Convention, the implementation of the Convention by the Parties, the overall effects of the measures taken pursuant to the Convention, in particular environmental, economic and social effects as well as their cumulative impacts and the extent to which progress towards the objective of the Convention is being achieved;
- (f) Consider and adopt regular reports on the implementation of the Convention and ensure their publication;
- (g) Make recommendations on any matters necessary for the implementation of the Convention;
- (h) Seek to mobilize financial resources in accordance with Article 4, paragraphs 3, 4 and 5, and Article 11;
- (i) Establish such subsidiary bodies as are deemed necessary for the implementation of the Convention;

- (j) Review reports submitted by its subsidiary bodies and provide guidance to them;
- (k) Agree upon and adopt, by consensus, rules of procedure and financial rules for itself and for any subsidiary bodies;
- (l) Seek and utilize, where appropriate, the services and cooperation of, and information provided by, competent international organizations and intergovernmental and non-governmental bodies; and
- (m) Exercise such other functions as are required for the achievement of the objective of the Convention as well as all other functions assigned to it under the Convention.

3. The Conference of the Parties shall, at its first session, adopt its own rules of procedure as well as those of the subsidiary bodies established by the Convention, which shall include decision-making procedures for matters not already covered by decision-making procedures stipulated in the Convention. Such procedures may include specified majorities required for the adoption of particular decisions.

4. The first session of the Conference of the Parties shall be convened by the interim secretariat referred to in Article 21 and shall take place not later than one year after the date of entry into force of the Convention. Thereafter, ordinary sessions of the Conference of the Parties shall be held every year unless otherwise decided by the Conference of the Parties.

5. Extraordinary sessions of the Conference of the Parties shall be held at such other times as may be deemed necessary by the Conference, or at the written request of any Party, provided that, within six months of the request being communicated to the Parties by the secretariat, it is supported by at least one third of the Parties.

6. The United Nations, its specialized agencies and the International Atomic Energy Agency, as well as any State member thereof or observers thereto not Party to the Convention, may be represented at sessions of the Conference of the Parties as observers. Any body or agency, whether national or international, governmental or non-governmental, which is qualified in matters covered by the Convention, and which has informed the secretariat of its wish to be represented at a session of the Conference of the Parties as an observer, may be so admitted unless at least one third of the Parties present object. The admission and participation of observers shall be subject to the rules of procedure adopted by the Conference of the Parties.

#### ARTICLE 8

**SECRETARIAT**

1. A secretariat is hereby established.
2. The functions of the secretariat shall be:
  - (a) To make arrangements for sessions of the Conference of the Parties and its subsidiary bodies established under the Convention and to provide them with services as required;
  - (b) To compile and transmit reports submitted to it;
  - (c) To facilitate assistance to the Parties, particularly developing country Parties, on request, in the compilation and communication of information required in accordance with the provisions of the Convention;
  - (d) To prepare reports on its activities and present them to the Conference of the Parties;
  - (e) To ensure the necessary coordination with the secretariats of other relevant international bodies;
  - (f) To enter, under the overall guidance of the Conference of the Parties, into such administrative and contractual arrangements as may be required for the effective discharge of its functions; and
  - (g) To perform the other secretariat functions specified in the Convention and in any of its protocols and such other functions as may be determined by the Conference of the Parties.
3. The Conference of the Parties, at its first session, shall designate a permanent secretariat and make arrangements for its functioning.

**ARTICLE 9****SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE**

1. A subsidiary body for scientific and technological advice is hereby established to provide the Conference of the Parties and, as appropriate, its other subsidiary bodies with timely information and advice on scientific and technological matters relating to the Convention. This body shall be open to participation by all Parties and shall be multidisciplinary. It shall comprise government representatives competent in the relevant field of expertise. It shall report regularly to the Conference of the Parties on all aspects of its work.

2. Under the guidance of the Conference of the Parties, and drawing upon existing competent international bodies, this body shall:

- (a) Provide assessments of the state of scientific knowledge relating to climate change and its effects;
- (b) Prepare scientific assessments on the effects of measures taken in the implementation of the Convention;
- (c) Identify innovative, efficient and state-of-the-art technologies and know-how and advise on the ways and means of promoting development and/or transferring such technologies;
- (d) Provide advice on scientific programmes, international cooperation in research and development related to climate change, as well as on ways and means of supporting endogenous capacity-building in developing countries; and
- (e) Respond to scientific, technological and methodological questions that the Conference of the Parties and its subsidiary bodies may put to the body.

3. The functions and terms of reference of this body may be further elaborated by the Conference of the Parties.

## ARTICLE 10

### SUBSIDIARY BODY FOR IMPLEMENTATION

1. A subsidiary body for implementation is hereby established to assist the Conference of the Parties in the assessment and review of the effective implementation of the Convention. This body shall be open to participation by all Parties and comprise government representatives who are experts on matters related to climate change. It shall report regularly to the Conference of the Parties on all aspects of its work.

2. Under the guidance of the Conference of the Parties, this body shall:

- (a) Consider the information communicated in accordance with Article 12, paragraph 1, to assess the overall aggregated effect of the steps taken by the Parties in the light of the latest scientific assessments concerning climate change;
- (b) Consider the information communicated in accordance with Article 12, paragraph 2, in order to assist the

Conference of the Parties in carrying out the reviews required by Article 4, paragraph 2(d); and

- (c) Assist the Conference of the Parties, as appropriate, in the preparation and implementation of its decisions.

## ARTICLE 11

### FINANCIAL MECHANISM

1. A mechanism for the provision of financial resources on a grant or concessional basis, including for the transfer of technology, is hereby defined. It shall function under the guidance of and be accountable to the Conference of the Parties, which shall decide on its policies, programme priorities and eligibility criteria related to this Convention. Its operation shall be entrusted to one or more existing international entities.

2. The financial mechanism shall have an equitable and balanced representation of all Parties within a transparent system of governance.

3. The Conference of the Parties and the entity or entities entrusted with the operation of the financial mechanism shall agree upon arrangements to give effect to the above paragraphs, which shall include the following:

- (a) Modalities to ensure that the funded projects to address climate change are in conformity with the policies, programme priorities and eligibility criteria established by the Conference of the Parties;
- (b) Modalities by which a particular funding decision may be reconsidered in light of these policies, programme priorities and eligibility criteria;
- (c) Provision by the entity or entities of regular reports to the Conference of the Parties on its funding operations, which is consistent with the requirement for accountability set out in paragraph 1 above; and
- (d) Determination in a predictable and identifiable manner of the amount of funding necessary and available for the implementation of this Convention and the conditions under which that amount shall be periodically reviewed.

4. The Conference of the Parties shall make arrangements to implement the above-mentioned provisions at its first session, reviewing and taking into account the interim arrangements referred to in Article 21, paragraph 3, and shall decide

whether these interim arrangements shall be maintained. Within four years thereafter, the Conference of the Parties shall review the financial mechanism and take appropriate measures.

5. The developed country Parties may also provide and developing country Parties avail themselves of, financial resources related to the implementation of the Convention through bilateral, regional and other multilateral channels.

## ARTICLE 12

### COMMUNICATION OF INFORMATION RELATED TO IMPLEMENTATION

1. In accordance with Article 4, paragraph 1, each Party shall communicate to the Conference of the Parties, through the secretariat, the following elements of information:

- (a) A national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties;
- (b) A general description of steps taken or envisaged by the Party to implement the Convention; and
- (c) Any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, material relevant for calculations of global emission trends.

2. Each developed country Party and each other Party included in Annex I shall incorporate in its communication the following elements of information:

- (a) A detailed description of the policies and measures that it has adopted to implement its commitment under Article 4, paragraphs 2(a) and 2(b); and
- (b) A specific estimate of the effects that the policies and measures referred to in subparagraph (a) immediately above will have on anthropogenic emissions by its sources and removals by its sinks of greenhouse gases during the period referred to in Article 4, paragraph 2(a).

3. In addition, each developed country Party and each other developed Party included in Annex II shall incorporate details of measures taken in accordance with Article 4, paragraphs 3, 4 and 5.

4. Developing country Parties may, on a voluntary basis, propose projects for financing, including specific technologies, materials, equipment, techniques or practices

that would be needed to implement such projects, along with, if possible, an estimate of all incremental costs, of the reductions of emissions and increments of removals of greenhouse gases, as well as an estimate of the consequent benefits.

5. Each developed country Party and each other Party included in Annex I shall make its initial communication within six months of the entry into force of the Convention for that Party. Each Party not so listed shall make its initial communication within three years of the entry into force of the Convention for that Party, or of the availability of financial resources in accordance with Article 4, paragraph 3. Parties that are least developed countries may make their initial communication at their discretion. The frequency of subsequent communications by all Parties shall be determined by the Conference of the Parties, taking into account the differentiated timetable set by this paragraph.

6. Information communicated by Parties under this Article shall be transmitted by the secretariat as soon as possible to the Conference of the Parties and to any subsidiary bodies concerned. If necessary, the procedures for the communication of information may be further considered by the Conference of the Parties.

7. From its first session, the Conference of the Parties shall arrange for the provision to developing country Parties of technical and financial support, on request, in compiling and communicating information under this Article, as well as in identifying the technical and financial needs associated with proposed projects and response measures under Article 4. Such support may be provided by other Parties, by competent international organizations and by the secretariat, as appropriate.

8. Any group of Parties may, subject to guidelines adopted by the Conference of the Parties, and to prior notification to the Conference of the Parties, make a joint communication in fulfilment of their obligations under this Article, provided that such a communication includes information on the fulfilment by each of these Parties of its individual obligations under the Convention.

9. Information received by the secretariat that is designated by a Party as confidential, in accordance with criteria to be established by the Conference of the Parties, shall be aggregated by the secretariat to protect its confidentiality before being made available to any of the bodies involved in the communication and review of information.

10. Subject to paragraph 9 above, and without prejudice to the ability of any Party to make public its communication at any time, the secretariat shall make communications by Parties

under this Article publicly available at the time they are submitted to the Conference of the Parties.

### ARTICLE 13

#### RESOLUTION OF QUESTIONS REGARDING IMPLEMENTATION

The Conference of the Parties shall, at its first session, consider the establishment of a multilateral consultative process, available to Parties on their request, for the resolution of questions regarding the implementation of the Convention.

### ARTICLE 14

#### SETTLEMENT OF DISPUTES

1. In the event of a dispute between any two or more Parties concerning the interpretation or application of the Convention, the Parties concerned shall seek a settlement of the dispute through negotiation or any other peaceful means of their own choice.

2. When ratifying, accepting, approving or acceding to the Convention, or at any time thereafter, a Party which is not a regional economic integration organization may declare in a written instrument submitted to the Depositary that, in respect of any dispute concerning the interpretation or application of the Convention, it recognizes as compulsory ipso facto and without special agreement, in relation to any Party accepting the same obligation:

- (a) Submission of the dispute to the International Court of Justice, and/or
- (b) Arbitration in accordance with procedures to be adopted by the Conference of the Parties as soon as practicable, in an annex on arbitration.

A Party which is a regional economic integration organization may make a declaration with like effect in relation to arbitration in accordance with the procedures referred to in subparagraph (b) above.

3. A declaration made under paragraph 2 above shall remain in force until it expires in accordance with its terms or until three months after written notice of its revocation has been deposited with the Depositary.

4. A new declaration, a notice of revocation or the expiry of a declaration shall not in any way affect proceedings pending before the International Court of Justice or the arbitral tribunal, unless the parties to the dispute otherwise agree.

5. Subject to the operation of paragraph 2 above, if after twelve months following notification by one Party to another that a dispute exists between them, the Parties concerned have not been able to settle their dispute through the means mentioned in paragraph 1 above, the dispute shall be submitted, at the request of any of the parties to the dispute, to conciliation.

6. A conciliation commission shall be created upon the request of one of the parties to the dispute. The commission shall be composed of an equal number of members appointed by each party concerned and a chairman chosen jointly by the members appointed by each party. The commission shall render a recommendatory award, which the parties shall consider in good faith.

7. Additional procedures relating to conciliation shall be adopted by the Conference of the Parties, as soon as practicable, in an annex on conciliation.

8. The provisions of this Article shall apply to any related legal instrument which the Conference of the Parties may adopt, unless the instrument provides otherwise.

## ARTICLE 15

### AMENDMENTS TO THE CONVENTION

1. Any Party may propose amendments to the Convention.

2. Amendments to the Convention shall be adopted at an ordinary session of the Conference of the Parties. The text of any proposed amendment to the Convention shall be communicated to the Parties by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate proposed amendments to the signatories to the Convention and, for information, to the Depositary.

3. The Parties shall make every effort to reach agreement on any proposed amendment to the Convention by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the amendment shall as a last resort be adopted by a three-fourths majority vote of the Parties present and voting at the meeting. The adopted amendment shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties for their acceptance.

4. Instruments of acceptance in respect of an amendment shall be deposited with the Depositary. An amendment adopted in accordance with paragraph 3 above shall enter into force for those Parties having accepted it on the ninetieth day after the date of receipt by the Depositary of an instrument of acceptance by at least three fourths of the Parties to the Convention.

5. The amendment shall enter into force for any other Party on the ninetieth day after the date on which that Party deposits with the Depositary its instrument of acceptance of the said amendment.

6. For the purposes of this Article, "Parties present and voting" means Parties present and casting an affirmative or negative vote.

## ARTICLE 16

### ADOPTION AND AMENDMENT OF ANNEXES TO THE CONVENTION

1. Annexes to the Convention shall form an integral part thereof and, unless otherwise expressly provided, a reference to the Convention constitutes at the same time a reference to any annexes thereto. Without prejudice to the provisions of Article 14, paragraphs 2(b) and 7, such annexes shall be restricted to lists, forms and any other material of a descriptive nature that is of a scientific, technical, procedural or administrative character.

2. Annexes to the Convention shall be proposed and adopted in accordance with the procedure set forth in Article 15, paragraphs 2, 3 and 4.

3. An annex that has been adopted in accordance with paragraph 2 above shall enter into force for all Parties to the Convention six months after the date of the communication by the Depositary to such Parties of the adoption of the annex, except for those Parties that have notified the Depositary, in writing, within that period of their non-acceptance of the annex. The annex shall enter into force for Parties which withdraw their notification of non-acceptance on the ninetieth day after the date on which withdrawal of such notification has been received by the Depositary.

4. The proposal, adoption and entry into force of amendments to annexes to the Convention shall be subject to the same procedure as that for the proposal, adoption and entry into force of annexes to the Convention in accordance with paragraphs 2 and 3 above.

5. If the adoption of an annex or an amendment to an annex involves an amendment to the Convention, that annex or amendment to an annex shall not enter into force until such time as the amendment to the Convention enters into force.

## ARTICLE 17

### PROTOCOLS

1. The Conference of the Parties may, at any ordinary session, adopt protocols to the Convention.

2. The text of any proposed protocol shall be communicated to the Parties by the secretariat at least six months before such a session.

3. The requirements for the entry into force of any protocol shall be established by that instrument.

4. Only Parties to the Convention may be Parties to a protocol.

5. Decisions under any protocol shall be taken only by the Parties to the protocol concerned.

#### **ARTICLE 18**

##### **RIGHT TO VOTE**

1. Each Party to the Convention shall have one vote, except as provided for in paragraph 2 below.

2. Regional economic integration organizations, in matters within their competence, shall exercise their right to vote with a number of votes equal to the number of their member States that are Parties to the Convention. Such an organization shall not exercise its right to vote if any of its member States exercises its right, and vice versa.

#### **ARTICLE 19**

##### **DEPOSITARY**

The Secretary-General of the United Nations shall be the Depositary of the Convention and of protocols adopted in accordance with Article 17.

**ARTICLE 20****SIGNATURE**

This Convention shall be open for signature by States Members of the United Nations or of any of its specialized agencies or that are Parties to the Statute of the International Court of Justice and by regional economic integration organizations at Rio de Janeiro, during the United Nations Conference on Environment and Development, and thereafter at United Nations Headquarters in New York from 20 June 1992 to 19 June 1993.

**ARTICLE 21****INTERIM ARRANGEMENTS**

1. The secretariat functions referred to in Article 8 will be carried out on an interim basis by the secretariat established by the General Assembly of the United Nations in its resolution 45/212 of 21 December 1990, until the completion of the first session of the Conference of the Parties.

2. The head of the interim secretariat referred to in paragraph 1 above will cooperate closely with the Intergovernmental Panel on Climate Change to ensure that the Panel can respond to the need for objective scientific and technical advice. Other relevant scientific bodies could also be consulted.

3. The Global Environment Facility of the United Nations Development Programme, the United Nations Environment Programme and the International Bank for Reconstruction and Development shall be the international entity entrusted with the operation of the financial mechanism referred to in Article 11 on an interim basis. In this connection, the Global Environment Facility should be appropriately restructured and its membership made universal to enable it to fulfil the requirements of Article 11.

**ARTICLE 22****RATIFICATION, ACCEPTANCE, APPROVAL OR ACCESSION**

1. The Convention shall be subject to ratification, acceptance, approval or accession by States and by regional economic integration organizations. It shall be open for accession from the day after the date on which the Convention is closed for signature. Instruments of ratification, acceptance, approval or accession shall be deposited with the Depositary.

2. Any regional economic integration organization which becomes a Party to the Convention without any of its member

States being a Party shall be bound by all the obligations under the Convention. In the case of such organizations, one or more of whose member States is a Party to the Convention, the organization and its member States shall decide on their respective responsibilities for the performance of their obligations under the Convention. In such cases, the organization and the member States shall not be entitled to exercise rights under the Convention concurrently.

3. In their instruments of ratification, acceptance, approval or accession, regional economic integration organizations shall declare the extent of their competence with respect to the matters governed by the Convention. These organizations shall also inform the Depositary, who shall in turn inform the Parties, of any substantial modification in the extent of their competence.

## **ARTICLE 23**

### **ENTRY INTO FORCE**

1. The Convention shall enter into force on the ninetieth day after the date of deposit of the fiftieth instrument of ratification, acceptance, approval or accession.

2. For each State or regional economic integration organization that ratifies, accepts or approves the Convention or accedes thereto after the deposit of the fiftieth instrument of ratification, acceptance, approval or accession, the Convention shall enter into force on the ninetieth day after the date of deposit by such State or regional economic integration organization of its instrument of ratification, acceptance, approval or accession.

3. For the purposes of paragraphs 1 and 2 above, any instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by States members of the organization.

## **ARTICLE 24**

### **RESERVATIONS**

No reservations may be made to the Convention.

## **ARTICLE 25**

### **WITHDRAWAL**

1. At any time after three years from the date on which the Convention has entered into force for a Party, that Party may withdraw from the Convention by giving written notification to the Depositary.

2. Any such withdrawal shall take effect upon expiry of one year from the date of receipt by the Depositary of the notification of withdrawal, or on such later date as may be specified in the notification of withdrawal.

3. Any Party that withdraws from the Convention shall be considered as also having withdrawn from any protocol to which it is a Party.

## **ARTICLE 26**

### **AUTHENTIC TEXTS**

The original of this Convention, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

**IN WITNESS WHEREOF** the undersigned, being duly authorized to that effect, have signed this Convention.

**DONE** at New York this ninth day of May one thousand nine hundred and ninety-two.

**Annex I**

Australia  
Austria  
Belarus<sup>a/</sup>  
Belgium  
Bulgaria<sup>a/</sup>  
Canada  
Czechoslovakia<sup>a/</sup>  
Denmark  
European Economic Community  
Estonia<sup>a/</sup>  
Finland  
France  
Germany  
Greece  
Hungary<sup>a/</sup>  
Iceland  
Ireland  
Italy  
Japan  
Latvia<sup>a/</sup>  
Lithuania<sup>a/</sup>  
Luxembourg  
Netherlands  
New Zealand  
Norway  
Poland<sup>a/</sup>  
Portugal  
Romania<sup>a/</sup>  
Russian Federation<sup>a/</sup>  
Spain  
Sweden  
Switzerland  
Turkey  
Ukraine<sup>a/</sup>  
United Kingdom of Great  
Britain and Northern Ireland  
**United States of America**

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<sup>a/</sup> Countries that are undergoing the process of transition to a market economy.

Annex II

Australia  
Austria  
Belgium  
Canada  
Denmark  
European Economic Community  
Finland  
France  
Germany  
Greece  
Iceland  
Ireland  
Italy  
Japan  
Luxembourg  
Netherlands  
New Zealand  
Norway  
Portugal  
Spain  
Sweden  
Switzerland  
Turkey  
United Kingdom of Great  
    Britain and Northern Ireland  
United States of America

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World  
Meteorological  
Organization  
Weather • Climate • Water

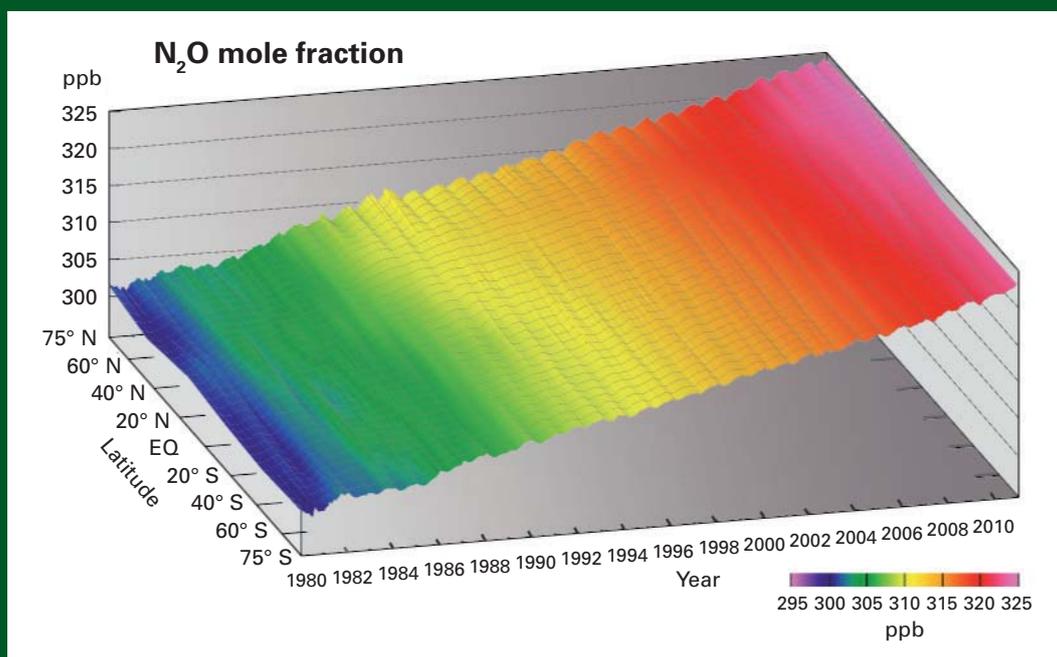


GLOBAL  
ATMOSPHERE  
WATCH

# WMO GREENHOUSE GAS BULLETIN

The State of Greenhouse Gases in the Atmosphere  
Based on Global Observations through 2010

No. 7 | 21 November 2011



In the figure above, zonally averaged nitrous oxide (N<sub>2</sub>O) abundance from WMO/GAW air sampling sites is plotted as a function of latitude from 1980 to 2010. Nitrous oxide is now the third most important contributor to radiative forcing of long-lived greenhouse gases, recently surpassing CFC-12, and its impact on climate integrated over 100 years is 298 times greater than equal emissions of carbon dioxide (CO<sub>2</sub>). It plays an important role in stratospheric ozone (O<sub>3</sub>) destruction. The major anthropogenic source of N<sub>2</sub>O to the

atmosphere is the use of nitrogen containing fertilizers (including manure), which have profoundly affected the global nitrogen cycle. Reductions in the amounts of fertilizer applied to agricultural fields to better match the nitrogen needs of crops can reduce N<sub>2</sub>O emissions. Such changes must be made carefully to avoid lower crop yields, which would raise concerns about global food security. The predominant use of fertilizers in the mid-latitudes of the northern hemisphere is responsible for the small north-to-south gradient of ~1.2 ppb.<sup>[1]</sup>

## Executive summary

The latest analysis of observations from the WMO Global Atmosphere Watch (GAW) Programme shows that the globally averaged mixing ratios of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) reached new highs in 2010, with CO<sub>2</sub> at 389.0 ppm,<sup>[2]</sup> CH<sub>4</sub> at 1808 ppb and N<sub>2</sub>O at 323.2 ppb. These values are greater than those in pre-industrial times (before 1750) by 39%, 158% and 20%, respectively. Atmospheric increases of CO<sub>2</sub> and N<sub>2</sub>O from

2009 to 2010 are consistent with recent years, but they are higher than both those observed from 2008 to 2009 and those averaged over the past 10 years. Atmospheric CH<sub>4</sub> continues to increase, consistent with the past three years. The NOAA Annual Greenhouse Gas Index shows that from 1990 to 2010 radiative forcing by long-lived greenhouse gases increased by 29%, with CO<sub>2</sub> accounting for nearly 80% of this increase. Radiative forcing of N<sub>2</sub>O exceeded that of CFC-12, making N<sub>2</sub>O the third most important long-lived greenhouse gas.

## Overview

This is the seventh in a series of WMO/GAW Annual Greenhouse Gas Bulletins. Each year, this bulletin reports the atmospheric burdens and rates of change of the most important long-lived greenhouse gases (LLGHGs) – carbon dioxide, methane, nitrous oxide, CFC-12 and CFC-11 – and provides a summary of the contributions of the lesser gases. These five major gases account for approximately 96% of radiative forcing due to LLGHGs (Figure 1).

The WMO Global Atmosphere Watch Programme coordinates systematic observations and analysis of atmospheric composition, including greenhouse gases and other trace species. The GAW CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O networks are comprehensive and baseline networks of the Global Climate Observing System (GCOS). Sites where greenhouse gases are monitored are shown in Figure 2. Measurement data are reported by participating countries and archived and distributed by the World Data Centre for Greenhouse Gases (WDCGG) at the Japan Meteorological Agency.

Statistics on global atmospheric abundances in 2010 and changes in abundance since 2009 and 1750 for the three major greenhouse gases are given in the table. These results are obtained from a global analysis (GAW Report No. 184, available at <http://www.wmo.int/gaw>) of datasets

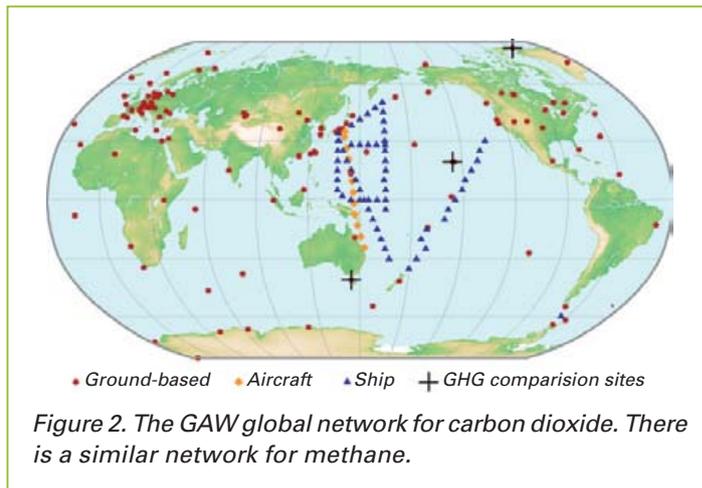


Figure 2. The GAW global network for carbon dioxide. There is a similar network for methane.

that are traceable to the WMO World Reference Standard. Data from mobile stations, with the exception of NOAA flask sampling in the Pacific (blue triangles in Figure 2), are not used for this global analysis.

The three greenhouse gases summarized in the table have been increasing in the atmosphere since the beginning of the industrial era. Their atmospheric abundances are directly connected with human activity, unlike water vapour, which is the most important greenhouse gas but whose abundance is controlled by fast climate feedbacks. They are generally much longer lived in the atmosphere than water vapour. The three primary greenhouse gases are not only closely linked to anthropogenic activities, but they also have strong interactions with the biosphere and the oceans. Chemical reactions in the atmosphere affect their abundances as well. Prediction of the evolution of greenhouse gases in the atmosphere requires an understanding of their many sources and sinks.

According to the NOAA Annual Greenhouse Gas Index, the total radiative forcing by all LLGHGs increased by 29% from 1990 to 2010 and by 1.4% from 2009 to 2010 (see Figure 1 and <http://www.esrl.noaa.gov/gmd/aggi>).

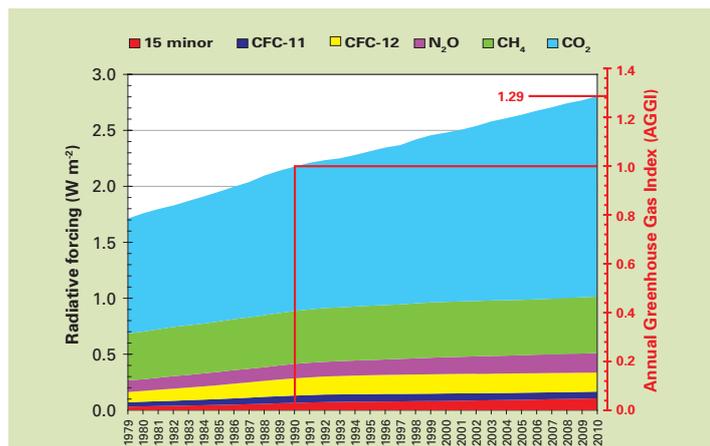


Figure 1. Atmospheric radiative forcing, relative to 1750, of all long-lived greenhouse gases and the 2010 update of the NOAA Annual Greenhouse Gas Index (AGGI). The reference year for the index is 1990 (AGGI = 1).

Global abundances of and increases in key greenhouse gases from the GAW global greenhouse gas monitoring network. Global abundances for 2010 are calculated as an average over 12 months.

	CO <sub>2</sub> (ppm)	CH <sub>4</sub> (ppb)	N <sub>2</sub> O (ppb)
Global abundance in 2010	389.0	1808	323.2
2010 abundance relative to year 1750 <sup>a</sup>	139%	258%	120%
2009–2010 absolute increase	2.3	5	0.8
2009–2010 relative increase	0.59%	0.28%	0.25%
Mean annual absolute increase during last 10 years	1.97	2.6	0.75

<sup>a</sup> Assuming a pre-industrial mixing ratio of 280 ppm for CO<sub>2</sub>, 700 ppb for CH<sub>4</sub> and 270 ppb for N<sub>2</sub>O.

## Carbon dioxide (CO<sub>2</sub>)

Carbon dioxide is the single most important anthropogenic greenhouse gas in the atmosphere, contributing ~64%<sup>[3]</sup> to radiative forcing by LLGHGs. It is responsible for 85% of the increase in radiative forcing over the past decade and 81% over the last five years. For about 10 000 years before the industrial revolution, the atmospheric abundance of CO<sub>2</sub> was nearly constant at ~280 ppm. This level represented a balance among the atmosphere, the oceans and the biosphere. Since 1750, atmospheric CO<sub>2</sub> has increased by 39%, primarily because of emissions from combustion of fossil fuels (total of 8.4±0.5 PgC<sup>[4]</sup> in 2009; <http://www.globalcarbonproject.org>), deforestation and land-use change. High-precision measurements of atmospheric CO<sub>2</sub> beginning in 1958 show that the average increase in CO<sub>2</sub> in the atmosphere corresponds to ~55% of the CO<sub>2</sub> emitted by fossil fuel combustion. The remaining ~45% has been removed from the atmosphere by the oceans and the terrestrial biosphere. The airborne fraction, the portion of CO<sub>2</sub> emitted by fossil fuel combustion that remains in the atmosphere, varies interannually without a confirmed global trend. Globally averaged CO<sub>2</sub> in 2010 was 389.0 ppm and the increase from the previous year

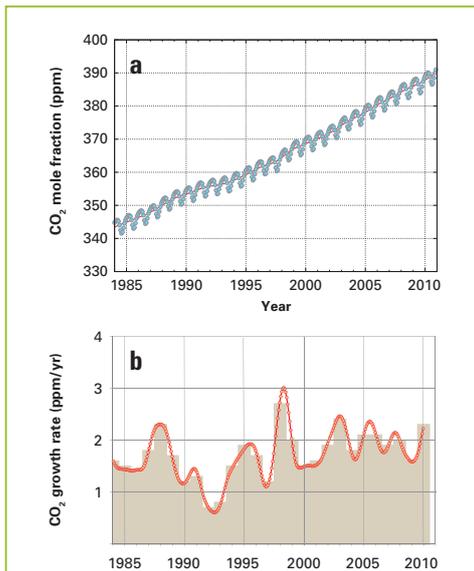


Figure 3. Globally averaged  $\text{CO}_2$  mole fraction (a) and its growth rate (b) from 1984 to 2010. Annually averaged growth rate is shown by columns at (b).

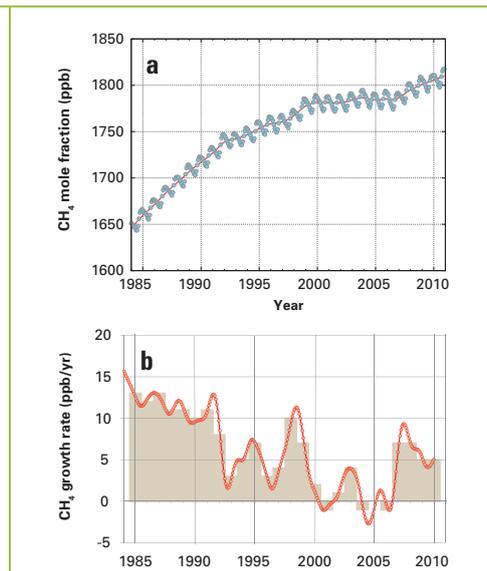


Figure 4. Globally averaged  $\text{CH}_4$  mole fraction (a) and its growth rate (b) from 1984 to 2010. Annually averaged growth rate is shown by columns at (b).

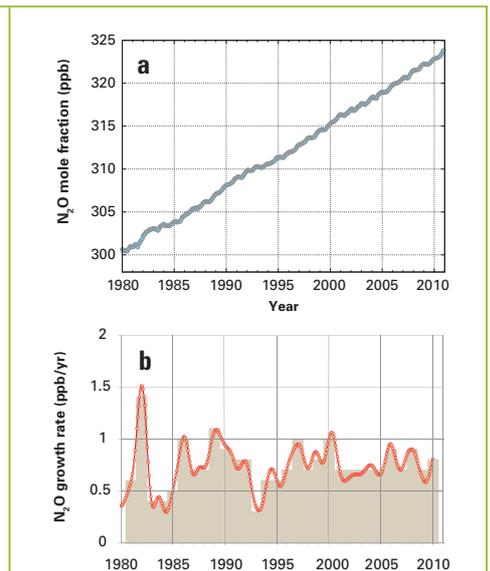


Figure 5. Globally averaged  $\text{N}_2\text{O}$  mole fraction (a) and its growth rate (b) from 1980 to 2010. Annually averaged growth rate is shown by columns at (b).

was 2.3 ppm (Figure 3). This growth rate is higher than the average for the 1990s (~1.5 ppm/yr) and the average for the past decade (~2.0 ppm/yr).

## Methane ( $\text{CH}_4$ )

Methane contributes ~18%<sup>[3]</sup> to radiative forcing by LLGHGs. Approximately 40% of methane emitted into the atmosphere comes from natural sources such as wetlands and termites, while anthropogenic sources, such as ruminants, rice agriculture, fossil fuel exploitation, landfills and biomass burning, account for about 60%. Methane is removed from the atmosphere primarily by reaction with the hydroxyl radical (OH). Before the industrial era, atmospheric methane was at ~700 ppb. Increasing emissions from anthropogenic sources are responsible for the 158% increase in  $\text{CH}_4$ . Globally averaged  $\text{CH}_4$  in 2010 was 1808 ppb, an increase of 5 ppb from the previous year. It exceeds the highest annual mean abundance so far, which was recorded in 2009 (Figure 4). The growth rate of  $\text{CH}_4$  decreased from ~13 ppb/yr during the early 1980s to near zero from 1999 to 2006. Since 2007, atmospheric  $\text{CH}_4$  has been increasing again. The 19 ppb rise from 2006 to 2009 was followed by a 5 ppb rise in 2010. The reasons for the renewed increase in  $\text{CH}_4$  are not fully understood and several factors, mostly biogenic, were reported to contribute to this increase. To improve our understanding of the processes that affect  $\text{CH}_4$  emissions, more in situ measurements are needed close to the source regions.

## Nitrous oxide ( $\text{N}_2\text{O}$ )

Nitrous oxide contributes ~6%<sup>[3]</sup> to radiative forcing by LLGHGs. It is now the third most important contributor to this total. Its atmospheric abundance prior to industrialization was 270 ppb. It is emitted into the atmosphere from natural and

anthropogenic sources, including oceans, soil, biomass burning, fertilizer use, and various industrial processes. Anthropogenic sources may account for approximately 40% of the total  $\text{N}_2\text{O}$  emissions. It is removed from the atmosphere by photochemical processes in the stratosphere. Globally averaged  $\text{N}_2\text{O}$  during 2010 was 323.2 ppb, up 0.8 ppb from the previous year (Figure 5) and 20% above the pre-industrial level. The mean growth rate has been 0.75 ppb/yr over the past 10 years.

## Other greenhouse gases

Sulphur hexafluoride ( $\text{SF}_6$ ) is a potent LLGHG controlled by the Kyoto Protocol to the United Nations Framework Convention on Climate Change. It is produced artificially and used as an electrical insulator in power distribution equipment. Its mixing ratio has increased to double that observed in the mid-1990s (Figure 6). The ozone-depleting chlorofluorocarbons (CFCs), together with minor halogenated gases, contribute ~12%<sup>[3]</sup> to radiative forcing by LLGHGs. While CFCs and most halons are decreasing, hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), which are also potent greenhouse gases, are increasing at rapid rates, although they are still low in abundance (Figure 7).

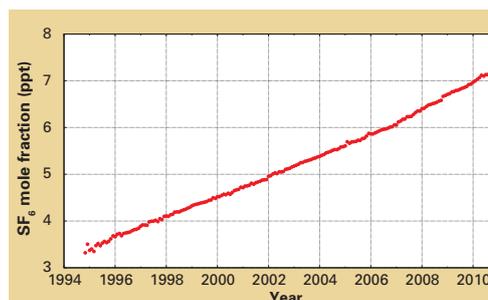


Figure 6. Monthly mean mole fraction of sulphur hexafluoride ( $\text{SF}_6$ ) from 1995 to 2010 averaged over 18 stations

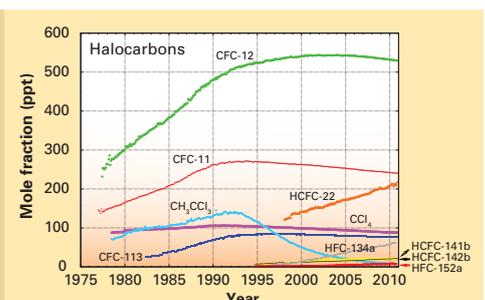


Figure 7. Monthly mean mole fraction of the most important halocarbons from 1977 to 2010 averaged over the network (between 7 and 19 stations)

Tropospheric ozone has a relatively short lifetime. Its radiative forcing, however, appears to be comparable to that of the halocarbons, although much less certain. It is difficult to estimate the global distribution and trend of tropospheric ozone because of its uneven geographical distribution and high temporal variability. Many other pollutants, such as carbon monoxide, nitrogen oxides and volatile organic compounds, although insignificant as greenhouse gases, have an indirect effect on the radiative forcing through their impact on the tropospheric ozone abundance. Aerosols (suspended particulate matter) are also short-lived substances that influence radiative forcing.

All gases mentioned herein as well as aerosols are monitored by the GAW Programme, with support from WMO Member countries and contributing networks.

## Distribution of the bulletins

The WMO Secretariat prepares and distributes bulletins in cooperation with the World Data Centre for Greenhouse Gases at the Japan Meteorological Agency and the GAW Scientific Advisory Group for Greenhouse Gases, with the assistance of the NOAA Earth System Research Laboratory (ESRL). The bulletins are available through the GAW Programme Web page and on the home page of WDCGG.

## Acknowledgements and links

Fifty WMO Member countries have contributed CO<sub>2</sub> data to the GAW WDCGG. Approximately 49% of the measurement records submitted to WDCGG are obtained at sites in the NOAA ESRL cooperative air-sampling network. The rest of the network is maintained by Australia, Canada, China, Japan and many European countries (see the national reports in GAW Report No. 186, available at <http://www.wmo.int/gaw>). The Advanced Global Atmospheric Gases Experiment (AGAGE) is also a GAW-affiliated network contributing observations to this bulletin. The GAW monitoring stations contributing data to this bulletin, shown in Figure 2, are included in the list of contributors on the WDCGG Web page (<http://gaw.kishou.go.jp/wdcgg>). They are also described in the GAW Station Information System (<http://gaw.empa.ch/gawsis>) operated by EMPA, Switzerland.

## Contacts

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### World Data Centre for Greenhouse Gases

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<sup>[1]</sup> ppb = number of molecules of the gas per billion (10<sup>9</sup>) molecules of dry air.

<sup>[2]</sup> ppm = number of molecules of the gas per million molecules of dry air.

<sup>[3]</sup> This percentage is calculated as the relative contribution of the mentioned gas to the increase in global radiative forcing caused by all long-lived greenhouse gases since 1750 (<http://www.esrl.noaa.gov/gmd/aggi>).

<sup>[4]</sup> 1 PgC = 1 billion tons or 1 000 x million tons of carbon.

## Selected greenhouse gas observatories



**The Samoa Observatory** (14.23°S, 170.56°W) was established in 1974, and is one of six NOAA ESRL Global Monitoring Division (GMD) Baseline Observatories. It is located on the north-eastern tip of Tutuila Island, American Samoa, on a ridge over-

looking the South Pacific Ocean. Since its construction, the Observatory has survived two major hurricanes with only minor damage. It has the distinction of obtaining 30% of its daytime power from solar panels. Flask collection for measurements of N<sub>2</sub>O started in January 1977 and continuous measurements have been carried out since July 1978.

### Barrow Observatory

(71.32°N, 156.61°W), established in 1973 in Alaska, United States of America, is staffed year-round by two engineers/scientists who often commute to work in winter on snowmobiles. The Observatory is host to numerous cooperative



research projects from around the world owing to its unique location, dedicated and highly trained staff, excellent power and communications infrastructure. It is located so that it receives minimal influence from local pollution. Flask collection for measurements of N<sub>2</sub>O started in January 1977 and continuous measurements have been carried out since January 1987.



**Niwot Ridge** (40.05°N, 105.59°W) is located approximately 35 km west of Boulder, Colorado, United States, with the entire study site lying above 3000 m elevation. Niwot Ridge, including the main alpine

study site, is part of the Roosevelt National Forest and has been designated a Biosphere Reserve by UNESCO, and an Experimental Ecology Reserve by the United States Department of Agriculture Forest Service. Air samples have been taken here, in flasks, for NOAA ESRL GMD since 1963. These flasks have been analysed for N<sub>2</sub>O since January 1977 and continuous N<sub>2</sub>O observations have been carried out since January 1987.

There are a number of other stations with long-term observations of N<sub>2</sub>O mole fractions: Cape Grim, Australia (N<sub>2</sub>O observations have been carried out since 1978), Adrigole, Ireland (started in 1978) then moved to Mace Head, Ireland (records from 1987 onward), Ragged Point, Barbados (since 1978) and, in the United States, Cape Meares, Oregon (beginning in 1979) then moved to Trinidad Head, California (1995), and Mauna Loa, Hawaii (started in 1978).

---

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<snyder.doug@epamail.epa.gov>; Thea Schwartz  
<tschwartz@atg.state.vt.us>; Fisherow, Walter Benjamin (ENRD)  
<walter.benjamin.fisherow@usdoj.gov>  
Cc:  
Bcc:  
Subject: Request for telephone conference TODAY at 10:00 a.m. in Case No. 99-1182  
Date: Mon Dec 10 2012 09:28:46 EST  
Attachments:

---

Dear Counsel,  
Judge Sargus would like to have a very brief telephone conference today at  
10:00 a.m. -- the call-in information is shown below. If you could, please  
let me know if you will be able to participate.  
Thank you so much,  
Debbie

The call in number is 888-684-8852., please call about 5 minutes prior to  
the scheduled time of call.  
You will be asked for an access code, which is: 9586353#  
Then you will be asked for a Conference Security Code, which is 1182

Debra Hepler  
Secretary to Judge Edmund A. Sargus, Jr.  
(614) 719-3240

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Debra\_A\_Hepler@ohsd.uscourts.gov  
<debra\_a\_hepler@ohsd.uscourts.gov>  
Cc:  
Bcc:  
Subject: RE: Request for telephone conference TODAY at 10:00 a.m. in Case No. 99-1182  
Date: Mon Dec 10 2012 09:54:13 EST  
Attachments:

---

Debra, I can participate in a brief call at 10. Thanks.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Debra\_A\_Hepler@ohsd.uscourts.gov [mailto:Debra\_A\_Hepler@ohsd.uscourts.gov]  
Sent: Monday, December 10, 2012 9:29 AM  
To: jjhenry@aep.com; Flint, Myles (ENRD); penny\_barrick@ohsd.uscourts.gov; allen.brooks@doj.nh.gov; argentieri.sabrina@epa.gov; Brooks.Phillip@epamail.epa.gov; Bruce Nilles; Apple Chapman; Shallcross, Douglas (DEP); Braczyk, Edward (DEP); Faith Bugel; Augenstern, Fred (AGO); Gregory Fried; Gregory Schultz (gschultz@riag.ri.gov); jjhenry@aep.com; dmike1947@gmail.com; jhadden@porterwright.com; jon.martin@dol.lps.state.nj.us; Seema Kakade; Eleanor Kane; lori.dibella@po.state.ct.us; Mastro.Donna@epamail.epa.gov; Michael J. Myers; MZimmerman@mde.state.md.us; nmarks@nrdc.org; Chris Pilla; David Schulz; Doug Snyder; Thea Schwartz; Fisherow, Walter Benjamin (ENRD)  
Subject: Request for telephone conference TODAY at 10:00 a.m. in Case No. 99-1182

Dear Counsel,  
Judge Sargus would like to have a very brief telephone conference today at 10:00 a.m. -- the call-in information is shown below. If you could, please let me know if you will be able to participate.  
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Debbie

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You will be asked for an access code, which is: 9586353#  
Then you will be asked for a Conference Security Code, which is 1182

Debra Hepler  
Secretary to Judge Edmund A. Sargus, Jr.  
(614) 719-3240



---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Hollinger.Jacob@epamail.epa.gov  
<hollinger.jacob@epamail.epa.gov>; Morgan Costello  
</o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: RE: Inside EPA articles  
Date: Wed Dec 12 2012 17:00:47 EST  
Attachments:

---

Thanks Jacob. Hope you're doing well.

Michael J. Myers  
Chief, Affirmative Litigation Section  
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---

From: Hollinger.Jacob@epamail.epa.gov [mailto:Hollinger.Jacob@epamail.epa.gov]  
Sent: Wednesday, December 12, 2012 11:06 AM  
To: Michael J. Myers; Morgan Costello  
Subject: Inside EPA articles

FYI, two articles about you! (Or, more accurately, your letters).

Jacob Hollinger  
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Hollinger.Jacob@epa.gov

----- Forwarded by Jacob Hollinger/R2/USEPA/US on 12/12/2012 11:03 AM -----

Daily News  
States Eye Suit To Force EPA Limits On Methane From Oil And Gas Drilling  
Posted: December 11, 2012

A coalition of eastern states is threatening to sue EPA to try and force regulations imposing first-time limits on the greenhouse gas (GHG) methane from oil and gas drilling operations, saying the agency is violating the Clean Air Act because it has not met an air law mandate to declare and justify whether such controls would be "appropriate."

The states' potential lawsuit -- announced in a Dec. 11 notice of intent (NOI) to sue EPA -- adds to legal pressure on the agency to control GHGs from the sector. EPA already faces a suit from environmentalists over the agency's revised new source performance standards (NSPS) for oil and gas drilling issued in August, in which EPA deferred setting methane limits and instead said it would "continue to evaluate the appropriateness" of setting such controls.

In contrast to the environmentalists' lawsuit, the states would not be suing directly over the revised NSPS, and the 60-day window for challenging the Aug. 15 final rule has already passed. Instead, the states would be suing to claim EPA has failed to meet a mandate in Clean Air Act section 111(b)(1)(B) to review whether it should set such limits for previously unregulated pollutants from the sector as part of its review of the sector's NSPS.

EPA first set NSPS criteria pollutant rules for the oil and gas sector in 1985 and air toxics limits in 1999, but then missed a mandate in the air law to review the rules every eight years. Environmentalists sued in 2009 to force a review of the rules, resulting in the updated NSPS and air toxics regulations that EPA issued in August.

In the rules, EPA addressed emissions from some sources not previously regulated by the agency. For example, the rules require installation of reduced emissions completions -- a set of equipment and processes designed to capture emissions otherwise released during the completion phase at hydraulic fracturing drilling wells.

While EPA's final NSPS rules require emissions controls that the agency says will result in methane reductions as a side-benefit of meeting the limits set for volatile organic compounds and other conventional pollutants, critics say EPA should not have sidestepped whether to set direct methane controls. In the final rules, EPA pushed off the decision on whether methane should be directly regulated from the sector saying, "Rather, we intend to continue to evaluate the appropriateness of regulating methane with an eye toward taking additional steps if appropriate."

However, the seven states that filed the NOI claim EPA's statements violate a mandate under section 111(b)(1)(B) of the Clean Air Act to formally determine whether regulating methane in the revised NSPS would be appropriate. That section of the air law says that the agency administrator "need not review any such standard if the Administrator determines that such review is not appropriate in light of readily available information on the efficacy of such standard" -- a determination that the states threatening the suit contend EPA failed to make in the review.

"That section imposes a clear-cut nondiscretionary duty of timeliness that requires EPA to make a decision within the 8-year review period whether it is 'appropriate' to revise the standards to regulate methane, regardless of whether the substance of that decision is discretionary," says the NOI, filed by New York Attorney General Eric Schneiderman and backed by Connecticut, Delaware, Maryland, Massachusetts, Rhode Island and Vermont.

The states argue that it would be "wholly inconsistent" with the language of section 111 of the air law if EPA could refuse to address pollutants that are emitted by a listed source category already subject to existing NSPS rules, and that the agency has previously determined endanger public health and welfare.

Further, EPA failed to address methane in the final emissions rules despite "extensive information" that setting limits for the pollutant would be appropriate, the states say, citing data from EPA's Natural Gas Star voluntary program and its GHG inventories for various industry sectors, which it publishes annually.

The NOI says, "instead of drawing on the successes of the Natural Gas Star Program to propose a course of action, or even soliciting comment on the issue, the agency chose to ignore the problem" despite ample data on cost-effective control technologies for reducing methane from oil and gas

facilities.

### 'Appropriateness' Finding

Moreover, the states say that EPA's failure to render an "appropriateness" finding on methane controls has also prevented the agency from fulfilling its statutory requirement to public updated emissions guidelines covering methane releases from existing sources in the sector, violating section 111(d) of the air law.

Citing EPA's 2009 GHG endangerment finding -- which includes methane among GHGs listed as endangering human health and welfare -- the states in a Dec. 11 press release say "because EPA recognizes that methane endangers public health and welfare and is emitted in large quantities by the oil and gas industry -- and has 18 years of data demonstrating that many methods of controlling these emissions are available and cost-effective -- the agency broke the law by deferring a decision on whether to set NSPS standards for methane emissions from the industry."

The states' argument echoes part of the environmentalists' suit that claims harm to the public from uncontrolled oil and gas drilling methane emissions. The states say in the NOI that "EPA's ongoing failure to address the sector's methane emissions violates the Clean Air Act and harms the health and welfare of our residents."

Meanwhile, environmentalists' and drilling companies' suits over the NSPS and air toxics rules continue in the U.S. Court of Appeals for the District of Columbia Circuit, with industry groups contesting storage tank controls and other aspects of the rules, and environmentalists citing the agency's failure to update emissions guidelines or set limits for emissions from liquids unloading, among other issues. -- Bridget DiCosmo ( [bdicosmo@iwpnews.com](mailto:bdicosmo@iwpnews.com) This e-mail address is being protected from spambots. You need JavaScript enabled to view it )

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The Inside Story  
State AGs Seek Strict PM NAAQS  
Posted: December 11, 2012

Nine states' attorneys general (AGs) are urging EPA to tighten its fine particulate matter (PM2.5) ambient air standard from the existing 15 micrograms per cubic meter (ug/m3) limit to 12 ug/m3, saying any weaker limit would violate a Clean Air Act mandate to protect public health.

In a separate push for EPA to tighten the PM2.5 national ambient air quality standard (NAAQS), environmentalists are citing new studies they say show adverse health effects from PM2.5 exposure that warrant setting a stricter limit. The agency has proposed tightening the standard to between 12-13 ug/m3 and took comment on an even more stringent limit of 11 ug/m3.

EPA faces a binding Dec. 14 deadline to issue the rule, but some observers question whether the agency can meet the deadline as it only sent the final revised NAAQS for White House Office of Management & Budget (OMB) pre-publication review Dec. 4, and inter-agency review can take months.

Environmentalists and EPA officials, however, have expressed confidence that the deadline will be met. EPA previously met a June 14 court-ordered deadline to propose revisions to the standard, including a new, separate PM2.5 standard of either 28 or 30 "deciviews," a measure of haze, to improve visibility.

As part of the rulemaking, EPA is proposing to retain its existing 24-hour PM2.5 standard addressing short-term exposures, which was set at 35 ug/m3 in 2006, and to retain its limit for larger "coarse" PM of 150 ug/m3, first set in 1987.

The U.S. District Court for the District of Columbia imposed the June 14 proposal deadline and signed

off on a Dec. 14 final rule consent decree deadline after environmentalists and states sued the agency to force compliance with a Clean Air Act mandate to review the NAAQS.

The rule will also address the D.C. Circuit's 2009 ruling remanding the 2006 PM<sub>2.5</sub> NAAQS to EPA in *American Farm Bureau Federation v. EPA*. The court sent the rule back to EPA asking it to better justify selecting a NAAQS limit at odds with its science advisors' recommendations.

In a Dec. 6 letter to OMB, AGs from New York, Maryland, New Mexico, Washington, Vermont and other states note that they successfully challenged the 2006 standard in the case, and the D.C. Circuit found that it was "contrary to law." The attorneys argue that setting a standard at 13 ug/m<sup>3</sup> "would not satisfy the agency's obligation under the statute to protect public health with an adequate margin of safety," citing both the findings of EPA staff and the Clean Air Scientific Advisory Committee that harms could come from PM<sub>2.5</sub> exposures below this level.

"Therefore, we believe it would be contrary to the Clean Air Act and to the D.C. Circuit's decision in *American Farm Bureau* to set the annual standard at 13 ug/m<sup>3</sup>," the AGs say. They also express support for a standard no higher than 12 ug/m<sup>3</sup>, saying it is "necessary to protect public health with an adequate margin of safety as required under the Clean Air Act" and "compelled both by the extensive and overwhelming public health evidence contained in the record and by EPA's own 2010 quantitative health risk assessment for particulate matter."

Several of EPA's six ambient air standards face legal challenges based on the requirement that they protect public health with an adequate margin of safety. For instance, several copper smelting companies are urging the Supreme Court to review the D.C. Circuit's July 20 ruling upholding EPA's 2010 sulfur dioxide (SO<sub>2</sub>) NAAQS, arguing that the lower court allowed EPA too much discretion to set standards stricter than the Clean Air Act's requirements to provide an "adequate margin of safety" to protect public health.

And D.C. Circuit judges at Nov. 16 oral arguments over challenges to EPA's 2008 ozone NAAQS seemed receptive to environmentalists' claim that "an extraordinary body of scientific evidence" shows that the 2008 primary NAAQS is too weak to protect human health.

In a related development, the Natural Resources Defense Council in a Dec. 7 letter highlighted several new studies on PM<sub>2.5</sub> effects, saying that "we think it is important to consider this important information as EPA finalizes the standards."

In the letter, the group cites a Harvard School of Public Health study finding "strong evidence of an association between reductions in PM<sub>2.5</sub> and improvements in life expectancy, especially in densely populated areas," and a University of Michigan School of Public Health study that the group says "documents a strong case for considering obese adults as sensitive populations in the PM NAAQS update due to the heightened pulmonary susceptibility."

Says NRDC, "The paper notes that EPA considers pre-existing cardiac and respiratory conditions in people as comprising sensitive populations that are more susceptible to PM pollution. However, obese adults, who are more vulnerable to respiratory illness and make up roughly one-third of the U.S. population are not considered in those sensitive groups."

---

From: Vickie Patton <vpatton@edf.org>  
To: Vickie Patton <vpatton@edf.org>  
Cc:  
Bcc:  
Subject: FW: 12-1248 Las Brisas Energy Center, LLC v. EPA, et al "Per Curiam Order Filed (Special Panel)" (EPA-77FR22392)  
Date: Thu Dec 13 2012 14:00:26 EST  
Attachments: Order Dismissing Petitions.pdf

---

Dear Journalist,

Not surprisingly, today the DC Circuit rejected a misguided legal challenge by some power companies to block EPA's proposed carbon pollution standards for coal- and gas-fired power plants – standards that have received the support of over 2 million Americans.

There is no legal basis for challenging an EPA proposal as it is manifestly not final agency action subject to judicial review.

It is unfortunate that the Agency spent precious, scarce public resources litigating such flawed legal challenges when there is so much vital work for our nation to do in protecting human health and the environment from carbon pollution – and moving forward swiftly to address the profound human and economic costs of extreme weather.

Sincerely yours,

Vickie Patton

General Counsel

Environmental Defense Fund

From: [ecfnoticing@cadc.uscourts.gov](mailto:ecfnoticing@cadc.uscourts.gov) [mailto:[ecfnoticing@cadc.uscourts.gov](mailto:ecfnoticing@cadc.uscourts.gov)]  
Sent: Thursday, December 13, 2012 11:25 AM  
Subject: 12-1248 Las Brisas Energy Center, LLC v. EPA, et al "Per Curiam Order Filed (Special Panel)" (EPA-77FR22392)

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United States Court of Appeals for District of Columbia Circuit

Notice of Docket Activity

The following transaction was entered on 12/13/2012 at 11:19:41 AM EST and filed on 12/13/2012

Case Name:

Las Brisas Energy Center, LLC v. EPA, et al

Case Number:

12-1248

Document(s):

Document(s)

Docket Text:

PER CURIAM ORDER filed [1409856] granting motions to dismiss [1388723-2], [1388445-2]; dismissing as moot motion for declaratory relief [1388731-2]; withholding issuance of the mandate. Before Judges: Rogers, Garland and Brown. [12-1248, 12-1251, 12-1252, 12-1253, 12-1254, 12-1257]

Notice will be electronically mailed to:

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Recipients:

- \*Ms. Patricia Thrower Barmeyer
- \*F. William Brownell
- \*Megan Ceronsky
- \*Sean H. Donahue
- \*Mr. David D. Doniger
- \*Mr. Norman William Fichthorn
- \*Mr. John L Fortuna
- \*Mr. Peter S. Glaser
- \*Eric A. Groten
- \*Michael H. Higgins
- \*Jeffrey R. Holmstead
- \*Mr. Benjamin Hoyt Longstreth
- \*Mr. Brian H. Lynk, Trial Attorney
- \*Mr. Jeremy C Marwell
- \*Nathan Matthews
- \*Henry Vernon Nickel
- \*Ms. Vickie Lynn Patton
- \*John Aloysius Riley, Attorney
- \*Mr. Darin T. Schroeder
- \*Ms. Sandra Snyder
- \*Joanne Marie Spalding
- \*Mr. George Y. Sugiyama
- \*Mr. John Timothy Suttles, Jr., Attorney
- \*Christopher Charles Thiele
- \*Ms. Ann Brewster Weeks, Senior Counsel
- \*Allison D. Wood

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Last Modified: Thu Dec 13 14:00:26 EST 2012

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**United States Court of Appeals**  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

**No. 12-1248**

**September Term, 2012**

**EPA-77FR22392**

**Filed On:** December 13, 2012

Las Brisas Energy Center, LLC,

Petitioner

v.

Environmental Protection Agency and Lisa  
Perez Jackson,

Respondents

-----  
Conservation Law Foundation, et al.,  
Intervenors  
-----

Consolidated with 12-1251, 12-1252, 12-1253,  
12-1254, 12-1257

**BEFORE:** Rogers, Garland, and Brown, Circuit Judges

**ORDER**

Upon consideration of the motions to dismiss, the oppositions thereto, and the replies; and the motion for declaratory relief, the oppositions thereto, and the replies, it is

**ORDERED** that the motions to dismiss be granted. The challenged proposed rule is not final agency action subject to judicial review. See 42 U.S.C. § 7607(b)(1); Bennett v. Spear, 520 U.S. 154, 177-78 (1997) (holding that final agency action “must mark the consummation of the agency’s decisionmaking process” and “must be one by which rights or obligations have been determined, or from which legal consequences will flow”) (internal quotations omitted). It is

**United States Court of Appeals**  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

**No. 12-1248**

**September Term, 2012**

**FURTHER ORDERED** that the motion for declaratory relief be dismissed as moot.

Pursuant to D.C. Circuit Rule 36, this disposition will not be published. The Clerk is directed to withhold issuance of the mandate herein until seven days after resolution of any timely petition for rehearing or petition for rehearing en banc. See Fed. R. App. P. 41(b); D.C. Cir. Rule 41.

**Per Curiam**

---

From: Debra\_A\_Hepler@ohsd.uscourts.gov  
<debra\_a\_hepler@ohsd.uscourts.gov>  
To: jjhenry@aep.com <jjhenry@aep.com>;  
Flint, Myles (ENRD) <myles.flint@usdoj.gov>;  
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<mastro.donna@epamail.epa.gov>; Michael J. Myers  
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group/cn=recipients/cn=michaelmyers>;  
MZimmerman@mde.state.md.us <mzimmerman@mde.state.md.us>;  
nmarks@nrdc.org <nmarks@nrdc.org>; Chris Pilla  
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<schulz.david@epamail.epa.gov>; Doug Snyder  
<snyder.doug@epamail.epa.gov>; Thea Schwartz  
<tschwartz@atg.state.vt.us>; Fisherow, Walter Benjamin (ENRD)  
<walter.benjamin.fisherow@usdoj.gov>  
Cc: Edmund\_A\_Sargus@ohsd.uscourts.gov  
<edmund\_a\_sargus@ohsd.uscourts.gov>  
Bcc:  
Subject: Telephone Status Conference in Case No. 99-1182 - United States v AEP  
Date: Tue Dec 18 2012 14:47:16 EST  
Attachments:

---

Please see below for the call-in instructions for the telephone status conference tomorrow, December 19, 2012 at 9:00 a.m.

The call in number is 888-684-8852., please call about 5 minutes prior to the scheduled time of call.

You will be asked for an access code, which is: 9586353#

Then you will be asked for a Conference Security Code, which is 1182

Debra Hepler  
Secretary to Judge Edmund A. Sargus, Jr.

(614) 719-3240

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Longstreth, Ben <blongstreth@nrdc.org>; Kennedy, Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: Copy: Call with NRDC and EPB re efficiency  
Date: Mon Jan 07 2013 10:08:11 EST  
Attachments:

---

StartTime: Mon Jan 07 15:45:00 Eastern Standard Time 2013

EndTime: Mon Jan 07 16:30:00 Eastern Standard Time 2013

Location:

Invitees:

Recurring: No

ShowReminder: No

Accepted: Yes

AcceptedTime: Mon Jan 07 10:13:47 Eastern Standard Time 2013

When: Monday, January 07, 2013 3:45 PM-4:30 PM (GMT-05:00) Eastern Time (US & Canada).

Where: call in #: 866-394-2346, code 4149570819

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Kennedy, Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Call with NRDC and EPB re efficiency  
Date: Mon Jan 07 2013 10:13:47 EST  
Attachments:

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Accepted: Call with NRDC and EPB re efficiency

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From: Doniger, David <ddoniger@nrdc.org>  
To: tballo@earthjustice.org  
<tballo@earthjustice.org>; craig.segall@sierraclub.org  
<craig.segall@sierraclub.org>; Longstreth, Ben  
<blongstreth@nrdc.org>; aweeks@catf.us <aweeks@catf.us>;  
dschroeder@catf.us <dschroeder@catf.us>; dmarshall@catf.us  
<dmarshall@catf.us>; joanne.spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Geertsma, Meleah  
<mgeertsma@nrdc.org>; jduffy@cleanair.org  
<jduffy@cleanair.org>; tcarbonell@edf.org <tcarbonell@edf.org>;  
pzalzal@edf.org <pzalzal@edf.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; mceronsky@edf.org  
<mceronsky@edf.org>; Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Copy: Update re: Oil & Gas NSPS/NESHAP case  
Date: Wed Jan 09 2013 14:07:59 EST  
Attachments:

---

StartTime: Mon Jan 14 12:00:00 Eastern Standard Time 2013  
EndTime: Mon Jan 14 13:00:00 Eastern Standard Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Wed Jan 09 14:08:00 Eastern Standard Time 2013

When: Monday, January 14, 2013 12:00 PM-1:00 PM. (UTC-05:00) Eastern Time (US & Canada)  
Where: 212-727-4600, code: 193688#

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Update re: Oil & Gas NSPS/NESHAP case  
Date: Wed Jan 09 2013 14:08:35 EST  
Attachments:

---

---

From: khenderson@nrdc.org <khenderson@nrdc.org>  
on behalf of Doniger, David <ddoniger@nrdc.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Vickie Patton  
<vpatton@edf.org>; Megan Ceronsky <mceronsky@edf.org>;  
Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>  
Cc:  
Bcc:  
Subject: NSPS for Power Plants Scheduling  
Date: Thu Jan 10 2013 15:56:29 EST  
Attachments:

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StartTime: Wed Jan 16 12:00:00 Eastern Standard Time 2013  
EndTime: Wed Jan 16 13:00:00 Eastern Standard Time 2013  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Fri Jan 11 09:01:00 Eastern Standard Time 2013

---

From: Doniger, David <ddoniger@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Vickie Patton <vpatton@edf.org>; Megan Ceronsky <mceronsky@edf.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Copy: NSPS for Power Plants Scheduling  
Date: Thu Jan 10 2013 15:57:34 EST  
Attachments:

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StartTime: Wed Jan 16 12:00:00 Eastern Standard Time 2013  
EndTime: Wed Jan 16 13:00:00 Eastern Standard Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Thu Jan 10 15:58:00 Eastern Standard Time 2013

When: Wednesday, January 16, 2013 12:00 PM-1:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: 212-727-4600, code: 193688#

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: NSPS for Power Plants Scheduling  
Date: Thu Jan 10 2013 15:58:29 EST  
Attachments:

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dzamelis@windstream.net <dzamelis@windstream.net>;  
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emillett@ebglaw.com <emillett@ebglaw.com>; epremo@hselaw.com  
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<jrigano@riganollc.com>; jsachs@kblaw.com <jsachs@kblaw.com>;  
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<reed@superlawgroup.com>; rfeller@bsk.com <rfeller@bsk.com>;  
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<saporita.chris@epa.gov>; scalfone@gmail.com  
<scalfone@gmail.com>; scrusso@gw.dec.state.ny.us  
<scrusso@gw.dec.state.ny.us>; tau@fmbf-law.com  
<tau@fmbf-law.com>; tbakner@woh.com <tbakner@woh.com>;  
tputsavage@sandw.com <tputsavage@sandw.com>;  
twest@westfirmlaw.com <twest@westfirmlaw.com>;  
vgrail@gw.dec.state.ny.us <vgrail@gw.dec.state.ny.us>;  
vrobbins@bsk.com <vrobbins@bsk.com>; wieder.marla@epa.gov  
<wieder.marla@epa.gov>; wmarsh@hancocklaw.com  
<wmarsh@hancocklaw.com>; yhennessy@hblaw.com  
<yhennessy@hblaw.com>; ymomot@bergmannpc.com  
<ymomot@bergmannpc.com>

Cc:

Bcc:

Subject:  
Reception

Environmental Law Section EPA Update Program, Business Meeting and Cocktail

Date: Fri Jan 11 2013 10:06:49 EST

Attachments:

Greetings:

The Environmental Law Section will once again hold a one-credit EPA Update program on Thursday, January 24th beginning at 5:00 p.m. at the New York Hilton Hotel, in the Beekman Parlor on the 2nd Floor. Marla Wieder, Joe Siegel and Chris Saporita will be speaking.

Space is limited for attendance at this program. There is no charge to attend. If interested in attending, please click here to register: [www.nysba.org/EPAUpdateam13](http://www.nysba.org/EPAUpdateam13)

The program will be followed by the Section's business meeting and cocktail reception.

As a reminder, the Section's program will be held on Friday, January 25th in the East Ballroom on the 3rd Floor beginning at 8:50 a.m. The Executive Committee will take place at 2:15 p.m. in the Regent Parlor on the 2nd Floor.

If you have any agenda items or materials for the Executive Committee, please let me know as soon as possible.

If you have any questions or need any further information, just let me know.

Lisa Bataille  
Chief Section Liaison  
Department of Section Services  
New York State Bar Association  
One Elk Street, Albany, NY 12207  
518.487.5680 Phone  
518.487.5579 Fax  
[lbataille@nysba.org](mailto:lbataille@nysba.org)

ü Please consider the environment before printing this email.



---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To:  
Cc:  
Bcc:  
Subject: Call with EDF on GHGs  
Date: Mon Jan 14 2013 10:57:55 EST  
Attachments:

---

StartTime: 01/17/2013 12:00:00 PM GMT  
EndTime: 01/17/2013 12:30:00 PM GMT  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: No

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton <vpatton@edf.org>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc: Tomas Carbonell <tcarbonell@edf.org>; Kevin Donovan </o=lawnet/ou=first administrative group/cn=recipients/cn=kevindonovan>; Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>  
Bcc:  
Subject: RE: wood boiler pollution - unresolved  
Date: Tue Jan 15 2013 08:59:37 EST  
Attachments:

---

Vickie, we'd be happy to talk to you about strategy on OWBs. CC'ing Kevin Donovan and Jeremy Magliaro of my office, who have been our main points of contact on OWB issues. Thanks.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Monday, December 31, 2012 1:18 AM  
To: Michael J. Myers; Morgan Costello  
Cc: Tomas Carbonell  
Subject: FW: wood boiler pollution - unresolved

Dear Mike, Morgan,

Do you have time to discuss this within the next few weeks?

Best wishes for a new year of joy, cleaner air and climate progress, Vickie

From: John and Bonnie Lichak [mailto:bjlich@live.com]  
Sent: Sunday, December 30, 2012 7:08 AM

To: Rebecca Symes  
Cc: Vickie Patton; lisa rector  
Subject: wood boiler pollution - unresolved

Dear Ms. Symes:

We wrote to Senator Gillibrand in August 2011 about the issue of wood boiler pollution and the lack of regulations by EPA causing countless Americans to suffer unbelievable pollution. EPA has yet to advance any regulations for wood boilers. NY DEC --- the agency in charge of enforcing the Clean Air Act in NY --- has also done little to correct the EPA's loophole despite 2 highly regarded reports (2005 and 2008) by the NY AG's Office and a petition by the NY AG's Office in August 2005 to EPA.

We became aware of wood boilers in 2004 and have worked diligently since then to try and regain not only our clean air back but that of others. Sadly we have been met with near bureaucratic indifference to the plight of families becoming ill from the pollution. We personally continue to be subjected to horrendous pollution from an indoor wood boiler w/no action by NY DEC despite an existing Order on Consent and Schedule of Compliance which shut down the Outdoor Wood Boiler only to have it replaced by an Indoor Boiler with the same horrendous emissions.

Why has the EPA not yet regulated these devices nor has the Federal Government set up any change out programs to help families get back their clean air? We need Senator Gillibrand to recognize this problem for not only our family but all those that continue to suffer. An EPA loophole should not be causing families decade long nightmares. Did you ever get a response back from EPA on the issue of their failure to issue New Source Performance Standards in over 20 years? A consortium of Environmental Agencies has sent EPA a letter but still nothing. How long does it take government to address such a serious health issue. EPA just updated the National Ambient Air Quality Standards and yet those of us in Rural NY and other parts of the U.S. are subjected to spikes in fine particulate from wood boilers that are far in excess of these standards with no one seeming to care.

Nearly 1 in 10 children have asthma now and wood boilers are a major source of fine particulate, a very serious trigger for asthmatics. Every day we worry about our health and that of our daughter. Below are some of this year's emails to DEC requesting they enforce their Order on Consent. Included are YouTube links of 2 videos taken (March and December), two of many sent to DEC documenting the ongoing violations of the Order on Consent. We would very much appreciate if Senator Gillibrand would follow up w/DEC for enforcement of the existing Order on Consent and Schedule of Compliance AND express some outrage to the EPA about their failure to address this source of pollution. If EPA recognized wood stoves as needing regulation in the 1980s why are they not adopting standards holding wood boilers to the same standards? This is not an unreasonable expectation. We understand the lax enforcement and climbing into bed w/the industry by the Bush Administration but expected President Obama to stand by his commitment for EPA to regulate based upon science. Europe is light years ahead of the U.S. in testing methods and pollution limitations for wood burning appliances. What is wrong w/the U.S. Over and over again we see that the Federal government seemingly does not care about the environment anymore. Children are exposed to increasing levels of chemicals and pollution and the Federal government does nothing. Many of the same chemicals that are in cigarette smoke are in wood smoke, so why the delay? EPA has commissioned countless studies --- many with the New York Energy and Research Development Authority. How long does it take to turn science into public policy to protect the public?

Our Village Deputy Mayor and the Rensselaer Co. Minority Offices have both sent letters to DEC requesting DEC action. Our case is just one of many where regulators have turned a blind eye mainly we believe because of the lack of knowledge of the very real health issues of wood smoke. Many regulators are wood burners including the DEC Commissioner and fail to comprehend the lack of emission regulations on boilers (NY DEC Part 247 left indoor boilers unaddressed, holds wood boilers to a lesser standard than stoves thereby reversing the 1980s EPA strides in curbing wood smoke

emissions, and did not address in place boilers --- partly we believe because the Asst. Commissioner for Air Resources had a somewhat unsavory conflict with the industry). The public deserves regulation and educational awareness as people look for alternative heating sources. Not only are the families that live downwind exposed but so too are the unwitting owners of these boilers. Attached is a copy of the Village's letter to DEC along with the letter DEC sent to Senator Gillibrand in April 2012 stating they would not enforce the Order on Consent because of limited staff resources. We would very much appreciate it if Senator Gillibrand would request on our behalf that DEC allocate its limited resources to enforcing their Order on Consent and as a member of the Senate Environmental Committee take a more active role in pushing the EPA for this much needed regulation (New Source Performance Standards) along with Change Out Programs so that no American family has to endure the nightmare of having their home engulfed in wood smoke filled with carcinogens, PAHs, VOCs, and fine particulate.

Thank you,  
Bonnie Lichak  
2136 US 20  
Nassau, NY 12123  
518-794-0203

---

From: bjlich@live.com  
To: djshaw@gw.dec.state.ny.us; seflint@gw.dec.state.ny.us; ejkelly@gw.dec.state.ny.us; khgibbs@gw.dec.state.ny.us  
CC: jeremy.magliaro@ag.ny.gov; cwballan@gw.dec.state.ny.us  
Subject: absolutely horrendous  
Date: Sat, 29 Dec 2012 22:37:29 -0500

Dear Mr. Shaw, Mr., Flint, Mr. Kelly, and Mr. Gibbs:

Tonight our home is again surrounded by the thick putrid smelling wood smoke from our neighbor's boiler. The smell is permeating our home. I smelled it when I went in the computer/laundry room to put clothes in the dryer. This room is the room that is most noticeable. It is directly under our daughter's bedroom and is on the front eastern corner of the house. I then came downstairs to hang up my newly laundered rugs and could smell the smoke here as well. I went to the door and opened it and the smell hit me in the face. I quickly closed the door but the smell is seeping around the door.

This situation is completely unbearable. I would very much appreciate an update on the status of the enforcement of the Order on Consent. I am very distressed to know that our young daughter Katarina is continually subjected to this pollution. What is wrong w/the DEC? I do not understand why you are ignoring us and not enforcing the law.

I am requesting that you please enforce the Compliance Schedule. The letter sent to Senator Gillibrand clearly said it was a violation but you have elected to not use scarce resources. It does not seem that enforcement of an existing order should take that much of the DEC's time. I have repeatedly requested a meeting w/the Commissioner to appeal this non-enforcement decision and have received no rational reason for the denial.

What must our family do to regain our clean air and stop this assault on our family?

Thank you for your attention to this most serious health issue.

Sincerely,

Bonnie Lichak  
2136 us 20 nASSAU, ny 12123

518-794-0203

From: bjlich@live.com  
To: djshaw@gw.dec.state.ny.us; seflint@gw.dec.state.ny.us; ejkelly@gw.dec.state.ny.us; khgibbs@gw.dec.state.ny.us  
Subject: Indoor Wood Boiler video  
Date: Mon, 17 Dec 2012 21:49:37 -0500

Dear Mr. Shaw, Mr. Flint, Mr. Kelly, and Mr. Gibbs:

Here is a video John took today . This went on longer than 10 minutes today. Horrendous.

<http://youtu.be/GWcPu9cW1ZM>

Please enforce the Order on Consent BEFORE John dies of a heart attack documenting and taking these videos. What does it take for DEC to enforce Part 211 and Part 227-1.3 especially when there is an existing Compliance Schedule that is not being adhered to. Would you want your children or family or those in your neighborhood to endure what we are all enduring?

Sincerely,

Bonnie Lichak

2136 US 20

Nassau, NY 12123

518-794-0203

---

From John and Bonnie Lichak <bjlich@live.com>

Sent Wed 12/5/2012 7:23 AM

To David Shaw <djshaw@gw.dec.state.ny.us>; Steve Flint <seflint@gw.dec.state.ny.us>; Eugene Kelly <ejkelly@gw.dec.state.ny.us>; Khai Gibbs <khgibbs@gw.dec.state.ny.us>

Cc Sen. Roy McDonald <mcdonald@senate.state.ny.us>; Steve McLaughlin <mclaughlins@assembly.state.ny.us>; McDermott, Eileen <emcdermott@renesco.com>; mayor@villageofeastnassau.org; Deputy Mayor of Village of East Nassau, NY <adam.acquario@villageofeastnassau.org>; East Nassau Village Trustee Tom Kernan <mythmythos@aol.com>; Arbetter, Susan <susan\_arbetter@wcny.org>; Michael Lever <michael.lever@villageofeastnassau.org>; William Davis <william.davis@villageofeastnassau.org>; Liz Romeling <dream@taconic.net>; Daniel Luttinger <dal02@health.state.ny.us>

Subject Request for Appeal to DEC to Enforce the Order on Consent

Dear Sirs:

Since the Wood Boiler has been started our home continues to be engulfed in thick acrid smelling wood smoke. It settles in our yard because of the topography. On Sunday I asked Katarina to take the dog out for a run around 3:00. I was in the dining room vaccuuming and as soon as she opened the door I could smell the horrible smell of the boiler. I told her she could not go out. Do you know what it is like to have to try and not look or act alarmist that your home is being engulfed by carcinogens, PAHs, VOCs and PM 2.5. I try my hardest to protect us by being away from home or inside. We all know that is a joke since at least half of outdoor air becomes indoor air and the toxins build up. Do you know what it is like to worry about the lungs of your child from just breathing your air.

For Thanksgiving we went away to my Mom's but John stayed here to hunt. We escaped for 5 days, but he did not. When we drove in the driveway on Sunday we were greeted w/the boiler spewing.

This morning I took Katarina to her bus stop. Thankfully she does not have to stand at the end of our driveway engulfed in smoke. As we drove out the smell was in the air and the boiler was just starting up. By the time I came back -- about 5 minutes the yard was filled w/smoke. The short run from the car to the house was enough for my clothes and hair to get the smoke attached to me.

Nearly every morning and night when I have to let the dog out I am smacked in the face by the smoke when I open the door. Much of the smoke seems to be under the cover of darkness. I'm not sure if that is because someone has advised my neighbor that opacity testing does not work at night or it just seems much more of the smoke is under the cover of darkness. John did however get another video the other day. The DOH did a study showing over 500 ug/m3 from a wood boiler. The Federal NAAQS are 35 ug/m3. Studies have shown spikes can cause serious health impacts including asthma and heart attacks. What does DEC think the impact of spikes of 500 ug/m3 are to our family? If our family has a serious health event is DEC going to say no certain connection can be made? Does the health of our family matter to no one?

We do not want to live like this. 9 years of trying to get someone to listen to us only to have one appliance replaced w/another. I now have a respiratory thing I can not get rid of. Started in November w/sore throat and dropped into my chest. Last Monday I returned to work from Thanksgiving and two of my co-workers came to my desk and told me to go home. I'm sure I can get signed statements from Ms. Grandy and Mr. Shields if that would count for anything. I'm not really contagious I just sound like I'm dying I wanted to tell them but I did not. Yesterday I gave in and used my inhaler. Do you know what it is like to wake every night coughing and unable to stop. No good rest, not getting better. I took off 2 days work last week. The coughing continues.

I want to know where and how do I file an appeal for the DEC to enforce the Order on Consent. I sent letters, pictures and video in July and was dismissed by the Regional Office. I want this to go before an Administrative Law Judge. Is there a process in DEC for that?

I have requested a meeting w/the Commissioner in the past and been denied. I will call Mr. Ballantyne again today.

My family's health and well being are in ALL of your hands. I am begging for someone to do something. Time to go. Late for work again thanks to all of you.

Sincerely,

Bonnie Lichak

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From: bjlich@live.com  
To: djshaw@gw.dec.state.ny.us; seflint@gw.dec.state.ny.us; ejkelly@gw.dec.state.ny.us; khgibbs@gw.dec.state.ny.us  
CC: mcdonald@senate.state.ny.us; mclaughlins@assembly.state.ny.us; emcdermott@rensco.com; mayor@villageofeastnassau.org; adam.acquario@villageofeastnassau.org; mythmythos@aol.com; susan\_arbetter@wcny.org; michael.lever@villageofeastnassau.org; william.davis@villageofeastnassau.org  
Subject: Wood Boiler engulfing home for 9th season  
Date: Mon, 5 Nov 2012 06:45:33 -0500

Dear Mr. Shaw, Mr. Flint, Mr. Gibbs and Mr. Kelly:

Our neighbor, Gerald Landrigan at 2142 US 20, Nassau, NY 12123 started up his indoor wood boiler this weekend. Our yard was again engulfed in smoke. Attached is a picture previously taken and a video previously taken showing what we endure. We will again be taking videos and pictures and sending to you but are again requesting that the Order on Consent be enforced.

<http://www.youtube.com/watch?v=OO61TdrMMgE&feature=share&list=UUHa1V8g575EN8ECxo0B8Z9A>

Thank you.

Bonnie Lichak

2136 US 20

Nsasau, NY 12123

518-794-0203

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From: Linda M. Wilson </o=lawnet/ou=first administrative group/cn=recipients/cn=lindawilson>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>  
Cc: Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Bcc:  
Subject: RE: APGA - from climate wire  
Date: Thu Jan 17 2013 08:51:26 EST  
Attachments:

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## ENERGY EFFICIENCY:

Lawsuit could force costly delay in new gas furnace standards

Nayantara Narayanan, E&E reporter

Published: Thursday, January 17, 2013

The wait for more fuel-efficient gas furnaces just got longer. The Department of Energy has moved to withdraw a new rule that would require consumers in 30 northern states to buy 90-percent-efficient furnaces starting May 1.

The rule would have saved 81 million to 130 million metric tons of carbon dioxide between 2013 and 2045, according to DOE estimates, as consumers upgraded their furnaces from 80 percent efficiency to 90 percent efficiency systems.

In a joint settlement of a case brought against it by the American Public Gas Association, DOE last week asked the U.S. Court of Appeals for the District of Columbia Circuit to vacate the new rule. The settlement needs to be approved by the court for the rule to be vacated.

APGA had challenged the rule last year. One of its main contentions was that DOE had issued a direct final rule without considering all stakeholders' concerns. DOE can issue a direct final rule, allow a period for public comment, and then consider withdrawing the rule if any comments provide a reasonable basis not to go ahead with it.

"APGA put forward adverse comments, and I know other groups did as well. But despite receiving adverse comments, DOE went ahead with the rule," said David Schryver, APGA's executive vice president.

"We believe that the DOE did the right thing in proposing the direct final rule," said Kit Kennedy, clean energy counsel at the Natural Resources Defense Council. "We think that the DOE did the right thing and should have continued to defend the lawsuit."

Kennedy said the rule was formed out of a consensus agreement after DOE consulted manufacturers, trade associations, and environmental and consumer advocates.

APGA also said the new rule would hurt efficiency. The rule would require installing condensing furnaces with additional vents, Schryver said, and the higher cost of venting would drive consumers to lower-efficiency electric furnaces.

Andrew deLaski, executive director of the Appliance Standards Awareness Project (ASAP), said there's no danger of that happening. "I think it's ludicrous. According to EIA, heating with an electric furnace is three times [the price] as compared to gas, and with gas prices declining it's probably four times," he said. "Electric furnaces -- there's no place in the market. They have 5 percent of market share today because they are a really lousy choice in terms of operating costs."

Potential \$10.7B in heating savings put on ice

However, DOE concedes that some consumers would find it expensive to upgrade their gas furnaces to the new standard. For these cases, it had proposed a waiver of the 90 percent efficiency rule.

"The rule does mention a potential waiver process, but no waiver process was ever agreed to. We found that the proposed waiver would be unworkable," Schryver said. "If you're living in a cold northern state and the furnace goes out in January, you don't want to have to wait two or three days to get a waiver to have an 80 percent furnace as opposed to a 90 percent furnace."

Schryver said that contractors were not trained to assess waivers, and it was not certain that they have 80 percent furnaces available to install in households that received waivers.

But sticking with the old standard could be the costlier option for regular households. DOE estimates that the 90 percent standard over 30 years would save consumers \$10.7 billion taking into account utility bills, equipment costs and gas prices. "Consumer protection organizations like efficiency standards because they save money for consumers," Kennedy said.

If the court accepts the settlement and the gas furnace efficiency standard rule is vacated, DOE will have to go back to the drawing board to come up with a new rule. Kennedy said this sets the stage for even stricter norms. "The law requires that the standard be set at the highest level that is economically feasible," she said. "We will be pushing for the highest possible standard, and that could be higher than the 90 percent level."

DeLaski is less optimistic. He said DOE will now take another year to issue a proposed standard and an additional two years to come up with a new final standard.

"It actually means we'll have to wait another seven years. There's a five-year lag time from when the DOE publishes a standard and when it goes into effect," deLaski said. The new standard will apply only to the installation of new products. "That means that 80 percent units will be installed to run for the next 20 to 40 years," he added.

---

From: Michael J. Myers  
Sent: Tuesday, January 15, 2013 2:46 PM  
To: Lemuel Srolovic  
Cc: Linda M. Wilson; Alan Belenz; Morgan Costello  
Subject: FW: APGA

See below. Also let me know if you'd like us to come up with a quote or statement in the event we are contacted by the press.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

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From: Kennedy, Kit [mailto:kkennedy@nrdc.org]  
Sent: Tuesday, January 15, 2013 2:34 PM  
To: Augenstern, Fred (AGO); Longstreth, Ben; Michael J. Myers  
Cc: Andrew deLaski  
Subject: RE: APGA

All, Andrew and I each posted blogs on this today. I suspect there will be press on this over time, so if your offices are interested in commenting and could have quotes/statements at the ready, that would be helpful.

[http://switchboard.nrdc.org/blogs/kkennedy/the\\_us\\_department\\_of\\_energy\\_re.html](http://switchboard.nrdc.org/blogs/kkennedy/the_us_department_of_energy_re.html)

<http://www.aceee.org/blog/2013/01/why-does-cave-furnace-standards-such->

Responses to the DOE/APGA motion are due 1/25. We're still thinking about our strategy.

Would love your thoughts on all of this.

Thanks, Kit

From: Augenstern, Fred (AGO) [mailto:fred.augenstern@state.ma.us]  
Sent: Tuesday, January 15, 2013 2:29 PM  
To: Kennedy, Kit; Longstreth, Ben  
Subject: APGA

Have you folks decided whether you are going to oppose DOE's motion or issue a tatement? We are thinking about alternatives, too.

Fred Augenstern

Assistant Attorney General

Environmental Protection Division

Office of the Attorney General

1 Ashburton Place, 18th Floor

Boston, Massachusetts 02108

Ph: 617-963-2427 (direct)

(or 617-727-2200 x.2427)

Fax: 617-727-9665

E-mail: [fred.augenstern@state.ma.us](mailto:fred.augenstern@state.ma.us)

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: AG contacts  
Date: Tue Jan 22 2013 18:17:10 EST  
Attachments:

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David, I'll get you that list tomorrow. I was very pleased with the speech yesterday.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Doniger, David <ddoniger@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: AG contacts  
Date: Tue Jan 22 2013 18:18:31 EST  
Attachments:

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Thanks.

Me too!

David D. Doniger

Policy Director, Climate and Clean Air Program

Natural Resources Defense Council

1152 15th Street, NW, Suite 300

Washington, DC 20005

Phone: (202) 289-2403

Cell: (202) 321-3435

Fax: (202) 289-1060

ddoniger@nrdc.org

on the web at [www.nrdc.org](http://www.nrdc.org)

read my blog: <http://switchboard.nrdc.org/blogs/ddoniger/>

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Tuesday, January 22, 2013 6:17 PM  
To: Doniger, David  
Subject: AG contacts

David, I'll get you that list tomorrow. I was very pleased with the speech yesterday.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Longstreth, Ben <blongstreth@nrdc.org>;  
Kennedy, Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: FW: 11-1485 American Public Gas Assoc. v. Department of Energy "Response to  
Motion Filed" (DOE-76FR67037)  
Date: Fri Jan 25 2013 17:40:00 EST  
Attachments:

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Well done!

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: [ecfnoticing@cadc.uscourts.gov](mailto:ecfnoticing@cadc.uscourts.gov) [mailto:[ecfnoticing@cadc.uscourts.gov](mailto:ecfnoticing@cadc.uscourts.gov)]  
Sent: Friday, January 25, 2013 5:17 PM  
To: Michael J. Myers  
Subject: 11-1485 American Public Gas Assoc. v. Department of Energy "Response to Motion Filed"  
(DOE-76FR67037)

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United States Court of Appeals for District of Columbia Circuit

Notice of Docket Activity

The following transaction was entered on 01/25/2013 at 5:17:23 PM EST and filed on 01/25/2013

Case Name:

American Public Gas Assoc. v. Department of Energy

Case Number:

11-1485

Document(s):

Document(s)

Docket Text:

RESPONSE IN OPPOSITION FILED [1417337] by Alliance to Save Energy, American Council for an Energy-Efficient Economy, City of New York, Consumer Federation of America, Massachusetts Union of Public Housing Tenants and Natural Resources Defense Council to motion to vacate [1414812-2], motion to remand case [1414812-3] [Service Date: 01/25/2013 by CM/ECF NDA] Pages: 1-10. [11-1485] (Longstreth, Benjamin)

Notice will be electronically mailed to:

Christopher Gene King, Assistant Corporation Counsel: cking@law.nyc.gov  
Mr. Randolph Lee Elliott: relliott@mbolaw.com  
Mr. William Thomas Miller: wmiller@mbolaw.com  
Michael J. Myers: michael.myers@oag.state.ny.us  
Ms. Morgan Anna Costello, Assistant Attorney General: morgan.costello@ag.ny.gov  
Ms. Katherine Kennedy, Counsel: kkennedy@nrdc.org, vkeane@nrdc.org  
Ms. Monica Derbes Gibson: mdgibson@venable.com  
Mr. Benjamin Hoyt Longstreth: blongstreth@nrdc.org, dmeyer@nrdc.org  
Mr. H. Thomas Byron, III, Attorney: H.Thomas.Byron@usdoj.gov  
Mr. Douglas Haber Green: dhgreen@venable.com  
Mr. Jonathan Hughes Brees, Assistant Chief Counsel: jbles@energy.state.ca.us, mtran@energy.state.ca.us  
Mr. Frederick Don Augenstern, I, Assistant Attorney General: fred.augenstern@state.ma.us  
Mr. Michael S. Raab, Attorney: michael.raab@usdoj.gov  
Jeffrey Kenneth Janicke: jjanicke@mbolaw.com  
Ms. Amber Dale Abbasi, Chief Counsel: amber.abbasi@causeofaction.org, susan.martin@causeofaction.org, amber.abbasi@causeofaction.org  
Mr. David Brett Calabrese: dcalabrese@ahrinet.org, jmattingly@ahrinet.org  
Mr. Joseph McCalmont Mattingly, General Counsel: jmattingly@ahrinet.org  
Mr. Daniel Zachary Epstein: daniel.epstein@causeofaction.org

Document to be served by alternative means on:

Mr. Charles Harak  
National Consumer Law Center  
7 Winthrop Square  
Boston, MA 02110

The following document(s) are associated with this transaction:

Document Description: Response to Motion Filed

Original Filename: NRDC et al Response.pdf

Electronic Document Stamp:

[STAMP acecfStamp\_ID=1109186823 [Date=01/25/2013] [FileNumber=1417337-0]

[9026eea3ef9efc50155385708cd64b97104099fcfc21314e2234edaa0be77781325ea2e286abc46baac629e8864de16cfe703243a5e131d78bcbe0cba79c9d4c]]

---

From: Longstreth, Ben <blongstreth@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: 11-1485 American Public Gas Assoc. v. Department of Energy "Response to  
Motion Filed" (DOE-76FR67037)  
Date: Fri Jan 25 2013 17:41:57 EST  
Attachments:

---

Thanks Mike. Have a good weekend!

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Friday, January 25, 2013 5:40 PM  
To: Longstreth, Ben; Kennedy, Kit  
Subject: FW: 11-1485 American Public Gas Assoc. v. Department of Energy "Response to Motion  
Filed" (DOE-76FR67037)

Well done!

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: ecfnoticing@cadc.uscourts.gov [mailto:ecfnoticing@cadc.uscourts.gov]  
Sent: Friday, January 25, 2013 5:17 PM  
To: Michael J. Myers  
Subject: 11-1485 American Public Gas Assoc. v. Department of Energy "Response to Motion Filed"  
(DOE-76FR67037)

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United States Court of Appeals for District of Columbia Circuit

Notice of Docket Activity

The following transaction was entered on 01/25/2013 at 5:17:23 PM EST and filed on 01/25/2013

Case Name:

American Public Gas Assoc. v. Department of Energy

Case Number:

11-1485

Document(s):

Document(s)

Docket Text:

RESPONSE IN OPPOSITION FILED [1417337] by Alliance to Save Energy, American Council for an Energy-Efficient Economy, City of New York, Consumer Federation of America, Massachusetts Union of Public Housing Tenants and Natural Resources Defense Council to motion to vacate [1414812-2], motion to remand case [1414812-3] [Service Date: 01/25/2013 by CM/ECF NDA] Pages: 1-10. [11-1485] (Longstreth, Benjamin)

Notice will be electronically mailed to:

Christopher Gene King, Assistant Corporation Counsel: cking@law.nyc.gov  
Mr. Randolph Lee Elliott: relliott@mbolaw.com  
Mr. William Thomas Miller: wmiller@mbolaw.com  
Michael J. Myers: michael.myers@oag.state.ny.us  
Ms. Morgan Anna Costello, Assistant Attorney General: morgan.costello@ag.ny.gov  
Ms. Katherine Kennedy, Counsel: kkennedy@nrdc.org, vkeane@nrdc.org  
Ms. Monica Derbes Gibson: mdgibson@venable.com  
Mr. Benjamin Hoyt Longstreth: blongstreth@nrdc.org, dmeyer@nrdc.org  
Mr. H. Thomas Byron, III, Attorney: H.Thomas.Byron@usdoj.gov  
Mr. Douglas Haber Green: dhgreen@venable.com  
Mr. Jonathan Hughes Blees, Assistant Chief Counsel: jblees@energy.state.ca.us, mtran@energy.state.ca.us  
Mr. Frederick Don Augenstern, I, Assistant Attorney General: fred.augenstern@state.ma.us  
Mr. Michael S. Raab, Attorney: michael.raab@usdoj.gov  
Jeffrey Kenneth Janicke: jjanicke@mbolaw.com  
Ms. Amber Dale Abbasi, Chief Counsel: amber.abbasi@causeofaction.org, susan.martin@causeofaction.org, amber.abbasi@causeofaction.org  
Mr. David Brett Calabrese: dcalabrese@ahrinet.org, jmattingly@ahrinet.org  
Mr. Joseph McCalmont Mattingly, General Counsel: jmattingly@ahrinet.org  
Mr. Daniel Zachary Epstein: daniel.epstein@causeofaction.org

Document to be served by alternative means on:

Mr. Charles Harak  
National Consumer Law Center  
7 Winthrop Square  
Boston, MA 02110

The following document(s) are associated with this transaction:

Document Description: Response to Motion Filed

Original Filename: NRDC et al Response.pdf

Electronic Document Stamp:

[STAMP acecfStamp\_ID=1109186823 [Date=01/25/2013] [FileNumber=1417337-0]

[9026eea3ef9efc50155385708cd64b97104099fcfc21314e2234edaa0be77781325ea2e286abc46baac6  
29e8864de16cfe703243a5e131d78bcbe0cba79c9d4c]]

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>; Vickie Patton <vpatton@edf.org>; Joanne Spalding <joanne.spalding@sierraclub.org>; Susan Durbin <susan.durbin@doj.ca.gov>; Elaine Meckenstock <elaine.meckenstock@doj.ca.gov>; Megan Ceronsky <mceronsky@edf.org>  
Cc: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>  
Bcc:  
Subject: NSPS  
Date: Tue Feb 05 2013 16:26:02 EST  
Attachments:

---

I spoke to Joe Goffman yesterday. Has anyone else recently? If so, should we schedule a call to compare notes? I'm pretty jammed up this week but Mon. or Tues. next week would work.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Doniger, David <ddoniger@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; vpatton@edf.org <vpatton@edf.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; Susan.Durbin@doj.ca.gov <susan.durbin@doj.ca.gov>; Elaine.Meckenstock@doj.ca.gov <elaine.meckenstock@doj.ca.gov>; mceronsky@edf.org <mceronsky@edf.org>  
Cc: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>  
Bcc:  
Subject: Re: NSPS  
Date: Tue Feb 05 2013 16:56:47 EST  
Attachments:

---

Happy to do a call. In the interests of time, can you (or anyone else who speaks with him) summarize any new intel?

David Doniger  
NRDC  
202 321-3435

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Tuesday, February 05, 2013 04:26 PM  
To: Doniger, David; Vickie Patton <vpatton@edf.org>; Joanne Spalding <joanne.spalding@sierraclub.org>; Susan Durbin <Susan.Durbin@doj.ca.gov>; 'Elaine Meckenstock' <Elaine.Meckenstock@doj.ca.gov>; Megan Ceronsky <mceronsky@edf.org>  
Cc: Morgan Costello <Morgan.Costello@ag.ny.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>  
Subject: NSPS

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(518) 402-2594  
michael.myers@ag.ny.gov

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To: Doniger, David <ddoniger@nrdc.org>;  
Vickie Patton <vpatton@edf.org>  
Cc: Joanne Spalding  
<joanne.spalding@sierraclub.org>; Susan Durbin  
<susan.durbin@doj.ca.gov>; Elaine Meckenstock  
<elaine.meckenstock@doj.ca.gov>; Megan Ceronsky  
<mceronsky@edf.org>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Henderson, Kelly <khenderson@nrdc.org>  
Bcc:  
Subject: RE: NSPS  
Date: Wed Feb 06 2013 09:04:14 EST  
Attachments:

---

I have a brief due Fri., but if we set up a call for before 3 pm eastern, Morgan can cover if I'm tied up with last-minute work on the brief.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Doniger, David [mailto:ddoniger@nrdc.org]  
Sent: Wednesday, February 06, 2013 8:55 AM  
To: Vickie Patton  
Cc: Joanne Spalding; Michael J. Myers; Susan Durbin; Elaine Meckenstock; Megan Ceronsky; Morgan Costello; Alan Belenz; Henderson, Kelly  
Subject: Re: NSPS

Could we do a call on Friday? I am out of town but have a fairly flexible schedule that day. Adding Kelly to track for me.

David Doniger  
202 321-3435 (NRDC)  
202 441-8326 (personal)  
Sent from my iPad

On Feb 6, 2013, at 1:17 AM, "Vickie Patton" <vpatton@edf.org<mailto:vpatton@edf.org>> wrote:

Hi Joanne, I am not available the next few days but Megan is so please press ahead w/o me.

On Feb 5, 2013, at 10:06 PM, "Joanne Spalding" <joanne.spalding@sierraclub.org<mailto:joanne.spalding@sierraclub.org>> wrote:

This week would be better, based on my call with David earlier this evening. But I'm free Tuesday at 4 ET.

Joanne Spalding  
415-977-5725 (o)  
510-612-4062 (c)

Sent from my iPhone

On Feb 5, 2013, at 9:45 PM, Vickie Patton <vpatton@edf.org<mailto:vpatton@edf.org>> wrote:

Is Tuesday late afternoon workable - at 4pm EST? Best wishes, Vickie

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---

From: Megan Ceronsky <mceronsky@edf.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Doniger, David <ddoniger@nrdc.org>; Vickie Patton <vpatton@edf.org>  
Cc: Joanne Spalding <joanne.spalding@sierraclub.org>; Susan Durbin <susan.durbin@doj.ca.gov>; Elaine Meckenstock <elaine.meckenstock@doj.ca.gov>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Henderson, Kelly <khenderson@nrdc.org>  
Bcc:  
Subject: RE: NSPS  
Date: Wed Feb 06 2013 10:50:24 EST  
Attachments:

---

Hi all--

Would 2 ET work on Friday? I'm on a plane for much of the east coast time day, but should land by then.

Best,  
Megan

Megan Ceronsky  
Attorney  
Environmental Defense Fund  
(303) 447-7224 (P)  
(303) 440-8052 (F)  
1875 Connecticut Avenue NW  
Suite 600  
Washington, D.C. 20009

-----Original Message-----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, February 06, 2013 9:04 AM  
To: 'Doniger, David'; Vickie Patton  
Cc: Joanne Spalding; Susan Durbin; Elaine Meckenstock; Megan Ceronsky; Morgan Costello; Alan Belenz; Henderson, Kelly  
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michael.myers@ag.ny.gov<mailto:michael.myers@ag.ny.gov>

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---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Megan Ceronsky <mceronsky@edf.org>;  
Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Doniger, David  
<ddoniger@nrdc.org>; Vickie Patton <vpatton@edf.org>  
Cc: Joanne Spalding  
<joanne.spalding@sierraclub.org>; Susan Durbin  
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</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Alan Belenz  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=abelenz>  
Bcc:  
Subject: RE: NSPS  
Date: Wed Feb 06 2013 10:58:51 EST  
Attachments:

---

Should work for David!

From: Megan Ceronsky [mailto:mceronsky@edf.org]  
Sent: Wednesday, February 06, 2013 10:50 AM  
To: Michael J. Myers; Doniger, David; Vickie Patton  
Cc: Joanne Spalding; Susan Durbin; Elaine Meckenstock; Morgan Costello; Alan Belenz; Henderson, Kelly  
Subject: RE: NSPS

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Sent: Wednesday, February 06, 2013 9:04 AM  
To: 'Doniger, David'; Vickie Patton

Cc: Joanne Spalding; Susan Durbin; Elaine Meckenstock; Megan Ceronsky; Morgan Costello; Alan Belenz; Henderson, Kelly  
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From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Megan Ceronsky <mceronsky@edf.org>;  
Doniger, David <ddoniger@nrdc.org>; Vickie Patton  
<vpatton@edf.org>  
Cc: Joanne Spalding  
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<khenderson@nrdc.org>  
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Morgan and/or I should be able to make that time work.

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The Capitol  
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Sent: Wednesday, February 06, 2013 10:50 AM  
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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Megan Ceronsky <mceronsky@edf.org>  
Cc:  
Bcc:  
Subject: Tentative: NSPS check in  
Date: Wed Feb 06 2013 16:30:51 EST  
Attachments:

---

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Henderson, Kelly <khenderson@nrdc.org>  
Cc: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Bcc:  
Subject: RE: Call re: NSPS  
Date: Wed Feb 13 2013 15:13:33 EST  
Attachments:

---

I'm available tomorrow at 11:30 (until noon), 3, and 3:30. CC'ing Morgan so she can weigh in as well. Thanks.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Henderson, Kelly [mailto:khenderson@nrdc.org]  
Sent: Wednesday, February 13, 2013 3:11 PM  
To: 'Joanne.Spalding@sierraclub.org' (Joanne.Spalding@sierraclub.org); Vickie Patton (vpatton@edf.org); Megan Ceronsky (mceronsky@edf.org); Michael J. Myers  
Cc: Beckerman, Samantha; Doniger, David  
Subject: Call re: NSPS

Dear all,

I would like to schedule a time tomorrow (Thursday 2/14) to follow up on NSPS. Please indicate your availability during the following times:

11:30am EST (I know that is a little early for west coast folks)

12pm EST

3pm EST

3:30pm EST

5pm EST

Best,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | [khenderson@nrdc.org](mailto:khenderson@nrdc.org) | [www.nrdc.org](http://www.nrdc.org)

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: NSPS  
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Attachments:

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---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>; Hawkins, Dave <dhawkins@nrdc.org>; Joanne Spalding <joanne.spalding@sierraclub.org>; Vickie Patton <vpatton@edf.org>; Megan Ceronsky <mceronsky@edf.org>; Susan Durbin <susan.durbin@doj.ca.gov>; Raissa Lerner <raissa.lerner@doj.ca.gov>; David.Zonana@doj.ca.gov <david.zonana@doj.ca.gov>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: NSPS small group dist list  
Date: Thu Feb 21 2013 17:05:14 EST  
Attachments:

---

updating the list. Susan, I just couldn't drop you off quite yet.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Kennedy, Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: RE: Dinner on Tues, 3/5?  
Date: Mon Feb 25 2013 10:06:27 EST  
Attachments:

---

Hey Kit, would love to get together for dinner. You may have heard back already from Maureen or Lisa B. that there are plans to have drinks/food with Steve Russo after work that day at the City Beer Hall due to his impending departure. Maureen sent the e-mail around to the bureau last week so she would know whether it's just EPB folks (and Bob) and Steve or a larger contingent. In any event, I'm happy to do a separate dinner with you after stopping by the Russo happy hour or just meeting up with you there.  
--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Kennedy, Kit [mailto:kkennedy@nrdc.org]  
Sent: Monday, February 25, 2013 8:53 AM  
To: Lisa M. Burianek; Maureen F. Leary; Michael J. Myers; John J. Sipos; 'robert.rosenthal@exec.ny.gov'  
Subject: Dinner on Tues, 3/5?

Hello, EPBers! I'm speaking at a conference in Albany on Wed. 3/6. I'd love to have drinks and/or dinner on Tuesday, 3/5 with you all if any of you are free. Let me know if that works. Best, Kit

---

From: Doniger, David <ddoniger@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Hawkins, Dave <dhawkins@nrdc.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; vpatton@edf.org <vpatton@edf.org>; mceronsky@edf.org <mceronsky@edf.org>; Susan.Durbin@doj.ca.gov <susan.durbin@doj.ca.gov>; Raissa.Lerner@doj.ca.gov <raissa.lerner@doj.ca.gov>; David.Zonana@doj.ca.gov <david.zonana@doj.ca.gov>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Longstreth, Ben <blongstreth@nrdc.org>  
Cc:  
Bcc:  
Subject: Re: NSPS small group dist list  
Date: Mon Feb 25 2013 14:03:46 EST  
Attachments:

---

Hi all,

I have added Ben.

I have some updated intel. Could we do a half-hour call tomorrow at 4 or 4:30 eastern?

David  
David Doniger  
NRDC  
202 321-3435

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Thursday, February 21, 2013 05:05 PM  
To: Doniger, David; Hawkins, Dave; Joanne Spalding <joanne.spalding@sierraclub.org>; Vickie Patton <vpatton@edf.org>; 'Megan Ceronsky' <mceronsky@edf.org>; 'Susan Durbin' <Susan.Durbin@doj.ca.gov>; 'Raissa Lerner' <Raissa.Lerner@doj.ca.gov>; David.Zonana@doj.ca.gov <David.Zonana@doj.ca.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; Morgan Costello <Morgan.Costello@ag.ny.gov>  
Subject: NSPS small group dist list

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Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov



---

From: Joanne Spalding  
<joanne.spalding@sierraclub.org>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Hawkins,  
Dave <dhawkins@nrdc.org>; vpatton@edf.org <vpattton@edf.org>;  
mceronsky@edf.org <mceronsky@edf.org>; Susan.Durbin@doj.ca.gov  
<susan.durbin@doj.ca.gov>; Raissa.Lerner@doj.ca.gov  
<raissa.lerner@doj.ca.gov>; David.Zonana@doj.ca.gov  
<david.zonana@doj.ca.gov>; Alan Belenz </o=lawnet/ou=first  
administrative group/cn=recipients/cn=abelenz>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Longstreth, Ben  
<blongstreth@nrdc.org>  
Bcc:  
Subject: Re: NSPS small group dist list  
Date: Mon Feb 25 2013 14:03:47 EST  
Attachments:

---

Either time works for me.

On Mon, Feb 25, 2013 at 11:03 AM, Doniger, David <ddoniger@nrdc.org> wrote:

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David  
David Doniger  
NRDC  
202 321-3435

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Thursday, February 21, 2013 05:05 PM  
To: Doniger, David; Hawkins, Dave; Joanne Spalding <joanne.spalding@sierraclub.org>; Vickie Patton  
<vpattton@edf.org>; 'Megan Ceronsky' <mceronsky@edf.org>; 'Susan Durbin' <Susan.Durbin@doj.ca.  
gov>; 'Raissa Lerner' <Raissa.Lerner@doj.ca.gov>; David.Zonana@doj.ca.gov <David.Zonana@doj.ca.  
.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; Morgan Costello <Morgan.Costello@ag.ny.gov>  
Subject: NSPS small group dist list

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michael.myers@ag.ny.gov

--

Joanne Spalding  
Senior Managing Attorney  
Sierra Club  
85 Second Street  
San Francisco, CA 94105  
415-977-5725 (o)  
510-612-4062 (c)

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---

From: Megan Ceronsky <mceronsky@edf.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Hawkins, Dave  
<dhawkins@nrdc.org>; Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Vickie Patton  
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<david.zonana@doj.ca.gov>; Alan Belenz </o=lawnet/ou=first  
administrative group/cn=recipients/cn=abelenz>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Longstreth, Ben  
<blongstreth@nrdc.org>  
Cc:  
Bcc:  
Subject: RE: NSPS small group dist list  
Date: Mon Feb 25 2013 14:04:09 EST  
Attachments:

---

Hi all—

Vickie and I are both committed elsewhere tomorrow from 4-5:30 ET. Is there any other time that would work for you tomorrow afternoon or Wednesday, David?

Megan

Megan Ceronsky

Attorney

Environmental Defense Fund

(303) 447-7224 (P)

(303) 440-8052 (F)

1875 Connecticut Avenue NW

Suite 600

Washington, D.C. 20009

From: Doniger, David [mailto:ddoniger@nrdc.org]  
Sent: Monday, February 25, 2013 2:04 PM  
To: 'michael.myers@ag.ny.gov'; Hawkins, Dave; 'Joanne.Spalding@sierraclub.org'; Vickie Patton;  
Megan Ceronsky; 'Susan.Durbin@doj.ca.gov'; 'Raissa.Lerner@doj.ca.gov'; 'David.Zonana@doj.ca.gov';  
'Alan.Belenz@ag.ny.gov'; 'Morgan.Costello@ag.ny.gov'; Longstreth, Ben  
Subject: Re: NSPS small group dist list

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From: Doniger, David <ddoniger@nrdc.org>  
To: Megan Ceronsky <mceronsky@edf.org>  
Cc: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Hawkins, Dave <dhawkins@nrdc.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; Vickie Patton <vpatton@edf.org>; Susan.Durbin@doj.ca.gov <susan.durbin@doj.ca.gov>; Raissa.Lerner@doj.ca.gov <raissa.lerner@doj.ca.gov>; David.Zonana@doj.ca.gov <david.zonana@doj.ca.gov>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Longstreth, Ben <blongstreth@nrdc.org>; Henderson, Kelly <khenderson@nrdc.org>  
Bcc:  
Subject: Re: NSPS small group dist list  
Date: Mon Feb 25 2013 23:48:11 EST  
Attachments:

---

Adding Kelly to find us a time.

David Doniger  
202 321-3435 (NRDC)  
202 441-8326 (personal)  
Sent from my iPad

On Feb 25, 2013, at 2:05 PM, "Megan Ceronsky" <mceronsky@edf.org<mailto:mceronsky@edf.org>> wrote:

Hi all—

Vickie and I are both committed elsewhere tomorrow from 4-5:30 ET. Is there any other time that would work for you tomorrow afternoon or Wednesday, David?

Megan

Megan Ceronsky  
Attorney  
Environmental Defense Fund  
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To: 'michael.myers@ag.ny.gov<mailto:michael.myers@ag.ny.gov>'; Hawkins, Dave; 'Joanne.Spalding@sierraclub.org<mailto:Joanne.Spalding@sierraclub.org>'; Vickie Patton; Megan Ceronsky; 'Susan.Durbin@doj.ca.gov<mailto:Susan.Durbin@doj.ca.gov>'; 'Raissa.Lerner@doj.ca.gov<mailto:Raissa.Lerner@doj.ca.gov>'; 'David.Zonana@doj.ca.gov<mailto:David.Zonana@doj.ca.gov>'; 'Alan.

Belenz@ag.ny.gov<mailto:Alan.Belenz@ag.ny.gov>; 'Morgan.Costello@ag.ny.gov<mailto:Morgan.Costello@ag.ny.gov>'; Longstreth, Ben  
Subject: Re: NSPS small group dist list

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NRDC  
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Sent: Thursday, February 21, 2013 05:05 PM  
To: Doniger, David; Hawkins, Dave; Joanne Spalding <joanne.spalding@sierraclub.org<mailto:joanne.spalding@sierraclub.org>>; Vickie Patton <vpatton@edf.org<mailto:vpatton@edf.org>>; 'Megan Ceronsky' <mceronsky@edf.org<mailto:mceronsky@edf.org>>; 'Susan Durbin' <Susan.Durbin@doj.ca.gov<mailto:Susan.Durbin@doj.ca.gov>>; 'Raissa Lerner' <Raissa.Lerner@doj.ca.gov<mailto:Raissa.Lerner@doj.ca.gov>>; David.Zonana@doj.ca.gov<mailto:David.Zonana@doj.ca.gov> <David.Zonana@doj.ca.gov<mailto:David.Zonana@doj.ca.gov>>; Alan Belenz <Alan.Belenz@ag.ny.gov<mailto:Alan.Belenz@ag.ny.gov>>; Morgan Costello <Morgan.Costello@ag.ny.gov<mailto:Morgan.Costello@ag.ny.gov>>  
Subject: NSPS small group dist list

updating the list. Susan, I just couldn't drop you off quite yet.

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New York State Attorney General  
The Capitol  
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michael.myers@ag.ny.gov<mailto:michael.myers@ag.ny.gov>

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---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Megan Ceronsky <mceronsky@edf.org>  
Cc: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Hawkins,  
Dave <dhawkins@nrdc.org>; Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Vickie Patton  
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administrative group/cn=recipients/cn=abelenz>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Longstreth, Ben  
<blongstreth@nrdc.org>  
Bcc:  
Subject: RE: NSPS small group dist list  
Date: Tue Feb 26 2013 09:57:32 EST  
Attachments:

---

David may be called for jury duty on Wednesday so we are trying to leave that day open for now. Today (Tuesday), David can do:

2:30pm EST

3:00pm EST

3:30pm EST

Please let me know if any of those times work.

Best,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401| khenderson@nrdc.org| www.nrdc.org

From: Doniger, David  
Sent: Monday, February 25, 2013 11:48 PM

To: Megan Ceronsky  
Cc: michael.myers@ag.ny.gov; Hawkins, Dave; Joanne.Spalding@sierraclub.org; Vickie Patton; Susan.Durbin@doj.ca.gov; Raissa.Lerner@doj.ca.gov; David.Zonana@doj.ca.gov; Alan.Belensz@ag.ny.gov; Morgan.Costello@ag.ny.gov; Longstreth, Ben; Henderson, Kelly  
Subject: Re: NSPS small group dist list

Adding Kelly to find us a time.

David Doniger

202 321-3435 (NRDC)

202 441-8326 (personal)

Sent from my iPad

On Feb 25, 2013, at 2:05 PM, "Megan Ceronsky" <mceronsky@edf.org> wrote:

Hi all—

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Megan

Megan Ceronsky

Attorney

Environmental Defense Fund

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(303) 440-8052 (F)

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Suite 600

Washington, D.C. 20009

From: Doniger, David [mailto:ddoniger@nrdc.org]  
Sent: Monday, February 25, 2013 2:04 PM

To: 'michael.myers@ag.ny.gov'; Hawkins, Dave; 'Joanne.Spalding@sierraclub.org'; Vickie Patton; Megan Ceronisky; 'Susan.Durbin@doj.ca.gov'; 'Raissa.Lerner@doj.ca.gov'; 'David.Zonana@doj.ca.gov'; 'Alan.Belensz@ag.ny.gov'; 'Morgan.Costello@ag.ny.gov'; Longstreth, Ben  
Subject: Re: NSPS small group dist list

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Subject: NSPS small group dist list

updating the list. Susan, I just couldn't drop you off quite yet.

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Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
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---

From: Joanne Spalding  
<joanne.spalding@sierraclub.org>  
To: Henderson, Kelly <khenderson@nrdc.org>  
Cc: Doniger, David <ddoniger@nrdc.org>;  
Megan Ceronsky <mceronsky@edf.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
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<dhawkins@nrdc.org>; Vickie Patton <vpatton@edf.org>;  
Susan.Durbin@doj.ca.gov <susan.durbin@doj.ca.gov>;  
Raissa.Lerner@doj.ca.gov <raissa.lerner@doj.ca.gov>;  
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group/cn=recipients/cn=morgancostello>; Longstreth, Ben  
<blongstreth@nrdc.org>  
Bcc:  
Subject: Re: NSPS small group dist list  
Date: Tue Feb 26 2013 10:57:16 EST  
Attachments:

---

Any of those times works for me.

Joanne Spalding  
415-977-5725 (o)  
510-612-4062 (c)

Sent from my iPhone

On Feb 26, 2013, at 6:56 AM, "Henderson, Kelly" <khenderson@nrdc.org> wrote:

David may be called for jury duty on Wednesday so we are trying to leave that day open for now. Today (Tuesday), David can do:

2:30pm EST

3:00pm EST

3:30pm EST

Please let me know if any of those times work.

Best,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401| khenderson@nrdc.org| www.nrdc.org

From: Doniger, David

Sent: Monday, February 25, 2013 11:48 PM

To: Megan Ceronsky

Cc: michael.myers@ag.ny.gov; Hawkins, Dave; Joanne.Spalding@sierraclub.org; Vickie Patton; Susan.Durbin@doj.ca.gov; Raissa.Lerner@doj.ca.gov; David.Zonana@doj.ca.gov; Alan.Belensz@ag.ny.gov; Morgan.Costello@ag.ny.gov; Longstreth, Ben; Henderson, Kelly

Subject: Re: NSPS small group dist list

Adding Kelly to find us a time.

David Doniger

202 321-3435 (NRDC)

202 441-8326 (personal)

Sent from my iPad

On Feb 25, 2013, at 2:05 PM, "Megan Ceronsky" <mceronsky@edf.org> wrote:

Hi all—

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Megan Ceronsky

Attorney

Environmental Defense Fund

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(303) 440-8052 (F)

1875 Connecticut Avenue NW

Suite 600

Washington, D.C. 20009

From: Doniger, David [mailto:ddoniger@nrdc.org]

Sent: Monday, February 25, 2013 2:04 PM

To: 'michael.myers@ag.ny.gov'; Hawkins, Dave; 'Joanne.Spalding@sierraclub.org'; Vickie Patton; Megan Ceronsky; 'Susan.Durbin@doj.ca.gov'; 'Raissa.Lerner@doj.ca.gov'; 'David.Zonana@doj.ca.gov'; 'Alan.Belenz@ag.ny.gov'; 'Morgan.Costello@ag.ny.gov'; Longstreth, Ben  
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From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: joanne.spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; khenderson@nrdc.org  
<khenderson@nrdc.org>  
Cc: ddoniger@nrdc.org <ddoniger@nrdc.org>;  
mceronsky@edf.org <mceronsky@edf.org>; dhawkins@nrdc.org  
<dhawkins@nrdc.org>; vpatton@edf.org <vpatton@edf.org>;  
Susan.Durbin@doj.ca.gov <susan.durbin@doj.ca.gov>;  
Raissa.Lerner@doj.ca.gov <raissa.lerner@doj.ca.gov>;  
David.Zonana@doj.ca.gov <david.zonana@doj.ca.gov>; Alan Belenz  
</o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Morgan Costello  
</o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; blongstreth@nrdc.org  
<blongstreth@nrdc.org>  
Bcc:  
Subject: Re: NSPS small group dist list  
Date: Tue Feb 26 2013 11:10:48 EST  
Attachments:

---

I could do 3 today

Message sent from a Blackberry device

From: Joanne Spalding [mailto:joanne.spalding@sierraclub.org]  
Sent: Tuesday, February 26, 2013 10:57 AM  
To: Henderson, Kelly <khenderson@nrdc.org>  
Cc: Doniger, David <ddoniger@nrdc.org>; Megan Ceronsky <mceronsky@edf.org>; Michael J. Myers;  
Hawkins, Dave <dhawkins@nrdc.org>; Vickie Patton <vpatton@edf.org>; Susan.Durbin@doj.ca.gov  
<Susan.Durbin@doj.ca.gov>; Raissa.Lerner@doj.ca.gov <Raissa.Lerner@doj.ca.gov>; David.  
Zonana@doj.ca.gov <David.Zonana@doj.ca.gov>; Alan Belenz; Morgan Costello; Longstreth, Ben  
<blongstreth@nrdc.org>  
Subject: Re: NSPS small group dist list

Any of those times works for me.

Joanne Spalding  
415-977-5725 (o)  
510-612-4062 (c)

Sent from my iPhone

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Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | khenderson@nrdc.org | www.nrdc.org

From: Doniger, David

Sent: Monday, February 25, 2013 11:48 PM

To: Megan Ceronky

Cc: michael.myers@ag.ny.gov; Hawkins, Dave; Joanne.Spalding@sierraclub.org; Vickie Patton; Susan .Durbin@doj.ca.gov; Raissa.Lerner@doj.ca.gov; David.Zonana@doj.ca.gov; Alan.Belensz@ag.ny.gov; Morgan.Costello@ag.ny.gov; Longstreth, Ben; Henderson, Kelly

Subject: Re: NSPS small group dist list

Adding Kelly to find us a time.

David Doniger

202 321-3435 (NRDC)

202 441-8326 (personal)

Sent from my iPad

On Feb 25, 2013, at 2:05 PM, "Megan Ceronky" <mceronsky@edf.org> wrote:

Hi all—

Vickie and I are both committed elsewhere tomorrow from 4-5:30 ET. Is there any other time that would work for you tomorrow afternoon or Wednesday, David?

Megan

Megan Ceronsky

Attorney

Environmental Defense Fund

(303) 447-7224 (P)

(303) 440-8052 (F)

1875 Connecticut Avenue NW

Suite 600

Washington, D.C. 20009

From: Doniger, David [mailto:ddoniger@nrdc.org]

Sent: Monday, February 25, 2013 2:04 PM

To: 'michael.myers@ag.ny.gov'; Hawkins, Dave; 'Joanne.Spalding@sierraclub.org'; Vickie Patton; Megan Ceronsky; 'Susan.Durbin@doj.ca.gov'; 'Raissa.Lerner@doj.ca.gov'; 'David.Zonana@doj.ca.gov'; 'Alan.Belensz@ag.ny.gov'; 'Morgan.Costello@ag.ny.gov'; Longstreth, Ben

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David Doniger

NRDC

202 321-3435

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Sent: Thursday, February 21, 2013 05:05 PM

To: Doniger, David; Hawkins, Dave; Joanne Spalding <joanne.spalding@sierraclub.org>; Vickie Patton <vpatton@edf.org>; 'Megan Ceronsky' <mceronsky@edf.org>; 'Susan Durbin' <Susan.Durbin@doj.ca.gov>; 'Raissa Lerner' <Raissa.Lerner@doj.ca.gov>; David.Zonana@doj.ca.gov <David.Zonana@doj.ca.gov>; Alan Belensz <Alan.Belensz@ag.ny.gov>; Morgan Costello <Morgan.Costello@ag.ny.gov>

Subject: NSPS small group dist list

updating the list. Susan, I just couldn't drop you off quite yet.

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New York State Attorney General

The Capitol

Albany, NY 12224

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[michael.myers@ag.ny.gov](mailto:michael.myers@ag.ny.gov)

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---

From: Susan Durbin <susan.durbin@doj.ca.gov>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>;  
joanne.spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; khenderson@nrdc.org  
<khenderson@nrdc.org>  
Cc: ddoniger@nrdc.org <ddoniger@nrdc.org>;  
mceronsky@edf.org <mceronsky@edf.org>; dhawkins@nrdc.org  
<dhawkins@nrdc.org>; vpatton@edf.org <vpatton@edf.org>; Raissa  
Lerner <raissa.lerner@doj.ca.gov>; David Zonana  
<david.zonana@doj.ca.gov>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Morgan Costello  
</o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; blongstreth@nrdc.org  
<blongstreth@nrdc.org>  
Bcc:  
Subject: RE: NSPS small group dist list  
Date: Tue Feb 26 2013 11:52:08 EST  
Attachments:

---

I'm flexible.

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Tuesday, February 26, 2013 8:11 AM  
To: 'joanne.spalding@sierraclub.org'; 'khenderson@nrdc.org'  
Cc: 'ddoniger@nrdc.org'; 'mceronsky@edf.org'; 'dhawkins@nrdc.org'; 'vpatton@edf.org'; Susan Durbin;  
Raissa Lerner; David Zonana; Alan Belenz; Morgan Costello; 'blongstreth@nrdc.org'  
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---

From: David Zonana <david.zonana@doj.ca.gov>  
To: Susan Durbin <susan.durbin@doj.ca.gov>;  
Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>;  
joanne.spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; khenderson@nrdc.org  
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<dhawkins@nrdc.org>; vpatton@edf.org <vpatton@edf.org>; Raissa  
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</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; blongstreth@nrdc.org  
<blongstreth@nrdc.org>  
Bcc:  
Subject: RE: NSPS small group dist list  
Date: Tue Feb 26 2013 12:23:10 EST  
Attachments:

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3:00 or 3:30 EST work for me.

From: Susan Durbin  
Sent: Tuesday, February 26, 2013 8:52 AM  
To: Michael J. Myers; 'joanne.spalding@sierraclub.org'; 'khenderson@nrdc.org'  
Cc: 'ddoniger@nrdc.org'; 'mceronsky@edf.org'; 'dhawkins@nrdc.org'; 'vpatton@edf.org'; Raissa Lerner;  
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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Pamela Campos <pcampos@edf.org>  
Cc:  
Bcc:  
Subject: BACT analyses for GHGs  
Date: Mon Mar 04 2013 11:10:51 EST  
Attachments:

---

Hi Pam, I'm contacting you because you were a great help in tracking down some sample BACT analyses for GHGs in advance of the oral argument last year in the Tailoring Rule case. Before asking someone to do a comprehensive search of EPA's RACT/BACT/LAER database, I figured I'd ask you first whether you or others at EDF are aware of any BACT analyses for existing facilities who triggered PSD under the Tailoring Rule by exceeding the 75,000 tpy threshold for a major modification. (The ones you made me aware of last year concerned new facilities, not modifications of existing ones.) Thanks for any help.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Philip Bein </o=lawnet/ou=first administrative group/cn=recipients/cn=philipbein>; Andrew Gershon </o=lawnet/ou=first administrative group/cn=recipients/cn=andrewgershon>  
Cc:  
Bcc:  
Subject: Fw: Possible Multi-State Letter to President Obama re Amendment of EPA and ACOE Clean Water Act Guidelines  
Date: Thu Mar 07 2013 18:01:59 EST  
Attachments: AG CWRA Letter Nov 07.pdf

---

Either of you guys involved with the 2007 letter? If interested in this, please reply to Greg. Thx.

Message sent from a Blackberry device

From: Gregory Schultz [mailto:gSchultz@riag.ri.gov]  
Sent: Thursday, March 07, 2013 05:13 PM  
To: allen.brooks@doj.nh.gov <allen.brooks@doj.nh.gov>; MZimmerman@mde.state.md.us <MZimmerman@mde.state.md.us>; Paul DeSantis <pdesantis@mde.state.md.us>; Mary Raivel <MRaivel@mde.state.md.us>; Satterfield Valerie (DOJ) <Valerie.Satterfield@state.de.us>; Christopher King <CKing@law.nyc.gov>; Carrie 'Noteboom' <cnoteboo@law.nyc.gov>; Kimberly (DDOE) 'Katzenbarger' <kimberly.katzenbarger@dc.gov>; Amy (DDOE) 'McDonnell' <amy.mcdonnell@dc.gov>; Susan Durbin <Susan.Durbin@doj.ca.gov>; dsherid@ag.state.ia.us <dsherid@ag.state.ia.us>; TORMIST@ag.state.ia.us <TORMIST@ag.state.ia.us>; gkarr@atg.state.il.us <gkarr@atg.state.il.us>; Gignac, James <jgignac@atg.state.il.us>; mdunn@atg.state.il.us <mdunn@atg.state.il.us>; jerry.reid@maine.gov <jerry.reid@maine.gov>; karen olson <karen.olson@ag.state.mn.us>; Kieley, Max <max.kieley@ag.state.mn.us>; Garrahan Paul <Paul.Garrahan@doj.state.or.us>; LeslieS@ATG.WA.GOV <LeslieS@ATG.WA.GOV>; MarySueW@ATG.WA.GOV <MarySueW@ATG.WA.GOV>; amoore@nmag.gov <amoore@nmag.gov>; sfarris@nmag.gov <sfarris@nmag.gov>; Bernstein, Marc <Mbern@ncdoj.gov>  
Cc: Michael J. Myers; Augenstern, Fred (AGO) <fred.augenstern@state.ma.us>; Triplett, Tracy (AGO) <tracy.triplett@state.ma.us>; lancu, Carol <Carol.lancu@ago.state.ma.us>; Thea Schwartz <tschwartz@atg.state.vt.us>; Koschwitz, Scott N. <Scott.Koschwitz@ct.gov>  
Subject: FW: Possible Multi-State Letter to President Obama re Amendment of EPA and ACOE Clean Water Act Guidelines

I am forwarding this email chain to all states that were signatories to the 11/1/2007 letter to Congress (attached) supporting the Clean Water Restoration Act of 2007 (and a few others). Rhode Island is considering drafting a letter to President Obama asking him to move forward on the proposed amendments to EPA and ACOE guidelines interpreting the jurisdiction of the Clean Water Act, which were submitted to the White House last February.

A link to the guidance at issue ([http://water.epa.gov/lawsregs/guidance/wetlands/upload/wous\\_guidance\\_4-2011.pdf](http://water.epa.gov/lawsregs/guidance/wetlands/upload/wous_guidance_4-2011.pdf)) and EPA's informational page about it (<http://water.epa.gov/lawsregs/guidance/wetlands/CWAwaters.cfm>). Below is a link to a helpful NWF article on this issue.

I would appreciate comments as to whether your state might be interested in joining this letter. Additionally, please let me know if there are other states that might be interested. Also, let me know if you would like to be removed from this email list or if there are others that should be included.

Thanks for your consideration.

Greg

Gregory S. Schultz

Special Assistant Attorney General

Rhode Island Department of Attorney General

150 South Main Street Providence, RI 02903

Tel.: (401) 274-4400, Ext. 2400

Fax: (401) 222-3016

From: Gregory Schultz

Sent: Thursday, March 07, 2013 4:30 PM

To: 'Michael J. Myers'; 'Augenstern, Fred (AGO)'; 'Triplett, Tracy (AGO)'; 'Iancu, Carol'; 'Thea Schwartz'; 'Koschwitz, Scott N.'

Subject: RE: Possible Multi-State Letter to President Obama re Amendment of EPA and ACOE Clean Water Act Guidelines

As a follow-up to my email below, attached is a letter to Congress from 11/1/2007 by DC, CA, CT, DE, ME, MD, MA, NH, NY, OR, RI, and VT, which supported the Clean Water Restoration Act of 2007. This Act would have reestablished the Clean Water Act's traditional reach to waters of the United States. Unfortunately, nothing very substantive has happened since that letter was issued.

From: Gregory Schultz

Sent: Thursday, March 07, 2013 11:18 AM

To: Michael J. Myers; Augenstern, Fred (AGO); Triplett, Tracy (AGO); Iancu, Carol; Thea Schwartz; 'Koschwitz, Scott N.'

Subject: Possible Multi-State Letter to President Obama re Amendment of EPA and ACOE Clean Water Act Guidelines

Importance: Low

Rhode Island is considering drafting a letter to President Obama asking him to move forward on the proposed amendments to EPA and ACOE guidelines interpreting the jurisdiction of the Clean Water Act. Last February, the ACOE and EPA submitted to the White House the final draft of a policy that would replace existing guidelines that are inconsistent with the intent of the CWA (promulgated during the G.W. Bush administration). Yet despite a public review process and widespread public support for this final draft, the White House has failed so far to approve the EPA and Corps guidelines. I have attached below a link to a recent article from the National Wildlife Federation that provides more detail. Additionally, I have been in contact with the Sierra Club and other environmental groups that would actively support a letter from the states to the President.

Before going further, I was hoping to gauge interest from your states (CT, MA, NY, and VT)( I realize that I may not be sending to the correct AAGs – please forward where appropriate). Could you let me know whether this might be something of interest to your state? I would like to gauge initial interest, finalize a draft letter, then send out to a wider audience (probably through NAAG).

Please feel free to contact me to discuss.

Thanks

Greg

Gregory S. Schultz

Special Assistant Attorney General

Rhode Island Department of Attorney General

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Tel.: (401) 274-4400, Ext. 2400

Fax: (401) 222-3016

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at our expense.

From: Gregory Schultz [mailto:[gschultz@riag.ri.gov](mailto:gschultz@riag.ri.gov)]  
Sent: Wednesday, March 06, 2013 3:05 PM  
To: Gregory Schultz  
Subject: Check Out This Page from the National Wildlife Federation  
Importance: Low

National Wildlife Federation

National Wildlife Federation

Send to a Friend

3/6/2013

Your friend Gregory Schultz, sent you this link to a web page on National Wildlife Federation's website:

Clean Water Act Protections Languish at White House for One Year

Interesting article

You may reply to your friend here: [gschultz@riag.ri.gov](mailto:gschultz@riag.ri.gov)

Please note - this is not an official communication from National Wildlife Federation -- NWF is not responsible for the content of this email.

---

Owner: Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>  
Filename: AG CWRA Letter Nov 07.pdf  
Last Modified: Thu Mar 07 18:01:59 EST 2013

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## STATE ATTORNEYS GENERAL

A Communication from the Chief Legal Officers Of the following States:

The District of Columbia; California; Connecticut; Delaware; Maine; Maryland; Massachusetts; New Hampshire; New Jersey; New York; Oregon; Rhode Island; Vermont

November 1, 2007

The Honorable James Oberstar  
Chair, House Committee on Transportation and Infrastructure  
2365 Rayburn House Office Building  
Washington, DC 20515

The Honorable John Mica  
Ranking Member, House Committee on Transportation and Infrastructure  
2313 Rayburn House Office Building  
Washington, DC 20515

Dear Chairman Oberstar and Congressman Mica:

We submit this letter on behalf of the undersigned State Attorneys General to support enactment of H.R. 2421, the Clean Water Restoration Act of 2007. As the highest law enforcement officers in our respective states, we have important responsibilities for interpretation, implementation, and enforcement of the Clean Water Act and state programs modeled on that Act. Our actions to assure clean water for our states protect the health of our citizens, the livelihoods of many of those we serve, recreational opportunities, and the beauty of our natural environments. Our abilities to carry out the task of assuring clean waters for all will be significantly enhanced if the bipartisan Clean Water Restoration Act of 2007 is passed, which reestablishes the Clean Water Act's traditional reach to waters of the United States.

When it enacted the first strong national act to clean our nation's waters in 1972, and consistently through amendments and oversight after that, Congress endorsed a broad and strong scope for the Clean Water Act to restore our rivers and streams to chemical, physical, and biological integrity. We continue to work to achieve the law's important goals of cleaning up and maintaining our nation's waters using the framework of the law—setting standards, using a permitting system, and assuring strong and effective enforcement. Congress recognized from the beginning the important role of states in carrying out the program to achieve these clean water goals. States have structured many aspects of their own programs on the model of the federal law, and the federal law creates a floor that helps maintain consistency among state water pollution control programs throughout the country. A strong and clear federal law is critical to our roles as State Attorneys General in restoring our waters.

Unfortunately, in recent years the Courts have made enforcement of the law more difficult and thus the achievement of its important purposes more uncertain. In 2001, the Supreme Court in Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers introduced some confusion as to what waters Congress intended to cover under the Clean Water Act. That problem was exacerbated by two additional Supreme Court decisions in June 2006.

These 2006 decisions—Rapanos v. United States and Carabell v. United States Army Corps of Engineers—raised doubts that the Clean Water Act extends to certain wetlands. Wetlands, of course, are important components of the ecosystem and significantly affect the quantity, quality, and biological integrity of downstream waters. They filter pollutants out of waters before they flow into our rivers and streams. Wetlands are home to myriad bird and fish species, act as essential breeding grounds, and provide the sites for birdwatching, fishing, hunting, and other activities critical to the environment and economies of many states. As State Attorneys General, we may challenge grants or denials of wetlands permits, or seek delegation of the wetlands programs, so we have a keen interest in the scope of this law. The Supreme Court’s decisions make less clear what wetlands will be considered covered by the Act.

The recent uncertainty in scope of the Clean Water Act’s coverage also affects what waters will be subject to the point source discharge programs of the Clean Water Act. The permits that the states or EPA issue under the point source program are among the most important and effective tools we have to control water pollution. In most of our states, the state is the primary issuer of permits and primary enforcer for that point source discharge program. The lack of clarity brought about by the recent decisions can lead to more litigation and can cause a serious problem for effective enforcement of this law and our mission to clean up and maintain the waters in our states.

Further, every state in the continental United States has waters that are downstream of another state, so we are affected by actions of other states and by the federal legal standard. A strong federal standard and federal program are essential to our state programs and to restoring and maintaining clean waters in our states.

Many states supported the federal government in asking the Supreme Court in the recent cases to uphold the historically broad scope of the Clean Water Act so that we could continue to clean up and maintain our waters and protect the health and welfare of our states’ citizens and their environment. We want to keep working to meet the important goals that Congress had in mind when it enacted, amended, and strengthened the Clean Water Act through the years.

H.R. 2421, the Clean Water Restoration Act of 2007, clarifies that the Clean Water Act covers all waters, and every kind of water by changing the term “navigable waters” throughout the Act to “waters of the United States.” “Waters” includes all waters (and similar ecological features) subject to the legislative power of Congress under the Constitution. As a result, H.R. 2421 restores the full protection of the Clean Water Act before the Court’s recent decisions.

The Supreme Court has created ambiguity about the reach of the Clean Water Act. We urge Congress to clean up the law by enacting the Clean Water Restoration Act of 2007 so that we can continue to clean up our nation's waters.

Thank you for your consideration.

Sincerely,



Linda Singer  
Attorney General for Washington, D.C.



Kelly A. Ayotte  
Attorney General for New Hampshire



Edmund G. Brown Jr.  
Attorney General for California



Anne Milgram  
Attorney General for New Jersey



Richard Blumenthal  
Attorney General for Connecticut



Andrew M. Cuomo  
Attorney General for New York



Joseph P. Biden, III  
Attorney General for Delaware



Hardy Myers  
Attorney General for Oregon



Steven Rowe  
Attorney General for Maine



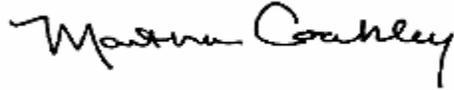
Patrick C. Lynch  
Attorney General for Rhode Island



Douglas F. Gansler  
Attorney General for Maryland



William H. Sorrell  
Attorney General for Vermont



Martha Coakley  
Attorney General for Massachusetts

---

From: gjaques@nrdc.org <gjaques@nrdc.org> on behalf of Kennedy, Kit <kkennedy@nrdc.org>  
To: Kennedy, Kit <kkennedy@nrdc.org>; Longstreth, Ben <blongstreth@nrdc.org>; Thompson, Jared <jared.thompson@nrdc.org>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; John J. Sipos </o=lawnet/ou=first administrative group/cn=recipients/cn=johnsipos>  
Cc:  
Bcc:  
Subject: Copy: Call on DOE Energy Efficiency Standards Delays  
Date: Tue Mar 12 2013 10:40:49 EDT  
Attachments:

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StartTime: Mon Mar 18 16:00:00 Eastern Daylight Time 2013  
EndTime: Mon Mar 18 17:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Tue Mar 12 12:04:00 Eastern Daylight Time 2013

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Longstreth, Ben <blongstreth@nrdc.org>;  
Thompson, Jared <jared.thompson@nrdc.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Lemuel Srolovic  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=lsrolovi>; John J. Sipos  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=johnsipos>; Kennedy, Kit  
<kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: Copy: Call on DOE Energy Efficiency Standards Delays  
Date: Tue Mar 12 2013 10:41:54 EDT  
Attachments:

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StartTime: Mon Mar 18 16:00:00 Eastern Daylight Time 2013

EndTime: Mon Mar 18 17:00:00 Eastern Daylight Time 2013

Location:

Invitees:

Recurring: No

ShowReminder: No

Accepted: Yes

AcceptedTime: Tue Mar 12 10:42:51 Eastern Daylight Time 2013

When: Monday, March 18, 2013 4:00 PM-5:00 PM (GMT-05:00) Eastern Time (US & Canada).

Where: 212 727 4600; pin 182703

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Kennedy, Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Call on DOE Energy Efficiency Standards Delays  
Date: Tue Mar 12 2013 10:42:51 EDT  
Attachments:

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Accepted: Call on DOE Energy Efficiency Standards Delays

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From: Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>  
To: Lisa M. Burianek </o=lawnet/ou=first administrative group/cn=recipients/cn=lisaburianek>; Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Peter Washburn </o=lawnet/ou=first administrative group/cn=recipients/cn=peterwashburn>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: Rob Moore leaving EA  
Date: Wed Mar 13 2013 11:39:51 EDT  
Attachments:

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<http://blog.timesunion.com/capitol/archives/181583/moore-to-nrdc/>

---

From: Andrew Gershon </o=lawnet/ou=first administrative group/cn=recipients/cn=andrewgershon>  
To: Andrew Gershon </o=lawnet/ou=first administrative group/cn=recipients/cn=andrewgershon>; Henderson, Kelly <khenderson@nrdc.org>; Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; Linda M. Wilson </o=lawnet/ou=first administrative group/cn=recipients/cn=lindawilson>; Dan Leinung </o=lawnet/ou=first administrative group/cn=recipients/cn=dleinung1>; Charles Silver </o=lawnet/ou=first administrative group/cn=recipients/cn=charlessilver>  
Cc:  
Bcc:  
Subject: Copy: Call re NRDC Refrigerant Petitions  
Date: Thu Mar 14 2013 16:00:04 EDT  
Attachments:

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StartTime: Tue Mar 19 13:00:00 Eastern Daylight Time 2013  
EndTime: Tue Mar 19 14:30:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: No

When: Tuesday, March 19, 2013 1:00 PM-2:30 PM (GMT-05:00) Eastern Time (US & Canada).

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Dial-in: 866-394-2346  
Conference Access Code: 3842557191

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Strategy on next litigation moves re: power plants and oil/gas  
Date: Tue Mar 19 2013 14:14:34 EDT  
Attachments:

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From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Graham McCahan <gmccahan@edf.org>;  
Andrew G. Frank </o=lawnet/ou=first administrative group/cn=recipients/cn=andrewfrank>  
Cc: Vickie Patton <vpatton@edf.org>  
Bcc:  
Subject: RE: Good neighbor administrative petitions & petition for review  
Date: Tue Mar 19 2013 16:56:13 EDT  
Attachments:

---

Thanks Graham. The administrative petition reads very well. Keep us posted on EPA's response.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Graham McCahan [mailto:gmccahan@edf.org]  
Sent: Tuesday, March 19, 2013 3:48 PM  
To: Michael J. Myers; Andrew G. Frank  
Cc: Vickie Patton  
Subject: Good neighbor administrative petitions & petition for review

Hello Michael and Andy,

We wanted to make sure you were aware of and had copies of a good neighbor-related administrative petition and petition for review that we (along with Sierra Club) filed yesterday. Attached are:

(1) a combined petition for reconsideration of the 1/15/13 ozone SIPs final rule and for administrative action regarding good neighbor obligations for the 2006 and 2013 PM2.5 NAAQS, and accompanying brief section 126 analysis; and

(2) a petition for review of the 1/15/13 ozone SIPs final rule.

We have also provided copies of the attached to Maryland, Delaware, and Connecticut.

Best,

Graham

Graham McCahan  
Attorney

Climate & Air Program

Environmental Defense Fund  
2060 Broadway, Suite 300  
Boulder, CO 80302  
O: 303-447-7228

C: 720-474-9472  
gmccahan@edf.org  
edf.org

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From: Graham McCahan <gmccahan@edf.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Andrew G. Frank </o=lawnet/ou=first administrative group/cn=recipients/cn=andrewfrank>  
Cc: Vickie Patton <vpatton@edf.org>  
Bcc:  
Subject: RE: Good neighbor administrative petitions & petition for review  
Date: Tue Mar 19 2013 17:30:21 EDT  
Attachments:

---

Thank you, Michael. We will keep you posted on EPA's response.

-Graham

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Tuesday, March 19, 2013 2:56 PM  
To: Graham McCahan; Andrew G. Frank  
Cc: Vickie Patton  
Subject: RE: Good neighbor administrative petitions & petition for review

Thanks Graham. The administrative petition reads very well. Keep us posted on EPA's response.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

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Sent: Tuesday, March 19, 2013 3:48 PM  
To: Michael J. Myers; Andrew G. Frank  
Cc: Vickie Patton  
Subject: Good neighbor administrative petitions & petition for review

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(2) a petition for review of the 1/15/13 ozone SIPs final rule.

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Graham

Graham McCahan  
Attorney

Climate & Air Program

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Boulder, CO 80302  
O: 303-447-7228

C: 720-474-9472  
gmccahan@edf.org  
edf.org

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Craig Segall - Sierra  
<craig.segall@sierraclub.org>; joanne.spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Bruce Nilles  
<bruce.nilles@sierraclub.org>  
Cc:  
Bcc:  
Subject: Bridgeport, CT plant  
Date: Wed Mar 20 2013 16:54:03 EDT  
Attachments:

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All--A cousin of mine who's an undergrad at UConn would like to do an EJ case study relating to relicensing of a coal-fired plant in Bridgeport (Bridgeport Harbor Station). I understand Sierra Club is involved in that proceeding. Are any of you working on this, or could you suggest someone for my cousin to contact to get some basic info and whether there are SC members affected by the plant that he might talk to? Thanks much.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Joshua Berman  
<josh.berman@sierraclub.org>; Craig Segall - Sierra  
<craig.segall@sierraclub.org>  
Cc: Josh Stebbins  
<josh.stebbins@sierraclub.org>; joanne.spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Bruce Nilles  
<bruce.nilles@sierraclub.org>  
Bcc:  
Subject: RE: Bridgeport, CT plant  
Date: Wed Mar 20 2013 17:21:50 EDT  
Attachments:

---

Great, thanks much. I'll send him your way.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Joshua Berman [mailto:josh.berman@sierraclub.org]  
Sent: Wednesday, March 20, 2013 5:20 PM  
To: Craig Segall - Sierra  
Cc: Michael J. Myers; Josh Stebbins; joanne.spalding@sierraclub.org; Bruce Nilles  
Subject: Re: Bridgeport, CT plant

Hi Mike:

I would be happy to speak with your cousin about the Bridgeport facility and Sierra Club's work in Bridgeport around the plant. I will also likely put him in touch with our organizer, Onte Johnson, who is based in Bridgeport and can connect your cousin with members who are directly impacted by the plant.

Best,

Josh

--

Joshua Berman  
Associate Attorney

Sierra Club Environmental Law Program

50 F St. NW, 8th Floor  
Washington, DC 20001  
Tel: (202) 650-6062  
Fax: (202) 547-6009

On Wed, Mar 20, 2013 at 4:55 PM, Craig Segall - Sierra <craig.segall@sierraclub.org> wrote:

Hi Mike,

I believe Josh Berman and Josh Stebbins in our DC office (copied) are the folks to talk with.

Cheers,

Craig

On Wed, Mar 20, 2013 at 4:54 PM, Michael J. Myers <Michael.Myers@ag.ny.gov> wrote:

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Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

--

I check email infrequently. Please call me if you need a quick reply.

Craig Segall  
Staff Attorney

Sierra Club Environmental Law Program

50 F St NW, Eighth Floor  
Washington, DC 20001  
(202)-548-4597  
(202)-547-6009 (fax)  
Craig.Segall@sierraclub.org

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: John Meyers <john.meyers@uconn.edu>  
Cc:  
Bcc:  
Subject: FW: Bridgeport, CT plant  
Date: Wed Mar 20 2013 17:23:06 EDT  
Attachments:

---

John, sounds like Josh will be able to get you up to speed on the Club's activities and put you in touch with others. Good luck!

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

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Sent: Wednesday, March 20, 2013 5:20 PM  
To: Craig Segall - Sierra  
Cc: Michael J. Myers; Josh Stebbins; joanne.spalding@sierraclub.org; Bruce Nilles  
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Josh

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Joshua Berman  
Associate Attorney

Sierra Club Environmental Law Program

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Tel: (202) 650-6062

Fax: (202) 547-6009

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Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

michael.myers@ag.ny.gov

--

I check email infrequently. Please call me if you need a quick reply.

Craig Segall  
Staff Attorney

Sierra Club Environmental Law Program

50 F St NW, Eighth Floor  
Washington, DC 20001  
(202)-548-4597  
(202)-547-6009 (fax)  
Craig.Segall@sierraclub.org

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---

From: Ted Hadzi-Antich <tha@pacificlegal.org>  
To: twebster@sidley.com  
<twebster@sidley.com>; pkeisler@sidley.com  
<pkeisler@sidley.com>; amacbeth@sidley.com  
<amacbeth@sidley.com>; holmes.carol@epa.gov  
<holmes.carol@epa.gov>; mallory.brenda@epa.gov  
<mallory.brenda@epa.gov>; SupremeCtBriefs@USDOJ.gov  
<supremectbriefs@usdoj.gov>; jon.lipshultz@usdoj.gov  
<jon.lipshultz@usdoj.gov>; angeline.purdy@usdoj.gov  
<angeline.purdy@usdoj.gov>; eric.hostetler@usdoj.gov  
<eric.hostetler@usdoj.gov>; perry.rosen@usdoj.gov  
<perry.rosen@usdoj.gov>; amanda.berman@usdoj.gov  
<amanda.berman@usdoj.gov>; david.gunter2@usdoj.gov  
<david.gunter2@usdoj.gov>; thomas.lorenzen@usdoj.gov  
<thomas.lorenzen@usdoj.gov>; kim.smaczniak@usdoj.gov  
<kim.smaczniak@usdoj.gov>; michele.walter@usdoj.gov  
<michele.walter@usdoj.gov>; peter.glaser@troutmansanders.com  
<peter.glaser@troutmansanders.com>;  
mark.nagle@troutmansanders.com  
<mark.nagle@troutmansanders.com>;  
matthew.dukes@troutmansanders.com  
<matthew.dukes@troutmansanders.com>; reed.clay@oag.state.tx.us  
<reed.clay@oag.state.tx.us>; michaelp.murphy@oag.state.tx.us  
<michaelp.murphy@oag.state.tx.us>; mpmurf@gmail.com  
<mpmurf@gmail.com>; jonathan.mitchell@texasattorneygeneral.gov  
<jonathan.mitchell@texasattorneygeneral.gov>; bcobb@jw.com  
<bcobb@jw.com>; rtambling@ago.state.al.us  
<rtambling@ago.state.al.us>; katie.spohn@nebraska.gov  
<katie.spohn@nebraska.gov>; maiolson@nd.gov <maiolson@nd.gov>;  
roxanne.giedd@state.sd.us <roxanne.giedd@state.sd.us>;  
agesmith@ag.state.sc.us <agesmith@ag.state.sc.us>;  
dgetchell@oag.state.va.us <dgetchell@oag.state.va.us>;  
kcuccinelli@oag.state.va.us <kcuccinelli@oag.state.va.us>;  
gavin.mccabe@doj.ca.gov <gavin.mccabe@doj.ca.gov>;  
dsberid@ag.state.ia.us <dsberid@ag.state.ia.us>;  
mraivel@mde.state.md.us <mraivel@mde.state.md.us>;  
gkarr@atg.state.il.us <gkarr@atg.state.il.us>;  
jerry.reid@maine.gov <jerry.reid@maine.gov>;  
carol.iancu@state.ma.us <carol.iancu@state.ma.us>;  
sfarris@nmag.gov <sfarris@nmag.gov>;  
paul.s.logan@doj.state.or.us <paul.s.logan@doj.state.or.us>;  
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Subject: Coalition for Responsible Regulation v. EPA, et al and consolidated cases; Courtesy  
Copy of Pacific Legal Foundation Petition for Writ of Certiorari

Date: Thu Mar 21 2013 16:17:40 EDT

Attachments: Courtesy Copy Service List ii.pdf  
Petition for Writ of Certiorari 3-20-13.pdf

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Dear Counsel:

Attached please find an electronic courtesy copy of Pacific Legal Foundation's Petition for Writ of Certiorari to the United States Supreme Court from the decision of the D.C. Circuit in the cases consolidated under the case name Coalition for Responsible Regulation, et. al v. Environmental Protection Agency, et al., along with an electronic copy of the courtesy copy service list. Because not all counsel in the consolidated cases were included in the D.C. Circuit's ECF system, we are sending first class courtesy copies as well.

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No. \_\_\_\_\_

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**In the  
Supreme Court of the United States**

—◆—  
**PACIFIC LEGAL FOUNDATION,**  
*Petitioner,*

v.

**ENVIRONMENTAL PROTECTION AGENCY,**  
*Respondent.*

—◆—  
**On Petition for Writ of Certiorari  
to the United States Court of Appeals  
for the District of Columbia Circuit**

—◆—  
**PETITION FOR WRIT OF CERTIORARI**

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## QUESTION PRESENTED

Carbon dioxide is a ubiquitous natural substance that is essential to life on Earth. Certain prominent scientific organizations have concluded that atmospheric emissions of carbon dioxide from man-made sources contribute to global climate change. Relying on such conclusions, the United States Environmental Protection Agency (EPA) promulgated a regulation, *Endangerment and Cause or Contribute Findings for Greenhouse Gasses under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66,496 (Dec. 15, 2009) (the Endangerment Finding), in which it determined that carbon dioxide and related substances pose a danger to human health and welfare, thereby establishing a springboard for comprehensive federal regulation of carbon dioxide emissions under the Clean Air Act. Because carbon dioxide is virtually everywhere and in everything, the Endangerment Finding confers upon EPA unprecedented authority to direct and control the Nation's physical, economic, and social infrastructure. Congress requires that a wide variety of regulations promulgated by EPA be made available for peer review by a panel of independent scientists known as the Science Advisory Board (SAB), whose function is to ensure the scientific credibility of EPA's regulatory proposals. 42 U.S.C. § 4365(c)(1). EPA promulgated the Endangerment Finding without providing the SAB with the opportunity for scientific peer review.

The question presented is: Must the Endangerment Finding be set aside because EPA violated the congressional mandate to submit the proposed Finding to the Science Advisory Board for peer review, as required by 42 U.S.C. § 4365(c)(1)?

## LIST OF ALL PARTIES

Many petitioners challenged the Endangerment Finding in the United States Court of Appeals for the District of Columbia Circuit, and many others challenged EPA regulations that depended upon the Endangerment Finding. The D.C. Circuit consolidated all the challenges into four sets of cases as follows: **(1) Lead Case No. 09-1322** (including Case Nos. 10-1024, 10-1025, 10-1026, 10-1030, 10-1035, 10-1036, 10-1037, 10-1038, 10-1039, 10-1040, 10-1041, 10-1042, 10-1044, 10-1045, 10-1046, 10-1234, 10-1235, 10-1239, 10-1245, 10-1281, 10-1310, 10-1318, 10-1319, 10-1320, 10-1321); **(2) Lead Case No. 10-1073** (including Case Nos. 10-1083, 10-1099, 10-1109, 10-1110, 10-1114, 10-1118, 10-1119, 10-1120, 10-1122, 10-1123, 10-1124, 10-1125, 10-1126, 10-1127, 10-1128, 10-1129, 10-1131, 10-1132, 10-1145, 10-1147, 10-1148, 10-1199, 10-1200, 10-1201, 10-1202, 10-1203, 10-1206, 10-1207, 10-1208, 10-1210, 10-1211, 10-1212, 10-1213, 10-1216, 10-1218, 10-1219, 10-1220, 10-1221, 10-1222); **(3) Lead Case No. 10-1092** (including Case Nos. 10-1094, 10-1134, 10-1143, 10-1144, 10-1152, 10-1156, 10-1158, 10-1159, 10-1160, 10-1161, 10-1162, 10-1163, 10-1164, 10-1166, 10-1182); and **(4) Lead Case No. 10-1167** (including Case Nos. 10-1168, 10-1169, 10-1170, 10-1173, 10-1174, 10-1175, 10-1176, 10-1177, 10-1178, 10-1179, 10-1180). The D.C. Circuit issued one opinion in connection with the referenced consolidated cases. Pacific Legal Foundation, the petitioner herein, was the petitioner in Case No. 10-1310, which was among the cases addressed by the consolidated judgment below. Other parties in the consolidated cases include the following:

The petitioners in related cases addressed by the consolidated judgment below, which are not petitioners herein, included Greg Abbott, Attorney General of Texas; Alpha Natural Resources, Inc.; American Farm Bureau Federation; Michele Bachmann, U.S. Representative, Minnesota 6th District; Haley Barbour, Governor of the State of Mississippi; Marsha Blackburn, U.S. Representative, Tennessee 7th District; Kevin Brady, U.S. Representative, Texas 8th District; Paul Broun, U.S. Representative, 10th District; Dan Burton, U.S. Representative, Indiana 5th District; Chamber of Commerce of the United States of America; Coalition for Responsible Regulation, Inc.; Collins Industries, Inc.; Collins Trucking Company, Inc.; Commonwealth of Virginia; Competitive Enterprise Institute; Nathan Deal, U.S. Representative, Georgia 9th District; Energy-Intensive Manufacturers' Working Group on Greenhouse Gas Regulation; Freedom Works; The Science and Environmental Policy Project; Georgia Agribusiness Council, Inc.; Georgia Coalition for Sound Environmental Policy, Inc.; Georgia Motor Trucking Association, Inc.; Gerdau Ameristeel US Inc.; Phil Gingrey, U.S. Representative, Georgia 11th District; Great Northern Project Development, L.P.; Industrial Minerals Association - North America; J&M Tank Lines, Inc.; Kennesaw Transportation, Inc.; Steve King, U.S. Representative, Iowa 5th District; Jack Kingston, U.S. Representative, Georgia 1st District; Landmark Legal Foundation; Langboard, Inc. - MDF; Langboard, Inc. - OSB; Langdale ChevroletPontiac, Inc.; The Langdale Company; Langdale Farms, LLC; Langdale Ford Company; Langdale Forest Products Company; Langdale Fuel Company; Mark R. Levin; John Linder, U.S. Representative, Georgia 7th District;

Louisiana Department of Environmental Quality; Missouri Joint Municipal Electric Utility Commission; National Cattlemen's Beef Association; National Environmental Development Association's Clean Air Project; National Mining Association; Ohio Coal Association; Peabody Energy Company; Rick Perry, Governor of Texas; Tom Price, U.S. Representative, Georgia 6th District; Dana Rohrabacher, U.S. Representative, California 46th District; Rosebud Mining-Co.; John Shadegg, U.S. Representative, Arizona 3rd District; John Shimkus, U.S. Representative, Illinois 19th District; South Carolina Public Service Authority; Southeast Trailer Mart, Inc.; Southeastern Legal Foundation, Inc.; State of Alabama; State of Nebraska; State of North Dakota; State of South Carolina; State of South Dakota; State of Texas; Texas Agriculture Commission; Texas Commission on Environmental Quality; Texas General Land Office; Texas Public Utilities Commission; Texas Railroad Commission; Utility Air Regulatory Group; Lynn Westmoreland, U.S. Representative, Georgia 3rd District; The American Chemistry Council; American Frozen Food American Fuel & Petrochemical Manufacturers; American Iron and Steel Institute; American Petroleum Institute; Brick Industry Association; Clean Air Implementation Project; Corn Refiners Association; Glass Association of North America; Glass Packaging Institute; Independent Petroleum Association of America; Indiana Cast Metals Association; Michigan Manufacturers Association; Mississippi Manufacturers Association; National Association of Home Builders; The National Association of Manufacturers; National Federation of Independent Business; National Oilseed Processors Association; North American Die Casting Association;

v

Portland Cement Association; Specialty Steel Industry of North America; Tennessee Chamber of Commerce and Industry; Western States Petroleum Association; West Virginia Manufacturers Association; and Wisconsin Manufacturers and Commerce.

Respondent herein, which was also the respondent in this case below, is the Environmental Protection Agency.

The respondents in related cases addressed by the consolidated judgment below included the U.S. Environmental Protection Agency (EPA), and Lisa P. Jackson, Administrator, U.S. Environmental Protection Agency. Lisa Perez Jackson ceased to hold the office of Administrator, U.S. Environmental Protection Agency, on February 15, 2013; that office is currently held in an acting capacity by Robert Perciasepe, Acting Administrator, U.S. Environmental Protection Agency.

**CORPORATE  
DISCLOSURE STATEMENT**

Pacific Legal Foundation is a nonprofit organization and it is not a publicly held corporation or entity; nor is it the parent, subsidiary, or affiliate of any publicly held corporation or entity.

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**PETITION FOR WRIT OF CERTIORARI**

Petitioner Pacific Legal Foundation (PLF) respectfully petitions this Court for a writ of certiorari to review the judgment of the United States Court of Appeals for the District of Columbia Circuit denying PLF's Petition for Review of the Endangerment Finding, entered on June 26, 2012, in the case of *Coalition for Responsible Regulation, et al. v. Environmental Protection Agency*, 684 F.3d 102 (D.C. Cir. 2012).

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**OPINIONS BELOW**

The opinion of the D.C. Circuit is reported as *Coalition for Responsible Regulation, et al. v. Environmental Protection Agency*, 684 F.3d 102. The slip opinion is reproduced in Appendix A. The judgment of the D.C. Circuit was entered on June 26, 2012, and is reproduced in Appendix B. The order of the D.C. Circuit denying a panel rehearing is reported as *Coalition for Responsible Regulation, et al. v. Environmental Protection Agency*, No. 09-1322, 2012 U.S. App. LEXIS 26315 (Dec. 20, 2012). The order is reproduced at Appendix C. The order of the D.C. Circuit denying rehearing en banc is reported as *Coalition for Responsible Regulation v. Environmental Protection Agency*, No. 09-1322, 2012 U.S. App. LEXIS 26313 (Dec. 20, 2012). The order is reproduced at Appendix D. The challenged administrative rule is set forth in *Endangerment and Cause or Contribute Findings for Greenhouse Gasses under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66,496 (Dec. 15, 2009), and is reproduced in Appendix F.

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**JURISDICTION**

The D.C. Circuit had jurisdiction to review this case pursuant to 42 U.S.C. § 7607 (b), (d). The decision of the D.C. Circuit was entered on June 26, 2012. Appendix (App.) B. On December 20, 2012, the D.C. Circuit denied Petitioner's Petition for Panel Rehearing, App. E, as well as the Petitioner's Petition for Rehearing En Banc, App. D. This Court has jurisdiction under 28 U.S.C. § 1254(1).

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**CONSTITUTIONAL AND STATUTORY PROVISIONS AT ISSUE**

42 U.S.C. § 4365(c)(1) states as follows:

The [EPA] Administrator, at the time any proposed criteria document, standard, limitation, or regulation under the Clean Air Act, the Federal Water Pollution Control Act, the Resource Conservation and Recovery Act of 1976, the Noise Control Act, the Toxic Substances Control Act, or the Safe Drinking Water Act, or under any other authority of the Administrator, is provided to any other Federal agency for formal review and comment, shall make available to the [Science Advisory] Board such proposed criteria document, standard, limitation, or regulation, together with relevant scientific and technical information in the possession of the Environmental Protection Agency on which the proposed action is based.

---

**STATEMENT OF THE CASE**

Because carbon dioxide is ubiquitous, this case presents a rare instance in which an administrative agency's promulgation of a rule in violation of a statutory mandate will have profound societal impacts. This Court has repeatedly held that courts must "give effect, if possible, to every clause and word of a statute." *See, e.g., Moskal v. United States*, 498 U.S. 103, 109 (1990); *United States v. Menasche*, 348 U.S. 528, 538-39 (1955); *Montclair v. Ramsdell*, 107 U.S. 147, 152 (1883). Yet the D.C. Circuit's holding below disregards the plain language of 42 U.S.C. § 4365(c)(1) and authorizes the United States Environmental Protection Agency (EPA) to ignore its nondiscretionary, statutory duty to submit to the Science Advisory Board for peer review its administrative finding that carbon dioxide and related compounds endanger human health and welfare. The holding is in conflict with decisions of this Court, a decision of the Ninth Circuit, and prior decisions of the D.C. Circuit.

**A. The Endangerment Finding  
and its Practical Implications**

The Endangerment Finding is set forth in *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66,496 (Dec. 15, 2009), reproduced in Appendix F. The finding has sparked EPA's promulgation of mobile source emissions limitations for carbon dioxide, which depend entirely on the Endangerment Finding. *See Light Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards; Final Rule*, 75 Fed.

Reg. 25,324 (May 7, 2010), and *Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium-and Heavy-Duty Engines and Vehicles*, 76 Fed. Reg. 57,106 (Sept. 15, 2011). In turn, EPA determined that the mobile source rules trigger regulatory programs for stationary sources of carbon dioxide emissions under the Clean Air Act, including the Prevention of Significant Deterioration of Air Quality Program, under which permits are issued pursuant to 42 U.S.C. §§ 7475, 7479. Further, EPA determined that requirements for stationary sources under Title V of the Clean Air Act, 42 U.S.C. § 7602(j), are triggered. EPA's interpretations of the regulatory triggers engendered by the Endangerment Finding have resulted in the promulgation of EPA's *Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule*, 75 Fed. Reg. 31,514 (June 3, 2010), which governs certain stationary source emissions of carbon dioxide throughout the nation. Additional carbon dioxide emissions controls are on EPA's regulatory agenda. *See, e.g., Proposed Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources, Electric Utility Generating Units*, 77 Fed. Reg. 22,392, *et seq.* (Mar. 27, 2012).

Roger O. McClellan is a former long-standing member of the Science Advisory Board (SAB) who served for years as a member of the SAB's Executive Committee and Co-Chair of the SAB's Clean Air Scientific Advisory Committee. He filed a declaration in the court below in support of Pacific Legal Foundation's challenge to the Endangerment Finding. Among other things, Mr. McClellan's declaration states that the Endangerment Finding "can have a profound impact on society." Declaration of Roger O. McClellan

¶ 8, Exhibit 1 of PLF's Petition for Rehearing En Banc Under Rule 35 and, In the Alternative, Petition for Rehearing Under Rule 40, reproduced in Appendix E-4. EPA has never contested the fact that the Endangerment Finding will have a profound societal impact.

### **B. The Science Advisory Board and Its Role in EPA Rulemaking**

The SAB's mission is to provide "expert and independent advice to the [EPA] on the scientific and technical issues facing the Agency" and to assist EPA "in identifying emerging environmental problems." 40 C.F.R. § 1.25(c). SAB "functions as a technical peer review panel for [EPA]." Lynn E. Dwyer, *Good Science in the Public Interest: A Neutral Source of Friendly Facts?*, 7 Hastings W.-N.W. J. Env'tl. L. & Pol'y 3, 6 (Fall 2000). A key purpose of SAB is to render advice to EPA "on a wide range of environmental issues and the integrity of the EPA's research." *Meyerhoff v. United States EPA*, 958 F.2d 1498, 1499 (9th Cir. 1992). See Joint Explanatory Statement of the Committee on Conference, The Environmental Research, Development, and Demonstration Authorization Act of 1978, Conf. Rep. 96-722, 3296 (1977) (Congress gave SAB the job "of advising the [EPA] on the adequacy of scientific information supporting proposed regulations.")

EPA is required by statute to submit to SAB any proposed "criteria document, standard, limitation, or regulation under the Clean Air Act . . . together with relevant scientific and technical information in the possession of [EPA] on which the proposed action is based" at the time the proposal is made available to other federal agencies "for formal review and

comment.” 42 U.S.C. § 4365(c)(1). Such “formal review and comment” occurs during the public comment period for regulatory proposals. *Lead Industries Ass’n v. EPA*, 647 F.2d 1130, 1137 (1980) (proposed criteria documents prepared by EPA under the Clean Air Act were properly submitted to SAB during public comment period). *See Mo. Coalition v. United States EPA*, No., 04-cv-00660, 2005 U.S. Dist. LEXIS 42186, at \*5 (E.D. Mo. Sept. 14, 2005) (“drafts should be made available for public review and comment and review by . . . the EPA’s Science Advisory Board.”). A scientist who served on the Science Advisory Board for over 20 years has stated in a declaration filed below, “I have always understood that EPA’s proposed regulations under the Clean Air Act would be made available to the SAB for review at the earliest possible time and no later than the date the regulations are first published in the Federal Register for comment by other federal agencies and the general public.” McClellan Decl. ¶ 7, App. E-4.

The purpose of the submittal requirement is to provide SAB an opportunity to make available “its advice and comments [to EPA] on the adequacy of the scientific and technical basis of the [regulatory proposals],” 42 U.S.C. § 4365(c)(2), and the submittal duty is nondiscretionary. *American Petroleum Inst. v. Costle*, 665 F.2d 1176, 1188 (D.C. Cir. 1981) (*API*) (“The language of the statute indicates that making a [regulatory proposal] . . . available to the SAB for comment is mandatory . . .”). *See* Joint Explanatory Statement, H.R. Conf. Rep. 96-722, 3296 (1977) (“The first paragraph of this subsection *requires* the Administrator of EPA to make available to the [Science Advisory] Board any proposed criteria, document, standard, limitation or regulation together with

scientific background information in the possession of the Agency on which the proposed action is based.” (emphasis added)).

“SAB essentially serves a critical gatekeeper role whose mission is to ensure that EPA’s regulatory proposals are based upon sound scientific and technical principles.” McClellan Decl. ¶ 11, App. E-5. EPA has often “changed its regulatory proposals and schedules based on review and comment by SAB. This has been the rule rather than the exception . . . as SAB was created to provide an expert reality check for EPA scientific and technical determinations that inform policy judgments.” McClellan Decl. ¶ 10, App. E-5.

### **C. The D.C. Circuit’s Decision**

PLF filed its Petition for Review in the D.C. Circuit on Oct. 4, 2010, pursuant to Clean Air Act Section 307(b)(1), 42 U.S.C. § 7607(b)(1), on the grounds that EPA improperly denied PLF’s administrative petition for reconsideration of the Endangerment Finding. The petition for reconsideration was based on EPA’s failure to comply with the requirement set forth in 42 U.S.C. § 4365(c)(1) to submit the Endangerment Finding to SAB before the finding was promulgated.

In the D.C. Circuit, PLF argued that EPA’s failure to submit the Endangerment Finding to SAB for peer review prior to promulgating the finding required vacatur and remand under *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 522 (D.C. Cir. 1983) and *Lead Industries Ass’n v. EPA*, 647 F.2d at 1137. Without addressing the specific arguments raised by PLF, the D.C. Circuit concluded that EPA did not violate the SAB submittal requirement because

(1) it was “not clear” whether the Endangerment Finding was submitted “to any other Federal agency for formal review and comment,” thereby triggering the SAB submittal duty, *Coalition for Responsible Regulation*, 684 F.3d at 124, and (2) “even if EPA violated its mandate by failing to submit the Endangerment Finding to the SAB, Industry Petitioners have not shown that this error was ‘of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made.’” *Coalition for Responsible Regulation*, 684 F.3d at 124 (citations omitted).

PLF now timely petitions this Court to resolve a question of exceptional nationwide importance: whether an administrative agency may ignore a statutory mandate to obtain independent peer review of a scientific finding that serves as the trigger for a cascade of federal regulations that will have substantial impacts on the Nation for years to come.



**REASONS FOR GRANTING THE WRIT**

**THE COURT SHOULD GRANT THE  
WRIT TO ADDRESS AN ISSUE OF  
NATIONAL IMPORTANCE: ALLOWING  
EPA TO EVADE THE CONGRESSIONAL  
MANDATE OF SCIENTIFIC PEER  
REVIEW OPENS THE DOOR TO A  
TORRENT OF REGULATIONS THAT  
WILL PROFOUNDLY IMPACT THE  
NATION'S ECONOMY**

**A. The Endangerment Finding Will  
Have An Extraordinary Effect Upon  
The Nation's Physical, Economic,  
and Social Infrastructure**

EPA has never disputed the fact that the Endangerment Finding embodies one of the most burdensome, costly, and far-reaching regulatory programs ever adopted by a federal administrative agency. The Endangerment Finding is the springboard for EPA's regulation of an entirely new category of emissions under the Clean Air Act, including the ubiquitous natural substance carbon dioxide. Because carbon dioxide is everywhere and in everything, the Endangerment Finding confers upon EPA unparalleled authority to regulate virtually every aspect of the Nation's economy. Indeed, EPA itself reached the conclusion that the Endangerment Finding could lead to "absurd" economic and regulatory impacts. 75 Fed. Reg. at 31,517 ("costs to sources and administrative burdens to permitting authorities . . . so severe that they bring the judicial doctrine of 'absurd results' into play.").

EPA relies on the Endangerment Finding to support a series of new and costly federal regulations, including the Auto Rule, 75 Fed. Reg. 25,324 (May 7, 2010), under which it regulates carbon dioxide emissions from automobiles and SUVs, and the Truck Rule, 76 Fed. Reg. 57,106 (Sep. 15, 2011), under which it regulates such emissions from medium- and heavy-duty trucks. In turn, those rules have triggered the Prevention of Significant Deterioration of Air Quality Program for carbon dioxide, under which permits are issued for stationary sources pursuant to 42 U.S.C. §§ 7475, 7479. Also triggered are EPA's permitting requirements for stationary sources under Title V of the Clean Air Act, 42 U.S.C. § 7602(j). These regulations and interpretations led EPA to promulgate its Tailoring Rule, 75 Fed. Reg. 31,514 (June 3, 2010), by which EPA in effect rewrote the Clean Air Act's emissions thresholds for regulating stationary sources, because EPA deemed them unmanageable in light of its Endangerment Finding. Remarkably, EPA has stated that the additional paperwork costs alone from adding carbon dioxide and related substances to the Title V permitting program could reach \$22.5 billion. *See* 75 Fed. Reg. at 31,540 & Table V-I. This only adds to EPA's own characterization of the "absurd" regulatory impacts stemming from the Endangerment Finding. *Id.* at 31,517. The genesis of the regulatory absurdity is EPA's arrogation of power over the Nation's economic life through the Endangerment Finding.

A scientist who served on the Science Advisory Board for over two decades, including years of service as Co-Chair of SAB's Clean Air Advisory Committee, offered written testimony in this case:

I am familiar with EPA's finding made in December of 2009 that greenhouse gases pose a threat to human health and welfare (the "Endangerment Finding"). The Endangerment Finding is certainly the type of regulatory action that SAB was created to review. It deals with novel, cutting edge scientific and technical issues that can have a profound impact on society. Those issues require the type of detailed expert scrutiny that SAB review was intended to provide.

McClellan Decl. ¶ 8, App E-4.

As this Court observed in connection with the issue of whether EPA had legal authority under the Clean Air Act to even consider making an Endangerment Finding for carbon dioxide, "[T]he unusual importance of the underlying issue persuaded us to grant the writ." *Massachusetts v. EPA*, 549 U.S. 497, 506 (2007). Here, the "underlying issue" is comparable in scope and effect, and is no less important: Whether EPA may refuse to comply with a nondiscretionary duty to submit to the Science Advisory Board for peer review its Endangerment Finding for carbon dioxide, the same substance at issue in *Massachusetts v. EPA*. Because of the pervasive presence of carbon dioxide, the Endangerment Finding opens the door to EPA regulation of aspects of national life that heretofore have remained untouched by federal statute or rule.

Given the extraordinary societal impacts of the Endangerment Finding, the instant Petition for Writ of Certiorari provides this Court with an opportunity to re-establish and emphasize with clarity for lower courts, as well as for administrative agencies, the

salutary principle that nondiscretionary statutory rulemaking procedures may not be ignored simply because an agency wishes to ignore them. *See Bennett v. Spear*, 520 U.S. 154, 172 (1997) (“It is rudimentary administrative law that discretion as to the substance of the ultimate decision does not confer discretion to ignore the required procedures of decisionmaking.”).

**B. By Violating the SAB Submittal Requirement, EPA Has Illegally Arrogated to Itself Authority to Regulate The Nation’s Economy**

A brief summary of the genesis of the Endangerment Finding, the manner in which it was promulgated, and the D.C. Circuit’s perfunctory review of EPA’s violation of the SAB submittal requirement provides insight into the importance of the issues raised by this case.

**1. *Massachusetts v. EPA*:  
The Genesis of the  
Endangerment Finding**

In *Massachusetts v. EPA*, this Court established a limited proposition: carbon dioxide and certain other substances, referred to as greenhouse gases, are covered by the broad definition of the term “air pollutants” set forth in the Clean Air Act, 42 U.S.C. § 7602(g), 549 U.S. at 529. Accordingly, the *Massachusetts v. EPA* Court opined that section 202(a)(1) of the Act authorizes EPA to regulate emissions of such substances from new motor vehicles, *id.* at 532, *see* 42 U.S.C. § 7521(a)(1), *if* EPA first makes the requisite endangerment finding. The Court underlined that, “We need not and do not reach the

question whether on remand EPA must make an endangerment finding.” 549 U.S. at 534.

In due course, EPA went on to make the Endangerment Finding, but nothing in *Massachusetts v. EPA* or any other decision of this Court authorizes EPA to refuse to comply with the requirements of any federal statute in making the finding.

## **2. The SAB Submittal Requirement Is Mandatory**

EPA was statutorily required to submit the Endangerment Finding to SAB for review before the finding was promulgated. This follows from the fact that the Endangerment Finding is a legislative-type “rule” within the meaning of the Administrative Procedure Act, 5 U.S.C. § 551(4) (“rule’ means . . . an agency statement of general . . . applicability and future effect designed to . . . prescribe law or policy”). This Court has recognized that, “[i]f EPA makes a finding of endangerment, the Clean Air Act *requires* the Agency to regulate emissions of the deleterious pollutant from new motor vehicles.” *Massachusetts v. EPA*, 549 U.S. at 533 (emphasis added). Because the Endangerment Finding binds EPA to undertake a specific action, *i.e.*, regulating motor vehicle emissions, the proposed finding constituted a regulatory proposal. Accordingly, EPA’s duty to submit the proposed Endangerment Finding to SAB was “mandatory.” *API*, 665 F.2d at 1188. The SAB statute states explicitly that EPA “shall” make regulatory proposals available to the SAB. 42 U.S.C. § 4365(c)(1). This Court has observed that when a statute uses the term “shall” in prescribing a duty, one is not at liberty to refuse to perform the duty. *See, e.g., Alabama v. Bozeman*, 533 U.S. 146, 153 (2001) (Congress’s specification of an

obligation that uses the word “shall” usually connotes a mandatory command.) *See also* Joint Explanatory Statement, H.R. Conf. Rep. 96-722, 3296 (SAB statute “requires . . . EPA to make available to the [SAB]” regulatory proposals. (Emphasis added)).

**3. EPA Was Required To  
Submit the Endangerment  
Finding to SAB During the  
Public Comment Period**

The time for SAB submittal is no later than during the public comment period on proposed regulations. *Lead Industries Ass’n v. EPA*, 647 F.2d at 1137; *API*, 665 F.2d at 1188-89; McClellan Decl. ¶ 7, App. E-4. This is because “the intent of [the SAB statute] is to ensure that the [SAB] is able to comment in a well-informed manner on any regulation that it so desires.” Joint Explanatory Statement, H.R. Conf. Rep. 96-722, 3296 (1977). For such comments to be meaningful, SAB’s statutory authority applies specifically to “advising [EPA] on the adequacy of scientific information supporting *proposed* regulations,”—*i.e.*, before they are promulgated. *Id.* (Emphasis added). Because EPA failed to submit the proposed Endangerment Finding to SAB before it was promulgated (or at any time, for that matter), it violated the mandatory SAB submittal requirement.

Citing 49 U.S.C. § 32902(j), the D.C. Circuit observed, without explanation, that it was “not clear” whether the Endangerment Finding was subject to a “formal review and comment . . . in which other agencies are given the opportunity to provide written comments about impacts of a proposed regulation on the reviewing agency’s universe of responsibility.” *Coalition for Responsible Regulation*, 684 F.3d at 124.

But the statutory provision cited by the D.C. Circuit has nothing to do with EPA or any of the statutory authorities under which it operates. Rather, 49 U.S.C. § 32902(j) requires the Secretary of *Transportation* to consult with the Secretary of *Energy* before proposing an average fuel economy standard. Of course, that duty is irrelevant to any duty of EPA.

The D.C. Circuit itself has implicitly recognized that the only “formal” review and comment period for EPA’s regulatory proposals occurs during the general *public* comment period for such proposals. *Lead Industries Ass’n v. EPA*, 647 F.2d at 1143. Because SAB submittal is “mandatory,” *API*, 665 F.2d at 1188-89, EPA must submit proposed regulations to SAB no later than during the public comment period. That is the only time “any other federal agency” is provided with a formal opportunity to comment on EPA’s regulatory proposals. Accordingly, as a practical matter, the only way to give effect to the requirement that EPA must submit regulatory proposals to the SAB whenever they are “provided to any other Federal agency for *formal* review and comment,” 42 U.S.C. § 4365(c)(1) (emphasis added), is to require SAB submittal during the formal, general public comment period on EPA’s regulatory proposals. *See Moskal v. United States*, 498 U.S. at 109 (courts should give effect to every clause and word of a statute). Consistent with this analysis, before *Coalition for Responsible Regulation*, EPA’s long-standing custom and standard operating procedure was to submit regulatory proposals to SAB for review during public comment periods.

I have always understood that EPA’s proposed regulations under the Clean Air Act

would be made available to the SAB for review at the earliest possible time and no later than the date the regulations are first published in the Federal Register for comment by other federal agencies and the general public.

McClellan Decl. ¶ 7, App. E-4.

**4. The D.C. Circuit's Perfunctory Review of the SAB Issue Was Inadequate in Light of the Extraordinary Results Stemming From EPA's Violation of the SAB Submittal Requirement**

The broad societal implications of the Endangerment Finding merited more than the summary treatment given to the SAB issue by the decision below, which accorded to the SAB submittal obligation a total of three paragraphs. App. A-40-41. EPA should not be permitted to arrogate to itself unprecedented power to regulate the Nation's infrastructure, without careful examination of whether the Agency failed to comply with the congressional mandate of peer review. Such a careful examination was not provided by the perfunctory review of the court below, but this Court has the opportunity to do so by granting the writ.

**C. The D.C. Circuit’s Approval of EPA’s Decision To Ignore a Statutorily Mandated Rulemaking Procedure Conflicts With Both Long-Standing Precedent of This Court and Ninth Circuit Precedent**

The core holding of the opinion below was that EPA was not required to comply with its statutory duty to submit the Endangerment Finding to SAB for review “even if EPA violated its mandate.” See *Coalition for Responsible Regulation v. EPA*, 684 F.3d at 124.

This holding conflicts with the fundamental rule established by this Court that an administrative agency is not permitted to disregard with impunity a mandated statutory rulemaking procedure. *Bennett v. Spear*, 520 U.S. at 172. Until the D.C. Circuit’s decision in *Coalition for Responsible Regulation*, that axiomatic proposition of administrative law had not been questioned. Importantly, in a recent case involving a citizen suit brought under the Clean Water Act, the Ninth Circuit cited *Bennett v. Spear* for the proposition that federal courts must require administrative agencies to adhere to mandated decisionmaking procedures. *Our Children’s Earth Fund v. EPA*, 527 F.3d 842, 847 (9th Cir.), *cert denied*, 555 U.S. 1045 (2008) (“As the Supreme Court teaches, . . . ‘It is rudimentary administrative law that discretion as to the substance of the ultimate decision does not confer discretion to ignore the required procedures of decisionmaking.’”). Indeed, district courts in the D.C. Circuit have consistently followed the principle that administrative agencies must scrupulously follow statutorily mandated adminis-

trative procedures. *See, e.g., Defenders of Wildlife v. Jackson*, 284 F.R.D. 1, 4 (D.D.C. 2012); *Sierra Club v. Leavitt*, 355 F. Supp. 2d 544, 550 (D.D.C. 2005).

Because the D.C. Circuit itself has recognized that EPA's duty to submit regulatory proposals to the SAB is nothing short of mandatory, *API v. Costle*, 665 F.2d at 1188, the decision below that EPA could ignore the SAB submittal requirement in connection with the Endangerment Finding breaks with the Circuit's own precedent, and flatly contradicts this Court's pronouncements in *Bennett v. Spear*, 520 U.S. at 172, and *Alabama v. Bozeman*, 533 U.S. at 153, as well as the Ninth Circuit's articulation in *Our Children's Earth Fund*, 527 F.3d at 847.

**D. The D.C. Circuit's Decision  
Provides Administrative Agencies  
With Perverse Incentives To  
Disregard Statutory Rulemaking  
Requirements, Thereby Undermining  
Decisions of This Court**

The decision below creates incentives for administrative agencies to ignore mandated rulemaking procedures, thereby thwarting this Court's insistence that nondiscretionary procedures be followed. *Bennett v. Spear*, 520 U.S. at 172; *Alabama v. Bozeman*, 533 U.S. at 153. *See also* McClellan Decl. ¶ 9, App. E-4 (“[By withholding the Endangerment Finding from SAB,] EPA was interfering with the purposes for which SAB had been created, namely, to provide scientific and technical credibility to EPA regulatory decisions.”). Significantly, the SAB submittal requirement applies not only to EPA's regulatory proposals under the Clean Air Act but also

to its regulatory proposals under “the Federal Water Pollution Control Act, the Resource Conservation and Recovery Act of 1976, the Noise Control Act, the Toxic Substances Control Act, or the Safe Drinking Water Act, or under *any other authority* of the Administrator.” 42 U.S.C. § 4365(c)(1) (emphasis added). Thus, the SAB submittal requirement applies to each and every one of EPA’s regulatory programs.

By allowing EPA to ignore its mandatory duty to submit Clean Air Act regulatory proposals to SAB, the D.C. Circuit has implicitly signaled to the Agency that it may also ignore its mandatory duty to adhere to the SAB submittal requirement in connection with rulemakings under other statutes it implements, whenever it so chooses, thereby undercutting this Court’s overarching rule that administrative agencies must comply with nondiscretionary rulemaking procedures, no matter how inconvenient those procedures may appear to the agency. *Bennett v. Spear*, 520 U.S. at 172.

And this Court cannot ignore the potentially broader reach of the decision below. The D.C. Circuit hears a large number of appeals from administrative agency actions. *Coalition for Responsible Regulation* could be construed as an implicit invitation for other agencies to short-change nondiscretionary rulemaking procedures, thereby undercutting to an even greater degree this Court’s decisions in *Bennett v. Spear*, 520 U.S. at 172 (department of Interior must consider economic impacts before designating critical habitat for endangered or threatened species, as required by the Endangered Species Act), and *Alabama v. Bozeman*, 533 U.S. at 153-54, (violation is not “harmless” or

“technical” in light of the “absolute language” of anti-shuttling provision).

Before its decision in *Coalition for Responsible Regulation*, the D.C. Circuit itself had long held that, when an administrative agency utterly fails to comply with a statutory rulemaking requirement that does not by its own terms limit judicial review, the failure cannot be considered harmless error if there is any uncertainty regarding what the rule may have been but for the failure. *Sugar Cane Growers Coop. of Fla. v. Veneman*, 289 F.3d 89, 96 (D.C. Cir. 2002) (In promulgating a rule under the Food Security Act, 7 U.S.C. § 1308a, an “utter failure” by the Department of Agriculture to comply with notice and comment requirements under the Administrative Procedure Act “cannot be considered harmless if there is *any* uncertainty at all as to the effect of that failure.” (emphasis added)). *Accord, New Jersey Dep’t of Env’tl. Prot. v. EPA*, 626 F.2d 1038, 1039, 1049-50 (D.C. Cir. 1980) (EPA’s utter failure to comply with procedural requirements of the Administrative Procedure Act requires reversal of a rule promulgated under the Clean Air Act.).

The SAB statute, 42 U.S.C. § 4265, does not in any way limit judicial review of EPA’s failure to comply with the mandatory SAB submittal requirement. There is a strong presumption in favor of judicial review of administrative agency actions, and there must be “clear and convincing evidence” showing Congress’s intent to shield any particular administrative agency action from full judicial review. *Abbott Labs. v. Gardner*, 387 U.S. 136, 140 (1967). Nothing in the SAB statute evidences such a congressional intent. *See Sackett v. EPA*, 132 S. Ct.

1367, 1373 (2012) (presumption of judicial review may be overcome only by evidence of congressional intent to restrict or limit review).

Just as an utter failure to comply with the independent requirements of the Administrative Procedure Act required a reversal in *Sugar Cane* and *New Jersey*, so too did EPA's utter failure to comply with the independent requirements of the SAB statute. By ignoring its own precedent in *Sugar Cane* and *New Jersey*, the court below set the stage for federal administrative agencies to take liberties with statutorily mandated rulemaking procedures, contrary to the dictates of *Bennett v. Spear*. This Court has not hesitated to constrain administrative agencies who failed to discharge mandatory duties when it has found "agency officials zealously but unintelligently pursuing their environmental objectives." 520 U.S. at 176-77.

**E. By Ignoring Its Own Precedent  
and Conflating Judicial Review  
Procedures under Two Separate  
Statutes, the D.C. Circuit Has  
Sanctioned EPA's Illegal Move  
to Chart the Course of the  
Nation's Economy**

Remarkably, the D.C. Circuit did not even address the Petitioner's argument that EPA's failure to submit the Endangerment Finding to SAB violated the standards set forth by the D.C. Circuit itself in *Sugar Cane* and *New Jersey*. Rather, without analysis, the court below concluded, "Industry Petitioners have not shown that this error was 'of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such

errors had not been made.” *Coalition for Responsible Regulation*, 684 F.3d at 124.

In absolving EPA of its duty to comply with a nondiscretionary rulemaking procedure, the D.C. Circuit not only violated the standards set down by this Court in *Bennett v. Spear*, 520 U.S. at 172, the Ninth Circuit in *Our Children’s Earth Fund*, and its own standards set down in *Sugar Cane* and *New Jersey*, but also ignored its own prior decision in *Kennecott Corp. v. EPA*, 684 F.2d 1007, 1017 (D.C. Cir. 1982). In *Kennecott*, EPA had denied an administrative petition for reconsideration of a rule by asserting that its failure to include certain documents in the rulemaking record was not significant because, even if the documents had been included, EPA would have come to the same regulatory conclusion. The *Kennecott* court disagreed, stating that the “absence of those documents . . . makes impossible any meaningful comment on the merits of EPA’s assertions.” *Id.* at 1018. “EPA’s failure to include such documents constitutes reversible error, for the uncertainty that might be clarified by those documents . . . indicates a ‘substantial likelihood’ that the regulations would ‘have been significantly changed.’” *Id.* at 1018-19.

Because the purpose of the SAB submittal requirement is to provide SAB an opportunity to make available “its advice and comments [to EPA] on the adequacy of the scientific and technical basis of [regulatory proposals],” 42 U.S.C. § 4365(c)(2), Congress could not have contemplated that SAB review would be no more than a mere formality or a superfluous gesture. *Moskal v. United States*, 498 U.S. 103 (courts should give effect to every clause and word of a statute). In fact, Congress contemplated

that EPA's proposed Clean Air Act regulations would significantly evolve, mature, and otherwise change as a result of SAB's scientific and technical advice. Dwyer, *supra*, at 6-7 (SAB was created to function as a scientific and technical peer review panel to provide EPA with guidance, so that the Agency's rulemaking is not based on erroneous or untrustworthy data or conclusions). See McClellan Decl. ¶¶ 10-12, App. E-5.

In this regard, the legislative history of the statute creating SAB is instructive. SAB's role in EPA's rulemaking process is to "be able to review conflicting claims and advise the [EPA] on the adequacy and reliability of the technical basis for rules and regulations." Joint Explanatory Statement, H.R. Conf. Rep. 96-722, 3295-96. The Legislative History also states:

Much of the criticism of the Environmental Protection Agency might be avoided if the decisions of the Administrator were fully supported by technical information which had been reviewed by independent, competent scientific authorities.

. . . [T]he intent of [the SAB submittal requirement] is to ensure that the [SAB] is able to comment in a well-informed manner on any regulation that it so desires.

*Id.*

Thus, congressional contemplation of a "substantial likelihood" that EPA's regulatory proposals would undergo "significant change" as a result of SAB review is built into the fabric of the SAB statute, 42 U.S.C. § 4365, and that is why SAB submittal is "mandatory" under *API v. Costle*, 665 F.2d

at 1188. “[Courts] must reject administrative constructions which are contrary to clear congressional intent.” *Chevron, U.S.A. v. NRDC, Inc.*, 467 U.S. 837, 843 n9 (1984).

Accordingly, even under the D.C. Circuit’s own standard, uncertainty created by EPA’s failure to submit the Endangerment Finding to SAB for review indicates a “substantial likelihood” that the rule would have been “significantly changed” had the procedural error not been made. *See Coalition for Responsible Regulation*, 684 F.3d at 124 (“a substantial likelihood that the rule would have been significantly changed if such errors had not been made.”). *See also, Kennecott*, 684 F.2d at 1017. This conclusion is echoed in a declaration filed below by a long-standing member of the SAB:

Based upon my more than two decades of experience as a member of SAB, after it was established legislatively, my more than 15 years of service as a member of the SAB Executive Committee and my knowledge of how SAB interacts with EPA, I believe there is substantial likelihood that the Endangerment Finding would have been substantially changed in response to advice made available to SAB for review prior to its promulgation.

McClellan Decl. ¶ 12, App. E-5.

At bottom, the difference between the standards set forth in *Sugar Cane* and *Kennecott*, both of which were ignored by the *Coalition for Responsible Regulation* court, is one of degree. Under *Sugar Cane*, “any” uncertainty regarding the final outcome of the

rule is sufficient to invalidate the rule. 289 F.3d at 96. Under *Kennecott*, the uncertainty must raise an inference that there is a “substantial likelihood” that the rule would have been “significantly changed” had the procedural error not been made. 684 F.2d at 1017.

*Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, explains the reason for the difference. In amending the Clean Air Act in 1977, Congress “wanted to add *new* procedural protections” to EPA rulemaking beyond those set forth in the Administrative Procedure Act (“APA”) and other statutes. *Id.* at 522 (emphasis in original). Congress “also wanted to minimize disputes over EPA’s compliance with the *new* procedures,” *id.* (emphasis added), and “did not intend to cut back” on statutory procedural safeguards located outside of the Clean Air Act. *Id.* Thus, the “substantial likelihood” standard was intended to apply to procedural violations of the additional procedural protections set forth in the Clean Air Act Amendments of 1977 and not to an utter failure to abide by rulemaking procedures required in legislation other than the Clean Air Act. *Id.* at 522-24.

Especially in light of the fact that the SAB submittal requirement applies to regulatory proposals generated by *all* of EPA’s regulatory programs and not just those arising under the Clean Air Act, it is important to underscore the relationship between the procedural requirements of the SAB statute and the substantive statutes that EPA administers, including the Clean Air Act. Consistent with this Court’s instructions regarding statutory interpretation, all of the statutes that provide EPA with either regulatory or procedural duties, or both, should be construed in a way that makes them consistent with each other, if at

all possible. *Parsons Steel, Inc. v. First Alabama Bank*, 474 U.S. 518, 524 (1986) (differing statutes should be interpreted so as to be consistent). The SAB statute contains no limitations on judicial review of the SAB submittal requirement. The Clean Air Act places limitations only on judicial review of rulemaking procedures mandated by the Clean Air Act itself. Accordingly, the Clean Air Act's limitations on judicial review of violations of that Act's procedures do not and cannot apply to judicial review of violations of procedures set forth in the entirely separate SAB statute. This follows from the fact that the SAB statute's mandatory submittal requirement does not set forth an exception for rules promulgated by EPA under the Clean Air Act. Nor does the Clean Air Act provide any hint that rules promulgated thereunder need not undergo SAB review.

Because the D.C. Circuit conflated the independent judicial review standards of the two statutes, it is now the law of the D.C. Circuit that EPA may unilaterally ignore its statutory duty to submit a regulatory proposal for peer review to the Science Advisory Board, even where the regulation deals with cutting edge scientific issues that will have profound impacts on society. The decision below, which runs counter to this Court's insistence that administrative agencies comply with nondiscretionary rulemaking procedures, *Bennett v. Spear*, 520 U.S. at 172, provides EPA with an unimpeded path to control carbon dioxide emissions throughout the Nation, thereby giving EPA a green light to broadly regulate in areas of economic and social life that heretofore have been closed to federal government involvement.

**F. The Extraordinary Impacts of  
Allowing the Endangerment Finding  
to Go into Effect Without Scientific  
Peer Review Can Be Avoided Only If  
This Court Grants Certiorari**

It is the ubiquitous nature of carbon dioxide that makes this case one of extraordinary national importance. Accordingly, just as this Court granted certiorari in *Bennett v. Spear* in order to determine whether the Department of Interior may neglect its mandatory duty to consider the economic impacts of critical habitat designation in a case involving substantial economic impacts, so too this Court should grant certiorari here so that it may determine whether EPA may neglect its mandatory duty to submit the Endangerment Finding to SAB for scientific peer review, in a case where the economic impacts are far greater. Only this Court is in a position to address this issue of national importance.

Because carbon dioxide is everywhere, the Endangerment Finding empowers EPA to regulate the Nation's physical, economic, and social infrastructure. It bears repeating: This Court in *Massachusetts v. EPA*, which also involved carbon dioxide, determined that the writ of certiorari should be granted because of "the unusual importance of the underlying issue." 549 U.S. at 506. And as Judge Tatel stated in the D.C. Circuit's earlier denial of en banc review in that same case, if the issues arising in connection with the then-future Endangerment Finding are "not a matter of exceptional importance, then those words have no meaning." *Massachusetts v. EPA*, 433 F.3d 66 (D.C. Cir. 2005) (Tatel, J., dissenting). Because the Endangerment Finding "can have a profound impact

on society,” McClellan Decl. ¶ 8, App. E-4, if ever there were an issue of exceptional importance to the Nation, it is to be found in the Endangerment Finding. The possibility that a finding of such great moment was made illegally provides ample justification for granting the writ.

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**CONCLUSION**

The Petition for Writ of Certiorari should be granted.

DATED: March, 2013.

Respectfully submitted,

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Subject: RE: Coalition for Responsible Regulation v. EPA, et al and consolidated cases;  
Courtesy Copy of Pacific Legal Foundation Petition for Writ of Certiorari

Date: Fri Mar 22 2013 13:13:01 EDT

Attachments: Petition for Writ of Certiorari (Commonwealth v EPA) (Ct. Filed).pdf

Kimberly  
(804) 786-2436 (office)

Distrustful souls see only darkness burdening the face of the earth. We prefer instead to reaffirm all our confidence in our Savior who has not abandoned the world which he redeemed. Pope John XXIII

-----Original Message-----

From: Sean Donahue [mailto:sean@donahuegoldberg.com]

Sent: Friday, March 22, 2013 12:56 PM

To: Ted Hadzi-Antich

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Subject: Re: Coalition for Responsible Regulation v. EPA, et al and consolidated cases; Courtesy Copy of Pacific Legal Foundation Petition for Writ of Certiorari

Thank you, Ted. It would be much appreciated if any other parties that have filed cert petitions so far could send around electronic copies (of the petition(s), not appendices).  
-Sean

On Thu, Mar 21, 2013 at 1:17 PM, Ted Hadzi-Antich <tha@pacificlegal.org> wrote:

> Dear Counsel:

>  
>  
>

> Attached please find an electronic courtesy copy of Pacific Legal  
> Foundation's Petition for Writ of Certiorari to the United States Supreme  
> Court from the decision of the D.C. Circuit in the cases consolidated under  
> the case name Coalition for Responsible Regulation, et. al v. Environmental  
> Protection Agency, et al., along with an electronic copy of the courtesy  
> copy service list. Because not all counsel in the consolidated cases were  
> included in the D.C. Circuit's ECF system, we are sending first class  
> courtesy copies as well.

>  
>  
>

> Sincerely,

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No. \_\_\_\_\_

**In The  
Supreme Court of the United States**

COMMONWEALTH OF VIRGINIA, *et al.*,  
*Petitioners,*

v.

ENVIRONMENTAL PROTECTION AGENCY,  
*Respondent.*

**On Petition For A Writ Of Certiorari  
To The United States Court Of Appeals  
For The District Of Columbia Circuit**

**PETITION FOR A WRIT OF CERTIORARI**

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## QUESTIONS PRESENTED

- 1) Did Virginia and other Petitioners below demonstrate that there was evidence of central relevance to the EPA's Endangerment Finding not available during the comment period such that the Administrator was obligated to convene a proceeding for reconsideration with procedural rights of notice and comment?
- 2) Did the EPA correctly apply the standard for demonstrating central relevance?
- 3) Did the EPA err when it found the objections material enough to require resort to extensive new evidence outside of the record while denying the rights of notice and comment on that evidence?
- 4) Did the EPA err initially and on Petition for Reconsideration by delegating its Statutory Authority to outside entities?

## **PARTIES AND CORPORATE DISCLOSURE STATEMENT**

The United States Court of Appeals for the District of Columbia Circuit consolidated the following cases for review:

09-1322 (Lead), 10-1024, 10-1025, 10-1026, 10-1030, 10-1035, 10-1036, 10-1037, 10-1038, 10-1039, 10-1040, 10-1041, 10-1042, 10-1044, 10-1045, 10-1046, 10-1234, 10-1235, 10-1239, 10-1245, 10-1281, 10-1310, 10-1318, 10-1319, 10-1320, 10-1321

### **Parties, Intervenors, and Amici**

#### **Petitioners**

Alliance for Natural Climate Change Science and  
William Orr (10-1049)  
Alpha Natural Resources, Inc. (09-1322)  
American Farm Bureau Federation (10-1026)  
American Iron and Steel Institute (10-1038)  
American Petroleum Institute (10-1044)  
Attorney General Greg Abbott (10-1041)  
Barry Smitherman, Chairman of the  
Texas Public Utility Commission (10-1041)  
Brick Industry Association (10-1044)  
Chamber of Commerce of the United States of  
America (10-1030)  
Coalition for Responsible Regulation, Inc. (09-1322)  
Collins Industries, Inc. (10-1035)  
Collins Trucking Company, Inc. (10-1035)  
Commonwealth of Virginia *ex rel.*  
Attorney General Kenneth T. Cuccinelli (10-1036)  
Competitive Enterprise Institute (10-1045)  
Corn Refiners Association (10-1044)

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

Freedomworks (10-1045)  
Georgia Agribusiness Council, Inc. &  
Georgia Motor Trucking Association, Inc. (10-1035)  
Gerdau Ameristeel Corporation (10-1037)  
Great Northern Project Development, L.P. (09-1322)  
Industrial Minerals Association –  
North America (09-1322)  
J&M Tank Lines, Inc. (10-1035)  
Kennesaw Transportation, Inc. (10-1035)  
Langdale Company (10-1035)  
Langdale Forest Products Company (10-1035)  
Langdale Farms, LLC (10-1035)  
Langdale Fuel Company (10-1035)  
Langdale Chevrolet-Pontiac, Inc. (10-1035)  
Langdale Ford Company (10-1035)  
Langboard, Inc.-MDF (10-1035)  
Langboard, Inc.-OSB (10-1035)  
Massey Energy Company (09-1322)  
National Association of Manufacturers (10-1044)  
National Association of Home Builders (10-1044)  
National Cattlemen’s Beef Association (09-1322)  
National Mining Association (10-1024)  
National Oilseed Processors Association (10-1044)  
National Petrochemical and  
Refiners Association (10-1044)  
Ohio Coal Association (10-1040)  
Peabody Energy Company (10-1025)  
Portland Cement Association (10-1046)  
Rosebud Mining Company (09-1322)  
Science and Environmental Policy Project (10-1045)  
Southeast Trailer Mart Inc. (10-1035)  
Southeastern Legal Foundation, Inc. (10-1035)

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

State of Alabama (10-1039)  
State of Texas (10-1041)  
Rick Perry, Governor of Texas (10-1041)  
Texas Commission on Environmental Quality (10-1041)  
Texas Agriculture Commission (10-1041)  
U.S. Representative Dana Rohrabacher (10-1035)  
U.S. Representative Jack Kingston (10-1035)  
U.S. Representative John Linder (10-1035)  
U.S. Representative John Shimkus (10-1035)  
U.S. Representative Kevin Brady (10-1035)  
U.S. Representative Lynn Westmoreland (10-1035)  
U.S. Representative Michele Bachmann (10-1035)  
U.S. Representative Nathan Deal (10-1035)  
U.S. Representative Paul Broun (10-1035)  
U.S. Representative Phil Gingrey (10-1035)  
U.S. Representative Steve King (10-1035)  
U.S. Representative Tom Price (10-1035)  
Utility Air Regulatory Group (10-1042)  
Western States Petroleum Association (10-1044)

**Respondents**

Environmental Protection Agency (Respondent IN ALL CONSOLIDATED CASES)

Lisa P. Jackson, Administrator, United States Environmental Protection Agency (Respondent in Nos. 10-1030, 10-1044, 10-1049, and 10-1235)

**Intervenors for Petitioners**

Associated Industries of Arkansas  
Arkansas State Chamber of Commerce

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

Colorado Association of Commerce & Industry  
Glass Packaging Institute  
Haley Barbour, Governor for the State of Mississippi  
Idaho Association of Commerce and Industry  
Independent Petroleum Association of America  
Indiana Cast Metals Association  
Kansas Chamber of Commerce and Industry  
Louisiana Oil and Gas Association  
Michigan Manufacturers Association  
Mississippi Manufacturers Association  
National Electrical Manufacturers Association  
Nebraska Chamber of Commerce and Industry  
North American Die Casting Association  
Ohio Manufacturers Association  
Pennsylvania Manufacturers Association  
Portland Cement Association  
State of Alaska  
State of Florida  
State of Indiana  
State of Kentucky  
State of Louisiana  
State of Michigan  
State of Nebraska  
State of North Dakota  
State of Oklahoma  
State of South Carolina  
State of South Dakota  
State of Utah  
Steel Manufacturers Association  
Tennessee Chamber of Commerce and Industry  
Virginia Manufacturers Association

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

West Virginia Manufacturers Association  
Wisconsin Manufacturers and Commerce

**Intervenors for Respondents**

City of New York  
Commonwealth of Massachusetts  
Commonwealth of Pennsylvania  
Conservation Law Foundation  
Department of Environmental Protection  
Environmental Defense Fund  
Natural Resources Defense Council  
National Wildlife Federation  
Sierra Club  
State of Arizona  
State of California  
State of Connecticut  
State of Delaware  
State of Illinois  
State of Iowa  
State of Maine  
State of Maryland  
State of Minnesota  
State of New Hampshire  
State of New Mexico  
State of New York  
State of Oregon  
State of Rhode Island  
State of Vermont  
State of Washington  
Wetlands Watch

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

**Amici Curiae for Petitioners**

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Landmark Legal Foundation  
Mountain States Legal Foundation  
National Federation of Independent Business Small  
Business Legal Center

**Amici Curiae for Respondents**

Great Waters Coalition  
Union of Concerned Scientists

Virginia, Kentucky, and Utah are States of the  
Union with no interests required to be disclosed.

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**PETITION FOR WRIT OF CERTIORARI**  
**OPINION BELOW**

The panel opinion affirming the rulemaking of the EPA is reported as *Coalition for Responsible Regulation, Inc. v. Environmental Protection Agency*, 684 F.3d 102 (D.C. Cir. 2012). Both the order and opinions relating to denial of rehearing are unpublished, but are available at 2012 U.S. App. LEXIS 25997, 2012 WL 6621785, and, through PACER, as U.S.C.A.

Case No. 09-1322, Doc. 1411145 (Dec. 20, 2012).<sup>1</sup> See SUP. CT. R. 12(7). And both are reprinted in the Appendix (“App.”) at App. 1-103, 104-63.



**JURISDICTION**

Section 307 of the Clean Air Act (CAA) grants exclusive jurisdiction to the United States Court of Appeals for the District of Columbia Circuit over petitions for review that challenge nationally applicable final actions of the Administrator of the EPA. 42 U.S.C. § 7607(b)(1) (“A petition for review of . . . final action taken[ ] by the Administrator under [the CAA] may be filed only in the United States Court of

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<sup>1</sup> All references to “Doc.” are to the appellate record in case number 09-1322, and collected cases, from the United States Court of Appeals for the District of Columbia Circuit and are available via that Court’s PACER system.

Appeals for the District of Columbia”). With regard to the Endangerment Finding and follow-on rulemaking, the D.C. Circuit received a number of timely petitions, and interventions, including those of the Commonwealth of Kentucky and the State of Utah, consolidated them, and, on June 26, 2012, issued an opinion denying the petitions and affirming the EPA’s rulemaking. *Responsible Regulation*, 684 F.3d at 102, 149. Timely petitions for rehearing *en banc* were received, circulated to the circuit court, voted on, and denied on a 6 to 2 vote on December 20, 2012. *See Coalition for Responsible Regulation, Inc. v. Evtl. Protection Agency (Responsible Regulation II)*, No. 09-1322, 2012 U.S. App. LEXIS 25997, 2012 WL 6621785 (D.C. Cir. Dec. 2012) (unpublished); Doc. 1411145; App. at 104-63. This petition for certiorari has been timely filed within 90 days of the denial of rehearing, *see* SUP. CT. R. 13(1) & (3), and so is now properly within this Court’s jurisdiction. *See* 28 U.S.C. § 1254(1).



## STATUTES AND REGULATIONS

The statutes and regulations involved in this case are 42 U.S.C. §§ 7521 and 7607; 74 Fed. Reg. 66,496 (Dec. 15, 2009), 75 Fed. Reg. 49,556 (Aug. 13, 2010). Because they are lengthy, the relevant statutory provisions are reprinted in the Appendix and the Federal Register provisions are cited from the Joint Appendix below. *See* SUP. CT. R. 14(f).



## STATEMENT OF THE CASE

This Court found in *Massachusetts v. EPA*, 549 U.S. 497, 534 (2007), that the EPA had both the jurisdiction and the obligation to decide “whether sufficient information exists to make an endangerment finding” with respect to CO<sub>2</sub>. The EPA published its Endangerment Finding on December 15, 2009. *Endangerment and Cause or Contribute Findings (Endangerment Finding)*, 74 Fed. Reg. at 66,496; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 29 of 695. Petitions for review of that finding were permitted “within sixty days from the date notice” was published in the Federal Register. 42 U.S.C. § 7607(b)(1). Virginia, Texas, and others filed timely petitions for review, invoking the jurisdiction of the United States Court of Appeals for the District of Columbia Circuit. *See id.*

By statute, the EPA Administrator must “convene a proceeding for reconsideration also of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed” if a person raising an objection to agency action can demonstrate that “the grounds for . . . objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule.” *Id.* § 7607(d)(7)(B). The comment period for the Endangerment Finding closed on June 23, 2009. *See EPA’s Response to the Petitions to Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases under*

*Section 202(a) of the Clean Air Act (RTP)*, 75 Fed. Reg. at 49,556, 49,560 (Aug. 13, 2010); J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), pp. 82, 86 of 695. On November 17, 2009, internal emails and documents from the Climate Research Unit (CRU) at the University of East Anglia (UEA) became available to the public. These documents were sufficiently damaging to the data upon which the EPA relied in making its Endangerment Finding that the release is now commonly known as “climategate.” See John M. Broder, *Scientists Taking Steps to Defend Work on Climate*, N.Y. Times, Mar. 2, 2012, at A11, <http://www.nytimes.com/2010/03/03/science/earth/03climate.html>. In the wake of these revelations, ten petitions for reconsideration also were timely filed within the period for appeal of the Endangerment Finding, including those of Virginia and Texas. The EPA refused to convene the statutory proceeding and flatly denied the petitions. See *RTP*, 75 Fed. Reg. at 49,557; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 83 of 695.

The Clean Air Act requires that information relied upon for rulemaking be in the administrative record, subject to public comment, and also provides for rehearing in the event additional information comes to light after the comment period has closed. With respect to the rulemaking record, Section 307(d)(4)(B) requires that “[a]ll documents which become available after the proposed rule has been published and which the Administrator determines are of central relevance to the rulemaking shall be placed in the docket as soon as possible after their availability.” 42 U.S.C. § 7607(d)(4)(B)(i). Once this

process is complete, Section 307(d)(6)(C) states that the “promulgated rule may not be based (in part or whole) on any information or data which has not been placed in the docket as of the date of such promulgation.” 42 U.S.C. § 7607(d)(6)(C). As for rehearing, Section 307(d)(7)(B) of the Act provides *inter alia*:

If the person raising an objection can demonstrate to the Administrator that . . . the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule, the Administrator shall convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed.

42 U.S.C. § 7607(d)(7)(B).

Ever since 1980, the EPA has consistently interpreted this rehearing standard, CAA § 307(d)(7)(B), 42 U.S.C. § 7607(d)(7)(B), as a heightened relevancy standard. That is, the EPA grants reconsideration when new evidence would “provide substantial support *for the argument* that the regulation should be revised.” *Denial of Petition to Revise NSPS for Stationary Gas Turbines*, 45 Fed. Reg. at 81,653 n.3 (Dec. 11, 1980) (emphasis added); see *Prevention of Significant Deterioration and Non-Attainment New Source Review: Reconsideration*, 68 Fed. Reg. 63,021 (Nov. 7, 2003) (codified at 40 CFR pts. 51, 52); *Denial of Petition for Reconsideration of National Ambient Air*

*Quality Standards for Particulate Matter*, 53 Fed. Reg. 52,698 (Dec. 29, 1988). Consistent with its past practice, the EPA announced that it would apply its usual standard to the petitions for reconsideration of the endangerment finding. *RTP*, 75 Fed. Reg. at 49,561.

In denying rehearing, the EPA relied in part on “a 3-volume, roughly 360-page Response to Petitions document,” which included both new information (developed after close of the comment period) and additional information not otherwise in the record and thus not subject to notice or comment. *RTP*, 75 Fed. Reg. at 49,556. The agency also relied upon investigations conducted by third parties:

Inquiries from the UK House of Commons, Science and Technology Committee, the University of East Anglia, Oxburgh Panel, the Pennsylvania State University, and the University of East Anglia, Russell Panel, all entirely independent from EPA, have examined the issues and many of the same allegations brought forward by the petitioners as a result of the disclosure of the private CRU e-mails. These inquiries are now complete. Their conclusions are in line with EPA’s review and analysis of these same CRU e-mails.

*RTP*, 75 Fed. Reg. at 49,557; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 83 of 695. However, none of these reports dealt with the central question raised by the reconsideration petitions: whether climategate undercut the reliability of the science upon which the EPA relied. *See* Pet’rs’ Opening Br. at 5-9; U.S.C.A.

Case 09-1322 Doc. 1309185, pp. 23-27 of 90. And obviously none of them addressed whether the information uncovered was of “central relevance” for purposes of 42 U.S.C. § 7607(d)(4)(B)(i) or (7)(B).

In support of rehearing, Petitioners argued that there were copious quantities of new information that had become public after the Endangerment Finding’s publication; that climategate emails suggested that the IPCC data and conclusion upon which the EPA relied were manipulated; that critical IPCC records were lost or destroyed; that the peer review process was corrupted and dissent suppressed; that IPCC personnel had conflicts of interest; and that the EPA’s reliance on IPCC data ensured that the process underlying the Endangerment Finding lacked transparency. The Rehearing Petitions also pointed out mistakes reflecting on the reliability of the underlying data, such as the EPA’s reliance on an IPCC report that purported to “distill[ IPCC’s] most important science into a form accessible to politicians and policy makers.” FoxNews.com, *Africa-Gate? U.N. fears of food shortages questioned* (Feb. 8, 2010), <http://www.foxnews.com/scitech/2010/02/08/british-scientist-says-panel-losing-credibility>; see IPCC, *Climate Change 2007: Synthesis Report*, [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf). In it, IPCC claimed that anthropogenic GHGs could cut many African countries’ yields from rain-fed agriculture in half. *IPCC Synthesis Report* § 3.3.2 at 50. The source of this alarmist conclusion was a 2003 policy paper from a Canadian think tank. J.A. Vol. IX, Doc.

1339079 (Oct. 31, 2011), pp. 451-53 of 649. *See* Int'l Inst. for Sustainable Dev., *Vulnerability of North African Countries to Climate Change: Adaptation and Implementation Strategies for Climate Change* (2003) at 5, [http://www.iisd.org/cckn/pdf/north\\_africa.pdf](http://www.iisd.org/cckn/pdf/north_africa.pdf). Petitioners argued that climategate revealed other significant errors and misstatements that the EPA failed to detect and on which the public could not comment before the finding's publication, including the percentage of the Netherlands lying below sea level, J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), p. 456 of 649, errors in the projection of glacier melt in the Himalayas, J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), pp. 448-51 of 649; *see* IPCC, *Statement on the melting of Himalayan Glaciers* (Jan. 20, 2010), <http://www.ipcc.ch/pdf/presentations/himalaya-statement-20january2010.pdf>, projected Amazon rainforest die-off, J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), pp. 453-54 of 649, and projections of more violent storms. J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), pp. 459-61 of 649; *see* Pet'rs' Opening Br. at 12-13 n.14; Doc. 1341062 (Nov. 10, 2011), pp. 30-31 n.14 of 90.

Finally, the Petitioners argued that, in adopting the Endangerment Finding, the Administrator viewed the IPCC, the National Research Council (NRC), and the U.S. Global Change Research Program (USGCRP) as representing independent, mutually reinforcing data, rather than data sets heavily dependent on the IPCC, which derives from a small number of collaborative "climate scientists." In the 360-page RTP – which consisted of new material that

had never been commented upon by the public, that was added to the docket by the agency for the first time after the comment period, and that was created, in some instances, after the Endangerment Finding was finalized – the EPA rejected Petitioners’ objections raised in the rehearing petitions, without notice and comment, on the ground that the objections did not change the EPA’s own conclusions. 75 Fed. Reg. at 49,558 (“The petitioners do not provide any substantial support for the argument that the Endangerment Finding should be revised.”), 49,569; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), pp. 84, 95 of 695. After the close of the comment period, the EPA also added more than four hundred documents to the record, and cited more than fifty of these documents in its RTP. *RTP* Vols. I through III; J.A. Vol. X, Doc. 1339079 (Oct. 31, 2011), pp. 29 through 401 of 403. For example, the EPA in the RTP cited a newly published NRC study entitled “Advancing the Science of Climate Change” to reinforce the now questioned IPCC study, noting that it was “not aware of any published criticisms” of the study. *RTP* Vol. I at 50; J.A. Vol. X, Doc. 1339079 (Oct. 31, 2011), p. 85 of 403.

By procedural order, the D.C. Circuit identified denial of reconsideration as one of the issues to be briefed and argued. D.C. Cir. Order, Doc. 1357330 (Feb. 8, 2012), 4 of 5. On the merits, the panel decision minimized the significance of identified errors in light of the size of the record without discussing the overarching reliability issues arising from the politicized, agenda-driven science disclosed by climategate

and without considering whether the EPA applied the wrong standard. *Responsible Regulation*, 684 F.3d at 125. The panel also rejected the claim that the EPA had necessarily revised its Endangerment Finding by supplementing it, and the record. The D.C. Circuit rejected this argument on a mere ipse dixit basis without analysis or citation to authority. *Id.* at 126.

The court of appeals, by procedural order, also identified delegation issues arising from the Endangerment Finding as matters to be briefed and argued. D.C. Cir. Order, Doc. 1357330 (Feb. 8, 2012). However, the panel in its opinion expressed dislike of the word “delegate,” branding it as “little more than a semantic trick.” *Responsible Regulation*, 684 F.3d at 124. In any case, that court rejected the delegation claim based upon the “extreme degree of deference” afforded factual and scientific decisions by agencies, *id.* at 120, and the precautionary principle, which operates to increase deference as evidence becomes “‘more difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge.’” *Responsible Regulation*, 684 F.3d at 121 (quoting *Ethyl Corp. v. EPA*, 541 F.2d 1, 28 (D.C. Cir. 1976)).

The D.C. Circuit permitted two days for oral argument on the numerous petitions challenging the Endangerment Finding and follow-on regulations. *See* D.C. Cir. Order, Doc. 1357330 (Feb. 8, 2012). However, this petition addresses only those reconsideration and delegation issues on which Virginia was lead on briefing and which Virginia argued. Other petitioners intend to present other issues by separate petitions for writs of certiorari in the coming weeks. *See*

*Chamber of Commerce v. EPA*, No. 12A871 (Mar. 5, 2013); *Am. Chemistry Council v. EPA*, No. 12A876 (Mar. 8, 2013); *Coalition for Responsible Regulation, Inc. v. EPA*, No. 12A877 (Mar. 8, 2013); *Energy-Intensive Mfrs. Working Grp. on Greenhouse Gas Regulation v. EPA*, No. 12A879 (Mar. 8, 2013); *South-eastern Legal Found. v. EPA*, No. 12A881 (Mar. 7, 2013); *Texas v. EPA*, No. 12A884 (Mar. 8, 2013). And, of course, parties below may advance only one petition each. Sup. Ct. R. 12(4). The parties to this brief pray the Court to grant petitions on all issues so that the decision of the D.C. Circuit may be comprehensively reviewed.



### **REASONS FOR GRANTING THE PETITION**

Supreme Court Rule 10 contains illustrative bases for granting certiorari. Rule 10(a)-(b) deals with issues of uniformity of Federal law. Because the D.C. Circuit had exclusive jurisdiction over this appeal, considerations of uniformity could never arise. Rule 10(c) states that certiorari is appropriate where “a United States court of appeals has decided an important question of Federal law that has not been, but should be, settled by this Court.” An example of an exercise of jurisdiction predicated on unusual public importance is provided by the predecessor case of *Massachusetts v. EPA*, 549 U.S. at 505-06, which cited “the unusual importance of the underlying issue,” authority to regulate greenhouse gases, as justification for granting a writ despite no conflict between the lower courts on the issue.

It would be difficult to overstate the importance of the decision below. The judges concurring in denial of rehearing were agreed on this:

To be sure, the stakes here are high. The underlying policy questions and the outcome of this case are undoubtedly matters of exceptional importance.

*Responsible Regulation II*, No. 09-1322, 2012 U.S. App. LEXIS 25997 at 28, 62, 2012 WL 6621785 at 3, 14; App. at 111, 139; Doc. 1411145, pp. 8 & 32 of 52. The significant regulatory and economic burden of greenhouse gas regulation has been the subject of testimony before both Houses of Congress on multiple occasions prior to and after the EPA issued the Endangerment Finding. See Testimony of Dr. Margo Thorning on The Impact of EPA Regulation of GHGs under the Clean Air Act on U.S. Investment and Job Growth before H. Subcomm. on Energy & Power (Feb. 9, 2011), American Council for Capital Formation, Publications, <http://accf.org/news/publication/the-impact-of-epa-regulation-of-ghgs-under-the-clean-air-act-on-u-s-investment-and-job-growth> (explaining the macroeconomic effect of the Endangerment Finding); Testimony of William L. Kovacs on Regulation of Greenhouse Gases under The Clean Air Act before the S. Comm. on Envt. & Public Works (Sept. 23, 2008), U.S. Chamber of Commerce, <http://www.uschamber.com/issues/testimony/2008/testimony-regulation-greenhouse-gases-under-clean-air-act> (explaining the wide range of activities that would be made subject to EPA permitting once an Endangerment Finding had been

reached); *see generally* Congressional Budget Office, The Economic Effects of Legislation to Reduce Greenhouse-Gas Emissions Report (Sept. 17, 2009), <http://www.cbo.gov/publication/41266>. It has been estimated that the EPA's regulation of greenhouse gases could decrease U.S. investment by between five to fifteen percent over the three-year period ending in 2014, with a potential reduction in employment from between one-half to 1.5 million jobs and with compliance costs ranging in the tens of billions "annually, a figure that does not include the costs of actually acquiring and implementing the Best Available Control Technology, as required under the PSD program." *See* Thorning Testimony at 4-5, 9.

And the CBO, in modeling various legislative programs deemed by some to be more efficient than the EPA approach, estimated that such regulation will reduce the annual rate of GDP growth by less than 1 percent of GDP this decade, but would rise sharply over time as the loss in wealth "multiplies." CBO Report at 12-13 (Table 1). Obviously, even a small reduction of GDP growth results in a large loss in societal wealth, jobs, and other measures of human flourishing. U.S. Dep't of Commerce, Bureau of Economic Analysis, "National Income and Product Accounts: Gross Domestic Product, 4th Quarter and Annual 2012 (second estimate)," (Feb. 28, 2013), [http://www.bea.gov/newsreleases/national/gdp/2013/gdp4q12\\_2nd.htm](http://www.bea.gov/newsreleases/national/gdp/2013/gdp4q12_2nd.htm). In sum, this Petition, challenging the EPA's adoption of regulations aimed at limiting the previous conduct of citizens in order to reduce CO<sub>2</sub>

and other greenhouse gas emissions, presents a matter of utmost importance to the vitality of our Nation. See *Responsible Regulation II*, No. 09-1322, 2012 U.S. App. LEXIS 12980 at 63; 2012 WL 6621785 at 14 (Kavanaugh, J., dissenting from denial of reh'g en banc) (“Put simply, the economic and environmental policy stakes are very high.”); App. at 139.

With respect to whether this is a case that “has not been, but should be, settled by this Court,” the judges of the panel thought that the outcome was predetermined by this Court in *Massachusetts v. EPA*. See *Responsible Regulation*, 684 F.3d at 120. But only this Court can definitely say that. Furthermore, the rehearing and delegation issues raised in this petition, and essential to public participation in the administrative process and informed agency decisionmaking, have never been decided by this Court.

Not only does this Petition raise matters of first impression, but the arguments against the EPA’s actions are weighty and substantial.

**A. The Administrator Was Obligated to Grant Reconsideration Because Petitioners Demonstrated that their Timely Objections Were Based on Evidence of Central Relevance to the Outcome of the Endangerment Finding.**

For over thirty years, the EPA has consistently held that a timely motion for reconsideration is due to be granted where new evidence would “provide

substantial support for the argument that the regulation should be revised.” See 45 Fed. Reg. at 81,653; 53 Fed. Reg. at 52,698; 68 Fed. Reg. at 63,021. Reversing the old saw “let’s not and say we did,” the EPA, in response, produced a 360-page, three-volume supplement to the Endangerment Finding and added numerous documents to shore up its scientific bases, but maintained that it had not reconsidered its original decision. Having supplemented its findings, the agency’s claim that the new information was unlikely to cause it to revise its action rang hollow. See *West Virginia v. EPA*, 362 F.3d 861 (D.C. Cir. 2004). The EPA, for foreign diplomatic reasons, had issued the Endangerment Finding as a free-standing document unassociated with any implementing rule. See John M. Broder, *Greenhouse Gases Imperil Health, E.P.A. Announces*, N.Y. Times, Dec. 7, 2009, at A18, [http://www.nytimes.com/2009/12/08/science/earth/08epa.html?\\_r=1&](http://www.nytimes.com/2009/12/08/science/earth/08epa.html?_r=1&) (“The announcement was timed to coincide with the opening of the United Nations conference on climate change in Copenhagen, strengthening President Obama’s hand as more than 190 nations struggle to reach a global accord.”). Having done so, any objection cogent enough to require a response relying on extensive new extra-record evidence plainly provided substantial support for an argument that the Finding needed reworking. Indeed, the rehearing petitions were not merely likely to lead to a revision, they in fact led to a *de facto* revision. Put another way, an Endangerment Finding whose supporting bases have to be materially supplemented and reweighed to adequately respond

to objections triggers reconsideration under notice and comment standards. This is the plain meaning of 42 U.S.C. § 7607(d)(7)(B), and the court of appeals erred in holding otherwise. *See Responsible Regulation*, 684 F.3d at 125-26.

### **B. The Administrator Misapplied the Central Relevance Standard.**

The EPA departed from its clear and consistent use of its heightened relevance standard without adequate explanation when it found that the data supplied by Petitioners did not change its mind on the Endangerment Finding. The Endangerment Finding was promulgated as the first step in rulemaking under Section 202(a) of the Clean Air Act, codified at 42 U.S.C. § 7521. *See Endangerment Finding*, 74 Fed. Reg. at 66,496; J.A. Vol. I, Doc. 1339709 (Oct. 31, 2011), p. 30 of 695. As a consequence, the associated rulemaking was required to be accompanied by “a statement of basis and purpose,” as well as “a response to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the comment period.” 42 U.S.C. § 7607(d)(6)(A)(i) & (d)(6)(B). In no event could the Endangerment Finding “be based (in part or whole) on any information or data which ha[d] not been placed in the docket as of the date of such promulgation.” 42 U.S.C § 7607(d)(6)(C). Thus, after promulgation on December 15, 2009, any revision to the statement of basis and purpose or to the response to comments was a revision requiring the same

process as that required in the initial promulgation. 42 U.S.C. § 7607(d)(1)(K). See *Donner Hanna Coke Corp. v. Costle*, 464 F. Supp. 1295 (W.D.N.Y. 1979) (EPA enforcement officials cannot circumvent rule-making requirements of 42 U.S.C. § 7607 by making substantial changes in testing methods without notice and hearing).

Whatever the 360-page tome “appears to be,” *Responsible Regulation*, 684 F.3d at 126, the EPA misapplied the central relevance and likelihood of revision test because, in purporting to deny reconsideration, the EPA did, in fact, revise the statement of basis and purpose and its response to comments. This is not only an arbitrary and capricious violation of the EPA’s own standard, but is also a facial violation of the Clean Air Act, or of the APA if the Endangerment Finding is not considered a rule for purposes of 42 U.S.C. § 7607(d)(8).

**C. The EPA Administrator Erred by Making Determinations without Notice or Comment.**

42 U.S.C. § 7607(d)(3) forbids the revision of any rule without notice and comment and limits the basis for such revision to data, information, and documents contained in the docket when the revision is published. 42 U.S.C. § 7607(d)(7)(B) requires any reconsideration to be conducted with rights of notice and comment. Moreover, 42 U.S.C. § 7607(h) declares, with exceptions not here relevant, a congressional

intent, “consistent with the policy of the Administrative Procedures Act,” that the Administrator “ensure a reasonable period for public participation of at least 30 days.” Finally, 42 U.S.C. § 7607(d)(6)(A) provides that any promulgated rule “shall be accompanied by (i) a statement of basis and purpose,” among other things. A revision of the statement of basis and purpose is, therefore, a revision requiring notice and comment. The Endangerment Finding itself is nothing more than an overarching statement of basis and purpose intended to support all subsequent rulemaking on the subject.

This is well-established:

To have any reasonable prospect of obtaining judicial affirmance of a major rule, an agency must set forth the basis and purpose of the rule in a detailed statement, often several hundred pages long, in which the agency refers to the evidentiary basis for all factual predicates, explains its method of reasoning from factual predicates to the expected effects of the rule, relates the factual predicates and expected effects of the rule to each of the statutory goals or purposes the agency is required to further or to consider, responds to all major criticisms contained in the comments on its proposed rule, and explains why it has rejected at least some of the plausible alternatives to the rule it has adopted.

1 Richard J. Pierce, Jr., *Administrative Law Treatise* 593 (5th ed. 2010). “Failure to fulfill one of these

judicially prescribed requirements of a ‘concise general statement of basis and purpose’ has become the most frequent basis for judicial reversal of agency rules.” *Id.* Supplementing the statement of basis and purpose with a 360-page response to objections, which includes data not included in the Endangerment Finding and, in some cases, not even compiled prior to its publication, is a revision that violates this scheme when conducted without rights of notice and comment. In fact, procedurally and institutionally, an agency in the present context is incapable of knowing and deciding scientific matters in the absence of notice and comment, and simply permitting reconsideration petitions affords no substitute. *See Kennecott Corp. v. EPA*, 684 F.2d 1007, 1018-19 (D.C. Cir. 1982).

**D. The EPA’s Reasons for Relying on the IPCC Were Undermined by the Climategate Data Provided in the Reconsideration Petitions which Data Compel the Conclusion that the Endangerment Finding Fails to meet essential Information Quality Standards such that Reconsideration Is Required.**

The EPA Administrator sought to justify her reliance on the “assessment literature” by claiming that the agency carefully reviewed the processes by which this literature was prepared, confirming thereby that these processes met the standards to which the EPA is subject in preparing scientific findings. *Endangerment Finding*, 74 Fed. Reg. at 66,511-13; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), pp. 45-47 of

695. *EPA Response to Public Comments (RTC)* at 1-2 (based on its review of IPCC procedures, “EPA has determined that the approach taken provided the high level of transparency and consistency outlined by EPA’s” information quality requirements); J.A. Vol. VII, Doc. 1339079 (Oct. 31, 2011), at 253 of 395. Based on this review, the Administrator concluded that her reliance on this literature “is entirely reasonable and allows EPA to rely on the best available science.” *Endangerment Finding*, 74 Fed. Reg. at 66,511 (footnote omitted); J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 45 of 695. Of course, as the EPA Inspector General found, not only was this not so, but the Administrator, in making the Endangerment Finding, lacked access to the information necessary to evaluate the quality of the IPCC’s scientific conclusions, violated the agency’s own peer-review standards, and, by having no procedure for evaluating the circumstances in which it is appropriate to rely on outside data, comprehensively delegated her statutory duties to the IPCC and other outside groups. *See* Report of the EPA Inspector General, Data Quality Processes, Report 11-P-0702 (Sept. 26, 2011), <http://www.epa.gov/oig/reports/2011/20110926-11-P-0702.pdf>) (“Inspector General Report”).

As discussed in the previous section, even if IPCC’s scientific procedures had been of sterling quality, the Administrator still would have been required to exercise her own judgment on climate science, and this she did not do. In issuing the Endangerment Finding, the EPA failed to comply even with its own standards for evaluating externally

generated information, insufficient as the EPA Inspector General subsequently found them to be. Accordingly, it should come as no surprise that climategate revealed that the quality of IPCC's science was anything but sterling, and that there is a yawning gap between the way IPCC operated in reality compared with the way the EPA says it did based on its review of IPCC's written procedures. Indeed, by relying so heavily on the IPCC, the agency failed to observe basic information quality standards to which it is subject.

**1. The EPA failed to ensure that Endangerment Finding's information was "accurate, reliable and unbiased."**

The EPA is subject to rigorous data quality obligations under the Information Quality Act (IQA), Pub. L. No. 106-554, 114 Stat. 2763 (2000), and the EPA's IQA Guidelines, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency (IQA Guidelines)* (Oct. 2002), [http://www.epa.gov/QUALITY/informationguidelines/documents/EPA\\_InfoQualityGuidelines.pdf](http://www.epa.gov/QUALITY/informationguidelines/documents/EPA_InfoQualityGuidelines.pdf). Because the Endangerment Finding meets the EPA's definition of "influential information," information having "a clear and substantial impact (i.e., potential change or effect) on important public policies or private sector decisions," *id.* at 19, the Endangerment Finding is "subject to a higher degree of quality (for example, transparency about data and methods) than

[other] information.” *Id.* at 20. The substance of the information underlying the Endangerment Finding must be “accurate, reliable and unbiased,” requiring use of “the best available science and supporting studies conducted in accordance with sound and objective scientific practices, including, when available, peer reviewed science and supporting studies; and (ii) data collected by accepted methods or best available methods (if the reliability of the method and the nature of the decision justifies the use of the data).” *Id.* at 22.

As demonstrated in detail in the petitions for reconsideration, however, the IPCC reports frequently relied on unscientific “studies” that were prepared by advocacy groups such as the World Wildlife Fund (WWF), Greenpeace, and other similar organizations. This led, among other numerous examples, to the IPCC having to retract its embarrassing assertion, which was relied on in the *Endangerment Finding*, 74 Fed. Reg. at 66,523; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 57 of 695. *TSD*, J.A. Vol. VII, Doc. 1339079 (Oct. 31, 2011), p. 202 of 395; *RTC*, J.A. Vol. X, Doc. 1339079 (Oct. 31, 2011), p. 210 of 403, that Himalyan glaciers would melt by 2035, which turned out to be based on faulty information from an unpublished, unpeered review study by an advocacy organization. J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), p. 448-51 of 649. The IPCC had been aware of the data problems in the study but had decided to rely on it anyway for public relations impact. The coordinating Lead Author of that section of the IPCC report, Dr. Murai Lai, has stated:

It related to several countries in this region and their water sources. *We thought that if we can highlight it, it will impact policy-makers and politicians and encourage them to take some concrete action.* It had importance for the region, so we thought we should put it in.

David Rose, “Glacier Scientist: I knew data hadn’t been verified,” UK Daily Mail (Jan. 24, 2010), <http://www.dailymail.co.uk/news/article-1245636/Glacier-scientists-says-knew-data-verified.html>.

This degree of goal-oriented “science” ought not, but can be expected to, inform decisions of momentous public policy import where an agency fails to follow its procedures, as the EPA did prior to the release of the Endangerment Finding TSD. *See* EPA Inspector General’s Report, *supra* at 28-29; *see also id.* at Executive Summary (reporting that the agency “did not meet all OMB requirements for peer review of a highly influential scientific assessment primarily because the review results and the EPA’s response were not publicly reported, and because 1 of the 12 reviewers was an EPA employee.”). What is more, while the EPA told the Inspector General that it engaged in ex post review in response to the petitions for reconsideration, *id.* at 29, the Inspector General found the agency’s procedures for reliance on outside entities to be inadequate and recommended that it “establish minimum review and documentation requirements for assessing and accepting data from other organizations.” *Id.*

## **2. The EPA's reliance on IPCC reports undermined the Public's right to comment.**

The EPA's reliance on the "assessment literature" rendered the public's right to comment meaningless. But ex ante the agency did not think that much of a public comment period was necessary at all. While recognizing the enormous complexity of climate science: "very wide range of risks and harms that need to be considered," *Endangerment Finding*, 74 Fed. Reg. at 66,509; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 43 of 695, the EPA limited the comment period to a mere 60 days based in part on the agency's (mistaken and irrelevant) view that the public had had an opportunity to comment previously. *Id.* at 66,503; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 37 of 695.

There was another defect with the comment process. The EPA time and again responded to public comments on a particular scientific point by saying that the "assessment literature" had reached a different conclusion. The fundamental purpose of the comment process, however, is to ensure that a "genuine interchange" is carried on between the agency and the public, where the agency makes available all the underlying studies and data and the public is able to provide "meaningful commentary." *Conn. Light & Power v. NRC*, 673 F.2d 525, 530-31 (D.C. Cir. 1982). No such interchange occurs when the Administrator dismisses public comments on the ground that a third party disagrees with them. Furthermore the EPA's reflexive citation to the "assessment literature," some of which was not part of the TSD, undermined the

substantive credibility of the agency's findings. *See Chamber of Commerce v. SEC*, 443 F.3d 890, 900 (D.C. Cir. 2006) (“By requiring the ‘most critical factual material’ used by the agency be subjected to informed comment, the APA provides a procedural device to ensure that agency regulations are tested through exposure to public comment . . .”).

Finally, in the Endangerment Finding, the EPA justified its use of third-party synthesis and assessment reports as “allow[ing] EPA to rely on the best available science.” 74 Fed. Reg. at 66,511; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 45 of 695. Now, however, the EPA argues that it was entitled to deny reconsideration in part because other institutions found “no evidence of scientific misconduct or intentional data manipulation” by the climate researchers on whom the IPCC had so extensively relied. *RTP*, 75 Fed. Reg. at 49,558; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 84 of 695. Informal reconsideration without notice or comment based on a “no evidence of scientific misconduct or intentional data manipulation” standard is nowhere authorized by the Clean Air Act.

### **3. The EPA's reliance on IPCC reports prevented public transparency.**

Under § 6.3 of the EPA's IQA Guidelines, the Endangerment Finding, as “Influential Information,” was required to have “a higher degree of transparency regarding (1) the source of the data used, (2) the various assumptions employed, (3) the analytic methods applied, and (4) the statistical procedures

employed.” *IQA Guidelines* at 21. Climategate revealed the hollowness of the EPA’s claim that IPCC met this same level of transparency, as key IPCC authors routinely relied on their own studies while simultaneously refusing to disclose to other scientists the data underlying those studies. The United Kingdom House of Commons Science and Technology report cited by the EPA in denying reconsideration found an “unacceptable” “culture of withholding information – from those perceived by CRU to be hostile to global warming.” Parliament of the United Kingdom – Science & Technology Comm., *The Disclosure of climate data from the Climatic Research Unit at the University of East Anglia: Conclusions & Recommendations* ¶13 (Mar. 31, 2010), <http://www.publications.parliament.uk/pa/cm200910/cmselect/cmstech/387/38709.htm>. Another review panel report cited by the EPA found “a consistent pattern of failing to display the proper degree of openness.” *The Independent Climate Change E-mails Review: Findings* § 1.3(15) (July 2010), <http://www.cce-review.org/pdf/FINAL%20REPORT.pdf>. As stated by the President of the National Academy of Sciences in commenting on climategate, “[f]ailure to make research data and related information accessible not only impedes science, it also breeds conflicts.” Ralph J. Cicerone, *Editorial: Ensuring Integrity in Science*, 327 *Science* 624 (2010), <http://www.nasonline.org/about-nas/leadership/president/cicerone-editorial-science.pdf>. It is also completely at odds with the “high” level of transparency demanded by the *IQA Guidelines* in order to ensure the high quality of the EPA’s science.

**E. In Issuing the Endangerment Finding and in Denying Rehearing, the EPA Impermissibly Delegated its Statutory Authority to Outside Entities.**

The EPA violated the CAA when it delegated its judgment to outside groups. Congress empowered the EPA Administrator to decide whether, “*in his judgment,*” pollutants emitted from motor vehicles endanger public health and welfare. 42 U.S.C. § 7521(a)(1) (emphasis added). But rather than independently assessing the data as required by the CAA, the EPA impermissibly delegated that responsibility to outside organizations.

By its own admission, the EPA placed “primary and significant weight on the[] assessment reports” of the IPCC, the NRC, and the USGCRP in making the endangerment finding. *Endangerment Finding*, 74 Fed. Reg. at 66,511; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 45 of 695. And rather than assessing the actual scientific data, these reports served as the EPA’s “primary scientific and technical basis” for its endangerment decision. *Id.* at 66,510; *see also* J.A. Vol. VII, TSD Executive Summary, Doc. 1339079 (Oct. 31, 2011), p. 34 of 395 (explaining that the document’s data and conclusions “are primarily drawn from the assessment reports of the Intergovernmental Panel on Climate Change (IPCC), the U.S. Climate Change Science Program (CCSP), the U.S. Global Change Research Program (USGCRP), and the National Research Council (NRC)”); *RTC* at Resp. 1-5 (“We did not develop new science to support the finding, but rather relied primarily on the conclusions of the

major assessment reports of USGCRP/CCSP, IPCC, and NRC and the evaluation of the public comments received.”); J.A. Vol. VII, Doc. 1339079 (Oct. 31, 2011), p. 256 of 394. However, to avoid an arbitrary decision, “the agency must examine the relevant data and articulate a satisfactory explanation for its action including a ‘rational connection between the facts found and the choice made.’” *Motor Vehicle Mfrs. Ass’n of the U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (emphasis added) (quoting *Burlington Truck Lines, Inc. v. United States*, 371 U.S. 156, 168 (1962)); see 42 U.S.C. § 7521(a)(1). The EPA failed to do so here.

Federal administrative agencies generally may not delegate their authority to outside parties. *U.S. Telecom Ass’n v. FCC*, 359 F.3d 554, 556 (D.C. Cir. 2004). An agency may look to outside groups for advice and policy recommendations, as the EPA did in proposed rulemakings, e.g., *Advance Notice of Proposed Rulemaking for Endangerment Finding*, 73 Fed. Reg. at 44,354 (July 30, 2008); J.A. Vol. I, Doc. 1339709 (Oct. 31, 2011), p. 122 of 695, but delegation is improper because “lines of accountability may blur, undermining an important democratic check on government decision-making.” *U.S. Telecom Ass’n*, 359 F.3d at 565-66, 568. Because outside sources do not necessarily “share the agency’s ‘national vision and perspective,’” the goals of the outside parties may be “inconsistent with those of the agency and the underlying statutory scheme.” *Id.* at 566 (quoting *Nat’l Park & Conservation Ass’n v. Stanton*, 54 F. Supp. 2d 7, 20 (D.D.C. 1999)).

The EPA's wrongful delegation in this case powerfully illustrates those dangers. The agency relied on the judgment of a number of outside groups, but the IPCC's Fourth Assessment Report was accorded special weight. See J.A. Vol. XI, Doc. 1339079 (Oct. 31, 2011), pp. 29 through 184 of 355. Not only did the EPA cite it more often than the others, but the USGCRP – another of EPA's major sources – also relied heavily on the IPCC Report for its “own” findings. See *Endangerment Finding*, 74 Fed. Reg. at 66,511 (noting that the “USGCRP incorporates a number of key findings from the [IPCC Report]” including “the attribution of observed climate change to human emissions of greenhouse gases, and the future projected scenarios of climate change for the global and regional scales”); J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 45 of 695. Despite the serious deficiencies of the IPCC process demonstrated in the reconsideration petitions and the fact that scientific data underlying the assessments is not in the administrative record, in violation of the CAA, see 42 U.S.C. § 7607(d)(3) (“All data, information, and documents . . . on which the proposed rule relies shall be included” in the rulemaking docket “on the date of publication of the proposed rule”), the EPA used the same assessments again to unilaterally reject reconsideration without notice or comment. 75 Fed. Reg. at 49,565-66; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), pp. 91-92 of 695; see *Nat'l Welfare Rights Org. v. Mathews*, 533 F.2d 637, 648 (D.C. Cir. 1976) (explaining that “judicial review is meaningless where the administrative record is insufficient to determine

whether the action is arbitrary and capricious”). In sum, the EPA’s delegation of its statutory duties was unreasonable and illegal.



**CONCLUSION**

Wherefore the petition should be granted and the Endangerment Finding reversed and remanded for further proceeding in accordance with law, including rehearing with rights of notice and comment.

Respectfully submitted,

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March 20, 2013

*Counsel for the  
Commonwealth of Virginia*

**APPENDIX**

App. 1

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United States Court of Appeals,  
District of Columbia Circuit.  
COALITION FOR RESPONSIBLE  
REGULATION, INC., et al., Petitioners

v.

ENVIRONMENTAL PROTECTION AGENCY,  
Respondent  
State of Michigan, et al., Intervenors.  
Coalition for Responsible Regulation, Inc., et al.,  
Petitioners

v.

Environmental Protection Agency, Respondent  
American Frozen Food Institute, et al., Intervenors.  
Coalition for Responsible Regulation, Inc., et al.,  
Petitioners

v.

Environmental Protection Agency, Respondent  
Langboard, Inc. – MDF, et al., Intervenors.  
American Chemistry Council, Petitioner

v.

Environmental Protection Agency and Lisa Perez  
Jackson, Administrator, U.S. Environmental  
Protection Agency, Respondents  
Chamber of Commerce of the United States of  
America, et al., Intervenors.

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Argued Feb. 28 and 29, 2012.

Decided June 26, 2012.

On Petitions for Review of Final Actions of the Environmental Protection Agency. Patrick R. Day, Harry W. MacDougald, and Jeffrey Bossert Clark argued the causes for Non-State Petitioners and Supporting Intervenors. With them on the briefs were John J. Burns, Attorney General, Office of the Attorney General of the State of Alaska, Steven E. Mulder, Chief Assistant Attorney General, Peter Glaser, Mark E. Nagle, Matthew Dukes, Paul D. Phillips, John A. Bryson, Ellen Steen, Eric Groten, John P. Elwood, James A. Holtkamp, Chet M. Thompson, Robin S. Conrad, Rachel L. Brand, Sheldon Gilbert, Quentin Riegel, Jeffrey A. Rosen, Robert R. Gasaway, William H. Burgess, Sam Kazman, Hans Bader, Matthew G. Paulson, Harry Moy Ng, Michele Marie Schoeppe, Michael R. Barr,

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Alexandra M. Walsh, Adam J. White, Jeffrey A. Lamken, Timothy K. Webster, Roger R. Martella, Neal J. Cabral, Theodore Hadzi-Antich, Ashley C. Parrish, Cynthia A.M. Stroman, Scott C. Oostdyk, Gordon R. Alphonso, Shannon L. Goessling, Edward A. Kazmarek, F. William Brownell, Norman W. Fichthorn, Henry V. Nickel, and Allison D. Wood. Paul D. Clement, Mark W. DeLaquil, Andrew M. Grossman, and David B. Rivin, Jr. entered appearances.

E. Duncan Getchell, Jr., Solicitor General, Office of the Attorney General for the Commonwealth of Virginia, argued the cause for State Petitioners Texas and Virginia on Denial of Reconsideration of the Endangerment Finding and State Petitioners and Supporting Intervenors on Endangerment Finding Delegation Issues. With him on the briefs were Kenneth T. Cuccinelli, II, Attorney General, Stephen R. McCullough, Senior Appellate Counsel, Charles E. James Jr., Chief Deputy Attorney General, and Wesley G. Russell, Jr., Deputy Attorney General.

Greg Abbott, Attorney General, Office of the Attorney General for the State of Texas, Bill Cobb, Deputy Attorney General for Civil Litigation, J. Reed Clay, Jr., Special Assistant and Senior Counsel to the Attorney General, Jonathan F. Mitchell, Solicitor General, Michael P. Murphy, Assistant Solicitor General, Luther Strange III, Attorney General, Office of the Attorney General for the State of Alabama, Pamela Jo Bondi, Attorney General, Office of the Attorney General for the State of Florida, Gregory F.

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Zoeller, Attorney General, Office of the Attorney General for the State of Indiana, Jack Conway, Attorney General, Office of the Attorney General for the Commonwealth of Kentucky, James D. “Buddy” Caldwell, Attorney General, Office of the Attorney General for the State of Louisiana, Bill Schuette, Attorney General, Office of the Attorney General for the State of Michigan, John J. Bursch, Solicitor General, Neil D. Gordon, Assistant Attorney General, Gary C. Rikard, Jon Bruning, Attorney General, Office of the Attorney General for the State of Nebraska, Katherine J. Spohn, Special Counsel to the Attorney General, Wayne Stenehjem, Attorney General, Office of the Attorney General for the State of North Dakota, Margaret Olson, Assistant Attorney General, Scott Pruitt, Attorney General, Office of the Attorney General for the State of Oklahoma, Alan Wilson, Attorney General, Office of the Attorney General for the State of South Carolina, Marty Jackley, Attorney General, Office of the Attorney General for the States of South Dakota, Roxanne Giedd, Chief, Civil Litigation Division, Mark L. Shurtleff, Attorney General, Office of the Attorney General for the State of Utah, and Kenneth T. Cuccinelli, II, Attorney General, Office of the Attorney General for the Commonwealth of Virginia were on the briefs for State Petitioners and Supporting Intervenors. Robert D. Tambling, Assistant Attorney General, Office of the Attorney General for the State of Alabama, entered an appearance.

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Christian J. Ward, Scott A. Keller, and April L. Farris were on the brief for amici curiae Scientists in support of Petitioners.

Derek Schmidt, Attorney General, Office of the Attorney General for the State of Kansas, and John Campbell, Chief Deputy Attorney General, were on the brief for amicus curiae State of Kansas in support of Petitioners.

Martin R. Levin, Michael J. O'Neill, Donald M. Falk, Mark S. Kaufman, Steven J. Lechner, and Richard P. Hutchison were on the brief for amici curiae Landmark Legal Foundation, et al. in support of Petitioners.

Jon M. Lipshultz and Angeline Purdy, Attorneys, U.S. Department of Justice, argued the causes for respondent. With them on the brief were John Hannon, Carol Holmes, and Steven Silverman, U.S. Environmental Protection Agency, Attorneys. Thomas A. Lorenzen, Attorney, U.S. Department of Justice, entered an appearance.

Carol Iancu, Assistant Attorney General, Office of the Attorney General for the Commonwealth of Massachusetts, argued the cause for State and Environmental Intervenors in support of respondents. With her on the briefs were Martha Coakley, Attorney General, William L. Pardee, Attorney Assistant General, Sean H. Donahue, Howard I. Fox, David S. Baron, Megan Ceronsky, Vickie L. Patton, Peter Zalzal, Kamala D. Harris, Attorney General, Office of the Attorney General for

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the State of California, Kathleen A. Kenealy, Senior Assistant Attorney General, Marc N. Melnick and Nicholas Stern, Deputy Attorneys General, Joseph R. Biden, III, Attorney General, Office of the Attorney General for the State of Delaware, Valerie M. Satterfield, Deputy Attorney General, George Jepsen, Attorney General, Office of the Attorney General for the State of Connecticut, Kimberly P. Massicotte, Matthew I. Levine, Scott N. Koschwitz, Assistant Attorneys General, Lisa Madigan, Attorney General, Office of the Attorney General for the State of Illinois, Gerald T. Karr, Assistant Attorney General, Thomas J. Miller, Attorney General, Office of the Attorney General for the State of Iowa, David R. Sheridan, Assistant Attorney General, Douglas F. Gansler, Attorney General, Office of the Attorney General for the State of Maryland, Mary E. Raivel, Assistant Attorney General, Michael A. Delaney, Attorney General, Office of the Attorney General for the State of New Hampshire, K. Allen Brooks, Senior Assistant Attorney General, William J. Schneider, Attorney General, Office of the Attorney General for the State of Maine, Gerald D. Reid, Assistant Attorney General, Lori Swanson, Attorney General, Office of the Attorney General for the State of Minnesota, Jocelyn F. Olson, Assistant Attorney General, Gary K. King, Attorney General, Office of the Attorney General for the State of New Mexico, Stephen R. Farris, Assistant Attorney General, Eric T. Schneiderman, Attorney General, Office of the Attorney General for the State of New York, Michael J. Myers and Yueh-Ru Chu, Assistant Attorneys General, John Kroger, Attorney

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General, Office of the Attorney General for the State of Oregon, Paul Logan, Assistant Attorney-in-Charge, Robert M. McKenna, Attorney General, Office of the Attorney General for the State of Washington, Leslie R. Seffern, Assistant Attorney General, Peter F. Kilmartin, Attorney General, Office of the Attorney General for the State of Rhode Island, Gregory S. Schultz, Special Assistant Attorney General, William H. Sorrell, Attorney General, Office of the Attorney General for the State of Vermont, Thea J. Schwartz, Assistant Attorney General, Christopher King, Assistant Corporation Counsel, Corporation Counsel for the City Of New York, Ann B. Weeks, Helen D. Silver, David Doniger, Meleah Geertsma, Morgan Butler, Frank W. Rambo, Joseph Mendelson III, Craig Holt Segall, and Joanne Spalding.

Deborah Sivas, Douglas A. Ruley, Edward Lloyd, and Susan J. Kraham were on the brief for amici curiae America's Great Waters Coalition, et al. in support of respondent. James K. Thornton entered an appearance.

Jonathan F. Mitchell, Solicitor General, Office of the Attorney General for the State of Texas, argued the cause for State Petitioners and Supporting Intervenor. With him on the briefs were Gregg Abbott, Attorney General, Bill Cobb, Deputy Attorney General, J. Reed Clay, Jr., Special Assistant and Senior Counsel to the Attorney General, Michael P. Murphy and James P. Sullivan, Assistant Solicitors General, Luther Strange, Attorney General, Office of the Attorney General for the State of Alabama,

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Herman Robinson, Donald Trahan, Kathy M. Wright, Gary C. Rikard, John Bruning, Attorney General, Office of the Attorney General for the State of Nebraska, Katherine J. Spohn, Special Counsel, Wayne Stenehjem, Attorney General, Office of the Attorney General for the State of North Dakota, Margaret Olson, Assistant Attorney General, Alan Wilson, Attorney General, Office of the Attorney General for the State of South Carolina, J. Emory Smith, Jr., Assistant Deputy Attorney General, Marty Jackley, Attorney General, Office of the Attorney General for the State of South Dakota, Roxanne Giedd, Chief, and Kenneth T. Cuccinelli, II, Attorney General, Office of the Attorney General for the Commonwealth of Virginia. Mark W. DeLaquil, Earle D. Getchell, Jr., Assistant Attorney General, Office of the Attorney General for the Commonwealth of Virginia, Andrew M. Grossman, David B. Rivkin, Jr., and Robert D. Tambling, Assistant Attorney General, Office of the Attorney General for the State of Alabama, entered appearances.

F. William Brownell and Peter Keisler argued the causes for Non-State Petitioners and Supporting Intervenors. With them on the briefs were Norman W. Fichthorn, Henry V. Nickel, Allison D. Wood, Charles H. Knauss, Shannon S. Broome, Timothy K. Webster, Roger R. Martella, Eric Groten, Patrick R. Day, John A. Bryson, Matthew G. Paulson, John P. Elwood, Paul D. Phillips, James A. Holtkamp, Shannon L. Goessling, Harry W. MacDougald, William H. Lewis, Jr., Ronald J. Tenpas, Gordon R. Alphonso, Edward A.

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Kazmarek, Chet M. Thompson, Neal J. Cabral, Scott C. Oostdyk, Richard P. Hutchison, John J. McMackin, Jr., Robin S. Conrad, Sheldon Gilbert, Michael W. Steinberg, Levi McAllister, Jeffrey A. Rosen, Robert R. Gasaway, Jeffrey Bossert Clark, William H. Burgess, Ashley C. Parrish, Cynthia A.M. Stroman, Ellen Steen, Leslie Sue Ritts, Peter Glaser, Mark E. Nagle, Terry J. Satterlee, Thomas J. Grever, Margaret Claiborne Campbell, Bryon W. Kirkpatrick, Quentin Riegel, Elizabeth Gaudio, Elizabeth Henry Warner, Harry Moy Ng, Michele Marie Schoeppe, Thomas J. Ward, and Peter H. Wyckoff. Mark A. Behrens, Paul D. Clement, Matthew Dukes, Virginia L. Hudson, and David B. Salmons entered appearances.

Jonathan S. Massey was on the brief for amicus curiae Municipal Gas Commission of Missouri.

John G. Horne, II, Samuel B. Boxerman and Leslie A. Hulse were on the brief for amici curiae the Commonwealth of Kentucky and the American Chemistry Council in support of petitioners. Angus Macbeth entered an appearance.

Amanda Shafer Berman and Perry M. Rosen, Attorneys, U.S. Department of Justice, argued the causes for respondents. With them on the briefs were Howard Hoffman, Elliott Zenick, Brian Doster, and David Orlin, Counsel, U.S. Environmental Protection Agency. Thomas A. Lorenzen and Kim N. Smaczniak, Attorneys, U.S. Department of Justice, and John D. Gunter, II and Michele L. Walter, Counsel, U.S.

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Environmental Protection Agency, entered appearances.

Sean H. Donahue and Michael J. Myers argued the causes for State and Environmental Intervenors in support of respondents. With them on the briefs were Vickie L. Patton, Pamela A. Campos, Megan Ceronsky, Petere Zalzal, Eric T. Schneiderman, Attorney General, Office of the Attorney General for the State of New York, Barbara D. Underwood, Solicitor General, Morgan A. Costello, Assistant Attorney General, Monica Wagner, Howard I. Fox, David S. Baron, Lisa Madigan, Attorney General, Office of the Attorney General for the State of Illinois, Gerald T. Karr, Assistant Attorney General, Joanne Spalding, Nathan Matthews, Craig Holt Segall, Kamala D. Harris, Attorney General, Office of the Attorney General for the State of California, Kathleen A. Kenealy, Senior Assistant Attorney General, Susan Durbin, Raissa Lerner, Marc N. Melnick, and Nicholas Stern, Deputy Attorneys General, Martha Coakley, Attorney General, Office of the Attorney General for the Commonwealth of Massachusetts, William L. Pardee and Carol Iancu, Assistant Attorneys General, David Doniger, Meleah Geertsma, William J. Schneider, Attorney General, Office of the Attorney General for the State of Maine, Gerald D. Ried, Assistant Attorney General, Ann B. Weeks, Helen D. Silver, Thomas J. Miller, Attorney General, Office of the Attorney General for the State of Iowa, David R. Sheridan, Assistant Attorney General, Douglas F. Gansler, Attorney General, Office

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of the Attorney General for the State of Maryland, Mary Raivel, Deputy Attorney General, Michael A. Delaney, Attorney General, Office of the Attorney General for the State of New Hampshire, K. Allen Brooks, Senior Assistant Attorney General, Barbara Baird, William B. Wong, Peter F. Kilmartin, Attorney General, Office of the Attorney General for the State of Rhode Island, Gregory S. Schultz, Special Assistant Attorney General, Frank Rambo, Morgan Butler, Gary K. King, Attorney General, Office of the Attorney General for the State of New Mexico, Stephen Farris, Assistant Attorney General, John Kroger, Attorney General, Office of the Attorney General for the State of Oregon, Paul Logan, Assistant Attorney-in-Charge, Roy Cooper, Attorney General, Office of the Attorney General for the State of North Carolina, and J. Allen Jernigan and Marc Bernstein, Special Deputy Attorneys General. Kenneth P. Alex and Gavin G. McCabe, Deputy Assistant Attorneys General, Office of the Attorney General for the State of California, entered appearances.

Peter Glaser argued the cause for petitioners. With him on the briefs were John P. Elwood, Eric Groten, Patrick R. Day, John A. Bryson, Shannon L. Goessling, Harry W. MacDougald, Paul D. Phillips, James A. Holtkamp, Edward A. Kazmarek, Chet M. Thompson, Sam Kazman, Hans Bader, Gordon R. Alphonso, Richard P. Hutchison, Neal J. Cabral, Scott C. Oostdyk, Ronald J. Tenpas, Michael W. Steinberg, Levi McAllister, John J. McMackin Jr., Robin S.

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Conrad, Rachel L. Brand, Sheldon Gilbert, F. William Brownell, Norman W. Fichthorn, Henry V. Nickel, Allison D. Wood, Ashley C. Parrish, Cynthia A.M. Stroman, Mark E. Nagle, Michael Higgins, Ellen Steen, Timothy K. Webster, Roger R. Martella, Matthew G. Paulson, Charles H. Knauss, Shannon S. Broome, Quentin Riegel, Elizabeth Gaudio, Thomas J. Ward, Harry Moy Ng, and Michele Marie Schoeppe.

Greg Abbott, Attorney General, Office of the Attorney General for the State of Texas, Bill Cobb, Deputy Attorney General for Civil Litigation, Jonathan F. Mitchell, Solicitor General, J. Reed Clay Jr., Special Assistant and Senior Counsel to the Attorney General, Michael P. Murphy, Assistant Solicitor General, Luther Strange, Attorney General, Office of the Attorney General for the State of Alabama, Samuel S. Olens, Attorney General, Office of the Attorney General for the State of Georgia, John E. Hennelly, Senior Assistant Attorney General, Gary C. Rikard, Jon C. Bruning, Attorney General, Office of the Attorney General for the State of Nebraska, Katherine J. Spohn, Special Counsel to the Attorney General, Wayne K. Stenehjem, Attorney General, Office of the Attorney General for the State of North Dakota, Margaret Olson, Assistant Attorney General, Alan Wilson, Attorney General, Office of the Attorney General for the State of South Carolina, J. Emory Smith, Jr., Assistant Deputy Attorney General, Marty Jackley, Attorney General, Office of the Attorney General for the State of North Dakota, Roxanne Giedd, Chief, Civil Litigation Division, and Kenneth

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T. Cuccinelli, II, Attorney General, Office of the Attorney General for the Commonwealth of Virginia, were on the briefs for State Petitioners and Supporting Intervenor. Paul D. Clement, James W. Coleman, Wayne J. D'Angelo, Mark W. DeLaquil, E. Duncan Getchell Jr., Solicitor General, Office of the Attorney General for the Commonwealth of Virginia, Andrew M. Grossman, Virginia L. Hudson, David B. Rivkin Jr., and Robert D. Tambling, Assistant Attorney General, Office of the Attorney General for the State of Alabama, entered appearances.

Samuel B. Boxerman and Leslie A. Hulse were on the brief for amicus curiae American Chemistry Council in support of petitioners. Angus Macbeth entered an appearance.

Eric G. Hostetler, Attorney, U.S. Department of Justice, argued the cause for respondents. With him on the brief were John Hannon and Steven Silverman, Attorneys, U.S. Environmental Protection Agency.

Raymond B. Ludwiszewski argued the cause for intervenors Association of Global Automakers, et al. With him on the brief were Kathleen M. Sullivan, Sanford I. Weisburst, and William B. Adams.

Gavin G. McCabe, Deputy Attorney General, Office of the Attorney General for the State of California, argued the cause for intervenor State of California. On the brief were Kamala D. Harris, Attorney General, Kathleen A. Kenealy, Senior Assistant Attorney General, Marc N. Melnick and Nicholas

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Stern, Deputy Attorneys General, Sean H. Donahue, Howard I. Fox, David S. Baron, Pamela Campos, Megan Ceronsky, Vickie L. Patton, Peter Zalzal, Joseph R. Biden, III, Attorney General, Office of the Attorney General for the State of Delaware, Valerie M. Satterfield, Deputy Attorney General, Thomas J. Miller, Attorney General, Office of the Attorney General for the State of Iowa, David R. Sheridan, Assistant Attorney General, Douglas F. Gansler, Attorney General, Office of the Attorney General for the State of Maryland, Roberta R. James, Assistant Attorney General, Lisa Madigan, Attorney General, Office of the Attorney General for the State of Illinois, Gerald T. Karr, Assistant Attorney General, William T. Schneider, Attorney General, Office of the Attorney General for the State of Maine, Gerald D. Reid, Assistant Attorney General, Martha Coakley, Attorney General, Office of the Attorney General for the Commonwealth of Massachusetts, Carol Iancu, Tracy Triplett, and William L. Pardee, Assistant Attorneys General, Gary K. King, Attorney General, Office of the Attorney General for the State of New Mexico, Stephen R. Farris, Assistant Attorney General, John Kroger, Attorney General, Office of the Attorney General for the State of Oregon, Paul Logan, Assistant Attorney-in-Charge, William H. Sorrell, Attorney General, Office of the Attorney General for the State of Vermont, Thea J. Schwartz, Assistant Attorney General, Eric T. Schneiderman, Attorney General, Office of the Attorney General for the State of New York, Michael J. Myers and Yueh-Ru Chu, Assistant Attorneys General, Peter F. Kilmartin,

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Attorney General, Office of the Attorney General for the State of Rhode Island, Gregory S. Schultz, Special Assistant Attorney General, Robert M. McKenna, Attorney General, Office of the Attorney General for the State of Washington, Leslie R. Seffern, Assistant Attorney General, Christopher King, Assistant Corporation Counsel, Corporation Counsel for the City of New York, Joanne Spalding, Craig Holt Segall, David Doniger and Meleah Geertsma. Judith A. Stahl Moore, Assistant Attorney General, Office of the Attorney General for the State of New Mexico, and John D. Walke entered appearances.

Richard E. Ayres, Jessica L. Olson, and Kristin L. Hines were on the brief for amicus curiae Honeywell International, Inc. in support of respondents.

Richard L. Revesz, Michael A. Livermore, and Jennifer S. Rosenberg were on the brief for amicus curiae Institute for Policy Integrity at New York University School of Law in support of respondents.

Timothy K. Webster, Roger R. Martella, Jr., James W. Coleman, William H. Lewis, Jr., Ronald J. Tenpas, Charles H. Knauss, Shannon S. Broome, Bryan M. Killian, and Matthew G. Paulson were on the briefs for petitioners. Peter D. Keisler, Leslie A. Hulse, and Quentin Riegel entered appearances.

Amanda Shafer Berman and Perry M. Rosen, Attorneys, U.S. Department of Justice, and Elliott Zenick and Howard J. Hoffman, Counsel, U.S. Environmental Protection Agency, were on the brief for respondents. Jon M. Lipshultz, Senior Counsel,

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U.S. Department of Justice, entered and [sic] appearance.

Ann Brewster Weeks, Sean H. Donahue, Vickie Patton, Peter Zalzal, Joanne Spalding, Craig Segall, David Doniger, and Meleah Geertsma were on the brief of intervenors in support of respondents. David S. Baron, Pamela A. Campos, Colin C. O'Brien, and John D. Walke entered appearances.

Vera P. Pardee, Brendan R. Cummings, and Kevin P. Bundy were on the brief for amicus curiae Center for Biological Diversity in support of respondents.

Before: SENTELLE, Chief Judge; ROGERS and TATEL, Circuit Judges.

Opinion for the Court filed PER CURIAM.

PER CURIAM:

Following the Supreme Court's decision in *Massachusetts v. EPA*, 549 U.S. 497, 127 S.Ct. 1438, 167 L.Ed.2d 248 (2007) – which clarified that greenhouse gases are an “air pollutant” subject to regulation under the Clean Air Act (CAA) – the Environmental Protection Agency promulgated a series of greenhouse gas-related rules. First, EPA issued an Endangerment Finding, in which it determined that greenhouse gases may “reasonably be anticipated to endanger public health or welfare.” *See* 42 U.S.C. § 7521(a)(1). Next, it issued the Tailpipe Rule, which set emission standards for cars and light trucks. Finally, EPA determined that the CAA requires major stationary sources of greenhouse

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gases to obtain construction and operating permits. But because immediate regulation of all such sources would result in overwhelming permitting burdens on permitting authorities and sources, EPA issued the Timing and Tailoring Rules, in which it determined that only the largest stationary sources would initially be subject to permitting requirements.

Petitioners, various states and industry groups, challenge all these rules, arguing that they are based on improper constructions of the CAA and are otherwise arbitrary and capricious. But for the reasons set forth below, we conclude: 1) the Endangerment Finding and Tailpipe Rule are neither arbitrary nor capricious; 2) EPA's interpretation of the governing CAA provisions is unambiguously correct; and 3) no petitioner has standing to challenge the Timing and Tailoring Rules. We thus dismiss for lack of jurisdiction all petitions for review of the Timing and Tailoring Rules, and deny the remainder of the petitions.

**I.**

We begin with a brief primer on greenhouse gases. As their name suggests, when released into the atmosphere, these gases act “like the ceiling of a greenhouse, trapping solar energy and retarding the escape of reflected heat.” *Massachusetts v. EPA*, 549 U.S. at 505, 127 S.Ct. 1438. A wide variety of modern human activities result in greenhouse gas emissions; cars, power plants, and industrial sites all release

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significant amounts of these heat-trapping gases. In recent decades “[a] well-documented rise in global temperatures has coincided with a significant increase in the concentration of [greenhouse gases] in the atmosphere.” *Id.* at 504-05, 127 S.Ct. 1438. Many scientists believe that mankind’s greenhouse gas emissions are driving this climate change. These scientists predict that global climate change will cause a host of deleterious consequences, including drought, increasingly severe weather events, and rising sea levels.

The genesis of this litigation came in 2007, when the Supreme Court held in *Massachusetts v. EPA* that greenhouse gases “unambiguous[ly]” may be regulated as an “air pollutant” under the Clean Air Act (“CAA”). *Id.* at 529, 127 S.Ct. 1438. Squarely rejecting the contention – then advanced by EPA – that “greenhouse gases cannot be ‘air pollutants’ within the meaning of the Act,” *id.* at 513, 127 S.Ct. 1438, the Court held that the CAA’s definition of “air pollutant” “embraces *all* airborne compounds of whatever stripe.” *Id.* at 529, 127 S.Ct. 1438 (emphasis added). Moreover, because the CAA requires EPA to establish motor-vehicle emission standards for “*any* air pollutant . . . which may reasonably be anticipated to endanger public health or welfare,” 42 U.S.C. § 7521(a)(1) (emphasis added), the Court held that EPA had a “statutory obligation” to regulate harmful greenhouse gases. *Id.* at 534, 127 S.Ct. 1438. “Under the clear terms of the Clean Air Act,” the Court concluded, “EPA can avoid taking further action only

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if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.” *Id.* at 533, 127 S.Ct. 1438. The Court thus directed EPA to determine “whether sufficient information exists to make an endangerment finding” for greenhouse gases. *Id.* at 534, 127 S.Ct. 1438.

*Massachusetts v. EPA* spurred a cascading series of greenhouse gas-related rules and regulations. First, in direct response to the Supreme Court’s directive, EPA issued an Endangerment Finding for greenhouse gases. *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* (“Endangerment Finding”), 74 Fed. Reg. 66,496 (Dec. 15, 2009). The Endangerment Finding defined as a single “air pollutant” an “aggregate group of six long-lived and directly-emitted greenhouse gases” that are “well mixed” together in the atmosphere and cause global climate change: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. *Id.* at 66,536-37. Following “common practice,” EPA measured the impact of these gases on a “carbon dioxide equivalent basis,” (CO<sub>2</sub>e) which is based on the gases’ “warming effect relative to carbon dioxide . . . over a specified timeframe.” *Id.* at 66,519. (Using the carbon dioxide equivalent equation, for example, a mixture of X amount of nitrous oxide and Y amount of sulfur hexafluoride is expressed as Z amount of CO<sub>2</sub>e). After compiling and

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considering a considerable body of scientific evidence, EPA concluded that motor-vehicle emissions of these six well-mixed gases “contribute to the total greenhouse gas air pollution, and thus to the climate change problem, which is reasonably anticipated to endanger public health and welfare.” *Id.* at 66,499.

Next, and pursuant to the CAA’s requirement that EPA establish motor-vehicle emission standards for “any air pollutant . . . which may reasonably be anticipated to endanger public health or welfare,” 42 U.S.C. § 7521(a)(1), the agency promulgated its Tailpipe Rule for greenhouse gases. *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule* (“Tailpipe Rule”), 75 Fed. Reg. 25,324 (May 7, 2010). Effective January 2, 2011, the Tailpipe Rule set greenhouse gas emission standards for cars and light trucks as part of a joint rulemaking with fuel economy standards issued by the National Highway Traffic Safety Administration (NHTSA). *Id.* at 25,326.

Under EPA’s longstanding interpretation of the CAA, the Tailpipe Rule automatically triggered regulation of stationary greenhouse gas emitters under two separate sections of the Act. The first, the Prevention of Significant Deterioration of Air Quality (PSD) program, requires state-issued construction permits for certain types of stationary sources – for example, iron and steel mill plants – if they have the potential to emit over 100 tons per year (tpy) of “any air pollutant.” *See* 42 U.S.C. §§ 7475; 7479(1). All other stationary sources are subject to PSD

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permitting if they have the potential to emit over 250 tpy of “any air pollutant.” *Id.* § 7479(1). The second provision, Title V, requires state-issued operating permits for stationary sources that have the potential to emit at least 100 tpy of “any air pollutant.” *Id.* § 7602(j). EPA has long interpreted the phrase “any air pollutant” in both these provisions to mean any air pollutant that is regulated under the CAA. *See Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans* (“1980 Implementation Plan Requirements”), 45 Fed. Reg. 52,676, 52,711 (Aug. 7, 1980) (PSD program); *Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule* (“Tailoring Rule”), 75 Fed. Reg. 31,514, 31,553-54 (June 3, 2010) (discussing history of Title V regulation and applicability). And once the Tailpipe Rule set motor-vehicle emission standards for greenhouse gases, they became a regulated pollutant under the Act, requiring PSD and Title V greenhouse permitting.

Acting pursuant to this longstanding interpretation of the PSD and Title V programs, EPA issued two rules phasing in stationary source greenhouse gas regulation. First, in the Timing Rule, EPA concluded that an air pollutant becomes “subject to regulation” under the Clean Air Act – and thus subject to PSD and Title V permitting – only once a regulation requiring control of that pollutant takes effect. *Reconsideration of Interpretation of Regulations That Determine Pollutants Covered by*

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*Clean Air Act Permitting Programs* (“Timing Rule”), 75 Fed. Reg. 17,004 (Apr. 2, 2010). Therefore, EPA concluded, major stationary emitters of greenhouse gases would be subject to PSD and Title V permitting regulations on January 2, 2011 – the date on which the Tailpipe Rule became effective, and thus, the date when greenhouse gases first became regulated under the CAA. *Id.* at 17,019.

Next, EPA promulgated the Tailoring Rule. In the Tailoring Rule, EPA noted that greenhouse gases are emitted in far greater volumes than other pollutants. Indeed, millions of industrial, residential, and commercial sources exceed the 100/250 tpy statutory emissions threshold for CO<sub>2</sub>e. Tailoring Rule, 75 Fed. Reg. at 31,534-36. Immediately adding these sources to the PSD and Title V programs would, EPA predicted, result in tremendous costs to industry and state permitting authorities. *See id.* As a result, EPA announced that it was “relieving overwhelming permitting burdens that would, in the absence of this rule, fall on permitting authorities and sources.” *Id.* at 31,516. Departing from the CAA’s 100/250 tpy emissions threshold, the Tailoring Rule provided that only the largest sources – those exceeding 75,000 or 100,000 tpy CO<sub>2</sub>e, depending on the program and project – would initially be subject to greenhouse gas permitting. *Id.* at 31,523. (The Tailoring Rule further provided that regulated sources must also emit greenhouse gases at levels that exceed the 100/250 tpy emissions threshold on a *mass* basis. That is, they must emit over 100/250 tpy of actual pollutants, in

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addition to exceeding the 75,000/100,000 tpy carbon dioxide equivalent. *Id.* at 31,523.)

A number of groups – including states and regulated industries – filed petitions for review of EPA’s greenhouse gas regulations, contending that the agency misconstrued the CAA and otherwise acted arbitrarily and capriciously. This appeal consolidates the petitions for review of the four aforementioned rules: the Endangerment Finding, the Tailpipe Rule, the Timing Rule, and the Tailoring Rule.

“The Clean Air Act empowers us to reverse the Administrator’s action in rulemaking if it is ‘arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law.’” *Med. Waste Inst. & Energy Recovery Council v. EPA*, 645 F.3d 420, 424 (D.C.Cir.2011) (quoting 42 U.S.C. § 7607(d)(9)(A)). Questions of statutory interpretation are governed by the familiar *Chevron* two-step: “First . . . if the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.” *Chevron, U.S.A. Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 842-43, 104 S.Ct. 2778, 81 L.Ed.2d 694 (1984). But “if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency’s answer is based on a permissible construction of the statute.” *Id.* at 843, 104 S.Ct. 2778.

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This opinion proceeds in several steps. Part II explains why the Endangerment Finding was neither arbitrary nor capricious, while Part III does the same for the Tailpipe Rule. Turning to stationary source regulation, Part IV examines whether any petitioners may timely challenge EPA's longstanding interpretation of the PSD statute. Because we conclude that they may, Part V addresses the merits of their statutory arguments, and explains why EPA's interpretation of the CAA was compelled by the statute. Next, Part VI explains why petitioners lack standing to challenge the Timing and Tailoring Rules themselves. Finally, Part VII disposes of several arguments that have nothing to do with the rules under review, and thus are not properly before us.

**II.**

We turn first to State and Industry Petitioners' challenges to the Endangerment Finding, the first of the series of rules EPA issued after the Supreme Court remanded *Massachusetts v. EPA*. In the decision ordering the remand, the Supreme Court held that EPA had failed in its statutory obligations when it "offered no reasoned explanation for its refusal to decide whether greenhouse gases cause or contribute to climate change." *Massachusetts v. EPA*, 549 U.S. at 534, 127 S.Ct. 1438. On remand, EPA compiled a substantial scientific record, which is before us in the present review, and determined that "greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to

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endanger public welfare.” Endangerment Finding, 74 Fed. Reg. at 66,497. EPA went on to find that motor-vehicle emissions of greenhouse gases “contribute to the total greenhouse gas air pollution, and thus to the climate change problem, which is reasonably anticipated to endanger public health and welfare.” *Id.* at 66,499.

State and Industry Petitioners challenge several aspects of EPA’s decision, including (1) EPA’s interpretation of CAA § 202(a)(1), which sets out the endangerment-finding standard; (2) the adequacy of the scientific record supporting the Endangerment Finding; (3) EPA’s decision not to “quantify” the risk of endangerment to public health or welfare created by climate change; (4) EPA’s choice to define the “air pollutant” at issue as an aggregate of six greenhouse gases; (5) EPA’s failure to consult its Science Advisory Board before issuing the Endangerment Finding; and (6) EPA’s denial of all petitions for reconsideration of the Endangerment Finding. We ultimately conclude that the Endangerment Finding is consistent with *Massachusetts v. EPA* and the text and structure of the CAA, and is adequately supported by the administrative record.

**A.**

Industry Petitioners contend that EPA improperly interpreted CAA § 202(a)(1) as restricting the Endangerment Finding to a science-based judgment devoid of considerations of policy concerns

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and regulatory consequences. They assert that CAA § 202(a)(1) requires EPA to consider, *e.g.*, the benefits of activities that require greenhouse gas emissions, the effectiveness of emissions regulation triggered by the Endangerment Finding, and the potential for societal adaptation to or mitigation of climate change. They maintain that eschewing those considerations also made the Endangerment Finding arbitrary and capricious.

These contentions are foreclosed by the language of the statute and the Supreme Court's decision in *Massachusetts v. EPA*. Section 202(a) of the CAA states in relevant part that EPA's Administrator

shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.

42 U.S.C. § 7521(a)(1). This language requires that the endangerment evaluation “relate to whether an air pollutant ‘cause[s], or contribute[s] to, air pollution which may reasonably be anticipated to endanger public health or welfare.’” *Massachusetts v. EPA*, 549 U.S. at 532-33, 127 S.Ct. 1438. At bottom, § 202(a)(1) requires EPA to answer only two questions: whether particular “air pollution” – here,

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greenhouse gases – “may reasonably be anticipated to endanger public health or welfare,” and whether motor-vehicle emissions “cause, or contribute to” that endangerment.

These questions require a “scientific judgment” about the potential risks greenhouse gas emissions pose to public health or welfare – not policy discussions. *Massachusetts v. EPA*, 549 U.S. at 534, 127 S.Ct. 1438. In *Massachusetts v. EPA*, the Supreme Court rebuffed an attempt by EPA itself to inject considerations of policy into its decision. At the time, EPA had “offered a laundry list of reasons not to regulate” greenhouse gases, including

that a number of voluntary Executive Branch programs already provide an effective response to the threat of global warming, that regulating greenhouse gases might impair the President’s ability to negotiate with “key developing nations” to reduce emissions, and that curtailing motor-vehicle emissions would reflect “an inefficient, piecemeal approach to address the climate change issue.”

*Id.* at 533, 127 S.Ct. 1438 (citations omitted). The Court noted that “these policy judgments . . . have nothing to do with whether greenhouse gas emissions contribute to climate change. Still less do they amount to a reasoned justification for declining to form a scientific judgment.” *Id.* at 533-34, 127 S.Ct. 1438. In the Court’s view, EPA’s policy-based explanations contained “no reasoned explanation for

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[EPA's] refusal to decide" the key part of the endangerment inquiry: "whether greenhouse gases cause or contribute to climate change." *Id.* at 534, 127 S.Ct. 1438.

As in *Massachusetts v. EPA*, a "laundry list of reasons not to regulate" simply has "nothing to do with whether greenhouse gas emissions contribute to climate change." *Id.* at 533-34, 127 S.Ct. 1438. The additional exercises State and Industry Petitioners would have EPA undertake – *e.g.*, performing a cost-benefit analysis for greenhouse gases, gauging the effectiveness of whatever emission standards EPA would enact to limit greenhouse gases, and predicting society's adaptive response to the dangers or harms caused by climate change – do not inform the "scientific judgment" that § 202(a)(1) requires of EPA. Instead of focusing on the question whether greenhouse gas emissions may reasonably be anticipated to endanger public health or welfare, the factors State and Industry Petitioners put forth only address what might happen were EPA to answer that question in the affirmative. As EPA stated in the Endangerment Finding, such inquiries "muddle the rather straightforward scientific judgment about whether there may be endangerment by throwing the potential impact of responding to the danger into the initial question." 74 Fed. Reg. at 66,515. To be sure, the subsection following § 202(a)(1), § 202(a)(2), requires that EPA address limited questions about the cost of compliance with new emission standards and the availability of technology for meeting those

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standards, *see infra* Part III, but these judgments are not part of the § 202(a)(1) endangerment inquiry. The Supreme Court made clear in *Massachusetts v. EPA* that it was not addressing the question “whether policy concerns can inform EPA’s actions in the event that it makes such a finding,” 549 U.S. at 534-35, 127 S.Ct. 1438, but that policy concerns were not part of the calculus for the determination of the endangerment finding in the first instance. The Supreme Court emphasized that it was holding “that EPA must ground its reasons for action or inaction in the statute.” *Id.* at 535, 127 S.Ct. 1438. The statute speaks in terms of endangerment, not in terms of policy, and EPA has complied with the statute.

State and Industry Petitioners insist that because statutes should be interpreted to avoid absurd results, EPA should have considered at least the “absurd” consequences that would follow from an endangerment finding for greenhouse gases. Specifically: having made an endangerment finding, EPA will proceed to promulgate emission standards under § 202(a)(1). Issuing those standards triggers regulation – under EPA’s PSD and Title V programs – of stationary sources that emit greenhouse gases at levels above longstanding statutory thresholds. Because greenhouse gases are emitted in much higher volumes than other air pollutants, hundreds of thousands of small stationary sources would exceed those thresholds. This would subject those sources to PSD and Title V permitting requirements despite what Petitioners claim was Congress’s clear intent

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that the requirements apply only to large industrial sources. Petitioners assert that even EPA believed such overbroad regulation to be an absurd result, which it attempted to rectify by adopting the Tailoring Rule to raise the statutory thresholds, *see infra* Part VI.

However “absurd” Petitioners consider this consequence, though, it is still irrelevant to the endangerment inquiry. That EPA adjusted the statutory thresholds to accommodate regulation of greenhouse gases emitted by stationary sources may indicate that the CAA is a regulatory scheme less-than-perfectly tailored to dealing with greenhouse gases. But the Supreme Court has already held that EPA indeed wields the authority to regulate greenhouse gases under the CAA. *See Massachusetts v. EPA*. The plain language of § 202(a)(1) of that Act does not leave room for EPA to consider as part of the endangerment inquiry the stationary-source regulation triggered by an endangerment finding, even if the degree of regulation triggered might at a later stage be characterized as “absurd.”

**B.**

State and Industry Petitioners next challenge the adequacy of the scientific record underlying the Endangerment Finding, objecting to both the type of evidence upon which EPA relied and EPA’s decision to make an Endangerment Finding in light of what

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Industry Petitioners view as significant scientific uncertainty. Neither objection has merit.

## 1.

As an initial matter, State and Industry Petitioners question EPA's reliance on "major assessments" addressing greenhouse gases and climate change issued by the Intergovernmental Panel on Climate Change (IPCC), the U.S. Global Climate Research Program (USGCRP), and the National Research Council (NRC). Endangerment Finding, 74 Fed. Reg. at 66,510-11. These peer-reviewed assessments synthesized thousands of individual studies on various aspects of greenhouse gases and climate change and drew "overarching conclusions" about the state of the science in this field. *Id.* at 66,511. The assessments provide data and information on, *inter alia*, "the amount of greenhouse gases being emitted by human activities"; their continued accumulation in the atmosphere; the resulting observed changes to Earth's energy balance, temperature and climate at global and regional levels, and other "climate-sensitive sectors and systems of the human and natural environment"; the extent to which these changes "can be attributed to human-induced buildup of atmospheric greenhouse gases"; "future projected climate change"; and "projected risks and impacts to human health, society and the environment." *Id.* at 66,510-11.

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State and Industry Petitioners assert that EPA improperly “delegated” its judgment to the IPCC, USGCRP, and NRC by relying on these assessments of climate-change science. See *U.S. Telecom Ass’n v. FCC*, 359 F.3d 554, 566 (D.C.Cir.2004). This argument is little more than a semantic trick. EPA did not delegate, explicitly or otherwise, any decision-making to any of those entities. EPA simply did here what it and other decision-makers often must do to make a science-based judgment: it sought out and reviewed existing scientific evidence to determine whether a particular finding was warranted. It makes no difference that much of the scientific evidence in large part consisted of “syntheses” of individual studies and research. Even individual studies and research papers often synthesize past work in an area and then build upon it. This is how science works. EPA is not required to re-prove the existence of the atom every time it approaches a scientific question.

Moreover, it appears from the record that EPA used the assessment reports not as substitutes for its own judgment but as evidence upon which it relied to make that judgment. EPA evaluated the processes used to develop the various assessment reports, reviewed their contents, and considered the depth of the scientific consensus the reports represented. Based on these evaluations, EPA determined the assessments represented the best source material to use in deciding whether greenhouse gas emissions may be reasonably anticipated to endanger public

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health or welfare. Endangerment Finding, 74 Fed. Reg. at 66,510-11. It then reviewed those reports along with comments relevant to the scientific considerations involved to determine whether the evidence warranted an endangerment finding for greenhouse gases as it was required to do under the Supreme Court's mandate in *Massachusetts v. EPA*.

**2.**

Industry Petitioners also assert that the scientific evidence does not adequately support the Endangerment Finding. As we have stated before in reviewing the science-based decisions of agencies such as EPA, “[a]lthough we perform a searching and careful inquiry into the facts underlying the agency’s decisions, we will presume the validity of agency action as long as a rational basis for it is presented.” *Am. Farm Bureau Fed’n v. EPA*, 559 F.3d 512, 519 (D.C.Cir.2009) (internal quotation marks omitted). In so doing, “we give an extreme degree of deference to the agency when it is evaluating scientific data within its technical expertise.” *Id.* (internal quotation marks omitted).

The body of scientific evidence marshaled by EPA in support of the Endangerment Finding is substantial. EPA’s scientific evidence of record included support for the proposition that greenhouse gases trap heat on earth that would otherwise dissipate into space; that this “greenhouse effect” warms the climate; that human activity is

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contributing to increased atmospheric levels of greenhouse gases; and that the climate system is warming.

Based on this scientific record, EPA made the linchpin finding: in its judgment, the “root cause” of the recently observed climate change is “very likely” the observed increase in anthropogenic greenhouse gas emissions. Endangerment Finding, 74 Fed. Reg. at 66,518. EPA found support for this finding in three lines of evidence. First, it drew upon our “basic physical understanding” of the impacts of various natural and manmade changes on the climate system. For instance, EPA relied on evidence that the past half-century of warming has occurred at a time when natural forces such as solar and volcanic activity likely would have produced cooling. Endangerment Finding, Response to Comments (RTC) Vol. 3, at 20. Other evidence supports EPA’s conclusion that the observed warming pattern – warming of the bottommost layer of the atmosphere and cooling immediately above it – is consistent with greenhouse-gas causation. *Id.*

EPA further relied upon evidence of historical estimates of past climate change, supporting EPA’s conclusion that global temperatures over the last half-century are unusual. Endangerment Finding, 74 Fed. Reg. at 66,518. Scientific studies upon which EPA relied place high confidence in the assertion that global mean surface temperatures over the last few decades are higher than at any time in the last four centuries. Technical Support Document for the

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Endangerment Finding (TSD), at 31. These studies also show, albeit with significant uncertainty, that temperatures at many individual locations were higher over the last twenty-five years than during any period of comparable length since 900 A.D. *Id.*

For its third line of evidence that anthropogenic emissions of greenhouse gases spurred the perceived warming trend, EPA turned to computer-based climate-model simulations. Scientists have used global climate models built on basic principles of physics and scientific knowledge about the climate to try to simulate the recent climate change. These models have only been able to replicate the observed warming by including anthropogenic emissions of greenhouse gases in the simulations. Endangerment Finding, 74 Fed. Reg. at 66,523.

To recap, EPA had before it substantial record evidence that anthropogenic emissions of greenhouse gases “very likely” caused warming of the climate over the last several decades. EPA further had evidence of current and future effects of this warming on public health and welfare. Relying again upon substantial scientific evidence, EPA determined that anthropogenically induced climate change threatens both public health and public welfare. It found that extreme weather events, changes in air quality, increases in food-and water-borne pathogens, and increases in temperatures are likely to have adverse health effects. *Id.* at 66,497-98. The record also supports EPA’s conclusion that climate change endangers human welfare by creating risk to food

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production and agriculture, forestry, energy, infrastructure, ecosystems, and wildlife. Substantial evidence further supported EPA's conclusion that the warming resulting from the greenhouse gas emissions could be expected to create risks to water resources and in general to coastal areas as a result of expected increase in sea level. *Id.* at 66,498. Finally, EPA determined from substantial evidence that motor-vehicle emissions of greenhouse gases contribute to climate change and thus to the endangerment of public health and welfare.

Industry Petitioners do not find fault with much of the substantial record EPA amassed in support of the Endangerment Finding. Rather, they contend that the record evidences too much uncertainty to support that judgment. But the existence of some uncertainty does not, without more, warrant invalidation of an endangerment finding. If a statute is "precautionary in nature" and "designed to protect the public health," and the relevant evidence is "difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge," EPA need not provide "rigorous step-by-step proof of cause and effect" to support an endangerment finding. *Ethyl Corp. v. EPA*, 541 F.2d 1, 28 (D.C.Cir.1976). As we have stated before, "Awaiting certainty will often allow for only reactive, not preventive, regulation." *Id.* at 25.

Congress did not restrict EPA to remedial regulation when it enacted CAA § 202(a). That section mandates that EPA promulgate new emission

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standards if it determines that the air pollution at issue “may reasonably be anticipated to endanger public health or welfare.” 42 U.S.C. § 7521(a)(1). This language requires a precautionary, forward-looking scientific judgment about the risks of a particular air pollutant, consistent with the CAA’s “precautionary and preventive orientation.” *Lead Indus. Ass’n, Inc. v. EPA*, 647 F.2d 1130, 1155 (D.C.Cir.1980). Requiring that EPA find “certain” endangerment of public health or welfare before regulating greenhouse gases would effectively prevent EPA from doing the job Congress gave it in § 202(a) – utilizing emission standards to prevent reasonably anticipated endangerment from maturing into concrete harm. *Cf. id.* (“[R]equiring EPA to wait until it can conclusively demonstrate that a particular effect is adverse to health before it acts is inconsistent with both the [CAA]’s precautionary and preventive orientation and the nature of the Administrator’s statutory responsibilities. Congress provided that the Administrator is to use his judgment in setting air quality standards precisely to permit him to act in the face of uncertainty.”).

In *Massachusetts v. EPA* the Supreme Court confirmed that EPA may make an endangerment finding despite lingering scientific uncertainty. Indeed, the Court held that the existence of “some residual uncertainty” did not excuse EPA’s decision to decline to regulate greenhouse gases. *Massachusetts v. EPA*, 549 U.S. at 534, 127 S.Ct. 1438. To avoid regulating emissions of greenhouse gases, EPA would

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need to show “scientific uncertainty . . . so profound that it precludes EPA from making a reasoned judgment as to whether greenhouse gases contribute to global warming.” *Id.* Clearly, then, EPA may issue an endangerment finding even while the scientific record still contains at least “some residual uncertainty.” Industry Petitioners have shown no more than that.

In the end, Petitioners are asking us to re-weigh the scientific evidence before EPA and reach our own conclusion. This is not our role. As with other reviews of administrative proceedings, we do not determine the convincing force of evidence, nor the conclusion it should support, but only whether the conclusion reached by EPA is supported by substantial evidence when considered on the record as a whole. *See, e.g., New York v. EPA*, 413 F.3d 3, 30 (D.C.Cir.2005). When EPA evaluates scientific evidence in its bailiwick, we ask only that it take the scientific record into account “in a rational manner.” *Am. Petroleum Inst. v. Costle*, 665 F.2d 1176, 1187 (D.C.Cir.1981). Industry Petitioners have not shown that EPA failed to do so here.

**C.**

State Petitioners, here led by Texas, contend that the Endangerment Finding is arbitrary and capricious because EPA did not “define,” “measure,” or “quantify” either the atmospheric concentration at which greenhouse gases endanger public health or

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welfare, the rate or type of climate change that it anticipates will endanger public health or welfare, or the risks or impacts of climate change. According to Texas, without defining these thresholds and distinguishing “safe” climate change from climate change that endangers, EPA’s Endangerment Finding is just a “subjective conviction.”

It is true that EPA did not provide a quantitative threshold at which greenhouse gases or climate change will endanger or cause certain impacts to public health or welfare. The text of CAA § 202(a)(1) does not require that EPA set a precise numerical value as part of an endangerment finding. Quite the opposite; the § 202(a)(1) inquiry necessarily entails a case-by-case, sliding-scale approach to endangerment because “[d]anger . . . is not set by a fixed probability of harm, but rather is composed of reciprocal elements of risk and harm, or probability and severity.” *Ethyl*, 541 F.2d at 18. EPA need not establish a minimum threshold of risk or harm before determining whether an air pollutant endangers. It may base an endangerment finding on “a lesser risk of greater harm . . . or a greater risk of lesser harm” or any combination in between. *Id.*

*Ethyl* is instructive. There, EPA made an endangerment finding for airborne lead. During its endangerment inquiry, EPA initially tried to do what Texas asks of it here: find a specific concentration of the air pollutant below which it would be considered “safe” and above which it would endanger public health. *Id.* at 56. However, EPA abandoned that

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approach because it failed to account for “the wide variability of dietary lead intake” and lacked predictive value. EPA substituted a “more qualitative” approach, which relied on “predictions based on uncertain data” along with clinical studies. *Id.* at 56-57. This court upheld the endangerment finding that used that qualitative approach despite the lack of a specific endangerment “threshold.”

In its essence, Texas’s call for quantification of the endangerment is no more than a specialized version of Industry Petitioners’ claim that the scientific record contains too much uncertainty to find endangerment. EPA relied on a substantial record of empirical data and scientific evidence, making many specific and often quantitative findings regarding the impacts of greenhouse gases on climate change and the effects of climate change on public health and welfare. Its failure to distill this ocean of evidence into a specific number at which greenhouse gases cause “dangerous” climate change is a function of the precautionary thrust of the CAA and the multivariate and sometimes uncertain nature of climate science, not a sign of arbitrary or capricious decision-making.

**D.**

EPA defined both the “air pollution” and the “air pollutant” that are the subject of the Endangerment Finding as an aggregate of six greenhouse gases, which EPA called “well mixed greenhouse gases”: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide

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(N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Industry Petitioners argue that EPA's decision to include PFCs and SF<sub>6</sub> in this group of greenhouse gases was arbitrary and capricious primarily because motor vehicles generally do not emit these two gases.

No petitioner for review of the Endangerment Finding has established standing to make this argument. Industry Petitioners concede that EPA's decision to regulate PFCs and SF<sub>6</sub> along with the other four greenhouse gases does not injure any motor-vehicle-related petitioner. Nor has any non-motor-vehicle-related petitioner shown an injury-in-fact resulting from EPA's inclusion of these two gases in the six-gas amalgam of "well-mixed greenhouse gases." At oral argument, Industry Petitioners asserted for the first time that certain utility companies – members of associations that petitioned for review of the Endangerment Finding – own utility transformers that emit SF<sub>6</sub>. However, they never demonstrated or even definitively asserted that any of these companies would not be subject to regulation or permitting requirements but for EPA's decision to include SF<sub>6</sub> as part of the "well-mixed greenhouse gases" that are the subject of the Endangerment Finding. *See Sierra Club v. EPA*, 292 F.3d 895, 898-900 (D.C.Cir.2002) (requiring that a petitioner seeking review of agency action demonstrate standing by affidavit or other evidence if standing is not "self-evident" from the administrative record). Absent a petitioner with standing to challenge EPA's inclusion

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of PFCs and SF<sub>6</sub> in the “air pollution” at issue, this court lacks jurisdiction to address the merits of Industry Petitioners’ contention.

**E.**

EPA did not submit the Endangerment Finding for review by its Science Advisory Board (SAB). Industry Petitioners claim that EPA’s failure to do so violates its mandate to “make available” to the SAB “any proposed criteria document, standard, limitation, or regulation under the Clean Air Act” at the time it provides the same “to any other Federal agency for formal review and comment.” 42 U.S.C. § 4365(c)(1); *see Am. Petroleum Inst.*, 665 F.2d at 1188.

To begin with, it is not clear that EPA provided the Endangerment Finding “to any other Federal agency for formal review and comment,” which triggers this duty to submit a regulation to the SAB. EPA only submitted a draft of the Endangerment Finding to the Office of Information and Regulatory Affairs pursuant to Executive Order 12,866. EPA contends that this was merely an *informal* review process, not “formal review and comment” – at least when compared with a statutory review-and-comment requirement in which other agencies are given the opportunity to provide written comments about the impacts of a proposed regulation on the reviewing agency’s universe of responsibility. *See, e.g.*,

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49 U.S.C. § 32902(j). Industry Petitioners failed to respond to this contention.

In any event, even if EPA violated its mandate by failing to submit the Endangerment Finding to the SAB, Industry Petitioners have not shown that this error was “of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made.” 42 U.S.C. § 7607(d)(8); *see Am. Petroleum Inst.*, 665 F.2d at 1188-89 (applying this standard to EPA’s failure to submit an ozone standard to the SAB).

**F.**

Lastly, State Petitioners maintain that EPA erred by denying all ten petitions for reconsideration of the Endangerment Finding. Those petitions asserted that internal e-mails and documents released from the University of East Anglia’s Climate Research Unit (CRU) – a contributor to one of the global temperature records and to the IPCC’s assessment report – undermined the scientific evidence supporting the Endangerment Finding by calling into question whether the IPCC scientists adhered to “best science practices.” *EPA’s Denial of the Petitions To Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* (“Reconsideration Denial”), 75 Fed. Reg. 49,556, 49,556-57 (Aug. 13, 2010). The petitions pointed to factual mistakes in

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the IPCC's assessment report resulting from the use of non-peer-reviewed studies and several scientific studies postdating the Endangerment Finding as evidence that the Endangerment Finding was flawed. *Id.*

On August 13, 2010, EPA issued a denial of the petitions for reconsideration accompanied by a 360-page response to petitions (RTP). *Id.* at 49,556. It determined that the petitions did not provide substantial support for the argument that the Endangerment Finding should be revised. According to EPA, the petitioners' claims based on the CRU documents were exaggerated, contradicted by other evidence, and not a material or reliable basis for questioning the credibility of the body of science at issue; two of the factual inaccuracies alleged in the petitions were in fact mistakes, but both were "tangential and minor" and did not change the key IPCC conclusions; and the new scientific studies raised by some petitions were either already considered by EPA, misinterpreted or misrepresented by petitioners, or put forth without acknowledging other new studies. *Id.* at 49,557-58.

1.

EPA is required to convene a proceeding for reconsideration of a rule if a party raising an objection to the rule

can demonstrate to the Administrator that it was impracticable to raise such objection

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within such time or if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule.

42 U.S.C. § 7607(d)(7)(B). For the purpose of determining whether to commence reconsideration of a rule, EPA considers an objection to be of “central relevance to the outcome” of that rule “if it provides substantial support for the argument that the regulation should be revised.” Reconsideration Denial, 75 Fed. Reg. at 49,561.

State Petitioners have not provided substantial support for their argument that the Endangerment Finding should be revised. State Petitioners point out that some studies the IPCC referenced in its assessment were not peer-reviewed, but they ignore the fact that (1) the IPCC assessment relied on around 18,000 studies that were peer-reviewed, and (2) the IPCC’s report development procedures expressly permitted the inclusion in the assessment of some non-peer-reviewed studies (“gray” literature).

Moreover, as EPA determined, the limited inaccurate information developed from the gray literature does not appear sufficient to undermine the substantial overall evidentiary support for the Endangerment Finding. State Petitioners have not, as they assert, uncovered a “pattern” of flawed science. Only two of the errors they point out seem to be errors at all, and EPA relied on neither in making the Endangerment Finding. First, as State

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Petitioners assert, the IPCC misstated the percentage of the Netherlands that is below sea level, a statistic that was used for background information. However, the IPCC corrected the error, and EPA concluded that the error was “minor and had no impact,” and the Endangerment Finding did not refer to the statistic in any way. *Id.* at 49,576-77. Second, the IPCC acknowledged misstating the rate at which Himalayan glaciers are receding. EPA also did not rely on that projection in the Endangerment Finding. *Id.* at 49,577.

State Petitioners also contend that a new study contradicts EPA’s reliance on a projection of more violent storms in the future as a result of climate change, but the study they cite only concerns past trends, not projected future storms. The record shows that EPA considered the new studies on storm trends and concluded that the studies were consistent with the Endangerment Finding. In sum, State Petitioners have failed to show that these isolated “errors” provide substantial support for their argument to overturn the Endangerment Finding.

## 2.

State Petitioners’ further argument that EPA erred in denying reconsideration fails as well. These Petitioners claim EPA erred by failing to provide notice and comment before denying the petitions for reconsideration because EPA’s inclusion of a 360-page RTP amounted to a revision of the Endangerment

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Finding, and revision of a rule requires notice and comment. The RTP, however, appears to be exactly what EPA called it – a response to the petitions for reconsideration, not a revision of the Endangerment Finding itself. EPA certainly may deny petitions for reconsideration of a rule and provide an explanation for that denial, including by providing support for that decision, without triggering a new round of notice and comment for the rule.

**III.**

State and Industry Petitioners contend that in promulgating the Tailpipe Rule, EPA relied on an improper interpretation of CAA § 202(a)(1), and was arbitrary and capricious in failing to justify and consider the cost impacts of its conclusion that the Rule triggers stationary-source regulation under the PSD and Title V provisions. They do not challenge the substantive standards of the Rule and focus principally on EPA's failure to consider the cost of stationary-source permitting requirements triggered by the Rule. Positing an absurd-consequences scenario, Petitioners maintain that if EPA had considered these costs it "would have been forced" to exclude carbon dioxide from the scope of the emission standards, to decline to issue greenhouse gas emission standards at all, or "to interpret the statute so as not to automatically trigger stationary source regulation." Industry Tailpipe Br. 17; *see also* Industry Tailpipe Reply Br. 8-9. Both the plain text of

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Section 202(a) and precedent refute Petitioners' contentions.

A.

Section 202(a)(1) provides:

The Administrator shall by regulation prescribe . . . standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.

42 U.S.C. § 7521(a)(1). By employing the verb “shall,” Congress vested a non-discretionary duty in EPA. See *Sierra Club v. Jackson*, 648 F.3d 848, 856 (D.C.Cir.2011). The plain text of Section 202(a)(1) thus refutes Industry Petitioners' contention that EPA had discretion to defer issuance of motor-vehicle emission standards on the basis of stationary-source costs. Neither the adjacent text nor the statutory context otherwise condition this clear “language of command,” *id.* (citation omitted). Having made the Endangerment Finding pursuant to CAA § 202(a), 42 U.S.C. § 7521(a), EPA lacked discretion to defer promulgation of the Tailpipe Rule on the basis of its trigger of stationary-source permitting requirements under the PSD program and Title V.

The Supreme Court's decision in *Massachusetts v. EPA* compels this interpretation of Section 202(a)(1).

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“If EPA makes a finding of endangerment, the Clean Air Act requires the [a]gency to regulate emissions of the deleterious pollutant from new motor vehicles.” 549 U.S. at 533, 127 S.Ct. 1438. “Under the clear terms of the Clean Air Act, EPA can avoid taking further action *only if* it determines that greenhouse gases do not contribute to climate change *or if* it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.” *Id.* (emphasis added). In the Endangerment Finding, EPA determined that motor-vehicle emissions contribute to greenhouse gas emissions that, in turn, endanger the public health and welfare; the agency therefore was in no position to “avoid taking further action,” *id.*, by deferring promulgation of the Tailpipe Rule. Given the non-discretionary duty in Section 202(a)(1) and the limited flexibility available under Section 202(a)(2), which this court has held relates only to the motor-vehicle industry, *see infra* Part III.C, EPA had no statutory basis on which it could “ground [any] reasons for” further inaction, *Massachusetts v. EPA*, 549 U.S. at 535, 127 S.Ct. 1438.

The plain text of Section 202(a)(1) also negates Industry Petitioners’ contention that EPA had discretion to defer the Tailpipe Rule on the basis of NHTSA’s authority to regulate fuel economy. The Supreme Court dismissed a near-identical argument in *Massachusetts v. EPA*, rejecting the suggestion that EPA could decline to regulate carbon-dioxide emissions because the Department of Transportation

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(DOT) had independent authority to set fuel-efficiency standards. *Id.* at 531-32, 127 S.Ct. 1438. “[T]hat DOT sets mileage standards in no way licenses EPA to shirk its environmental responsibilities,” because EPA’s duty to promulgate emission standards derives from “a statutory obligation wholly independent of DOT’s mandate to promote energy efficiency.” *Id.* at 532, 127 S.Ct. 1438. Just as EPA lacks authority to refuse to regulate on the grounds of NHTSA’s regulatory authority, EPA cannot defer regulation on that basis. A comparison of the relevant statutes bolsters this conclusion. *Compare* 49 U.S.C. § 32902(f) (“When deciding maximum feasible average fuel economy . . . , the Secretary of Transportation shall consider . . . the effect of other motor vehicle standards of the Government on fuel economy. . . .”), *with* 42 U.S.C. § 7521(a) (including no such direction). Nor, applying the same reasoning, was EPA required to treat NHTSA’s proposed regulations as establishing the baseline for the Tailpipe Rule. Furthermore, the Tailpipe Rule provides benefits above and beyond those resulting from NHTSA’s fuel-economy standards. *See, e.g.*, Tailpipe Rule, 75 Fed. Reg. at 25,490 (Table III.F.1-2), 25,636 (Table IV.G.1-4). Petitioners’ related contentions regarding the PSD permitting triggers are addressed in Part V.

**B.**

Turning to the APA, Industry Petitioners contend, relying on *Small Refiner Lead Phase-Down*

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*Task Force v. EPA*, 705 F.2d 506, 525 (D.C.Cir.1983), and *Ethyl Corp. v. EPA*, 541 F.2d 1 (D.C.Cir.1976), that EPA failed both to justify the Tailpipe Rule in terms of the risk identified in the Endangerment Finding and to show that the proposed standards “would meaningfully mitigate the alleged endangerment,” Industry Tailpipe Br. 35. Instead, they maintain that EPA “separated these two integral steps,” *id.* at 11, and “concluded that it had no obligation to show . . . ‘the resulting emissions control strategy or strategies will have some significant degree of harm reduction or effectiveness in addressing the endangerment,’” *id.* at 11-12 (quoting Endangerment Finding, 74 Fed. Reg. at 66,508). These contentions fail.

Petitioners’ reliance on *Small Refiner*, 705 F.2d at 525, is misplaced; the court there laid out guidelines for assessing EPA’s discretion to set numerical standards and Petitioners do not challenge the substance of the emission standards. In *Ethyl*, 541 F.2d at 7, the court assessed the scope of EPA’s authority, under CAA § 211(c)(1), 42 U.S.C. § 1857f-6c(c)(1) (1970) (*currently codified as amended at 42 U.S.C. § 7545(c)(1)*), to regulate lead particulate in motor-vehicle emissions. The court rejected the argument that the regulations had to “be premised upon factual proof of actual harm,” *Ethyl*, 541 F.2d at 12, and instead deferred to EPA’s reasonable interpretation that regulations could be based on a “significant risk of harm,” *id.* at 13. Nothing in *Ethyl* implied that EPA’s authority to regulate was

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conditioned on evidence of a particular level of mitigation; only a showing of significant *contribution* was required. EPA made such a determination in the Endangerment Finding, concluding that vehicle emissions are a significant contributor to domestic greenhouse gas emissions. *See, e.g.*, Endangerment Finding, 74 Fed. Reg. at 66,499. Further, in the preamble to the Tailpipe Rule itself, EPA found that the emission standards would result in meaningful mitigation of greenhouse gas emissions. For example, EPA estimated that the Rule would result in a reduction of about 960 million metric tons of CO<sub>2</sub>e emissions over the lifetime of the model year 2012-2016 vehicles affected by the new standards. *See* Tailpipe Rule, 75 Fed. Reg. at 25,488-90. Other precedent is likewise unhelpful to Petitioners: in *Chemical Manufacturers Association v. EPA*, 217 F.3d 861, 866 (D.C.Cir.2000), “nothing in the record” indicated that the challenged regulatory program would “directly or indirectly, further the Clean Air Act’s environmental goals,” whereas here the record is fulsome, *see supra* Part II.

**C.**

Petitioners also invoke Section 202(a)(2) as support for their contention that EPA must consider stationary-source costs in the Tailpipe Rule. Section 202(a)(2) provides:

Any regulation prescribed under paragraph (1) of this subsection . . . shall take effect

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after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.

42 U.S.C. § 7521(a)(2). State Petitioners maintain the reference to compliance costs encompasses those experienced by stationary sources under the PSD program, while Industry Petitioners maintain stationary-source costs are a relevant factor in EPA's Section 202(a)(1) rulemaking. This court, however, has held that the Section 202(a)(2) reference to compliance costs encompasses only the cost to the motor-vehicle industry to come into compliance with the new emission standards, and does not mandate consideration of costs to other entities not directly subject to the proposed standards. *See Motor & Equip. Mfrs. Ass'n, Inc. v. EPA*, 627 F.2d 1095, 1118 (D.C.Cir.1979).

**D.**

Petitioners' remaining challenges to the Tailpipe Rule fail as well. In Part II, the court rejects the contention that the Tailpipe Rule fails due to flaws in the underlying Endangerment Finding. The record also refutes Industry Petitioners' suggestion that EPA "employed a shell game to avoid," Industry Tailpipe Reply Br. 9 (capitalization removed), responding to comments regarding stationary-source costs. Industry Tailpipe Br. 19-20; *see also* Industry Tailpipe Reply Br. 14-15. EPA adequately responded to "significant

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comments,” 42 U.S.C. § 7607(d)(6)(B). *See, e.g.*, Tailpipe Rule, 75 Fed. Reg. at 25,401-02; Tailpipe Rule, Response to Comments at 7-65 to 7-69. And, assuming other statutory mandates provide a basis for judicial review, *see* Industry Tailpipe Br. 21-22 (listing mandates); *see, e.g.*, *Small Refiner*, 705 F.2d at 537-39, the record shows EPA’s compliance, *see* Tailpipe Rule, 75 Fed. Reg. at 25,539-42, and that EPA was not arbitrary and capricious by not considering stationary-source costs in its analyses. *See, e.g.*, *Michigan v. EPA*, 213 F.3d 663, 689 (D.C.Cir.2000); *Mid-Tex Elec. Coop., Inc. v. FERC*, 773 F.2d 327, 341-42 (D.C.Cir.1985). EPA’s economic impact assessment conducted pursuant to CAA § 317, 42 U.S.C. § 7617, does not provide grounds for granting the petitions because Petitioners’ contentions that EPA, “[i]n defiance of these requirements, . . . refused to estimate or even consider the costs of the [Tailpipe Rule] for stationary sources,” Industry Tailpipe Br. 22, are no more than another attempt to avoid the plain text of Section 202(a). *See also* 42 U.S.C. § 7617(e).

**IV.**

We turn next to the stationary source regulations. As noted *supra* in Part I, EPA’s interpretation of the CAA requires PSD and Title V permits for stationary sources whose potential emissions exceed statutory thresholds for *any* regulated pollutant – including greenhouse gases. Industry Petitioners now challenge EPA’s

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longstanding interpretation of the scope of the permitting requirements for construction and modification of major emitting facilities under CAA Sections 165(a) and 169(1), 42 U.S.C. §§ 7475(a) & 7479(1) (“the PSD permitting triggers”). EPA maintains that this challenge is untimely because its interpretation of the PSD permitting triggers was set forth in its 1978, 1980, and 2002 Rules.

In 1978, EPA defined “major stationary source” as a source that emits major amounts of “any air pollutant regulated under the [CAA].” *Part 51 – Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Prevention of Significant Air Quality Deterioration* (“1978 Implementation Plan Requirements”), 43 Fed. Reg. 26,380, 26,382 (June 19, 1978). Industry petitioners’ challenge to the 1978 Rule in *Alabama Power Co. v. Costle*, 636 F.2d 323 (D.C.Cir.1980) reflected their understanding that EPA would apply the PSD permitting program to both pollutants regulated pursuant to National Ambient Air Quality Standards (NAAQS) and other regulated pollutants. *See* Br. for Industry Pet’rs on Regulation of Pollutants other than Sulfur Dioxide and Particulates, No. 78-1006 (and consolidated cases) (Dec. 19, 1978) at 10, 12. In the 1980 Rule, EPA highlighted that to be subject to PSD review, a “source need only emit *any* pollutant in major amounts (i.e., the amounts specified in [CAA § 169(1)]) and be located in an area designated attainment or unclassifiable for that or any other pollutant.” 1980 Implementation Plan Requirements,

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45 Fed. Reg. at 52,711 (emphasis in original). EPA explained that “any pollutant” meant “both criteria pollutants, for which national ambient air quality standards have been promulgated, and non-criteria pollutants subject to regulation under the Act.” *Id.* The same explanation of EPA’s interpretation appeared in the 2002 Rule. *Prevention of Significant Deterioration and Nonattainment New Source Review*, 67 Fed. Reg. 80,186, 80,239-40, 80,264 (Dec. 31, 2002).

CAA Section 307(b)(1) provides that a petition for review of any promulgated nationally applicable regulations:

“shall be filed within sixty days from the date notice of such promulgation . . . appears in the Federal Register, except that if such petition is based solely on grounds arising after such sixtieth day, then any petition for review . . . shall be filed within sixty days after such grounds arise.”

42 U.S.C. § 7607(b)(1). The exception encompasses the occurrence of an event that ripens a claim. See *Chamber of Commerce v. EPA*, 642 F.3d 192, 208 n. 14 (D.C.Cir.2011); *Am. Rd. & Transp. Builders Ass’n v. EPA*, 588 F.3d 1109, 1113 (D.C.Cir.2009). EPA acknowledges this precedent, but maintains that the “new grounds” exception is narrow and inapplicable because Industry Petitioners’ challenge to EPA’s interpretation of the PSD permitting triggers is based on legal arguments that were available during the normal judicial review

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periods for the 1978, 1980, and 2002 Rules, and the “new ground” on which they now rely is a factual development, namely the regulation of greenhouse gases by the Tailpipe Rule. This is correct so far as it goes, but fails to demonstrate that Industry Petitioners’ challenge is untimely.

Industry Petitioners point out that two petitioners – the National Association of Home Builders (NAHB) and National Oilseed Processors Association (NOPA) – have newly ripened claims as a result of the Tailpipe Rule, which had the effect of expanding the PSD program to never-regulated sources:

- NAHB’s members construct single family homes, apartment buildings, and commercial buildings. According to the Vice President of Legal Affairs, prior to the Tailpipe Rule, no member of NAHB was a major source of any regulated pollutant, and thus no member was ever required to obtain a PSD permit. Decl. of Thomas J. Ward, Vice President of Legal Affairs for NAHB, ¶ 6 (May 10, 2011). Since the Tailpipe Rule rendered greenhouse gases a regulated pollutant, it is now certain that NAHB members that engage in construction projects that emit greenhouse gases in major amounts will have to obtain PSD permits sometime in the future. *Id.* at ¶¶ 7, 8. Indeed, EPA estimated that 6,397 multifamily buildings and 515 single family homes would trigger PSD review

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annually absent the Tailoring Rule. *See Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule; Proposed Rule* (“Proposed Tailoring Rule”), 74 Fed. Reg. 55,292, 55,338 (Oct. 27, 2009).

- NOPA’s members are large companies that monthly produce millions of tons of vegetable meals and over a billion pounds of oils from oilseeds, such as soybeans. *See, e.g.,* NOPA, January 2012 Statistical Report (Feb. 14, 2012) *available at* [www.nopa.org](http://www.nopa.org) ; NOPA, February 2012 Statistical Report (Mar. 14, 2012), *available at* [www.nopa.org](http://www.nopa.org). According to the Executive Vice President of Regulatory Affairs, NOPA members operate facilities that are major sources of criteria pollutants and, for this reason, are subject to PSD review. Decl. of David C. Ailor, Executive Vice President of Regulatory Affairs of NOPA, ¶ 8 (May 10, 2011). Prior to promulgation of the Tailpipe Rule, no member’s facility had triggered PSD review by virtue of emissions of a non-criteria pollutant. *Id.* Now that greenhouse gases are a regulated non-criteria pollutant, many NOPA members will have to obtain PSD permits as result of their facilities’ emissions of a non-criteria pollutant. *Id.* at ¶¶ 9, 10. For some NOPA members this time is not far off because renovations to their facilities will result in greenhouse gas

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emissions above the significance thresholds set by the Tailoring Rule, 75 Fed. Reg. at 31,567. *Id.* at ¶ 9.

Industry Petitioners thus maintain that because NAHB and NOPA filed their petitions on July 6, 2010, within 60 days of the promulgation of the Tailpipe Rule in the Federal Register on May 7, 2010, their challenges are timely.

“Ripeness, while often spoken of as a justiciability doctrine distinct from standing, in fact shares the constitutional requirement of standing that an injury in fact be certainly impending.” *Nat’l Treasury Emp. Union v. United States*, 101 F.3d 1423, 1427 (D.C.Cir.1996). During an initial review period, although purely legal claims may be justiciable and, thus, prudentially ripe, a party without an immediate or threatened injury lacks a constitutionally ripe claim. *See Baltimore Gas & Elec. Co. v. ICC*, 672 F.2d 146, 149 (D.C.Cir.1982). EPA’s position would conflate the constitutional and prudential considerations. Constitutional ripeness exists where a challenge “involve[s], at least in part, the existence of a live ‘Case or Controversy.’” *Duke Power Co. v. Carolina Envtl. Study Group*, 438 U.S. 59, 81, 98 S.Ct. 2620, 57 L.Ed.2d 595 (1978). Prudential considerations embodied in the ripeness doctrine relate to “the fitness of the issues for judicial decision and the hardship to the parties of withholding court consideration.” *Abbott Labs. v. Gardner*, 387 U.S. 136, 149, 87 S.Ct. 1507, 18 L.Ed.2d 681 (1967); *see Duke Power*, 438 U.S. at 81, 98 S.Ct. 2620. Standing to

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challenge agency action exists where a petitioner can demonstrate an “injury in fact” that is fairly traceable to the challenged action and is likely to be redressed by a favorable judicial decision. *Reyblatt v. NRC*, 105 F.3d 715, 721 (D.C.Cir.1997) (citing *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560-61, 112 S.Ct. 2130, 119 L.Ed.2d 351 (1992)).

Had NAHB and NOPA challenged EPA’s interpretation of the PSD permitting triggers in 1978, 1980, or 2002, as EPA suggests, the court would have lacked jurisdiction under Article III of the Constitution because their alleged injuries were only speculative. See, e.g., *Occidental Permian Ltd. v. FERC*, 673 F.3d 1024, 1026 (D.C.Cir.2012); *Baltimore Gas & Elec. Co.*, 672 F.2d at 149. At that time, NAHB and NOPA could have shown only the possibility that their members would be injured if EPA were someday to determine that greenhouse gases were a pollutant that endangers human health and welfare and to adopt a rule regulating the greenhouse gas emissions of stationary sources. EPA does not challenge the assertions in the NAHB and NOPA declarations, which establish no such rule was promulgated prior to the Tailpipe Rule.

The NAHB and NOPA challenges ceased to be speculative when EPA promulgated the Tailpipe Rule regulating greenhouse gases and their challenges ripened because of the “substantial probability” of injury to them. See *Baltimore Gas & Elec. Co.*, 672 F.2d at 149. Although, as EPA notes, other Industry Petitioners’ challenges to EPA’s interpretation of the

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PSD permitting triggers ripened decades earlier, this court has assured petitioners with unripe claims that “they will not be foreclosed from judicial review when the appropriate time comes,” *Grand Canyon Air Tour Coalition v. FAA*, 154 F.3d 455, 473 (D.C.Cir.1998), and that they “need not fear preclusion by reason of the 60-day stipulation [barring judicial review],” *Baltimore Gas & Elec. Co.*, 672 F.2d at 149-50. EPA expresses concern that allowing NAHB and NOPA to litigate their newly ripened claims will have far-reaching implications for finality of agency actions, but “the ripeness doctrine reflects a judgment that the disadvantages of a premature review that may prove too abstract or unnecessary ordinarily outweigh the additional costs of – even repetitive – . . . litigation.” *Ohio Forestry Ass’n, Inc. v. Sierra Club*, 523 U.S. 726, 735, 118 S.Ct. 1665, 140 L.Ed.2d 921 (1998). Some limitations inhere in doctrines such as *stare decisis* or the law-of-the-circuit doctrine, see *LaShawn A. v. Barry*, 87 F.3d 1389, 1395 (D.C.Cir.1996) (en banc).

Because petitioners NAHB and NOPA’s challenges to EPA’s PSD permitting triggers are newly ripened upon promulgation of the Tailpipe Rule and they filed petitions for review within sixty days thereof, their challenge to EPA’s interpretation of the PSD permitting triggers is timely.

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## V.

Having established that Industry Petitioners' challenges to the PSD permitting triggers are both timely and ripe, we turn to the merits of their claims.

## A.

CAA Title I, Part C – entitled “Prevention of Significant Deterioration of Air Quality” (PSD) – largely focuses on the maintenance of national ambient air quality standards (NAAQS). Under the PSD program, EPA designates specific pollutants as “NAAQS pollutants” and sets national ambient air quality standards for those pollutants – requiring, for example, that the concentration of a given NAAQS pollutant may not exceed more than a certain number of parts per billion in the ambient air. *See generally* 42 U.S.C. § 7407. Thus far, EPA has designated six NAAQS pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide. None of these NAAQS pollutants is one of the six well-mixed greenhouse gases defined as an “air pollutant” in the Endangerment Finding. *See* Environmental Protection Agency, National Ambient Air Quality Standards, *available at* <http://www.epa.gov/air/criteria.html> (last visited May 3, 2012); Endangerment Finding, 74 Fed. Reg. 66,536-37.

Acting upon information submitted by states, EPA then determines whether each region of the country is in “attainment” or “nonattainment” with the promulgated air quality standard for each

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NAAQS pollutant, or, alternatively, whether a region is “unclassifiable” for that pollutant. 42 U.S.C. § 7407(d)(1)(A). An area in attainment for a NAAQS pollutant is “any area . . . that meets the . . . ambient air quality standard for the pollutant.” *Id.* § 7407(d)(1)(A)(ii). By contrast, an area in nonattainment for a NAAQS pollutant is “any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national . . . ambient air quality standard for the pollutant.” *Id.* § 7407(d)(1)(A)(i). Finally, an unclassifiable area is any area that “cannot be classified on the basis of available information as meeting or not meeting the . . . ambient air quality standard for the pollutant.” *Id.* § 7407(d)(1)(A)(iii).

The PSD program applies to those areas of the United States designated as in “attainment” or “unclassifiable” for any NAAQS pollutant, *see id.* § 7471, and requires permits for major emitting facilities embarking on construction or modification projects in those regions. *Id.* § 7475(a). A separate part of Title I of the CAA, Part D, governs the construction and modification of sources in nonattainment regions. *See id.* §§ 7501, 7502. It bears emphasis that attainment classifications are pollutant-specific: depending on the levels of each NAAQS pollutant in an area, a region can be designated as in attainment for NAAQS pollutant A, but in nonattainment for NAAQS pollutant B. If a major emitting facility in such a region wishes to undertake a construction or modification project, both

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Part C and Part D's substantive requirements apply – that is, the source must obtain a general PSD permit and must also abide by Part D's more stringent, pollutant-specific requirements for any NAAQS pollutants for which the area is in nonattainment. *See* 1980 Implementation Plan Requirements, 45 Fed. Reg. at 52,711-12 (“where a source emits in major amounts a pollutant for which the area in which the source would locate is designated nonattainment, Part D NSR rather than Part C PSD review should apply to those pollutants.”) (emphasis added).

The key substantive provision in the PSD program is CAA Section 165(a), which establishes permitting requirements for “major emitting facilities” located in attainment or unclassifiable regions. In relevant part, section 165(a) provides that “[n]o major emitting facility . . . may be constructed in any area to which this part applies unless” the facility obtains a PSD permit. 42 U.S.C. § 7475(a). To obtain a PSD permit, a covered source must, among other things, install the “best available control technology [BACT] for each pollutant subject to regulation under [the CAA]” – regardless of whether that pollutant is a NAAQS pollutant. *Id.* § 7475(a)(4). Since the Tailpipe Rule became effective, EPA has regulated automotive greenhouse gas emissions under Title II of the Act. Thus, greenhouse gases are now a “pollutant subject to regulation under” the Act, and, as required by the statute itself, any “major emitting facility” covered by the PSD program must install BACT for greenhouse gases. *See id.*

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The dispute in this case centers largely on the scope of the PSD program – specifically, which stationary sources count as “major emitting facilities” subject to regulation. CAA Section 169(1) defines “major emitting facility,” for the purposes of the PSD program, as a stationary source “which emit[s], or [has] the potential to emit” either 100 tons per year (tpy) or 250 tpy of “any air pollutant.” 42 U.S.C. § 7479(1) (emphasis added). As discussed *supra* in Part I, whether the 100 or 250 tpy threshold applies depends on the type of source. Certain listed categories of sources – for example, iron and steel mill plants – qualify as “major emitting facilities” if they have the potential to emit over 100 tons per year of “any air pollutant.” *Id.* All other stationary sources are “major emitting facilities” if they have the potential to emit over 250 tons per year of “any air pollutant.” *Id.*

As mentioned above, since 1978 EPA has interpreted the phrase “any air pollutant” in the definition of “major emitting facility” as “any air pollutant regulated under the CAA.” *See* 1978 Implementation Plan Requirements, 43 Fed. Reg. at 26,388, 26,403; *supra* Part IV. Thus, because the PSD program covers “major emitting facilities” in “any area to which this part applies,” 42 U.S.C. § 7475, EPA requires PSD permits for stationary sources that 1) are located in an area designated as attainment or unclassifiable for any NAAQS pollutant, and 2) emit 100/250 tpy of any regulated air pollutant, regardless of whether that pollutant is itself a NAAQS pollutant.

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*See* 1980 Implementation Plan Requirements, 45 Fed. Reg. at 52,710-11. Consequently, once the Tailpipe Rule took effect and made greenhouse gases a regulated pollutant under Title II of the Act, the PSD program automatically applied to facilities emitting over 100/250 tpy of greenhouse gases. But because immediate regulation of greenhouse gas-emitting sources exceeding the 100/250 tpy benchmark would result in “overwhelming permitting burdens that would . . . fall on permitting authorities and sources,” Tailoring Rule, 75 Fed. Reg. at 31,516, EPA’s Tailoring Rule provided that, for now, sources are subject to PSD permitting requirements only if they have the potential to emit over 100,000 tpy of greenhouse gases (for a construction project) or 75,000 tpy (for a modification project). *Id.* at 31,523; *see also infra*, Part VI.

According to EPA, its longstanding interpretation of the phrase “any air pollutant” – “any air pollutant regulated under the CAA” – is compelled by the statute. *See id.* at 31,517. Disputing this point, Industry Petitioners argue that the phrase is capable of a far more circumscribed meaning and that EPA could have – and should have – avoided extending the PSD permitting program to major greenhouse gas emitters. For the reasons discussed below, we agree with EPA that its longstanding interpretation of the PSD permitting trigger is statutorily compelled. Thus, as EPA argues, it “must give effect to the unambiguously expressed intent of Congress,” *Chevron*, 467 U.S. at 843, 104 S.Ct. 2778, which here

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requires PSD coverage for major emitters of any regulated air pollutant.

We begin our analysis, as we must, with the statute's plain language. *See Chevron*, 467 U.S. at 842, 104 S.Ct. 2778 (“First, always, is the question whether Congress has directly spoken to the precise question at issue.”). CAA Section 169(1) requires PSD permits for stationary sources emitting major amounts of “*any* air pollutant.” 42 U.S.C. § 7479(1) (emphasis added). On its face, “the word ‘any’ has an expansive meaning, that is, ‘one or some indiscriminately of whatever kind,’” *United States v. Gonzales*, 520 U.S. 1, 5, 117 S.Ct. 1032, 137 L.Ed.2d 132 (1997) (quoting WEBSTER’S THIRD NEW INTERNATIONAL DICTIONARY 97 (1976)). Greenhouse gases are indisputably an “air pollutant.” *See Massachusetts v. EPA*, 549 U.S. at 528-29, 127 S.Ct. 1438. Congress’s use of the broad, indiscriminate modifier “any” thus strongly suggests that the phrase “any air pollutant” encompasses greenhouse gases.

This plain-language reading of the statute is buttressed by the Supreme Court’s decision in *Massachusetts v. EPA*. There the Court determined that CAA’s overarching definition of “air pollutant” in Section 302(g) – which applies to all provisions of the Act, including the PSD program – unambiguously includes greenhouse gases. Noting that “[t]he Clean Air Act’s sweeping definition of ‘air pollutant’ includes ‘*any* air pollution agent or combination of such agents. . . . which is emitted into or otherwise enters

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the ambient air,” the Court held that “the definition embraces *all* airborne compounds of whatever stripe, and underscores that intent through repeated use of the word ‘any.’” *Id.* at 529, 127 S.Ct. 1438 (quoting 42 U.S.C. § 7602(g)) (second and third emphases added). Crucially for purposes of the issue before us, the Court concluded that “[t]he statute is unambiguous.” *Id.*

Thus, we are faced with a statutory term – “air pollutant” – that the Supreme Court has determined unambiguously encompasses greenhouse gases. This phrase is preceded by the expansive term “any,” a word the Court held “underscores” Congress’s intent to include “all” air pollutants “of whatever stripe.” *See id.* Absent some compelling reason to think otherwise, “‘any’ . . . means any,” *Ford v. Mabus*, 629 F.3d 198, 206 (D.C.Cir.2010), and Petitioners have given us no reason to construe that word narrowly here. To the contrary: given both the statute’s plain language and the Supreme Court’s decision in *Massachusetts v. EPA*, we have little trouble concluding that the phrase “any air pollutant” includes *all* regulated air pollutants, including greenhouse gases.

In reaching this conclusion, we recognize that EPA’s definition of “any air pollutant” slightly narrows the literal statutory definition, which nowhere requires that “any air pollutant” be a *regulated* pollutant. *See* 42 U.S.C. § 7479(1). But this does not make the statutory language ambiguous. Indeed, “any regulated air pollutant” is the only logical reading of the statute. The CAA’s universal

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definition of “air pollutant” – the one at issue in *Massachusetts v. EPA* – provides that the term includes “any physical, chemical, biological [or] radioactive . . . substance or matter which is emitted into or otherwise enters the ambient air.” *Id.* § 7602(g). Of course, nothing in the CAA requires regulation of a substance simply because it qualifies as an “air pollutant” under this broad definition. As discussed *supra* in Parts II and III, for example, the Act requires EPA to prescribe motor vehicle “standards applicable to the emission of any air pollutant” only if that pollutant “cause[s], or contribute[s] to, air pollution which may reasonably be anticipated to endanger public health or welfare.” *Id.* § 7521(a)(1). But if “any air pollutant” in the definition of “major emitting facility” was read to encompass both regulated and nonregulated air pollutants, sources could qualify as major emitting facilities – and thus be subjected to PSD permitting requirements – if they emitted 100/250 tpy of a “physical, chemical, [or] biological” substance EPA had determined was harmless. It is absurd to think that Congress intended to subject stationary sources to the PSD permitting requirements due to emissions of substances that do not “endanger public health or welfare.” *Id.* § 7521(a)(1). Thus, “any regulated air pollutant” is, in this context, the only plausible reading of “any air pollutant.”

We find further support for this definition throughout the CAA. First, as previously mentioned, the PSD program provides that all major emitting

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facilities must install BACT for “each pollutant subject to regulation under [the CAA].” *Id.* § 7475(a)(4). “Each pollutant subject to regulation under” the Act is, of course, synonymous with “any air pollutant regulated under the Act.” Thus, EPA’s interpretation of “any air pollutant” in the definition of “major emitting facilities” harmonizes the PSD program’s scope (i.e., which pollutants trigger PSD coverage) with its substantive requirements (i.e., which pollutants must be controlled to obtain a permit). In other words, because a covered source must control greenhouse gas emissions, it makes sense that major emissions of greenhouse gases would subject that source to the PSD program.

Second, a PSD permittee is required to establish that it

will not cause, or contribute to, air pollution in excess of any (A) maximum allowable increase or maximum allowable concentration for any pollutant in any area to which this part applies more than one time per year, (B) national ambient air quality standard in any air quality control region, or (C) any other applicable emission standard or standard of performance under [the CAA].

*Id.* § 7475(a)(3). Subsections (A) and (B) prohibit a permitted source from contributing to a concentration of NAAQS pollutants that exceeds EPA’s standards. By contrast, subsection (C) has an entirely different focus: it prohibits a permitted

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source from causing or contributing to air pollution in excess of *any* CAA emission standard. Thus, as EPA notes, “what this provision establishes is that while the PSD program was certainly directed towards NAAQS-criteria pollutants, it also was directed at maintaining air quality for other pollutants regulated under other provisions.” EPA Timing & Tailoring Br. 101. EPA’s determination that “any air pollutant” means “any air pollutant regulated under the Act” – encompassing the greenhouse gases regulated under Title II – is entirely consistent with this focus.

Finally, Congress made perfectly clear that the PSD program was meant to protect against precisely the types of harms caused by greenhouse gases. The PSD provision contains a section entitled “Congressional declaration of purpose,” which provides, in relevant part, that “[t]he purposes of this part are . . . to protect public health and welfare from any actual or potential adverse effect which in the Administrator’s judgment may reasonably be anticipated to occur from air pollution.” 42 U.S.C. § 7470(1). The CAA further provides that “[a]ll language referring to effects on welfare includes, but is not limited to, effects on . . . weather . . . and climate.” *Id.* § 7602(h). As previously noted, EPA in the Endangerment Finding “marshaled . . . substantial. . . scientific evidence . . . for the proposition that greenhouse gases trap heat on earth that would otherwise dissipate into space [and] that this ‘greenhouse effect’ warms the climate.” Part II, *supra* at 28-29. It further concluded that this

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“anthropogenically induced climate change” was likely to threaten the public welfare through, among other things, “extreme weather events.” *Id.* at 15-16. Thus, one express purpose of the program is to protect against the harms caused by greenhouse gases.

In sum, we are faced with a statutory term – “any air pollutant” – that the Supreme Court has determined is “expansive,” and “unambiguous[ly]” includes greenhouse gases. *Massachusetts v. EPA*, 549 U.S. at 529, 127 S.Ct. 1438. Moreover, the PSD program requires covered sources to install control technology for “each pollutant” regulated under the CAA, 42 U.S.C. § 7475(a)(4), and to establish that they “will not cause, or contribute to, air pollution in excess of *any* . . . emission standard . . . under [the CAA].” *Id.* § 7475(a)(3) (emphasis added). These provisions demonstrate that the PSD program was intended to control pollutants regulated under every section of the Act. Finally, Congress’s “Declaration of Purpose” expressly states that the PSD program was meant, in part, to protect against adverse effects on “weather” and “climate” – precisely the types of harm caused by greenhouse gases. *See id.* § 7470(1). Given all this, we have little trouble concluding that “any air pollutant” in the definition of “major emitting facility” unambiguously means “any air pollutant regulated under the CAA.”

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**B.**

Industry Petitioners offer three alternative interpretations of the PSD permitting triggers, none of which cast doubt on the unambiguous nature of the statute.

As a preliminary matter, we note that none of Petitioners' alternative interpretations applies to Title V. To the contrary, all of the proposed alternative interpretations are based on the structure of – and purported Congressional intent behind – the PSD program. Indeed, Industry Petitioners never argue that their proposed alternative interpretations are relevant to Title V. Petitioners have thus forfeited any challenges to EPA's greenhouse gas-inclusive interpretation of Title V. *See, e.g., Nat'l Steel & Shipbuilding Co. v. NLRB*, 156 F.3d 1268, 1273 (D.C.Cir.1998) (petitioners forfeit an argument by failing to raise it in their opening brief).

Industry Petitioners' first alternative is simple enough. Because the PSD program focuses on “the air people breathe in certain geographically defined . . . areas,” Coalition for Responsible Reg. Timing & Tailoring Br. 38, Industry Petitioners contend that the term “pollutant” in the PSD statute encompasses only air pollutants that, unlike greenhouse gases, “pollute locally.” *Id.* at 35. Industry Petitioners would thus apply a greenhouse gas-exclusive interpretation of “pollutant” throughout the statute's PSD provision. Under this reading, a source would qualify as a “major emitting facility” only if it emits 100/250 tpy of

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“any air pollutant” except greenhouse gases. *See* 42 U.S.C. § 7479(1). Moreover, sources that *are* subject to PSD permitting requirements would be required to install BACT for “each pollutant subject to regulation under [the CAA]” – except greenhouse gases. *Id.* § 7475(a)(4).

We can easily dispose of Industry Petitioners’ argument that the PSD program’s “concerns with local emissions,” Coalition for Responsible Reg. Timing & Tailoring Br. 36, somehow limit the BACT provision. The statutory text provides, without qualification, that covered sources must install the “best available control technology for *each pollutant subject to regulation* under [the CAA].” 42 U.S.C. § 7475(a)(4) (emphasis added). Because greenhouse gases are indisputably a pollutant subject to regulation under the Act, it is crystal clear that PSD permittees must install BACT for greenhouse gases. “When the words of a statute are unambiguous . . . judicial inquiry is complete.” *Connecticut Nat’l Bank v. Germain*, 503 U.S. 249, 254, 112 S.Ct. 1146, 117 L.Ed.2d 391 (1992) (internal quotation marks omitted).

Equally without merit is Industry Petitioners’ argument that the PSD program’s regional focus requires a greenhouse gas-exclusive interpretation of “any air pollutant” in the definition of “major emitting facility.” In support of this contention, Industry Petitioners note that CAA Section 161 provides that states’ implementation plans for the PSD program “shall contain emission limitations and

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such other measures as may be necessary . . . to prevent *significant deterioration of air quality in each region.*” 42 U.S.C. § 7471 (emphasis added). The term “air quality,” Industry Petitioners contend, implies a focus on “the air people breathe,” and the term “in each region” suggests that Congress was concerned about local, not global, effects. See *Coalition for Responsible Reg. Timing & Tailoring* Br. 36. Moreover, Industry Petitioners note that when Congress enacted the PSD program in 1977, it did so “against the backdrop of a known universe of CAA-regulated pollutants.” *Id.* All these pollutants, Industry Petitioners argue, “were regulated because they could cause elevated ground-level concentrations in ambient air people breathe.” *Id.* And as Industry Petitioners point out, EPA itself has concluded that greenhouse gases are problematic for reasons other than local health and environmental concerns. In EPA’s Advance Notice of Proposed Rulemaking for the regulations at issue here, for example, the agency noted that “[a] significant difference between the major [greenhouse gases] and most air pollutants regulated under the CAA is that [greenhouse gases] have much longer atmospheric lifetimes [and] . . . can remain in the atmosphere for decades to centuries.” *Regulating Greenhouse Gas Emissions Under the Clean Air Act* (“Greenhouse Gas Advance Notice”), 73 Fed. Reg. 44,354, 44,400-01 (July 30, 2008). Moreover, “unlike traditional air pollutants,” greenhouse gases “become well mixed throughout the global atmosphere so that the long-term distribution of [greenhouse gas] concentrations is not dependant [sic] on local

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emission sources.” *Id.* Thus, Industry Petitioners conclude, greenhouse gases are problematic for reasons entirely distinct from the local concerns that provided the basis for the PSD program. Given this, the phrase “any air pollutant” cannot be applied to greenhouse gases in the context of the regionally-focused PSD program.

As an initial matter, we note that the Supreme Court rejected a very similar argument in *Massachusetts v. EPA*. There, EPA attempted to distinguish between greenhouse gases and other air pollution agents “because greenhouse gases permeate the world’s atmosphere rather than a limited area near the earth’s surface.” *Massachusetts v. EPA*, 549 U.S. at 529 n. 26, 127 S.Ct. 1438. The Court held that this was “a plainly unreasonable reading of a sweeping statutory provision designed to capture ‘any physical, chemical . . . substance or matter which is emitted into or otherwise enters the ambient air,’” *id.* (quoting 42 U.S.C. § 7602(g)), thus rejecting the dissent’s view that “EPA’s exclusion of greenhouse gases . . . is entitled to deference.” *Id.* As the Court noted, the purported distinction between greenhouse gases and “traditional” air pollutants “finds no support in the text of the statute, which uses the phrase ‘the ambient air’ without distinguishing between atmospheric layers.” *Id.* *Massachusetts v. EPA* thus forecloses Industry Petitioners’ argument that because greenhouse gases do not “cause elevated ground-level concentrations in ambient air people breathe,” Coalition for Responsible Reg. Timing &

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Tailoring Br. 36, EPA should have adopted a greenhouse gas-exclusive interpretation of “any air pollutant.”

We also have little trouble disposing of Industry Petitioners’ argument that the PSD program is specifically focused solely on localized air pollution. True, as Industry Petitioners note, one part of the PSD program requires states to “prevent significant deterioration of air quality in each region.” 42 U.S.C. § 7471 (emphasis added). But while localized air quality is obviously one concern of the PSD program, a comprehensive reading of the statute shows it was also meant to address a much broader range of harms. As an initial matter, the PSD provision’s “Congressional declaration of purpose” section expansively provides that the program is intended “to protect public health and welfare from *any* actual or potential adverse effect . . . from air pollution.” *Id.* § 7470(1) (emphasis added). Nothing in this section limits the PSD program to adverse effects on local air quality; to the contrary, the word “any” here gives this clause an “expansive meaning” which we see “no reason to contravene.” *New York*, 443 F.3d at 885 (internal quotation marks omitted). Indeed, the CAA expressly provides that effects on “welfare” means “effects on . . . weather . . . and climate.” 42 U.S.C. § 7602(h). It seems quite clear to us, then, that the PSD program was intended to protect against precisely the types of harms caused by greenhouse gases. This broad understanding of the PSD program’s scope is buttressed by the fact that the

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program requires covered sources to control “each pollutant subject to regulation under [the CAA],” and further requires sources to comply with “*any . . . emission standard*” under the CAA. *Id.* § 7475(a)(3); (a)(4) (emphasis added). These substantive requirements amount to further evidence that Congress wanted the PSD program to cover all regulated pollutants, regardless of the type of harm those pollutants cause.

In light of the PSD program’s broad scope of regulation and the express purposes of the program, we conclude – consistent with the Supreme Court in *Massachusetts v. EPA* – that Industry Petitioners’ greenhouse gas-exclusive interpretation of “pollutant” is “a plainly unreasonable reading” of the statute. *Massachusetts v. EPA*, 549 U.S. at 529 n. 26, 127 S.Ct. 1438.

## 1.

For their second alternative interpretation, Industry Petitioners argue that the PSD program’s definition of “major emitting facility” establishes a “pollutant-specific situs requirement.” Am. Chemistry Council Br. 33. Under this reading of the statute, a stationary source is subject to PSD permitting requirements only if “(1) a source has major emissions of a NAAQS criteria pollutant and (2) the source is located in an area attaining *that pollutant’s*” air quality standard. Coalition for Responsible Reg. Timing & Tailoring Br. 23. Thus, for example, a

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source would be subject to the PSD permitting requirements if it 1) emits over 100/250 tpy of sulfur dioxide (a NAAQS criteria pollutant), and 2) is located in an area that is in “attainment,” or is “unclassifiable,” for sulfur dioxide. But under this approach, a stationary source could never be subject to the PSD program solely because of its greenhouse gas emissions. After all, Industry Petitioners observe, EPA declined to make greenhouse gases a NAAQS criteria pollutant. Instead, EPA regulated greenhouse gases only under Title II of the Act, dealing with motor vehicle emissions. Because “no major source of [greenhouse gases] can be located in an area attaining the nonexistent [air quality standard] for [greenhouse gases],” *id.* at 24, Industry Petitioners point out that their reading of the statute would bring no new stationary sources under the PSD program’s ambit – alleviating any “absurd results” caused by excessive permitting requirements, *id.* at 25.

Industry Petitioners emphasize that, unlike their first proposed alternative, nothing in this approach would “wholly exempt [greenhouse gases] from PSD.” Coalition for Responsible Reg. Timing & Tailoring Reply Br. 20. Although a pollutant-specific situs requirement would limit the *number* of sources subject to the PSD program, nothing in this proposed reading of the statute would alter the substantive requirements for PSD permits, including the requirement that all regulated sources install BACT “for each pollutant subject to regulation under [the

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CAA].” 42 U.S.C. § 7475(a)(4). So, for example, under this interpretation, a hypothetical stationary source emitting more than 100/250 tpy of sulfur dioxide and located in an area designated as “in attainment” for sulfur dioxide, must still install BACT for “each pollutant subject to regulation” under the Act, including greenhouse gases. Their key point, though, is that sources emitting only major amounts of greenhouse gases – but not major amounts of a NAAQS criteria pollutant – would escape PSD permitting requirements.

Industry Petitioners’ argument in support of this interpretation proceeds in several steps. First, they argue that the term “any air pollutant,” though “capacious and flexible by itself,” “is a chameleon term” when placed in certain contexts. *Am. Chemistry Council Br. 38*. Indeed, Industry Petitioners note that EPA has already narrowed the literal meaning of the term “any air pollutant” here. After all, and as discussed *supra*, although the statutory term “air pollutant” includes “any physical [or] chemical . . . substance or matter,” 42 U.S.C. § 7602(g), EPA has long maintained that the term “any air pollutant” in the definition of “major emitting facility” encompasses only air pollutants regulated under the Act. Moreover, Industry Petitioners point out that when interpreting CAA Part C, Subpart 2, entitled “Visibility Protection,” EPA determined that the term “any pollutant” in the definition of “major stationary source” meant “any visibility-impairing pollutant.” *See Coalition for*

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Responsible Reg. Timing & Tailoring Br. 34 (emphasis added). The statute's definition of "major stationary source" in the visibility-protection subpart is quite similar to the definition of "major emitting facility" in the PSD subpart: for the purposes of the visibility program, a "major stationary source" is defined as a "stationary source[] with the potential to emit 250 tons or more of any pollutant." 42 U.S.C. § 7491(g)(7); *compare* 42 U.S.C. § 7479(1) ("major emitting facility" for the purposes of the PSD program is a source which "emit[s], or [has] the potential to emit," either 100 or 250 tons per year "of any air pollutant"). These narrowed interpretations, Industry Petitioners argue, prove that the seemingly capacious term "any air pollutant" is, notwithstanding that the Supreme Court called this term "expansive" and "sweeping," *Massachusetts v. EPA*, 549 U.S. at 529 nn. 25-26, 127 S.Ct. 1438, capable of a far more circumscribed meaning.

According to Industry Petitioners, EPA should have adopted that more circumscribed meaning by interpreting "any air pollutant" as establishing a pollutant-specific situs requirement. As Industry Petitioners point out, the PSD program requires permits for "major emitting facilit[ies] . . . in any area to which this part applies," 42 U.S.C. § 7479(1), and defines "major emitting facilities" as stationary sources emitting 100/250 tpy of "any air pollutant." *Id.* § 7475(a). In this context, Industry Petitioners contend, the phrases "any air pollutant" and "in any area to which this part applies" must be read in

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concert. And, Industry Petitioners argue, these phrases “*together* mean” that a source is subject to PSD permitting requirements only if it emits major amounts of “any [NAAQS] air pollutant whose NAAQS an area is attaining.” Am. Chemistry Council Br. 33.

In support of this supposedly holistic interpretation of the statute, Industry Petitioners cite CAA § 163(b), a different section of the PSD provision in which the phrase “any air pollutant” and “any area to which this part applies” are used in conjunction with one another. Unlike § 165(a), which sets permitting requirements for sources covered by the PSD program, § 163 provides guidelines for *areas* designated as “in attainment” under the program. Specifically, § 163(b) limits the “maximum allowable increase in concentrations of” airborne NAAQS pollutants that may occur in an attainment area before that area’s “attainment” status is jeopardized. *See* 42 U.S.C. § 7473(b)(1). Subsections (1) through (3) of § 163(b) – not directly relevant here – set limits on the maximum allowable increases for two specific NAAQS pollutants, sulfur dioxide and particulate matter. Subsection (4) is a catchall provision, which limits the maximum allowable increases for all other NAAQS pollutants. It is in subsection (4) that Industry Petitioners find what they believe is their payoff: the terms “any air pollutant” and “any area to which this part applies” in conjunction with one another. Section 163(b)(4) provides:

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The maximum allowable concentration of *any air pollutant in any area to which this part applies* shall not exceed a concentration for such pollutant for each period of exposure equal to –

(A) the concentration permitted under the national secondary ambient air quality standard, or

(B) the concentration permitted under the national primary ambient air quality standard,

whichever concentration is lowest for such pollutant for such period of exposure.

42 U.S.C. § 7473(b)(4) (emphasis added). As Industry Petitioners correctly point out, in this context the phrase “any air pollutant” must mean “any NAAQS pollutant,” and “in any area to which this part applies” must mean “any area that is in attainment for that NAAQS pollutant.” After all, the statute states that the “maximum allowable concentration of any air pollutant . . . shall not exceed” either the primary or secondary national ambient air quality standards. But, as Industry Petitioners observe, national ambient air standards exist only for NAAQS pollutants, so even if “any air pollutant” in CAA § 163(b)(4) was read to include non-NAAQS pollutants, the phrase, in context, would have no practical effect for those pollutants. Moreover, “any area to which this part applies” must mean “any area that is in attainment for that NAAQS pollutant,” because if an area was in nonattainment

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for a particular pollutant, Part D – rather than the PSD program – would govern emissions limits for that specific pollutant. *See id.* § 7501 (2) (“[t]he term ‘nonattainment area’ means, for any air pollutant, an area which is designated ‘nonattainment’ with respect to that pollutant”); § 7502 (c) (setting out required “Nonattainment plan provisions”). Finally, Industry Petitioners correctly note that a pollutant-specific reading of the phrase “air pollutant” must also apply to CAA § 165(a)(3)(A), which prohibits PSD permittees from “caus[ing], or contribut[ing] to, air pollution in excess of any . . . maximum allowable concentration for *any air pollutant in any area to which this part applies* more than one time per year.” *Id.* § 7475(a)(3) (A) (emphasis added). This clause, as Industry Petitioners point out, piggybacks off the NAAQS pollutant-specific definition of “maximum allowable concentration” in § 163(b)(4), prophylactically restricting PSD permittees from endangering an area’s attainment status. *See* Am. Chemistry Council Br. 32 (describing the interplay between the two provisions as “Section 163(b)(4) (and Section 165(a)(3)(A), which implements it) . . .”).

Based on all of this, Industry Petitioners conclude that because the phrase “any air pollutant in any area to which this part applies” in § 163(b)(4) means “any NAAQS pollutant in any area in attainment for that NAAQS pollutant,” an identical reading must apply to the definition of “major emitting facility.” As a result, a stationary source may be subject to the PSD program only if it emits 100/250

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typy of any NAAQS pollutant and is located in an area designated as in attainment for that NAAQS pollutant. We are unpersuaded.

Although we agree that the term “any air pollutant” is, in some contexts, capable of narrower interpretations, we see nothing in the definition of “major emitting facility” that would allow EPA to adopt a NAAQS pollutant-specific reading of that phrase. The contrast with the visibility program is instructive. There, EPA determined that “any pollutant” in the definition of “major stationary source” meant “any visibility-impairing pollutant.” See 40 C.F.R. pt. 51, App. Y, § II.A. But as EPA notes, the entire visibility program, codified in CAA Part C, Subpart 2, deals with visibility-impairing pollutants, as reflected in that subpart’s title: “Visibility Protection.” See 42 U.S.C. prec. § 7491. From this, “it naturally follows that EPA’s regulations under that section should address ‘visibility-impairing pollutants.’” EPA Timing & Tailoring Br. 99 n.19. No similar guidance can be garnered from Part C, Subpart 1, which contains the phrase “any air pollutant” at issue here. Dealing with far more than NAAQS pollutants, Part C, Subpart 1 requires, for example, covered sources to install BACT for “each pollutant subject to regulation under [the CAA].” 42 U.S.C. § 7475(a)(4). Indeed, Subpart 1 is simply – and expansively – entitled “Clean Air.” *Id.* prec. § 7470. Moreover, Congress designed the PSD program broadly to protect against “adverse effect[s]” on “public health and welfare,” *Id.* § 7470(1), including

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effects on global problems like weather and climate. *Id.* § 7602(h).

Furthermore, the phrases “any air pollutant” and “in any area to which this part applies” are used differently in Section 163(b)(4) and in the PSD program’s definition of “major emitting facility.” The presumption that “[a] term appearing in several places in a statutory text is generally read the same way each time it appears,” *Ratzlaf v. United States*, 510 U.S. 135, 143, 114 S.Ct. 655, 126 L.Ed.2d 615 (1994), “readily yields whenever there is such variation in the connection in which the words are used as reasonably to warrant the conclusion that they were employed in different parts of the act with different intent,” *Atl. Cleaners & Dyers, Inc. v. United States*, 286 U.S. 427, 433, 52 S.Ct. 607, 76 L.Ed. 1204 (1933). Here, the focus and structure of § 163(b)(4) is entirely distinct from the PSD permitting trigger. Section 163(b)(4) provides that “[t]he maximum allowable concentration of any air pollutant in any area to which this part applies shall not exceed a [particular] concentration.” 42 U.S.C. § 7473(b)(4). By contrast, § 165(a) provides that “[n]o major emitting facility . . . may be constructed in any area to which this part applies” unless certain conditions are met, *id.* § 7475(a), and § 169(1) defines “major emitting facility” as any stationary source that emits or has the potential to emit threshold amounts of “any air pollutant,” *id.* § 7479(1). The differences between these two provisions are manifest. In § 163(b)(4), the phrases “any air pollutant” and “in any area to which

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this part applies” appear next to one another, and it is the concentration of the pollutant in an area that matters. In the PSD permitting trigger, the phrases appear in different subsections and it is the location of the facility that matters. Section 163(b)(4) thus does nothing to undermine the unambiguous meaning of “any air pollutant” in the definition of “major emitting facility.”

Industry Petitioners’ pollutant-specific reading of “any air pollutant” is further undermined by contrasting Part C of the Act (the PSD program) with Part D (which regulates areas in nonattainment). Unlike Part C, Part D is expressly pollutant-specific, providing that “[t]he term ‘nonattainment area’ means, for any air pollutant, an area which is designated ‘nonattainment’ *with respect to that pollutant.*” *Id.* § 7501(2) (emphasis added). Congress thus clearly knew how to promulgate a narrow, pollutant-specific definition of “any air pollutant.” That it did so in Part D but not in Part C strongly suggests that the phrase “any air pollutant” in Part C was meant to be construed broadly. *Keene Corp. v. United States*, 508 U.S. 200, 208, 113 S.Ct. 2035, 124 L.Ed.2d 118 (1993) (“[W]here Congress includes particular language in one section of a statute but omits it in another . . . , it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion.”) (quoting *Russello v. United States*, 464 U.S. 16, 23, 104 S.Ct. 296, 78 L.Ed.2d 17 (1983)).

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A final point: Industry Petitioners observe that every area in the country has always been in attainment for at least one NAAQS criteria pollutant. *See* Tailoring Rule, 75 Fed. Reg. at 31,561. Thus, pursuant to EPA's pollutant-indifferent reading of § 165(a), under which a major emitting facility must abide by PSD requirements so long as it is located in an attainment area for *any* NAAQS pollutant, every facility in the United States has always been in an "area to which this part applies." Consequently, Industry Petitioners argue, "[i]f EPA's interpretation were right, Congress simply could have left out the phrase 'in any area to which this part applies'" in the PSD permitting trigger. Am. Chemistry Council Br. 36. But "Congress does not enact 'stillborn' laws," *id.* (quoting *Sosa v. Alvarez-Machain*, 542 U.S. 692, 714, 124 S.Ct. 2739, 159 L.Ed.2d 718 (2004)), and interpretations that render statutory language superfluous are disfavored. Am. Chemistry Council Reply Br. 19. The fact that the PSD program has applied nationwide since its inception, Industry Petitioners conclude, thus militates against EPA's pollutant-indifferent approach.

This argument fails at its premise, for Industry Petitioners confuse a lack of practical import with a lack of meaning. To say that the phrase "in any area to which this part applies" is currently without practical import is quite different than showing that the phrase means nothing. Indeed, under different circumstances, the phrase would have a significant effect. If, hypothetically, one area of the country was

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designated as “nonattainment” for every NAAQS pollutant, the phrase “in any area to which this part applies” would limit PSD coverage, as covered sources in that area would be subject only to Part D requirements. In fact, Environmental Intervenors point out that when Congress drafted the PSD permitting triggers “the prospect that some areas could be in nonattainment for all NAAQS was not far-fetched.” *Sierra Club Historic Reg. Br. 23*. “In the years leading up to 1977, EPA air quality data identified a number of areas that failed to meet all five of the then-current [air quality standards] for which EPA had gathered data.” *Id.* Accordingly, “in any area to which this part applies” is a meaningful phrase under EPA’s pollutant-indifferent interpretation of the PSD permitting triggers: it provides that sources need not obtain PSD permits if they are located in areas designated “nonattainment” for all six NAAQS pollutants.

In short, although we agree with Industry Petitioners that phrases like “any air pollutant” are, in certain contexts, capable of a more limited meaning, they have failed to identify any reasons that the phrase should be read narrowly here. Nor do we know of one. We thus conclude that EPA’s 34-year-old interpretation of the PSD permitting triggers is statutorily compelled: a source must obtain a permit if it emits major amounts of any regulated pollutant and is located in an area that is in attainment or unclassifiable for any NAAQS pollutant.

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## 2.

We can quickly dispose of Industry Petitioners' third alternative interpretation, namely, that in order to regulate new pollutants through the PSD program, EPA was required to go through the process prescribed by CAA § 166. Section 166 provides specific steps that EPA must take when designating new "pollutants for which national ambient air quality standards" apply. 42 U.S.C. § 7476(a). Here, Industry Petitioners argue, EPA unlawfully failed to follow the steps laid out in Section 166, including a required study of the pollutant and a one-year delay before the effective date of regulations, before adding greenhouse gases "to the PSD [c]onstellation." Coalition for Responsible Reg. Timing & Tailoring Br. 41.

This argument fails on its face. By its terms, § 166 applies only to new "pollutants *for which national ambient air quality standards*" apply, 42 U.S.C. § 7476(a) (emphasis added), i.e., NAAQS criteria pollutants for which regions may be classified as in "attainment," "non-attainment," or "unclassifiable." And EPA never classified greenhouse gases as a NAAQS criteria pollutant. Instead, it simply determined that under § 165, major emitters of greenhouse gases are subject to the PSD program and all covered sources must install BACT for greenhouse gases. Contrary to Industry Petitioners' arguments, then, § 166 has no bearing on this addition of greenhouse gases into "the PSD [c]onstellation." Coalition for Responsible Reg. Timing

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& Tailoring Br. 41. Indeed, we rejected a nearly identical argument in *Alabama Power*, holding that there is “no implied or apparent conflict between sections 165 and 166; nor . . . must the requirements of section 165 be ‘subsumed’ with those of section 166.” *Alabama Power*, 636 F.2d at 406. Stating what should have been obvious from the text of the statute, we concluded: “[S]ection 166 has a different focus from section 165.” *Id.*

Thus, because EPA has never classified greenhouse gases as a NAAQS criteria pollutant, the § 166 requirements are entirely inapplicable here. This section of the CAA has absolutely no bearing on our conclusion that EPA’s interpretation of the PSD permitting trigger is compelled by the statute itself.

## VI.

Having concluded that the CAA requires PSD and Title V permits for major emitters of greenhouse gases, we turn to Petitioners’ challenges to the Tailoring and Timing Rules themselves.

As an initial matter, we note that Petitioners fail to make any real arguments against the Timing Rule. To be sure, at one point State Petitioners contend that the Timing Rule constitutes an attempt “to extend the PSD and Title V permitting requirements to greenhouse-gas emissions,” State Pet’rs’ Timing & Tailoring Br. 67. This is plainly incorrect. As discussed in the previous section, greenhouse gases are regulated under PSD and Title V pursuant to

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automatic operation of the CAA. All the Timing Rule did was delay the applicability of these programs, providing that major emitters of greenhouse gases would be subject to PSD and Title V permitting requirements only once the Tailpipe Rule actually took effect on January 2, 2011. *See* Timing Rule, 75 Fed. Reg. at 17,017-19. Despite this, Petitioners confusingly urge us to vacate “[t]he Tailoring *and* Timing Rules,” *e.g.* State Pet’rs’ Timing & Tailoring Br. 24 (emphasis added), although it is unclear what practical effect vacature of the Timing Rule would have. Nonetheless, given this phrasing of their argument, and given our conclusion that Petitioners lack Article III standing to challenge *both* rules, we shall, where appropriate, discuss the Timing Rule in conjunction with the Tailoring Rule.

In the Tailoring Rule, EPA announced that it was “relieving overwhelming permitting burdens that would, in the absence of this rule, fall on permitting authorities and sources.” Tailoring Rule, 75 Fed. Reg. at 31,516. Although the PSD statute requires permits for sources with the potential to emit 100/250 tpy of “any air pollutant,” 42 U.S.C. § 7479(1), EPA noted that immediate application of that threshold to greenhouse gas-emitting sources would cause permit applications to jump from 280 per year to over 81,000 per year. Tailoring Rule, 75 Fed. Reg. at 31,554. Many of these applications would come from commercial and residential sources, which would “each incur, on average, almost \$60,000 in PSD permitting expenses.” *Id.* at 31,556. Similarly, if the Title V 100

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tpy threshold applied immediately to greenhouse gases, sources needing operating permits would jump from 14,700 per year to 6.1 million per year. *Id.* at 31,562. “The great majority of these sources would be small commercial and residential sources” which “would incur, on average, expenses of \$23,175.” *Id.* And were permitting authorities required to hire the 230,000 full-time employees necessary to address these permit applications, “authorities would face over \$21 billion in additional permitting costs each year due to [greenhouse gases], compared to the current program cost of \$62 million each year.” *Id.* at 31,563.

Thus, instead of immediately requiring permits for all sources exceeding the 100/250 tpy emissions threshold, EPA decided to “phas[e] in the applicability of these programs to [greenhouse gas] sources, starting with the largest [greenhouse gas] emitters.” *Id.* at 31,514. The Tailoring Rule established the first two steps in this phased-in process. During Step One, only sources that were “subject to PSD requirements for their conventional pollutants anyway” (i.e., those sources that exceeded the statutory emissions threshold for non-greenhouse gas pollutants) were required to install BACT for their greenhouse gas emissions. *Id.* at 31,567. Step Two, which took effect on July 1, 2011, also requires PSD permits for sources with the potential to emit over 100,000 tpy CO<sub>2</sub>e after a proposed construction project, or 75,000 tpy CO<sub>2</sub>e after a proposed modification project. *Id.* at 31,523. Step Two further requires Title V permits for sources

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which have the potential to emit over 100,000 tpy CO<sub>2</sub>e. *Id.* at 31,516. EPA has since proposed – but has yet to finalize – a “Step Three,” which would maintain the current thresholds while the agency evaluates the possibility of regulating smaller sources. *See* EPA’s 28(j) Letter 1-2, February 27, 2012.

In the Tailoring Rule, EPA justified its phased-in approach on three interrelated grounds, each of which rests on a distinct doctrine of administrative law. First, EPA concluded “the costs to sources and administrative burdens . . . that would result from [immediate] application of the PSD and title V programs . . . at the statutory levels . . . should be considered ‘absurd results,’” which Congress never intended. *Id.* at 31,517; *see Am. Water Works Ass’n v. EPA*, 40 F.3d 1266, 1271 (D.C.Cir.1994) (“[W]here a literal reading of a statutory term would lead to absurd results, the term simply has no meaning . . . and is the proper subject of construction by EPA and the courts.”). Thus, under the “absurd results” doctrine, EPA concluded that the PSD and Title V programs “should not [immediately] be read to apply to all [greenhouse gas] sources at or above the 100/250 tpy threshold.” Tailoring Rule, 75 Fed. Reg. at 31,554. Second, emphasizing that immediate regulation at the 100/250 tpy threshold would cause tremendous administrative burden, EPA justified its deviation from this threshold on the basis of the “administrative necessity” doctrine. *Id.* at 31,576; *see Env’tl. Def. Fund, Inc. v. EPA*, 636 F.2d 1267, 1283 (D.C.Cir.1980) (“[A]n agency may depart from the

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requirements of a regulatory statute . . . to cope with the administrative impossibility of applying the commands of the substantive statute.”). Finally, asserting that there exists a judicial doctrine that allows agencies to implement regulatory programs in a piecemeal fashion, EPA stated that the Tailoring Rule was justified pursuant to this “one-step-at-a-time” doctrine. Tailoring Rule, 75 Fed. Reg. at 31,578; see *Massachusetts v. EPA*, 549 U.S. at 524, 127 S.Ct. 1438 (“Agencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop.”).

Petitioners – particularly State Petitioners – argue that none of these doctrines permit EPA to “depart unilaterally from the [CAA’s] permitting thresholds and replace them with numbers of its own choosing.” State Pet’rs’ Timing & Tailoring Br. 29. Admitting the “lamentable policy consequences of adhering to the unambiguous numerical thresholds in the Clean Air Act,” State Petitioners rather colorfully argue that EPA’s attempts to alleviate those burdens “establish only that EPA is acting as a benevolent dictator rather than a tyrant.” *Id.* at 26. And because EPA exceeded the boundaries of its lawful authority Petitioners urge us to vacate the Tailoring Rule.

Before we may address the merits of these claims, however, we must determine whether we have jurisdiction. “No principle,” the Supreme Court has repeatedly explained, “is more fundamental to the judiciary’s proper role in our system of government than the constitutional limitation of federal-court

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jurisdiction to actual cases or controversies.” *Raines v. Byrd*, 521 U.S. 811, 818, 117 S.Ct. 2312, 138 L.Ed.2d 849 (1997) (internal quotation marks omitted). The doctrine of standing “is an essential and unchanging part of the case-or-controversy requirement.” *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560, 112 S.Ct. 2130, 119 L.Ed.2d 351 (1992). To establish standing, a petitioner must have suffered an “injury in fact” that is 1) “concrete and particularized . . . [and] actual or imminent, not conjectural or hypothetical,” 2) was caused by the conduct complained of, and 3) is “likely, as opposed to merely speculative [to] be redressed by a favorable decision.” *Id.* at 560-61, 112 S.Ct. 2130 (internal quotation marks and citations omitted).

Petitioners fall far short of these “irreducible constitutional . . . elements” of standing, *id.* at 560, 112 S.Ct. 2130. Simply put, Petitioners have failed to establish that the Timing and Tailoring Rules caused them “injury in fact,” much less injury that could be redressed by the Rules’ vacatur. Industry Petitioners contend that they are injured because they are subject to regulation of greenhouse gases, Coalition for Responsible Reg. Timing & Tailoring Br. 14. State Petitioners claim injury because they own some regulated sources and because they now carry a heavier administrative burden. State Pet’rs’ Timing & Tailoring Br. 22-23. But as discussed above, *see supra* Part V, the CAA mandates PSD and Title V coverage for major emitters of greenhouse gases. Thus, Industry Petitioners were regulated and State

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Petitioners required to issue permits not because of anything EPA did in the Timing and Tailoring Rules, but by automatic operation of the statute. Given this, neither the Timing nor Tailoring Rules caused the injury Petitioners allege: having to comply with PSD and Title V for greenhouse gases.

Indeed, the Timing and Tailoring Rules actually mitigate Petitioners' purported injuries. Without the Timing Rule, Petitioners may well have been subject to PSD and Title V for greenhouse gases before January 2, 2011. Without the Tailoring Rule, an even greater number of industry and state-owned sources would be subject to PSD and Title V, and state authorities would be overwhelmed with millions of additional permit applications. Thus, Petitioners have failed to "show that, absent the government's allegedly unlawful actions, there is a substantial probability that they would not be injured and that, if the court affords the relief requested, the injury will be removed." *Chamber of Commerce v. EPA*, 642 F.3d 192, 201 (D.C.Cir.2011) (quotations and alterations omitted). Far from it. If anything, vacature of the Tailoring Rule would significantly exacerbate Petitioners' injuries.

Attempting to remedy this obvious jurisdictional defect, State Petitioners present two alternative theories, neither of which comes close to meeting the "irreducible constitutional . . . elements" of standing. *Lujan*, 504 U.S. at 560, 112 S.Ct. 2130. First, State Petitioners counterintuitively suggest that they actually want EPA to immediately "appl[y] the

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100/250 tpy permitting thresholds to greenhouse-gas emissions.” State Pet’rs’ Timing & Tailoring Reply Br. 15. Admitting that vacature of the Tailoring Rule would result in astronomical costs and unleash chaos on permitting authorities, State Petitioners predict that Congress will be forced to enact “corrective legislation” to relieve the overwhelming permitting burdens on permitting authorities and sources, thus mitigating their purported injuries. *Id.*

This theory fails. To establish standing, plaintiffs must demonstrate that it is “likely, as opposed to merely speculative, that the injury will be redressed by a favorable decision,” *Lujan*, 504 U.S. at 561, 112 S.Ct. 2130 (internal quotation marks omitted), but here, State Petitioners simply hypothesize that Congress will enact “corrective legislation.” State Pet’rs’ Timing & Tailoring Reply Br. 15. We have serious doubts as to whether, for standing purposes, it is ever “likely” that Congress will enact legislation at all. After all, a proposed bill must make it through committees in both the House of Representatives and the Senate and garner a majority of votes in both chambers – overcoming, perhaps, a filibuster in the Senate. If passed, the bill must then be signed into law by the President, or go back to Congress so that it may attempt to override his veto. As a generation of schoolchildren knows, “by that time, it’s very unlikely that [a bill will] become a law. It’s not easy to become a law.” Schoolhouse Rock, *I’m Just a Bill*, at 2:41, available at <http://video.google.com/videoplay?docid=7266360872513258185#> (last visited June 1, 2012).

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And even if the astronomical costs associated with a 100/250 tpy permitting threshold make *some* Congressional action likely, State Petitioners are still unable to show that it is “likely, as opposed to merely speculative,” *Lujan*, 504 U.S. at 561, 112 S.Ct. 2130, that Congress will redress their injury. State Petitioners apparently assume that if the 100/250 tpy permitting threshold was immediately applied to greenhouse gases, Congress would exempt those pollutants from the PSD and Title V programs entirely. But this is just one of many forms “corrective legislation” could take. For example, were we to vacate the Tailoring Rule, Congress could decide to readopt its key provisions in the PSD and Title V statutes. Or it could set PSD and Title V permitting thresholds at 25,000 tpy for greenhouse gases – higher than the 100/250 tpy threshold, but lower (and thus more costly to Petitioners) than the thresholds promulgated in the Tailoring Rule. Or it could do something else entirely. All of this is guesswork, which is precisely the point: State Petitioners’ faith that Congress will alleviate their injury is inherently speculative.

State Petitioners’ second alternative theory of standing fares no better. In their reply brief, they contend that even if vacating the Timing or Tailoring Rules would indeed exacerbate their costs and administrative burdens (the purported injuries they claimed in their opening brief), “then State Petitioners can establish Article III standing under *Massachusetts* by asserting injuries caused by EPA’s

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failure to regulate sooner.” State Pet’rs’ Timing & Tailoring Reply Br. 5. Essentially, State Petitioners’ reply brief contends that, contrary to the position taken in the opening brief, they want more regulation, not less, and that they wanted regulation sooner rather than later. And because the Commonwealth of Massachusetts had standing to seek regulation of greenhouse gases in *Massachusetts v. EPA*, State Petitioners argue that they now have standing to seek more regulation of greenhouse gases as well.

This argument is completely without merit. As an initial matter, we are aware of no authority which permits a party to assert an entirely new injury (and thus, an entirely new theory of standing) in its reply brief. Quite to the contrary, we have held that, where standing is not self-evident, “[i]n its *opening* brief, the petitioner should . . . include . . . a concise recitation of the basis upon which it claims standing.” *Sierra Club v. EPA*, 292 F.3d 895, 901 (D.C.Cir.2002) (emphasis added); *see also* D.C.Cir. R. 28(a)(7) (“[i]n cases involving direct review in this court of administrative actions, the brief of the appellant or petitioner must set forth the basis for the claim of standing.”); *American Library Ass’n v. FCC*, 401 F.3d 489, 493-94 (D.C.Cir.2005) (discussing limitations on this principle). After all, “it is often the case . . . that some of the relevant facts are known only to the petitioner, to the exclusion of both the respondent and the court.” *Sierra Club*, 292 F.3d at 901. If “the petitioner does not submit evidence of those facts

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with its opening brief,” the respondent is “left to flail at the unknown in an attempt to prove the negative.” *Id.* This principle is particularly important here, for State Petitioners’ asserted fear of global warming stands in stark contrast to the position they took throughout this litigation. In an earlier brief, for example, they characterized the Endangerment Finding as “a subjective conviction” State Pet’rs’ Endangerment Br. 19, “supported by highly uncertain climate forecasts,” *id.* at 18, and “offer[ing] no criteria for determining a harmful, as opposed to a safe, climate,” *id.* at 17. Given this, EPA could not possibly have anticipated that State Petitioners, abruptly donning what they themselves call “an environmentalist hat,” State Pet’rs’ Timing & Tailoring Reply Br. 4, would assert that global warming causes them concrete and particularized harm.

In any event, State Petitioners fail to cite any record evidence to suggest that they are adversely affected by global climate change. This is in stark contrast to the evidence put forward in *Massachusetts v. EPA*, where the Commonwealth submitted unchallenged affidavits and declarations showing that 1) rising sea tides due to global warming had “already begun to swallow Massachusetts’ coastal land,” and 2) “[t]he severity of that injury will only increase over the course of the next century.” *Massachusetts v. EPA*, 549 U.S. at 522-23, 127 S.Ct. 1438. These specific, factual submissions were key to the standing analysis in *Massachusetts v. EPA*: the

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Court held that “petitioners’ *submissions as they pertain to Massachusetts* have satisfied the most demanding standards of the adversarial process.” *Id.* at 521, 127 S.Ct. 1438 (emphasis added). It is true, as State Petitioners emphasize, that the Supreme Court held that states are “entitled to special solicitude in our standing analysis.” *Id.* at 522, 127 S.Ct. 1438. But nothing in the Court’s opinion remotely suggests that states are somehow exempt from the burden of establishing a concrete and particularized injury in fact. State Petitioners, like Industry Petitioners, failed to do so here. We shall thus dismiss all challenges to the Timing and Tailoring Rules for lack of jurisdiction.

**VII.**

Following promulgation of the Timing and Tailoring Rules, EPA issued a series of rules ordering states to revise their PSD State Implementation Plans (SIPs) to accommodate greenhouse gas regulation. See *Action to Ensure Authority to Issue Permits Under the Prevention of Significant Deterioration Program to Sources of Greenhouse Gas Emissions: Finding of Substantial Inadequacy and SIP Call*, 75 Fed. Reg. 53,892 (Sept. 2, 2010), 75 Fed. Reg. 77,698 (Dec. 13, 2010); *Action to Ensure Authority to Issue Permits Under the Prevention of Significant Deterioration Program to Sources of Greenhouse Gas Emissions: Finding of Failure to Submit State Implementation Plan Revisions Required for Greenhouse Gases*, 75 Fed. Reg. 81,874

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(Dec. 29, 2010). Industry Petitioners present several challenges to these SIP-related rules. But our review in this case is limited to four EPA decisions: the Endangerment Finding, the Tailpipe Rule, and the Timing and Tailoring Rules. We thus lack jurisdiction over the SIP-related rules. Moreover, challenges to these rules are currently pending in at least two separate cases before this court. *See Utility Air Regulatory Group v. EPA*, No. 11-1037 (consolidating various challenges); *Texas v. EPA*, No. 10-1425 (challenge brought by Texas). We decline Industry Petitioners' invitation to rule on the merits of cases which are properly before different panels.

**VIII.**

For the foregoing reasons, we dismiss all petitions for review of the Timing and Tailoring Rules, and deny the remainder of the petitions.

*So ordered.*

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United States Court of Appeals  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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Filed: December 20, 2012

No. 09-1322

COALITION FOR RESPONSIBLE REGULATION, INC., ET AL.,  
PETITIONERS

v.

ENVIRONMENTAL PROTECTION AGENCY, RESPONDENT  
STATE OF MICHIGAN, ET AL., INTERVENORS

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Consolidated with 10-1024, 10-1025, 10-1026,  
10-1030, 10-1035, 10-1036, 10-1037, 10-1038,  
10-1039, 10-1040, 10-1041, 10-1042, 10-1044,  
10-1045, 10-1046, 10-1234, 10-1235, 10-1239,  
10-1245, 10-1281, 10-1310, 10-1318, 10-1319,  
10-1320, 10-1321

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No. 10-1073

COALITION FOR RESPONSIBLE REGULATION, INC., ET AL.,  
PETITIONERS

v.

ENVIRONMENTAL PROTECTION AGENCY, RESPONDENT  
AMERICAN FROZEN FOOD INSTITUTE, ET AL.,  
INTERVENORS

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Consolidated with 10-1083, 10-1099, 10-1109,  
10-1110, 10-1114, 10-1118, 10-1119, 10-1120, 10-1122,  
10-1123, 10-1124, 10-1125, 10-1126, 10-1127, 10-1128,  
10-1129, 10-1131, 10-1132, 10-1145, 10-1147, 10-1148,  
10-1199, 10-1200, 10-1201, 10-1202, 10-1203,  
10-1206, 10-1207, 10-1208, 10-1210, 10-1211,  
10-1212, 10-1213, 10-1216, 10-1218, 10-1219,  
10-1220, 10-1221, 10-1222

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No. 10-1092

COALITION FOR RESPONSIBLE REGULATION, INC., ET AL.,  
PETITIONERS

v.

ENVIRONMENTAL PROTECTION AGENCY, RESPONDENT  
LANGBOARD, INC.-MDF, ET AL., INTERVENORS

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Consolidated with 10-1094, 10-1134, 10-1143,  
10-1144, 10-1152, 10-1156, 10-1158, 10-1159, 10-1160,  
10-1161, 10-1162, 10-1163, 10-1164, 10-1166, 10-1182

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No. 10-1167

AMERICAN CHEMISTRY COUNCIL, PETITIONER

v.

ENVIRONMENTAL PROTECTION AGENCY AND  
LISA PEREZ JACKSON, ADMINISTRATOR,  
U.S. ENVIRONMENTAL PROTECTION AGENCY,  
RESPONDENTS

CHAMBER OF COMMERCE OF THE UNITED STATES  
OF AMERICA, ET AL., INTERVENORS

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Consolidated with 10-1168, 10-1169, 10-1170,  
10-1173, 10-1174, 10-1175, 10-1176, 10-1177,  
10-1178, 10-1179, 10-1180

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On Petitions for Rehearing En Banc

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Before: SENTELLE\*, *Chief Judge*, and  
HENDERSON, ROGERS\*, TATEL\*, GARLAND,  
BROWN\*, GRIFFITH, and KAVANAUGH\*, *Circuit  
Judges*.

**ORDER**

The petition of the Chamber of Commerce of the United States of America, joined by the State of Alaska, Peabody Energy Company, Southeastern Legal Foundation, et al., State Petitioners and Intervenors for Petitioners, for rehearing en banc; and the petition of the National Association of Manufacturers, et al. for rehearing en banc in No. 10-1073, et al. and No. 10-1167, et al., and the responses to the petitions were circulated to the full court, and a vote was requested. Thereafter, a majority of the judges eligible to participate did not vote in favor of the petitions. Upon consideration of the foregoing, it is



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many of the arguments her dissent now presses. In particular, it rebuffed EPA's attempt to use "postenactment congressional actions and deliberations" to obscure "the meaning of an otherwise-unambiguous statute," *id.* at 529, and found EPA's reliance on *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120 (2000), "similarly misplaced," *Massachusetts v. EPA*, 549 U.S. at 530. Seeking to revive the *Brown & Williamson* argument, Judge Brown suggests that the Court never considered the "far-reaching effects" of extending greenhouse gas regulation to stationary sources. *See* Dissenting Op. at 18 (Brown, J.). But this is inaccurate – the briefs before the Court explicitly raised the argument that interpreting "air pollutant" to include greenhouse gases could have tremendous consequences for stationary-source regulation. *See, e.g.*, Brief of Respondent CO<sub>2</sub> Litigation Group, *Massachusetts v. EPA*, 549 U.S. 497 (2007) (No. 05-1120), 2006 WL 3043971 at \*19-\*31.

To the extent Judge Brown attempts to bypass *Massachusetts v. EPA* by focusing on the statutory condition that air pollution "*reasonably be anticipated to endanger* public health or welfare," 42 U.S.C. § 7521(a)(1) (emphasis added), her quarrel is not just with the Supreme Court, but also with EPA's assessment of the science. Of course, we agree that the statute requires EPA to find a particular causal nexus between the pollutant and the harm in order to regulate. *See* Dissenting Op. at 9 (Brown, J.). But that is exactly what EPA did: it found that

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“greenhouse gases in the atmosphere may *reasonably be anticipated* both to endanger public health and to endanger public welfare.” *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66,496, 66,497 (Dec. 15, 2009). And, as the panel opinion explains, EPA’s scientific judgment about the causal relationship between greenhouse gases and climate change is a scientific determination entitled to “an extreme degree of deference.” *Coalition for Responsible Regulation v. EPA*, 684 F.3d 102, 120 (D.C. Cir. 2012) (quoting *American Farm Bureau Federation v. EPA*, 559 F.3d 512, 519 (D.C. Cir. 2009)). The dissent’s suggestion that EPA was somehow statutorily precluded from finding the requisite nexus between greenhouse gases and harm to public health and welfare, *see* Dissenting Op. at 10-11 (Brown, J.), is belied by the Supreme Court’s decision to remand precisely this question. *See Massachusetts v. EPA*, 549 U.S. at 532-35.

Judge Kavanaugh’s dissent relates to the scope of the Prevention of Significant Deterioration (“PSD”) program, an aspect of the panel opinion Judge Brown also rejects. Specifically, Judge Kavanaugh disagrees with EPA’s longstanding interpretation of the term “any air pollutant,” 42 U.S.C. § 7479(1), arguing that, in the context of the PSD program, “any air pollutant” refers not to all pollutants regulated under the Clean Air Act, but only to the six NAAQS pollutants. Because taking the statute at its word and interpreting “any air pollutant” to include greenhouse

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gases would lead to what he considers absurd results, Judge Kavanaugh insists that EPA and this Court are obligated to read “any air pollutant” more narrowly. *See* Dissenting Op. at 3-10 (Kavanaugh, J.). This argument, however, hinges on the proposition that both readings are plausible interpretations of an ambiguous statutory provision. *See* Dissenting Op. at 2-3, 10 (Kavanaugh, J.). But as the panel opinion explains at length, the statute is clear. *See Coalition for Responsible Regulation*, 684 F.3d at 132-44. Congress did not say “certain ‘air pollutants.’” Dissenting Op. at 2 (Kavanaugh, J.). It said “any air pollutant,” and it meant it. *See Coalition for Responsible Regulation*, 684 F.3d at 136. Thus, unlike the unreasonable interpretation rejected in *Kloeckner v. Solis*, No. 11-184, slip op. at 7-13 (U.S. 2012), the panel’s interpretation of the statute is the only plausible one.

Moreover – and again, as the panel opinion explains at length, *see Coalition for Responsible Regulation*, 684 F.3d at 135-36 – considering “any air pollutant” in context buttresses rather than undermines the panel’s interpretation. The statute frames the purpose of the PSD program in broad – not NAAQS-specific – terms, emphasizing that the program’s goal is “to protect public health and welfare from any actual or potential adverse effect which . . . may reasonably be anticipate[d] to occur from air pollution.” 42 U.S.C. § 7470(1). And although certain aspects of the program are specifically directed at NAAQS pollutants, *see, e.g., id.* § 7473(b)(4), the

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program as a whole plainly has a more expansive scope. For instance, covered sources are required to (1) install the best available control technology for “*each* pollutant subject to regulation under [the Act],” *id.* § 7475(a)(4) (emphasis added), and (2) demonstrate that they will not cause or contribute to “*any* . . . applicable emission standard” under the Act, *id.* § 7475(a)(3) (emphasis added).

In the end, we agree that “the question here is: Who Decides?” Dissenting Op. at 18 (Kavanaugh, J.). We also agree that “Congress (with the President) sets the policy through statutes, agencies implement that policy within statutory limits, and courts in justiciable cases ensure that agencies stay within the statutory limits set by Congress.” Dissenting Op. at 18 (Kavanaugh, J.). Here, Congress spoke clearly, EPA fulfilled its statutory responsibilities, and the panel, playing its limited role, gave effect to the statute’s plain meaning. *See Chevron, U.S.A., Inc. v. NRDC*, 467 U.S. 837, 842-43 (1984) (“If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.”).

To be sure, the stakes here are high. The underlying policy questions and the outcome of this case are undoubtedly matters of exceptional importance. The legal issues presented, however, are straightforward, requiring no more than the application of clear statutes and binding Supreme Court precedent. There is no cause for en banc review.

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BROWN, *Circuit Judge*, dissenting from the denial of rehearing en banc: In the summer of 1974, while waiting to start classes at UCLA, I was lucky enough to obtain a summer job house sitting in the pleasant, upscale neighborhood of Pasadena. Known mostly for its Rose Parade and Rose Bowl, Pasadena is one of the more scenic exurbs of Los Angeles. I inhabited a sparsely furnished, modest-but-pricey bungalow set among the lush landscape typical of southern California. This is a place where Birds of Paradise grow ten feet tall and the magenta blossoms of Bougainvillea fall like lavish draperies from redwood garden trellises. After staying in the house more than a month and spending a restless night listening to the agitated thrashings of the jacaranda trees in a fitful wind, I stumbled bleary-eyed into the kitchen, looked out the window, and stopped – utterly dumbfounded. There – looking like it was but a few feet beyond the back fence – stood a mountain. Not a foothill. Not an unobtrusive mesa. A mountain! Closer inspection revealed not a lone majestic peak, but a whole mountain range I later identified as the San Gabriels. In those days, the air in the Los Angeles basin was so thick with smog that a mountain, or even a nearby mountain range, could simply disappear.

Although the Los Angeles basin was among the most notorious examples of the phenomenon, it was by no means unique and certainly not the worst. It was this crisis of ambient air quality that precipitated the enactment of the Clean Air Act (CAA). But as the CAA's history, language, and

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structure make clear, Congress never intended the Act to serve as an environmental cure-all. It was targeted legislation designed to remedy a particular wrong: the harmful direct effects of poisoned air on human beings and their local environs. This is what Congress understood as “air pollution which may reasonably be anticipated to endanger public health” in the tailpipe emissions provision, 42 U.S.C. § 7521(a)(1). The Supreme Court in *Massachusetts v. EPA*, 549 U.S. 497 (2007), however, concluded otherwise. In dicta too suggestive to ignore, the Court implicitly assumed that climate change could provide the basis for an endangerment finding in the tailpipe context. *See id.* at 532-33.

Bound as I am by *Massachusetts*, I reluctantly concur with the Panel’s determination that EPA may regulate GHGs in tailpipe emissions. But I do not choose to go quietly. Because the most significant regulations of recent memory rest on the shakiest of foundations, Part I of this statement engages *Massachusetts’s* interpretive shortcomings in the hope that either Court or Congress will restore order to the CAA. Part II, by contrast, reflects my belief that *Massachusetts* does not compel the same result for Title V and the Prevention of Significant Deterioration of Air Quality (PSD) program. Although I agree with Judge Kavanaugh’s dissent, *Coal. for Responsible Regulation v. EPA*, Nos. 09-1322, et al. (Kavanaugh, J., dissenting from denial of rehearing en banc), I approach the inflection point from a

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slightly different perspective. Part III concludes with a brief note on standing.

Because I would vote for the full court to consider the propriety of extending *Massachusetts* to Title V and the PSD program, I respectfully dissent from this denial of rehearing en banc.

**I.****A.**

The origins of the Clean Air Act are closely tied to fatal fogs and deadly air inversions that, for much of early postindustrial history, seemed to be the inevitable consequence of economic progress. See Arnold W. Reitze, Jr., *A Century of Air Pollution Control Law: What's Worked; What's Failed; What Might Work*, 21 ENVTL. L. 1549, 1575 (1991).<sup>1</sup> Initially regulated at the local and state level, air pollution became the focus of the federal government only after World War II. See *id.* at 1585-86. In October 1948, a severe temperature inversion in the industrial city of Donora, Pennsylvania increased air pollution to such an extent that traffic “was virtually stopped because of lack of visibility.” The inversion killed 20 people, *id.*, and prompted the federal government to begin researching air pollution. *Id.* at 1586. By 1961,

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<sup>1</sup> Inversions, sometimes known as “Londoners,” occur “when a layer of hot air warmed by . . . water exists above cooler ground-level air and traps smoke and particulate matter under the warmer air.” *Id.*

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President Kennedy included a plea for “an effective air pollution program” in his Special Message on the Natural Resources. *Id.* Public pressures for legislation only increased when a “Killer Smog” engulfed London in December 1962, killing at least 340, and a similar inversion in New York City allegedly claimed the lives of 200. *Id.* Eventually, legislation recommended by President Kennedy in February 1963 led to the enactment of the CAA, which President Johnson signed into law on December 17, 1963. *Id.* at 1586-87. Seven years later, President Nixon signed The Clean Air Amendments of 1970. The 1970 Amendments authorized the EPA to prescribe national ambient air quality standards (NAAQS) and created the statutory framework that still exists today.

**B.**

It was no happy accident that congressional draftsmen titled the legislation the “*Clean Air Act.*” Ambient air quality was the point, purpose, and focus of the CAA. Congress had set its sights on the “dirty, visible ‘smokestack’ emissions,” 136 CONG. REC. H2771-03 (1990) (statement of Rep. Roe), and smog caused by vehicle emissions. The CAA was the means by which Congress would grapple with urban air pollution and its attendant health effects, including impaired breathing, heart disease, lung damage and lung disease, and even death. If pollution was the problem, these ills were the specific harms Congress sought to combat. Even a cursory glance at the

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legislative history, with its numerous charts, graphics, and statistics detailing cancer and death rates, will bear this point out. *See, e.g.*, Hearings on Air Pollution – 1968 Before the Subcomm. on Air and Water Pollution of the Sen. Comm. on Pub. Works, 90th Cong. 2nd Sess., pt. 2, 608-20 (1968) (statement of Dr. Samuel S. Epstein, Children’s Cancer Research Foundation.) (“Air Pollution – 1968”).

With the enactment of the 1990 Amendments, Congress expanded the Act beyond its singular emphasis on urban air quality to address hazardous – *i.e.*, toxic – air pollutants, acid rain, and stratospheric ozone. In regulating hazardous pollutants, Congress reemphasized the need for a close and tangible nexus between pollutant and harm. The legislative record, for example, continued to conceive of dangers in terms of their direct effects on human health and well-being. *See, e.g.*, S. Rep. No. 101-228, at 3388 (1989), *reprinted in* 1990 U.S.C.C.A.N. 3385 (“Air pollution can silently damage our lungs and heart or act swiftly in the case of exposure to toxic air pollutants. Rigorous regulation of toxic air pollutants is needed to avoid risk of serious, irreversible damage to human health.”). To the extent the regulation of stratospheric ozone and acid rain suggest a broader nexus between pollutant and harm to human health, the very particular way in which Congress handled these exceptions goes a long way toward proving the rule: Congress only expands the CAA through considered legislative acts.

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In addressing these transnational phenomena, the legislature did not spin regulations out of whole cloth. With ozone concerns, for example, Congress developed solutions through international negotiations, the implementation of which led to the creation of a separate title of the CAA. *See NRDC v. EPA*, 464 F.3d 1, 3 (D.C. Cir. 2006). Likewise, years of contentious discussions with Canada helped bring about the acid rain provisions in the 1990 Amendments. *See generally* Dennis A. Leaf, *Intergovernmental Cooperation: Air Pollution from an U.S. Perspective*, 18 CAN.-U.S. L.J. 245 (1992). Simply put, when Congress became aware of new dangers, it acted judiciously in crafting workable remedies that, when they obtained the necessary political support, were worked into their own discrete provisions under the Act. Neither Congress nor the EPA attempted to force these distinct problems into existing, ill-suited regulatory schemes.

Congressman Waxman, one of the strongest proponents of stringent air pollution controls and a key force behind the 1990 Amendments, has stated that “in recent experience, no legislation has received more scrutiny during its consideration.” The Honorable Henry A. Waxman, *An Overview of the Clean Air Act Amendments of 1990*, 21 ENVTL. L. 1721, 1724 (1991). Hyperbole or not, the admission is telling. The history of the CAA is one of hard-fought incremental gains through which Congress remedied particular environmental wrongs with tailored remedies. Said the Congressman:

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Discrete and extensive new programs are included to grapple with high ambient pollution levels (urban and regional smog), hazardous air pollution, acid rain, and depletion of the stratospheric ozone layer. Each of these programs [was] tailored to the problem it [sought] to address, and each [was] quite different in its approach.”

*Id.* at 1811. Political necessity has forced Congress to calibrate its amendments to the CAA with great specificity and care. Where our Representatives have acted with such caution, any suggestion that Congress has – through a single word – conferred upon EPA the authority to steamroll through Congressional gridlock, upend the Senate’s rejection of the Kyoto Protocol, and regulate GHGs for the whole of American industry must necessarily fail. The legislature, recall, does not “hide elephants in mouseholes.” *Whitman v. Am. Trucking Assocs.*, 531 U.S. 457, 468 (2001).

But we needn’t rely on interpretative canons alone to make this point. In drafting the 1990 Amendments, Congress considered – and *expressly rejected* – proposals authorizing EPA to regulate GHGs under the CAA. *See* S. Rep. No. 101-228, at 377 (1989), *as reprinted in* 1990 U.S.C.C.A.N. 3385, 3760. Even the Executive objected that an attempt to control Carbon Dioxide (CO<sub>2</sub>) emissions – emissions not harmful to health – in order to prevent global warming was premature. *See* Administration’s Amendments – Hearings Before the Subcomm. On

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Health and the Env't of the Comm. on Energy and Commerce, 101st Cong., 1st Sess. (1989) (includes Bush Administration Report on S. 1630). The Executive's critique noted that "unilateral action aimed at addressing a global problem" through a standard limiting tailpipe emissions would not be an effective means of safeguarding the global environment and would "necessarily punish national interests." *Id.* at 792, 813.

That Congress has never deviated from its decision to not regulate GHGs under the CAA was not for lack of opportunity. Congress has considered and rejected countless other bills in the years since the 1990 Amendments that would have authorized GHG regulation. By one estimate, Congressmen have proposed over 400 bills concerning GHGs between 1990 and 2009. See Abigail R. Moncrieff, *Reincarnating the "Major Questions" Exception to Chevron Deference As A Doctrine of Noninterference (or Why Massachusetts v. EPA Got It Wrong)*, 60 ADMIN. L. REV. 593, 636-37 (2008) (tracking proposals). Congress's inability to break this nearly quarter-century long deadlock is incredibly suggestive: this is not an area of policymaking where the legislature has acted rashly or unthinkingly in delegating authority to agencies.

At bottom, Congress understood the dangers of "any air pollutant" in § 7521(a)(1) in terms of the ill-effects caused those who inhale the pollutants, not the broad, attenuated consequences of climate change. The CAA was drafted not to combat the

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threat of flooding or the menace of heat waves, *see* Endangerment and Cause of Contribute Findings for Greenhouse Gases, 74 Fed. Reg. 66,496, 66,526 (Dec. 15, 2009) (“EPA Endangerment Finding”), but the choking, stifling, and degenerative effect of airborne pollutants on human beings and their affected localities. Congress has long quantified this harm in terms of mortality rates, *see, e.g.*, Air Pollution – 1968, 564 (statement of Dr. Roger S. Mitchell, Director, Webb-Waring Institute for Medical Research), not acreage of “costal land” lost. *Massachusetts*, 549 U.S. at 522. To put matters pointedly: the injury sufficient to establish standing need not suffice to establish endangerment as well.

Congress was of course free to circumvent this close cause-health effect nexus by devising a separate provision for GHG regulation, much as it did for stratospheric ozone, but it did no such thing. And nothing in the legislative history suggests that Congress has deviated from this status quo.

The plain language of the CAA only underscores the Act’s non-applicability to GHGs insofar as it requires the harm be of the sort “reasonably [] anticipated to endanger.” 42 U.S.C. § 7251(a)(1) – a term we know to have a discrete meaning.

**C.**

In the present case, this Court had “little trouble” disposing of the argument that the “PSD program is specifically focused solely on localized air pollution”

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because it is “quite clear . . . the PSD program was intended to protect against precisely the types of harms caused by greenhouse gases.” CRR Slp. Op. 62-63 (emphasis added). *Massachusetts* notwithstanding, this statement is a curious thing in light of the uncontradicted legislative history just discussed.<sup>2</sup> So too is the court’s reliance on the statutory text, particularly its finding that “the CAA expressly provides that effects on ‘welfare’ means ‘effects on . . . weather . . . and climate.’” Slp. Op. 62-63 (citing 42 U.S.C. § 7602(h)).

As a textual matter, there is nothing “quite clear” about it. The Supreme Court has declared that GHGs like CO<sub>2</sub> are pollutants within the meaning of the Act. Under the CAA, however, EPA can regulate a pollutant only if the administrator finds that the GHG causes or contributes to “air pollution which *may reasonably be anticipated to endanger* public health or welfare.” 42 U.S.C. § 7251(a)(1) (emphasis added). But in locating the CAA’s conception of “harm” in § 7602(h), the definition of “welfare,” and not § 7251(a)(1) generally, this court effectively skirted the operative statutory language – “may reasonably be anticipated” – and rendered it nugatory. This was in error. Section 7602(h) defines only the potential *objects* of harm; the “reasonably be

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<sup>2</sup> As noted, the weather and climate issues targeted by the CAA involve direct, deleterious, localized effects caused by polluted air people breathe or suspended pollutants that may be deposited on land and crops by precipitation.

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anticipated” language of § 7251(a)(1) supplies the requisite *nexus* between the pollutant and the objects of its harm. The two provisions must be read together if the statute is to be interpreted faithfully. To put matters another way, the “may reasonably be anticipated” language must do some analytical work in the endangerment determination lest it be deemed surplusage. *See, e.g., Conference of State Bank Supervisors v. Conover*, 715 F.2d 604, 627 (D.C. Cir. 1983) (“[I]n construing a statute, we ‘are obliged to give effect, if possible, to every word Congress used.’” (quoting *Reiter v. Sonotone Corp.*, 442 U.S. 330, 339 (1979))). And in view of the CAA’s legislative history, the nature of that work is clear.

In order to reasonably anticipate that a pollutant will contribute to air pollution that endangers public health or welfare, the Agency would have to conclude that pollution created by CO<sub>2</sub> or another GHG is a reasonably direct cause of the damage to public health and welfare. To find that CO<sub>2</sub> may ultimately endanger public health and welfare because sea levels will rise tells us nothing about whether CO<sub>2</sub> concentrations in the ambient air directly harm public health and welfare. The ingredients of a Killer Smog are few and specific; the process through which an air inversion traps particulate matter close to the ground is well understood. With both there is a direct correlation between reducing the concentration of the pollutant and reducing the negative health effects. Questions of public health impacts from air pollution have consistently been based on the direct – that is,

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inhalational – effects of exposure to the pollutant. *See, e.g.*, Joint Opening Brief of Non-State Petitioners and Supporting Intervenors at 58, *Coal. for Responsible Regulation v. EPA*, No. 09-1322 (May 20, 2011); *NRDC, Inc. v. EPA*, 902 F.2d 962, 973 (D.C. Cir. 1990) (concluding that EPA may not consider the health effects of increased unemployment when setting new health-based NAAQS).

In contrast, any harm to human health and welfare flowing from climate change comes at the end of a long speculative chain. The dissent in *Massachusetts* pointed out that EPA had described in great detail the scientific uncertainty that precluded even forming a judgment as to whether greenhouse gases endanger public welfare. *See* 549 U.S. at 553-55 (Scalia, J., dissenting). In that earlier defense of its refusal to form a judgment, EPA explained how predicting climate change involved a “complex web of economic and physical factors,” including:

[o]ur ability to predict future global anthropogenic emissions of GHGs and aerosols; the fate of these emissions once they enter the atmosphere (*e.g.*, what percentage are absorbed by vegetation or are taken up by the oceans); the impact of those emissions that remain in the atmosphere on the radiative properties of the atmosphere; changes in critically important climate feedbacks (*e.g.*, changes in cloud cover and ocean circulation); change in temperature characteristics (*e.g.*, average temperatures, shifts in daytime and evening temperatures);

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changes in other climatic parameters (*e.g.*, shifts in precipitation, storms); and ultimately the impact of such changes on human health and welfare (*e.g.*, increases or decreases in agricultural productivity, human health impacts).

*Id.* If there can be this much logical daylight between the pollutant and the anticipated harm, there is nothing EPA is not authorized to do. If this finding is valid, in a world where six degrees of separation is the compass of all humankind, the right endangerment finding would allow EPA to rule the world. But as this Court has noted before, EPA's authority to regulate is constrained, not enlarged, by the relationship of the term "will endanger" to other sections of the CAA. See *Ethyl v. EPA*, 541 F.2d 1, 29 (D.C. Cir. 1976) (*en banc*).

Of course, nothing here should be taken to imply that a particular GHG does not contribute to climate change. I mean only to suggest that a pollutant might contribute to the nebulous mélange of potential drivers of climate change without having any direct, deleterious impact within the meaning of the CAA. I emphasize too that this is not a problem with science. This is a problem of statutory interpretation. Climate change, with its geologic timeframe and its many uncertainties and imponderables, is and will probably remain a subject of some controversy. EPA finds the science sufficiently convincing for its purposes and it is entitled to a certain amount of deference on questions related to its technical expertise. But it is

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not necessary to quibble with the science of climate change to conclude that the endangerment finding fails on textual and logical terms. There is simply a point at which a difference in degree becomes a difference in kind and we have passed this point many times over in the course of this tortured litigation. The Supreme Court, however, has refused to recognize as much for tailpipe emissions.

**II.****A.**

But we need not follow *Massachusetts* off the proverbial cliff and apply its reasoning to the unique Title V and PSD provisions not considered in that case. The cascading layers of absurdity that flow from that interpretive exercise make clear that the plain language of the CAA compels no such result. As EPA's own rulemaking documents have so unabashedly explained:

To apply the statutory PSD and title V applicability thresholds literally to sources of GHG emissions would bring tens of thousands of small sources and modifications into the PSD program each year, and millions of small sources into the title V program. These extraordinary increases in scope of the permitting programs would mean that the programs would become several hundred-fold larger than what Congress appeared to contemplate.

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PSD and Title V Greenhouse Gas Tailoring Rule; Final Rule, 75 Fed. Reg. 31,514, 31,533 (Jun. 3, 2010) (“Final Tailoring Rule”). Completely oblivious to the irony, EPA added:

For our authority to take this action, we rely in part on the “absurd results” doctrine, because applying the PSD and title V requirements literally (as previously interpreted narrowly by EPA) would not only be inconsistent with congressional intent concerning the applicability of the PSD and title V programs, but in fact would severely undermine congressional purpose for those programs.

*Id.* at 31,541-42. And again:

[I]n this case because a literal reading of the PSD and title V applicability provisions results in insurmountable administrative burdens. Those insurmountable administrative burdens – along with the undue costs to sources – must be considered “absurd results” that would undermine congressional purpose for the PSD and title V programs.

*Id.* at 31,547.

In precincts outside Washington, D.C., this litany might cause a regulator to pause and consider whether results so at odds with Congressional presuppositions could ever be justified as falling within the literal meaning of an enactment. EPA, however, proposes that the absurd result can be easily eliminated by ramping up and gradually

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phasing in the requirements. Faced with the choice of reconsidering the legitimacy of an endangerment finding that sets in motion such a cluster of chaos or rewriting the statute, the agency has blithely done the latter. This is an abuse of the absurdity and administrative necessity doctrines as neither can be invoked to preempt legislative prerogatives. Permitting a statute “to be read to avoid absurd results allows an agency to establish that seemingly clear statutory language does not express the ‘unambiguously expressed intent of Congress,’” but it does not grant the agency “a license to rewrite the statute.” *Mova Pharmaceuticals v. Shalala*, 140 F.3d 1060, 1068 (D.C. Cir. 1998).

But that is not the worst of it. The real absurdity – apparently as invisible to the EPA as the San Gabriels once were to me – cannot be cured by phase in, no matter how subtly Byzantine. The real absurdity is that this unprecedented expansion of regulatory control, this epic overreach, may very well do more damage to the wellbeing of Americans than GHGs could ever do.<sup>3</sup>

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<sup>3</sup> *See, e.g.*, Joint Reply Br. of Non-State Petitioners and Supporting Intervenors at \*1, No. 09-1322 (Nov. 14, 2011) (“Nor does [EPA] dispute that the new rules will impose massive burdens on a struggling economy, or that its program of vehicle standards will affect global mean temperatures by no more than 0.01 degree Celsius by 2100”).

**B.**

A second, more elementary consideration counsels against the mechanical application of *Massachusetts's* tailpipe emissions determination to these distinct CAA provisions: deference to Congress.

As articulated in *Food & Drug Administration v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120 (2000), the Supreme Court's "major questions" canon gives form to the judicial intuition so strongly implicated here: Congress should not be presumed to have deferred to agencies on questions of great significance more properly resolved by the legislature. If there was ever a regulation in recent memory more befitting such a presumption than the present, I confess I do not know of it.

On familiar facts, the Supreme Court in *Brown & Williamson* rebuffed the FDA's expansionist effort to bring tobacco products within its regulatory ambit. The agency's regulation rested on a strained interpretation of the Food, Drug, and Cosmetic Act, 21 U.S.C. § 301 *et seq.*, in which it defined nicotine as a "drug" and cigarettes and smokeless tobacco as "combination products" used to deliver nicotine to the body. *See Brown & Williamson*, 529 U.S. at 125-27. Applying *Chevron U.S.A. Inc. v. Natural Resources Defense Council*, 467 U.S. 837 (1984), the Court first considered the statutory structure. "[I]f tobacco products were within the FDA's jurisdiction," the majority concluded, the normal operation of the "Act would require the FDA to remove them from the

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market entirely,” and this would “contradict Congress’ clear intent as expressed in its more recent, tobacco-specific legislation.” *Brown & Williamson*, 359 U.S. at 143. As the present case confirms, such absurdity is all but inevitable where an agency attempts to regulate that which “simply do[es] not fit” within its regulatory scheme. *Id.* The Court next considered Congress’s 35 year history of tobacco-specific legislation, finding it “clear” that this “legislation has effectively ratified the FDA’s previous position that it lacks jurisdiction to regulate tobacco.” *Id.* at 156.

The Court then closed its lengthy *Chevron* discussion with an appeal to first principles. The “inquiry into whether Congress has directly spoken to the precise question at issue,” the Court explained, “is shaped, at least in some measure, by the nature of the question presented.” *Id.* at 159. *Chevron* deference operates on the assumption “that a statute’s ambiguity constitutes an implicit delegation,” but this tenuous fiction need not hold true in every situation. *Id.* “In extraordinary cases,” the Court went on, “there may be reason to hesitate before concluding that Congress has intended such an implicit delegation.” *Id.* (referencing Stephen Breyer, *Judicial Review of Questions of Law and Policy*, 38 ADMIN. L. REV. 363, 370 (1986) (“A court may also ask whether the legal question is an important one. Congress is more likely to have focused upon, and answered, major questions, while leaving interstitial

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matters to answer themselves in the course of the statute's daily administration").<sup>4</sup>

Declaring *Brown & Williamson* “hardly [the] ordinary case,” the Court reasoned:

Contrary to its representations to Congress since 1914, the FDA has now asserted jurisdiction to regulate an industry constituting a significant portion of the American economy. In fact, the FDA contends that, were it to determine that tobacco products provide no “reasonable assurance of safety,” it would have the authority to ban cigarettes and smokeless tobacco entirely. Owing to its unique place in American history and society, tobacco has its own unique political history. Congress, for better or for worse, has created a distinct regulatory scheme for tobacco products, squarely rejected proposals to give the FDA jurisdiction over tobacco, and repeatedly

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<sup>4</sup> *MCI Telecommunications Corporation v. AT&T Co.*, 512 U.S. 218 (1994), a case the *Brown & Williamson* Court found “instructive,” *Brown & Williamson*, 529 U.S. at 160, had advanced a similar logic. In concluding Congress had spoken to the meaning of the term “modify” as it appears in § 203(b) of the Communications Act of 1934, the Court rejected FCC’s far more expansive interpretation. The Court assumed in dicta that it was “highly unlikely that Congress would leave the determination of whether an industry will be entirely, or even substantially, rate-regulated to agency discretion – and even more unlikely that it would achieve that through such a subtle device as permission to ‘modify’ rate-filing requirements.” *MCI*, 512 U.S. at 231. Certainly the same might be said here as well.

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acted to preclude any agency from exercising significant policymaking authority in the area. Given this history and the breadth of the authority that the FDA has asserted, we are obliged to defer not to the agency's expansive construction of the statute, but to Congress' consistent judgment to deny the FDA this power.

*Brown & Williamson*, 529 U.S. at 159-60.

In view of the language, structure, and history of the CAA, I am simply unable to distinguish this logic from the present case in any meaningful way. To the contrary, with only the slightest of modifications one could rework the above text to apply to GHG emissions.<sup>5</sup>

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<sup>5</sup> Perhaps:

Contrary to its representations in *Massachusetts v. EPA*, the EPA has now asserted jurisdiction to regulate industries constituting a significant portion of the American economy. In fact, the EPA contends that, because greenhouse gases can be regulated as tailpipe emissions, it is obligated to regulate all stationary sources at admittedly "absurd" levels. Owing to its ubiquitous place in the planet's life cycle, greenhouse gases have their own unique political history. Congress, for better or for worse, has declined to create a distinct regulatory scheme for greenhouse gases, squarely rejected proposals to give the EPA jurisdiction over greenhouse gases, and repeatedly acted to preclude any agency from exercising significant policymaking authority in the area. Given this history and the breadth of the authority that the EPA has asserted, we are obliged to defer not to the

(Continued on following page)

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Although the *Massachusetts* Court distinguished *Brown & Williamson*, it did so only in the context of tailpipe emissions. Its reasoning does not extend to Title V and the PSD program.

In the Court's view, *Brown & Williamson* had “found critical at least two considerations that have no counterpart in [*Massachusetts*].” 549 U.S. at 531. First, whereas the regulation of tobacco under the FDCA would have necessarily led to a ban on tobacco products – an outcome that clashed with the “common sense” intuition that Congress never meant to remove those products from circulation – the expansion of EPA's “jurisdiction would lead to no such extreme measures [because] EPA would only *regulate* emissions” and “there is nothing counterintuitive to the notion that EPA can curtail the emission of substances that are putting the global climate out of kilter.” *Id.* But the Court spoke too soon. In the present litigation, EPA argued – and a Panel of this Court readily agreed – that in regulating tailpipe emissions under 42 U.S.C. § 7521, it is obligated to regulate stationary sources under Title V and the PSD program as well. As a threshold matter, the *Massachusetts* Court never considered these far-reaching effects. It limited its brief discussion on the merits to the tailpipe emissions question squarely before it. In this way, the Court never considered the

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agency's expansive construction of the statute, but to Congress' consistent judgment to deny the EPA this power.

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differing ways in which the CAA regulates tailpipes and stationary sources.

With tailpipe emissions, the inclusion of greenhouse gasses within the term “air pollutant” does not directly expand or contract the universe of vehicles and engines subject to the new standards. Consequently, the regulation’s impact will fall primarily on those manufacturers already complying with existing emission requirements. And even then, the Court explained, EPA “would have to delay any action ‘to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance.’” *Massachusetts*, 549 U.S. at 531 (quoting § 7521(a)(2)). Not so with the regulation of stationary sources. Insofar as 42 U.S.C. § 7479(1) defines “major emitting facility” to include those facilities with the “potential to emit” either 100 or 250 “tons per year or more of *any* air pollutant,” the statutory term is necessarily tied to CAA’s jurisdictional scope. Inescapably, then, the regulation of greenhouse gasses as “air pollutants” will radically expand the universe of covered entities far beyond Congress’s intentions. EPA’s decidedly extra-textual Tailoring Rule only confirms the ludicrousness of this result. Nor can it be said that the statutory safeguards operate in the same way as § 7521(a)(2). Permitting authorities may well be able to determine on a case-by-case basis what constitutes the “best available control technology” for a particular emitting facility, 42 U.S.C. § 7479(3), but this is of little consolation for

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the small business owner who previously fell outside the CAA. At bottom, this outcome clashes with the “common sense” understanding that Congress would not have intended such a broad, unchecked expansion of the CAA to potentially millions of businesses from all walks of industry. The Supreme Court in *Massachusetts* simply did not have occasion to consider this absurd and “counterintuitive” outcome, but we do – and we must.

Second, the Court determined that the “unbroken series of congressional enactments” referenced in *Brown & Williamson* “made sense only if adopted ‘against the backdrop of the FDA’s consistent and repeated statements that it lacked authority under the FDCA to regulate tobacco.’” *Massachusetts*, 549 U.S. at 531.<sup>6</sup> By contrast, EPA had “not identified any congressional action that conflicts in any way with the regulation of greenhouse gases from new motor vehicles.” *Id.* And even if it had, “Congress could not have acted against a regulatory ‘backdrop’ of disclaimers of regulatory authority” because “EPA had never disavowed the authority to regulate greenhouse gases, and in 1998 it in fact affirmed that it *had* such authority.” *Id.* When read in context, however, it is clear that the Court’s reasoning was

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<sup>6</sup> The suggestion here seems to be that Congress’s decision to regulate tobacco products would not, by itself, evince its intent to proscribe agencies from doing the same. Doing so in light of FDA’s statements, however, had the effect of implicitly codifying the agency’s long-held view.

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building toward a wholly unspectacular point: because EPA's legislative history failed to establish congressional intent with the same weight and precision as *Brown & Williamson*, it did not justify "read[ing] ambiguity into a clear statute." *Id.* That logic is inapplicable here. In the absence of lexical clarity – which the Court had found in in [sic] CAA's "sweeping definition of 'air pollutant,'" *id.* at 528 – we need legislative history and other indicia of congressional intent to inform our understanding of how GHGs are to be regulated under other CAA provisions.<sup>7</sup>

The *Massachusetts* Court's effort to distinguish *Brown & Williamson* is thus unavailing where we

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<sup>7</sup> Consider the role of NAAQS in this regulatory system. EPA in *Massachusetts* had observed that NAAQS were established to "address air pollution problems that occur primarily at ground level" as well as "concentrations of substances in the ambient air and the related public health and welfare problems." *Massachusetts*, 549 U.S. at 558-59 (Scalia, J., dissenting). EPA thus reasoned that the regulation of the buildup of CO<sub>2</sub> in the upper reaches of the atmosphere – the process alleged to cause global climate change – was not akin to regulating the concentration of a substance that is polluting the air and was "beyond the scope of CAA's authorization to regulate." *Id.* In other words, EPA maintained that had Congress intended the CAA to regulate greenhouse gases [sic] and global climate change, it would have provided some better tool than NAAQS. That defense – offered in response to a demand to regulate tailpipe emissions – applies with even greater potency to Title V and the PSD program. In fact, although EPA now claims it is authorized to regulate greenhouse gases and global climate change, the agency acknowledges that the regulatory framework is as ill-suited to the task as ever.

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deal not with the definitional scope of “any pollutant” and tailpipe emissions, but the particular dangers Congress sought to combat in enacting Title V and the PSD program. When read in conjunction with the CAA’s history, structure, and language, the intuitive logic of the “major questions” doctrine makes clear that the Panel erred in extending *Massachusetts*. Congress simply did not intend for EPA to convert the “Clean Air Act” to the “Warm Air Act” writ large. But that is exactly what the federal courts have done.

As the Chief Justice observed in his *Massachusetts* dissent, impatience is not a juridical principle that can be sustained under our constitutional framework. *See Massachusetts*, 549 U.S. at 535-36 (Roberts, C.J., dissenting). It certainly fares no better as a default measure of institutional choice under *Chevron*. As *Massachusetts* recognized, an agency can only exercise the authority Congress has delegated to it. *See* 549 U.S. at 534-35 (noting that EPA must “ground its reasons for action or inaction in the statute” and “exercise its discretion within defined statutory limits.”). Absurdity can never figure as an adequate substitute for authority in this threshold assessment. Nor can absurdity cure the agency’s failure to establish that the statute unambiguously compels its interpretation or that its interpretation, though discretionary, is actually consistent with statutory text, structure, and purposes. The agency seeks to avoid these pesky constraints here by invoking *Massachusetts*, but Article III judges cannot be a legitimate source of

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legislative authority. By deferring to the distorted claim of delegation advanced here, this Court has transformed *Chevron* from a useful, albeit accidental, touchstone into an idol to which we surrender our constitutional faith.

**III.**

In rejecting State Petitioners' challenge to the Tailoring Rule for want of standing, the Panel invoked that famed preceptor of American civics, Schoolhouse Rock, to great effect. Slp. Op. at 79. ("As a generation of schoolchildren knows, 'by that time, it's very unlikely that [a bill will] become a law. It's not easy to become a law.'"). I certainly do not quarrel with such dispositive authority. Lawmaking is neither easy nor certain. In an ordinary case, the mere possibility of "corrective legislation" will not establish that redress is "likely, as opposed to merely speculative." *Lujan*, 504 U.S. at 561. But it bears repeating that this is not an ordinary case. Where the choice is between non-action or a confessedly "absurd" regulation poised to impress countless billions of dollars in costs on American industry, we have transcended the realm of the speculative. For once, the comparison with *Massachusetts* is apt. The Supreme Court found standing on the basis of an estimated rise in sea level of 20 to 70 centimeters by the year 2100, *see Massachusetts*, 549 U.S. at 542 (Roberts, C.J, dissenting) – a prediction based almost entirely on conjecture. Is it any more speculative to say that specific projections of billions of dollars in

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actual regulatory costs would not suffice to compel Congress to act?

The Panel's alternative contention fares better: because Congress could remedy the issue in countless ways, not all of which inure to State Petitioners' benefit, the inquiry is "inherently speculative." *See Op.* at 79. This argument benefits from the genuine uncertainty in Congress over what, if any, role EPA should play in GHG regulation. But therein lies a frighteningly obtuse logic. If EPA actions are *ultra vires* precisely because disagreement on the Hill prevented Congress from altering the status quo and authorizing such regulation, how then can the very same deadlock be used to *defeat* Petitioners' standing to challenge the Rule through which EPA effectuates its absurdist scheme? The Court cannot have it both ways.

At bottom, bad decisions make bad law. In denying rehearing en banc, this Court has read *Massachusetts* to its illogical ends and it is American industry that will have to pay. That this Court did so is unsurprising, but certainly not fated. *Massachusetts* does not compel this outcome for the PSD and Title V provisions. Had this Court interrogated its own assumptions and yielded not to *Massachusetts's* telos but sound constitutional principles, it would have found that the matter properly belongs before Congress, not courts or agencies. As Schoolhouse Rock long ago explained:

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Ring one, Executive,  
Two is Legislative, that's Congress.  
Ring three, Judiciary.  
See it's kind of like my circus, circus.<sup>8</sup>

And what a circus it is.

For these reasons, I respectfully dissent from the denial of rehearing en banc.

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KAVANAUGH, *Circuit Judge*, dissenting from the denial of rehearing en banc:

This case is plainly one of exceptional importance. A decision in either direction will have massive real-world consequences. The U.S. Chamber of Commerce describes the EPA regulations at issue here as “the most burdensome, costly, far-reaching program ever adopted by a United States regulatory agency.” Petition for Rehearing En Banc at 1. On the other hand, EPA issued these regulations to help address global warming, a policy issue of major long-term significance to the United States. Put simply, the economic and environmental policy stakes are very high.

Of course, our role is not to make the policy choices or to strike the balance between economic and environmental interests. That job is for Congress and

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<sup>8</sup> “Three Ring Government,” Schoolhouse Rocks, *available at* <http://www.schoolhouserock.tv/ThreeRing.html>.

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the President when considering and enacting legislation, and then as appropriate for the Executive Branch – here, EPA, under the ultimate supervision of the President – when exercising its authority within statutory constraints. Our job as a court is more limited: to ensure that EPA has acted within the authority granted to it by Congress. In this case, I conclude that EPA has exceeded its statutory authority. I respectfully disagree with the panel opinion’s contrary conclusion, and given the overall importance of the case, I respectfully dissent from the denial of rehearing en banc.

I

A

This case concerns EPA’s implementation of the Prevention of Significant Deterioration provisions of the Clean Air Act. The Prevention of Significant Deterioration program – which is codified in Sections 7470 to 7479 of Title 42 – is designed to maintain state and local compliance with the National Ambient Air Quality Standards, known as the NAAQS. The NAAQS are currently established for six air pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide. As relevant here, the Prevention of Significant Deterioration statute requires stationary facilities that emit certain “air pollutants” to obtain permits before beginning new construction. *See* 42 U.S.C. §§ 7475(a)(1), 7479(1). To obtain a permit, the facility

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must undergo a lengthy, costly process to analyze the new construction's impact on air quality and to try to demonstrate its compliance with the relevant emissions limits.

A central question in this case is how to construe the term "air pollutant" for purposes of this statutory permitting requirement. In particular, the question is whether the term "air pollutant" here covers not just the NAAQS pollutants, which can cause breathing problems or other health issues, but also greenhouse gases such as carbon dioxide, which contribute to global warming. Under the broader interpretation of "air pollutant" that encompasses greenhouse gases, a far greater number of facilities would fall within the Prevention of Significant Deterioration program and have to obtain pre-construction permits. That in turn would impose significantly higher costs on businesses and individuals that are building new commercial or residential property.

In considering a different Clean Air Act program targeted at motor vehicle emissions, the Supreme Court said that the term "air pollutant" meant "all airborne compounds of whatever stripe," which included greenhouse gases such as carbon dioxide. *Massachusetts v. EPA*, 549 U.S. 497, 529 (2007). But all parties here, including EPA, agree that the *Massachusetts v. EPA* interpretation of the term "air pollutant" cannot control in this case, for purposes of this very different Clean Air Act program for stationary facilities. Rather, as the parties agree, we must look to the text and context of the Prevention of

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Significant Deterioration statute to determine what “air pollutant” covers here.

Looking at the relevant statutory text and context, there would initially appear to be two plausible interpretations of the term “air pollutant” for purposes of the Prevention of Significant Deterioration statute: (i) more broadly, an airborne compound that is deemed harmful and is regulated by EPA in any Clean Air Act program, which would include greenhouse gases such as carbon dioxide; or (ii) more narrowly, the six air pollutants that are regulated by EPA in setting and enforcing the NAAQS, which would cover carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide, but would not include greenhouse gases such as carbon dioxide.

EPA chose the broader interpretation of “air pollutant,” thereby greatly expanding the reach of the Prevention of Significant Deterioration statute. But that broader interpretation has a glaring problem, as EPA itself recognized. In the context of the Prevention of Significant Deterioration statute, EPA’s broader interpretation would not mesh with other provisions of the statute and would lead to absurd results. That’s because the Prevention of Significant Deterioration statute requires pre-construction permits for facilities with the potential to emit more than 250 tons per year (or, for some facilities, 100 tons per year) of any covered pollutant. *See* 42 U.S.C. §§ 7475(a)(1), 7479(1). That would be a very low trigger for emissions of greenhouse gases because

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greenhouse gases are emitted in far greater quantities than the NAAQS pollutants. As a result, the low trigger would mean a dramatically higher number of facilities would fall within the program and have to obtain pre-construction permits.

In an unusual twist, EPA openly acknowledged the unreasonableness – indeed, the absurdity – caused by its interpretation of the statute. If the Prevention of Significant Deterioration program were interpreted to require pre-construction permits based on emissions of greenhouse gases, EPA candidly stated that the result would be “so contrary to what Congress had in mind – and that in fact so undermines what Congress attempted to accomplish with the PSD requirements – that it should be avoided under the ‘absurd results’ doctrine.” 74 Fed. Reg. 55,292, 55,310 (Oct. 27, 2009).

But faced with those absurd consequences from the broader interpretation of the statute, EPA surprisingly did not choose the seemingly obvious option of adopting the narrower and more sensible interpretation of the term “air pollutant” for the Prevention of Significant Deterioration statute – the interpretation limited to NAAQS air pollutants. Instead, EPA plowed ahead with the broader interpretation. And then, to try to deal with the absurd repercussions of that interpretation for the Prevention of Significant Deterioration statute, EPA re-wrote the very specific 250-ton trigger in the permitting requirement of the statute, unilaterally raising that trigger for greenhouse gas emissions

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from 250 tons to 100,000 tons – a 400-fold increase. *See* 75 Fed. Reg. 31,514 (June 3, 2010). EPA believed that re-writing the statute’s permitting-triggers provision in this way would reduce the number of facilities that would require pre-construction permits and thereby “tailor” the absurdity – that is, alleviate some of the absurdity caused by interpreting “air pollutant” to cover greenhouse gases.<sup>1</sup>

This is a very strange way to interpret a statute. When an agency is faced with two initially plausible readings of a statutory term, but it turns out that one reading would cause absurd results, I am aware of no precedent that suggests the agency can still choose the absurd reading and then start rewriting other perfectly clear portions of the statute to try to make it all work out. And just recently, the Supreme Court reminded the Executive Branch and the lower courts that this is not the proper way to interpret a statute: Instead of “reading new words into the statute” to avoid absurd results, as the Government had urged in that case, the Court said that the statute should be interpreted so that “no absurdity arises in the first

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<sup>1</sup> At the same time, EPA reserved the right to ratchet the trigger all the way back down to 250 tons, thereby bringing more and more facilities under the program at EPA’s unilateral discretion. EPA’s assertion of such extraordinary discretionary power both exacerbates the separation of powers concerns in this case and underscores the implausibility of EPA’s statutory interpretation. Put simply, the statute cannot be read to grant discretion to EPA to raise or lower the permitting triggers as EPA sees fit.

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place.” *Kloeckner v. Solis*, No. 11-184, slip op. at 13 (U.S. 2012).

Even limited to this case alone, the practical implications of accepting EPA’s approach are obviously major. And if this case stands as a precedent that influences other agency decisionmaking, the future consequences likewise could be significant: Agencies presumably could adopt absurd or otherwise unreasonable interpretations of statutory provisions and then edit other statutory provisions to mitigate the unreasonableness. Allowing agencies to exercise that kind of statutory re-writing authority could significantly enhance the Executive Branch’s power at the expense of Congress’s and thereby alter the relative balance of powers in the administrative process. I would not go down that road.

## B

In my view, the statutory issue here is reasonably straightforward. The Prevention of Significant Deterioration statute’s definition of “major emitting facility” subjects a facility to the permitting requirement based on the facility’s emissions of “air pollutants.” See 42 U.S.C. §§ 7475(a)(1), 7479(1). In the context of the Prevention of Significant Deterioration program as a whole, it seems evident that the term “air pollutant” refers to the NAAQS air pollutants.

To begin with, as explained above, interpreting “air pollutant” in this context to refer to the NAAQS

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air pollutants would avoid the absurd consequences that EPA's broader interpretation creates – namely, the exponential increase in the number of facilities that would be required to obtain pre-construction permits. That single point alone provides dispositive support for the narrower, NAAQS-specific interpretation. *See, e.g., Taniguchi v. Kan Pacific Saipan, Ltd.*, 132 S. Ct. 1997, 2004-05 (2012) (statutory context supports narrower rather than broader reading of statutory term).

Moreover, other provisions in the Prevention of Significant Deterioration statute likewise plainly use the term “air pollutant” to refer to the NAAQS air pollutants. The Prevention of Significant Deterioration program is codified in Sections 7470 to 7479 of Title 42. Of relevance here, Section 7473 sets guidelines for areas designated as in attainment of the NAAQS and requires that the “concentration of any air pollutant” in those areas not exceed certain concentrations permitted by the NAAQS. 42 U.S.C. § 7473(b)(4). The term “air pollutant” in Section 7473(b)(4) necessarily refers to the NAAQS air pollutants. In addition, several other provisions in the Prevention of Significant Deterioration statute similarly refer to Section 7473(b)(4)'s maximum concentrations for NAAQS pollutants. Each of those references thus also necessarily employs a NAAQS-specific use of the term “air pollutant.” *See, e.g.,* 42 U.S.C. § 7473(c)(1) (listing exclusions from “the maximum allowable increases in ambient concentrations of an air pollutant”); § 7474(a)(B)

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(redesignations cannot cause “concentrations of any air pollutant” to exceed the maximum); *see also* § 7475(a)(3)(A) (facility may not cause air pollution in excess of “maximum allowable concentration for any pollutant”).

So it’s clear that a variety of provisions in the Prevention of Significant Deterioration statute use “air pollutant” to refer to a NAAQS air pollutant. And we presume that, unless otherwise indicated, the term “air pollutant” is used the same way throughout the Prevention of Significant Deterioration statute – and here, we have no reason to conclude otherwise. *See IBP, Inc. v. Alvarez*, 546 U.S. 21, 34 (2005) (“identical words used in different parts of the same statute are generally presumed to have the same meaning”).

By contrast, when Congress wanted, in the Prevention of Significant Deterioration statute, to refer to a broader set of pollutants than the NAAQS pollutants, it did so expressly. Thus, a facility that requires a pre-construction permit because of its emissions of NAAQS pollutants must employ the best available control technology for emissions not just of “air pollutants” but of “each pollutant subject to regulation under this chapter,” which – now that EPA has regulated greenhouse gases in other parts of the Clean Air Act – *does* include greenhouse gases. 42 U.S.C. § 7475(a)(4). By its terms, Section 7475(a)(4) thus applies to greenhouse gases, not just the NAAQS. Importantly, however, Congress did not employ the language “each pollutant subject to

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regulation under this chapter” in the statutory provision setting forth which facilities must obtain a pre-construction permit, the provision at issue in this case. And the policy distinction drawn in Section 7475(a)(4) is rather intuitive: Congress designed the statute’s permitting requirement based on facilities’ NAAQS emissions, but, once those facilities are subject to the permitting requirement, they must also meet a range of other minimum environmental standards.<sup>2</sup>

The overall objectives of the Prevention of Significant Deterioration statute also suggest that “air pollutant” refers to the NAAQS air pollutants for purposes of the permitting requirement. Importantly, the Prevention of Significant Deterioration statute applies only in areas that have met the NAAQS – that is, areas that do not have excessive emissions of the NAAQS air pollutants. If the purpose of this statute were in part to address global warming by requiring pre-construction permits for facilities that emit greenhouse gases, as EPA’s reading suggests, why would the statute target the construction of facilities only in areas that are in *compliance* with the NAAQS – and not elsewhere in the United States?

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<sup>2</sup> Section 7479(1) – the definition of “major emitting facility” – speaks of “any” air pollutant. But the word “any” just begs the question of what the term “air pollutant” covers in the Prevention of Significant Deterioration program. It’s either any air pollutant regulated under the Clean Air Act or any of the NAAQS air pollutants.

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That would make little sense, which in turn further suggests that EPA has misread the statute.

Moreover, as its name indicates, the Prevention of Significant Deterioration statute is designed primarily to prevent “deterioration” of an attainment area’s air quality. The relevant air quality standards that define whether an area is in attainment are the NAAQS. In a statute expressly linked to the NAAQS and designed to ensure that air quality does not “deteriorate” with respect to the NAAQS, it is somewhat illogical to read the statute as requiring pre-construction permits simply because a facility may emit substances that will *not* affect attainment of the NAAQS. Under EPA’s approach, a facility could be covered by the permitting requirement even if it emits no NAAQS air pollutants at all. That, too, makes little sense and suggests that EPA has misread the statute.

A separate canon of interpretation further demonstrates that EPA’s broad reading of the term “air pollutant” is at odds with Congress’s design. By requiring a vastly increased number of facilities to obtain pre-construction permits, EPA’s interpretation will impose enormous costs on tens of thousands of American businesses, with corresponding effects on American jobs and workers; on many American homeowners who move into new homes or plan other home construction projects; and on the U.S. economy more generally. Yet there is literally no indication in the text or legislative record that Members of Congress ever contemplated – much less intended –

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such a dramatic expansion of the permitting requirement of the Prevention of Significant Deterioration statute. Courts do not lightly conclude that Congress intended such major consequences absent some indication that Congress meant to do so. *See FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 159-61 (2000). Here, as elsewhere, we should not presume that Congress hid an elephant in a mousehole.

For all of those reasons – the statutory text, the absurdity principle, the statutory context as demonstrated by related statutory provisions, the overarching objectives of the statute, the major unintended consequences of a broader interpretation – the Prevention of Significant Deterioration statute as a whole overwhelmingly indicates that the permitting requirement is based on emissions of the NAAQS air pollutants.

And just to reiterate, the simple and absolutely dispositive point in this case is the following: The broader interpretation of “air pollutant” adopted by EPA produces what even EPA itself admits are absurd consequences. When an agency is faced with two plausible readings of a statutory term, but one reading would cause absurd results, the agency cannot choose the absurd reading. Here, therefore, EPA was required to adopt the narrower and more sensible interpretation of “air pollutant,” the interpretation limited to the NAAQS pollutants. As the Supreme Court has said, “interpretations of a statute which would produce absurd results are to be

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avoided if alternative interpretations consistent with the legislative purpose are available.” *Griffin v. Oceanic Contractors, Inc.*, 458 U.S. 564, 575 (1982). Such an “alternative interpretation[ ] consistent with the legislative purpose” is readily available here.

## II

If that were the end of the analysis, I would not hesitate to conclude that EPA had adopted an impermissibly broad reading of the term “air pollutant” for purposes of the permitting provision of the Prevention of Significant Deterioration statute. But before reaching that conclusion definitively, we need to consider whether EPA’s approach was mandated by the Supreme Court’s decision in *Massachusetts v. EPA*, 549 U.S. 497 (2007). In that case, the Supreme Court considered the general statutory term “air pollutant” as applied to a different aspect of the Clean Air Act – the motor vehicle emissions program. The Court there interpreted “air pollutant” very broadly to mean “all airborne compounds of whatever stripe,” including greenhouse gases. *Id.* at 529.

Does *Massachusetts v. EPA* dictate EPA’s broader interpretation of “air pollutant” in the different context of the Prevention of Significant Deterioration statute? The panel opinion seemed to think so; its conclusion appears to have been heavily if not dispositively influenced by *Massachusetts v. EPA*. See, e.g., *Coalition for Responsible Regulation, Inc. v. EPA*,

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684 F.3d 102, 134, 136 (D.C. Cir. 2012). In my view, however, the holding in *Massachusetts v. EPA* does not control the result in this case. Indeed, as explained more fully below, even EPA has concluded that *Massachusetts v. EPA* does not control here. The decision in *Massachusetts v. EPA* concerned the motor vehicle emissions program, a point the Supreme Court expressly noted many times in its opinion. The case did not purport to say that every other use of the term “air pollutant” throughout the sprawling and multifaceted Clean Air Act necessarily includes greenhouse gases. Each individual Clean Air Act program must be considered in context.<sup>3</sup>

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<sup>3</sup> As an analogy, take the familiar example of “no vehicles in the park.” Assume that a court has decided that the term “vehicles” generally includes bicycles, and that no bicycles are allowed in the park. Next assume that another park regulation states that “all park service vehicles must have reinforced gas tanks.” In that latter regulation, context tells us that the term “vehicles” obviously does not include bicycles. Bicycles are still vehicles in the abstract, but the gas-tank regulation logically applies only to a specific subset of vehicles (namely, motor vehicles).

So it is with “air pollutant” as used in different parts of the Clean Air Act. *Massachusetts v. EPA* held that the term “air pollutant” generally includes greenhouse gases. But that does not mean that the term “air pollutant” can never be used in a narrower sense. Greenhouse gases may qualify as “air pollutants” in the abstract, but context tells us that the Prevention of Significant Deterioration program uses the term “air pollutant” to refer only to a subset of all air pollutants (namely, the NAAQS pollutants).

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Importantly, in *Massachusetts v. EPA*, the Supreme Court explicitly relied on the fact that the Clean Air Act’s “capacious definition of ‘air pollutant,’” did not appear “counterintuitive” or produce “extreme” consequences in the context of motor vehicle emissions. 549 U.S. at 531-32. But, as explained above, EPA’s capacious definition of “air pollutant” *is* counterintuitive and *does* produce extreme consequences in the context of the Prevention of Significant Deterioration statute, as EPA itself acknowledges. Moreover, in this case, an alternative and sensible interpretation of the term “air pollutant” is readily discernible from the text, context, and structure of the Prevention of Significant Deterioration statute as a whole – namely, the NAAQS-specific interpretation.

To be sure, as noted earlier, the same words used in different parts of an Act are often construed to have the same meaning. See *IBP, Inc. v. Alvarez*, 546 U.S. 21, 34 (2005). If that were an inflexible command, the *Massachusetts v. EPA* interpretation of “air pollutant” would certainly control here and throughout the entire Clean Air Act. But as the Supreme Court recently reminded us – *in the context of interpreting the Clean Air Act* – “the natural presumption that identical words used in different parts of the same act are intended to have the same meaning is not rigid and readily yields whenever there is such variation in the connection in which the words are used as reasonably to warrant the conclusion that they were employed in different parts

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of the act with different intent.” *Environmental Defense v. Duke Energy Corp.*, 549 U.S. 561, 574 (2007) (internal quotation marks and ellipsis omitted). As instructed by the Supreme Court, we must interpret statutory terms based on their context and in light of the statute as a whole, even if that approach on some occasions means that the same term applies differently in different parts of a statute. See, e.g., *General Dynamics Land Systems, Inc. v. Cline*, 540 U.S. 581, 596-97 (2004) (term “age” has different meanings within Age Discrimination in Employment Act); *United States v. Cleveland Indians Baseball Co.*, 532 U.S. 200, 212-13 (2001) (term “wages paid” has different meanings within Social Security Act Amendments of 1939); *Robinson v. Shell Oil Co.*, 519 U.S. 337, 343-44 (1997) (term “employee” has different meanings within Title VII).

The Supreme Court’s application of that interpretive principle in *Environmental Defense v. Duke Energy* – a decision issued on the same day as *Massachusetts v. EPA* – is illuminating. There, the Supreme Court confronted the Clean Air Act’s definition of a stationary source “modification.” See 549 U.S. at 567-68. That term was relevant to both the New Source Performance Standards program and the Prevention of Significant Deterioration program. The Court ruled that EPA could interpret the term “modification” differently for each of those two Clean Air Act programs, even though “the terms share a common statutory definition.” *Id.* at 574. In so holding, the Court analyzed the two programs’

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different regulatory goals, noting that a “given term in the same statute may take on distinct characters from association with distinct statutory objects calling for different implementation strategies.” *Id.*

The Supreme Court’s interpretive approach in *Environmental Defense v. Duke Energy* – which recognizes that the meaning of a statutory term in the Clean Air Act may vary based on the particular program at issue – shows that the *Massachusetts v. EPA* interpretation of “air pollutant” in the context of the motor vehicle emissions program does not necessarily require the same interpretation of “air pollutant” in the context of the Prevention of Significant Deterioration program. In *Massachusetts v. EPA*, the Supreme Court emphasized that the regulation of greenhouse gases in the motor vehicle emissions program would not be “counterintuitive” and would not lead to any “extreme measures.” 549 U.S. at 531. Greenhouse gas standards would simply be added to the other regulations already applicable to manufacturers of new motor vehicles, and any such standards would take into account both cost and technological feasibility. *See* 42 U.S.C. § 7521(a). By contrast, the regulation of greenhouse gases in the Prevention of Significant Deterioration program would be both counterintuitive and extreme. Tens of thousands of businesses and homeowners would be swept into the Clean Air Act’s purview for the first time and hit with permitting costs averaging \$60,000, not to mention the additional costs of trying to construct and maintain the facility in compliance

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with the relevant emissions limits and technological standards. *See* 75 Fed. Reg. 31,514, 31,556 (June 3, 2010). In addition, the costs associated with a vastly expanded permitting requirement would deter numerous projects from even starting in the first place. The major differences between the motor vehicle emissions program and the Prevention of Significant Deterioration program thus neatly fit the *Environmental Defense v. Duke Energy* paradigm of “distinct statutory objects calling for different implementation strategies.”

In reaching that conclusion, it bears mention that the Clean Air Act is a very complicated statute encompassing several distinct environmental programs. It is no surprise, then, that the motor vehicle emissions program and the Prevention of Significant Deterioration program are not the only parts of the Act to employ a term like “air pollutant” in a context-dependent way. For example, the visibility program applies to facilities based on their emissions of “any pollutant.” 42 U.S.C. § 7491(g)(7). In the context of that program, EPA has interpreted the term “any pollutant” to mean “any visibility-impairing pollutant,” which obviously does not include greenhouse gases. 40 C.F.R. pt. 51, App. Y, § II.A. Similarly, the nonattainment program applies to areas that have been designated as nonattainment “for any air pollutant.” 42 U.S.C. § 7501(2). In the context of that program, the term “air pollutant” is logically limited to the NAAQS air pollutants, which are the only pollutants for which an area can be

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designated as nonattainment. *Id.* § 7407(d)(1)(A). All of that simply underscores that a court should exercise caution before reflexively importing the interpretations applicable to one Clean Air Act program into a distinct Clean Air Act program.

Any lingering doubt that *Massachusetts v. EPA* does not control here is dispelled when we recall that EPA itself has rejected *Massachusetts v. EPA*'s interpretation of "air pollutant" for the Prevention of Significant Deterioration statute. The Court in *Massachusetts v. EPA* said that "air pollutant" meant "all airborne compounds of whatever stripe." 549 U.S. at 529. EPA has acknowledged, however, that such a broad definition cannot possibly extend to the use of the term "air pollutant" in the Prevention of Significant Deterioration statute. EPA understood that it would be absurd to require pre-construction permits because of emissions of any airborne compound, including emissions of airborne compounds that have not been deemed harmful and regulated under the Clean Air Act. To avoid rendering the Prevention of Significant Deterioration statute an absurdity, EPA construed "air pollutant" to mean *certain* air pollutants – in particular, "any regulated air pollutant."

The critical point for present purposes – and it really is a critical point in thinking about the significance of *Massachusetts v. EPA* to the present case – is that EPA itself recognized that the *Massachusetts v. EPA* definition of "air pollutant" cannot and does not control how to interpret "air

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pollutant” in the Prevention of Significant Deterioration context. As it tries to justify its broad interpretation of the Prevention of Significant Deterioration statute, EPA cannot simultaneously latch on to *Massachusetts v. EPA* and reject *Massachusetts v. EPA*.

If *Massachusetts v. EPA* does not control here – and even EPA admits that it does not – then we are back where we started. EPA was faced with two initially plausible interpretations of “air pollutant” for purposes of the permitting requirement of the Prevention of Significant Deterioration statute. One interpretation created patent absurdities and made little sense given the other statutory provisions. The other interpretation fit comfortably and sensibly within the statutory text and context. EPA nonetheless chose the first option. In my view, EPA’s reading of the statute was impermissible. An agency cannot adopt an admittedly absurd interpretation and discard an eminently sensible one.

Given all of this, the case seems reasonably straightforward. So how did the panel opinion reach the opposite conclusion? I respectfully have three main points of disagreement. First, as I read it, the panel opinion was decisively influenced by *Massachusetts v. EPA*’s interpretation of “air pollutant” in the context of the motor vehicle emissions program. But in light of the material differences between the motor vehicle emissions program and the Prevention of Significant Deterioration program, the *Massachusetts v. EPA*

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interpretation cannot control here, as even EPA acknowledges. Second, the panel opinion attempted to buttress its choice of a broad interpretation of the term “air pollutant” by pointing to Section 7475(a)(4), the provision in the Prevention of Significant Deterioration program requiring covered facilities to use the best available control technology. But as explained above, Section 7475(a)(4) actually cuts the other way because it specifically refers to “each pollutant subject to regulation under this chapter,” which now does include greenhouse gases – whereas, by contrast, other statutory provisions in the Prevention of Significant Deterioration program clearly employ a NAAQS-specific interpretation of the unadorned term “air pollutant.” Third, the panel gave insufficient weight to the most critical point in this case, the absurd consequences of EPA’s broad interpretation. This was a mistake because the ultimate clincher in this case is one simple point: EPA chose an admittedly absurd reading over a perfectly natural reading of the relevant statutory text. An agency cannot do that.

## III

In finding EPA’s statutory interpretation legally impermissible, I do not in any way want to diminish EPA’s vital policy objectives. EPA’s regulations for the Prevention of Significant Deterioration statute may well be a good idea as a matter of policy. The task of dealing with global warming is urgent and important. But as in so many cases, the question here is: Who

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Decides? The short answer is that Congress (with the President) sets the policy through statutes, agencies implement that policy within statutory limits, and courts in justiciable cases ensure that agencies stay within the statutory limits set by Congress. A court's assessment of an agency's compliance with statutory limits does not depend on whether the agency's policy is good or whether the agency's intentions are laudatory. Even when that is true, we must enforce the statutory limits. *See Hamdan v. United States*, 696 F.3d 1238 (D.C. Cir. 2012) (ruling that Executive Branch exceeded statutory authority in wartime prosecution of al Qaeda member).

In cases like this one, the bedrock underpinnings of our system of separation of powers are at stake. To be sure, courts must be wary of undue interference with an agency's action implementing its statutory responsibilities. *See American Radio Relay League, Inc. v. FCC*, 524 F.3d 227 (D.C. Cir. 2008) (separate opinion of Kavanaugh, J.); *see also Desert Citizens Against Pollution v. EPA*, 699 F.3d 524 (D.C. Cir. 2012); *National Environmental Development Association's Clean Air Project v. EPA*, 686 F.3d 803 (D.C. Cir. 2012); *American Petroleum Institute v. EPA*, 684 F.3d 1342 (D.C. Cir. 2012); *ATK Launch Systems, Inc. v. EPA*, 669 F.3d 330 (D.C. Cir. 2012); *Natural Resources Defense Council v. EPA*, 661 F.3d 662 (D.C. Cir. 2011); *Medical Waste Institute & Energy Recovery Council v. EPA*, 645 F.3d 420 (D.C. Cir. 2011). To take one salient and important example, the statutory scheme gives EPA significant discretion in setting the

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NAAQS for the NAAQS air pollutants – a discretion the courts must respect.

But at the same time, undue deference or abdication to an agency carries its own systemic costs. If a court mistakenly allows an agency's transgression of statutory limits, then we green-light a significant shift of power from the Legislative Branch to the Executive Branch. The Framers of the Constitution did not grant the Executive Branch the authority to set economic and social policy as it sees fit. Rather, the Framers gave Congress, along with the President, that legislative role (subject to constitutional limits), and they assigned the Executive Branch the executive power to issue rules and enforce the law *within the limits set by Congress*.<sup>4</sup>

It is true that the legislative process can be cumbersome and frustrating, and the Executive Branch often is well-intentioned in wanting to address pressing policy concerns quickly, before the sometimes glacial congressional machinery can be

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<sup>4</sup> In protecting national security, the Executive has some Article II authority to act in certain circumstances in the Nation's defense even without specific congressional authorization. This is known as *Youngstown* category two. See *Youngstown Sheet & Tube Co. v. Sawyer*, 343 U.S. 579, 637 (1952) (Jackson, J., concurring). There is no general *Youngstown* category two authority in the domestic social and economic realms, where the Executive must have statutory authority in order to act.

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stirred to action.<sup>5</sup> The legislative process can be slow because the Constitution makes it far harder to enact legislation than to block it: Under the Constitution, three different entities must agree in order to enact legislation – the House, the Senate, and the President (or two-thirds of both the House and the Senate to override a President’s veto). But the Framers knew the legislative process would be laborious. They designed it that way. The time and difficulty of enacting new legislation has never justified an agency’s contravention of statutory limits. The Framers specifically contemplated, moreover, that there would be situations where the Executive Branch confronts a pressing need that it does not have current authority to address. In those circumstances, the Constitution’s Recommendations Clause provides that the President may “recommend” to Congress “such Measures as he shall judge necessary and expedient.” U.S. CONST. art. II, § 3.

Importantly, the separation of powers and checks and balances of our system are designed not just to ensure that the Branches operate within the proper spheres of their authority, but also to protect individual liberty. As the Supreme Court has

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<sup>5</sup> In 2009, the House of Representatives passed a global warming bill that was supported by the President. But the Senate did not pass it. In the early 2000s, Senators McCain and Lieberman sought to pass global warming legislation, but no law was ultimately enacted. Numerous other bills have been introduced over the years, and various legislative efforts are ongoing.

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explained many times, “while a government of opposite and rival interests may sometimes inhibit the smooth functioning of administration, the Framers recognized that, in the long term, structural protections against abuse of power were critical to preserving liberty. . . . The failures of . . . regulation may be a pressing national problem, but a judiciary that licensed extraconstitutional government with each issue of comparable gravity would, in the long run, be far worse.” *Free Enterprise Fund v. Public Company Accounting Oversight Board*, 130 S. Ct. 3138, 3157 (2010) (internal quotation marks, alterations, and citations omitted).

As a court, it is not our job to make the policy choices and set the statutory boundaries, but it is emphatically our job to carefully but firmly enforce the statutory boundaries. That bedrock separation of powers principle accounts for my concern about this case. Here, as I see it, EPA went well beyond what Congress authorized for the Prevention of Significant Deterioration statute. I respectfully disagree with the panel’s resolution of this issue, and given the overall importance of the case, I respectfully dissent from the denial of rehearing en banc.

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TITLE 42. THE PUBLIC HEALTH AND WELFARE  
CHAPTER 85. AIR POLLUTION PREVENTION  
AND CONTROL EMISSION STANDARDS  
FOR MOVING SOURCES MOTOR VEHICLE  
EMISSION AND FUEL STANDARDS

42 U.S.C. § 7521. Emission standards for new motor vehicles or new motor vehicle engines

(a) Authority of Administrator to prescribe by regulation. Except as otherwise provided in subsec.

(b) –

(1) The Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. Such standards shall be applicable to such vehicles and engines for their useful life (as determined under subsection (d), relating to useful life of vehicles for purposes of certification), whether such vehicles and engines are designed as complete systems or incorporate devices to prevent or control such pollution.

(2) Any regulation prescribed under paragraph (1) of this subsection (and any revision thereof) shall take effect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving

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appropriate consideration to the cost of compliance within such period.

(3) (A) In general.

(i) Unless the standard is changed as provided in subparagraph (B), regulations under paragraph (1) of this subsection applicable to emissions of hydrocarbons, carbon monoxide, oxides of nitrogen, and particulate matter from classes or categories of heavy-duty vehicles or engines manufactured during or after model year 1983 shall contain standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to cost, energy, and safety factors associated with the application of such technology.

(ii) In establishing classes or categories of vehicles or engines for purposes of regulations under this paragraph, the Administrator may base such classes or categories on gross vehicle weight, horsepower, type of fuel used, or other appropriate factors.

(B) Revised standards for heavy duty trucks.

(i) On the basis of information available to the Administrator concerning the effect of air pollutants emitted from heavy-duty vehicles or engines and from other sources of mobile source

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related pollutants on the public health and welfare, and taking costs into account, the Administrator may promulgate regulations under paragraph (1) of this subsection revising any standard promulgated under, or before the date of, the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990] (or previously revised under this subparagraph) and applicable to classes or categories of heavy-duty vehicles or engines.

(ii) Effective for the model year 1998 and thereafter, the regulations under paragraph (1) of this subsection applicable to emissions of oxides of nitrogen (NO[X]) from gasoline and diesel-fueled heavy duty trucks shall contain standards which provide that such emissions may not exceed 4.0 grams per brake horsepower hour (gbh).

(C) Lead time and stability. Any standard promulgated or revised under this paragraph and applicable to classes or categories of heavy-duty vehicles or engines shall apply for a period of no less than 3 model years beginning no earlier than the model year commencing 4 years after such revised standard is promulgated.

(D) Rebuilding practice. The Administrator shall study the practice of rebuilding heavy-duty engines and the impact rebuilding has on engine emissions. On the basis of that study and other information available to the Administrator, the Administrator may prescribe requirements to control rebuilding practices, including standards applicable

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to emissions from any rebuilt heavy-duty engines (whether or not the engine is past its statutory useful life), which in the Administrator's judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare taking costs into account. Any regulation shall take effect after a period the Administrator finds necessary to permit the development and application of the requisite control measures, giving appropriate consideration to the cost of compliance within the period and energy and safety factors.

(E) Motorcycles. For purposes of this paragraph, motorcycles and motorcycle engines shall be treated in the same manner as heavy-duty vehicles and engines (except as otherwise permitted under section 206(f)(1)) unless the Administrator promulgates a rule reclassifying motorcycles as light-duty vehicles within the meaning of this section or unless the Administrator promulgates regulations under subsection (a) applying standards applicable to the emission of air pollutants from motorcycles as a separate class or category. In any case in which such standards are promulgated for such emissions from motorcycles as a separate class or category, the Administrator, in promulgating such standards, shall consider the need to achieve equivalency of emission reductions between motorcycles and other motor vehicles to the maximum extent practicable.

(4) (A) Effective with respect to vehicles and engines manufactured after model year 1978, no emission control device, system, or element of design

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shall be used in a new motor vehicle or new motor vehicle engine for purposes of complying with requirements prescribed under this title if such device, system, or element of design will cause or contribute to an unreasonable risk to public health, welfare, or safety in its operation or function.

(B) In determining whether an unreasonable risk exists under subparagraph (A), the Administrator shall consider, among other factors, (i) whether and to what extent the use of any device, system, or element of design causes, increases, reduces, or eliminates emissions of any unregulated pollutants; (ii) available methods for reducing or eliminating any risk to public health, welfare, or safety which may be associated with the use of such device, system, or element of design, and (iii) the availability of other devices, systems, or elements of design which may be used to conform to requirements prescribed under this title without causing or contributing to such unreasonable risk. The Administrator shall include in the consideration required by this paragraph all relevant information developed pursuant to section 214 [42 USCS § 7548].

(5) (A) If the Administrator promulgates final regulations which define the degree of control required and the test procedures by which compliance could be determined for gasoline vapor recovery of uncontrolled emissions from the fueling of motor vehicles, the Administrator shall, after consultation with the Secretary of Transportation with respect to motor vehicle safety, prescribe, by regulation, fill pipe

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standards for new motor vehicles in order to insure effective connection between such fill pipe and any vapor recovery system which the Administrator determines may be required to comply with such vapor recovery regulations. In promulgating such standards the Administrator shall take into consideration limits on fill pipe diameter, minimum design criteria for nozzle retainer lips, limits on the location of the unleaded fuel restrictors, a minimum access zone surrounding a fill pipe, a minimum pipe or nozzle insertion angle, and such other factors as he deems pertinent.

(B) Regulations prescribing standards under subparagraph (A) shall not become effective until the introduction of the model year for which it would be feasible to implement such standards, taking into consideration the restraints of an adequate leadtime for design and production.

(C) Nothing in subparagraph (A) shall (i) prevent the Administrator from specifying different nozzle and fill neck sizes for gasoline with additives and gasoline without additives or (ii) permit the Administrator to require a specific location, configuration, modeling, or styling of the motor vehicle body with respect to the fuel tank fill neck or fill nozzle clearance envelope.

(D) For the purpose of this paragraph, the term "fill pipe" shall include the fuel tank fill pipe, fill neck, fill inlet, and closure.

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(6) Onboard vapor recovery. Within 1 year after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall, after consultation with the Secretary of Transportation regarding the safety of vehicle-based (“onboard”) systems for the control of vehicle refueling emissions, promulgate standards under this section requiring that new light-duty vehicles manufactured beginning in the fourth model year after the model year in which the standards are promulgated and thereafter shall be equipped with such systems. The standards required under this paragraph shall apply to a percentage of each manufacturer’s fleet of new light-duty vehicles beginning with the fourth model year after the model year in which the standards are promulgated. The percentage shall be as specified in the following table:

**IMPLEMENTATION SCHEDULE FOR ON BOARD VAPOR RECOVERY REQUIREMENTS**

Model year commencing after standards promulgated	Percentage*
Fourth .....	40
Fifth.....	80
After Fifth .....	100

\*Percentages in the table refer to a percentage of the manufacturer’s sales volume.

The standards shall require that such systems provide a minimum evaporative emission capture efficiency of 95 percent. The requirements of section

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182(b)(3) [42 USCS § 7511a(b)(3)] (relating to stage II gasoline vapor recovery) for areas classified under section 181 [42 USCS § 7511] as moderate for ozone shall not apply after promulgation of such standards and the Administrator may, by rule, revise or waive the application of the requirements of such section 182(b)(3) [42 USCS § 7511a(b)(3)] for areas classified under section 181 [42 USCS § 7511] as Serious, Severe, or Extreme for ozone, as appropriate, after such time as the Administrator determines that onboard emissions control systems required under this paragraph are in widespread use throughout the motor vehicle fleet.

(b) Emissions of carbon monoxide, hydrocarbons, and oxides of nitrogen; annual report to Congress; waiver of emission standards; research objectives.

(1) (A) The regulations under subsection (a) applicable to emissions of carbon monoxide and hydrocarbons from light-duty vehicles and engines manufactured during model years 1977 through 1979 shall contain standards which provide that such emissions from such vehicles and engines may not exceed 1.5 grams per vehicle mile of hydrocarbons and 15.0 grams per vehicle mile of carbon monoxide. The regulations under subsection (a) applicable to emissions of carbon monoxide from light-duty vehicles and engines manufactured during the model year 1980 shall contain standards which provide that such emissions may not exceed 7.0 grams per vehicle mile. The regulations under subsection (a) applicable to emissions of hydrocarbons from light-duty vehicles

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and engines manufactured during or after model year 1980 shall contain standards which require a reduction of at least 90 percent from emissions of such pollutant allowable under the standards under this section applicable to light-duty vehicles and engines manufactured in model year 1970. Unless waived as provided in paragraph (5), regulations under subsection (a) applicable to emissions of carbon monoxide from light-duty vehicles and engines manufactured during or after the model year 1981 shall contain standards which require a reduction of at least 90 percent from emissions of such pollutant allowable under the standards under this section applicable to light-duty vehicles and engines manufactured in model year 1970.

(B) The regulations under subsection (a) applicable to emissions of oxides of nitrogen from light-duty vehicles and engines manufactured during model years 1977 through 1980 shall contain standards which provide that such emissions from such vehicles and engines may not exceed 2.0 grams per vehicle mile. The regulations under subsection (a) applicable to emissions of oxides of nitrogen from light-duty vehicles and engines manufactured during the model year 1981 and thereafter shall contain standards which provide that such emissions from such vehicles and engines may not exceed 1.0 gram per vehicle mile. The Administrator shall prescribe standards in lieu of those required by the preceding sentence, which provide that emissions of oxides of nitrogen may not exceed 2.0 grams per vehicle mile

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for any light-duty vehicle manufactured during model years 1981 and 1982 by any manufacturer whose production, by corporate identity, for calendar year 1976 was less than three hundred thousand light-duty motor vehicles worldwide if the Administrator determines that –

(i) the ability of such manufacturer to meet emission standards in the 1975 and subsequent model years was, and is, primarily dependent upon technology developed by other manufacturers and purchased from such manufacturers; and

(ii) such manufacturer lacks the financial resources and technological ability to develop such technology.

(C) The Administrator may promulgate regulations under subsection (a)(1) revising any standard prescribed or previously revised under this subsection, as needed to protect public health or welfare, taking costs, energy, and safety into account. Any revised standard shall require a reduction of emissions from the standard that was previously applicable. Any such revision under this title may provide for a phase-in of the standard. It is the intent of Congress that the numerical emission standards specified in subsections (a)(3)(B)(ii),(g),(h), and (i) shall not be modified by the Administrator after the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990] for any model year before the model year 2004.

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(2) Emission standards under paragraph (1), and measurement techniques on which such standards are based (if not promulgated prior to the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990]), shall be promulgated by regulation within 180 days after such date.

(3) For purposes of this part [42 USCS §§ 7521 et seq.] –

(A) (i) The term “model year” with reference to any specific calendar year means the manufacturer’s annual production period (as determined by the Administrator) which includes January 1 of such calendar year. If the manufacturer has no annual production period, the term “model year” shall mean the calendar year.

(ii) For the purpose of assuring that vehicles and engines manufactured before the beginning of a model year were not manufactured for purposes of circumventing the effective date of a standard required to be prescribed by subsection (b), the Administrator may prescribe regulations defining “model year” otherwise than as provided in clause (i).

(B) [Repealed]

(C) The term “heavy duty vehicle” means a truck, bus, or other vehicle manufactured primarily for use on the public streets, roads, and highways (not including any vehicle operated exclusively on a rail or rails) which has a gross vehicle weight (as

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determined under regulations promulgated by the Administrator) in excess of six thousand pounds. Such term includes any such vehicle which has special features enabling off-street or off-highway operation and use.

[(4)](3) Upon the petition of any manufacturer, the Administrator, after notice and opportunity for public hearing, may waive the standard required under subparagraph (B) of paragraph (1) to not exceed 1.5 grams of oxides of nitrogen per vehicle mile for any class or category of light-duty vehicles or engines manufactured by such manufacturer during any period of up to four model years beginning after the model year 1980 if the manufacturer demonstrates that such waiver is necessary to permit the use of an innovative power train technology, or innovative emission control device or system, in such class or category of vehicles or engines and that such technology or system was not utilized by more than 1 percent of the light-duty vehicles sold in the United States in the 1975 model year. Such waiver may be granted only if the Administrator determines –

(A) that such waiver would not endanger public health,

(B) that there is a substantial likelihood that the vehicles or engines will be able to comply with the applicable standard under this section at the expiration of the waiver, and

(C) that the technology or system has a potential for long-term air quality benefit and has the

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potential to meet or exceed the average fuel economy standard applicable under the Energy Policy and Conservation Act upon the expiration of the waiver.

No waiver under this subparagraph [paragraph] granted to any manufacturer shall apply to more than 5 percent of such manufacturer's production or more than fifty thousand vehicles or engines, whichever is greater.

(c) Feasibility study and investigation by National Academy of Sciences; reports to Administrator and Congress; availability of information.

(1) The Administrator shall undertake to enter into appropriate arrangements with the National Academy of Sciences to conduct a comprehensive study and investigation of the technological feasibility of meeting the emissions standards required to be prescribed by the Administrator by subsection (b) of this section.

(2) Of the funds authorized to be appropriated to the Administrator by this Act, such amounts as are required shall be available to carry out the study and investigation authorized by paragraph (1) of this subsection.

(3) In entering into any arrangement with the National Academy of Sciences for conducting the study and investigation authorized by paragraph (1) of this subsection, the Administrator shall request the National Academy of Sciences to submit semiannual reports on the progress of its study and investigation

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to the Administrator and the Congress, beginning not later than July 1, 1971, and continuing until such study and investigation is completed.

(4) The Administrator shall furnish to such Academy at its request any information which the Academy deems necessary for the purpose of conducting the investigation and study authorized by paragraph (1) of this subsection. For the purpose of furnishing such information, the Administrator may use any authority he has under this Act (A) to obtain information from any person, and (B) to require such person to conduct such tests, keep such records, and make such reports respecting research or other activities conducted by such person as may be reasonably necessary to carry out this subsection.

(d) Useful life of vehicles. The Administrator shall prescribe regulations under which the useful life of vehicles and engines shall be determined for purposes of subsection (a)(1) of this section and section 207 [42 USCS § 7541]. Such regulations shall provide that except where a different useful life period is specified in this title [42 USCS §§ 7521 et seq.] useful life shall –

(1) in the case of light duty vehicles and light duty vehicle engines and light-duty trucks up to 3,750 lbs. LVW and up to 6,000 lbs. GVWR, be a period of use of five years or of fifty thousand miles (or the equivalent), whichever first occurs, except that in the case of any requirement of this section which first

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becomes applicable after the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990] where the useful life period is not otherwise specified for such vehicles and engines, the period shall be 10 years or 100,000 miles (or the equivalent), whichever first occurs, with testing for purposes of in-use compliance under section 207 [42 USCS § 7541] up to (but not beyond) 7 years or 75,000 miles (or the equivalent), whichever first occurs;

(2) in the case of any other motor vehicle or motor vehicle engine (other than motorcycles or motorcycle engines), be a period of use set forth in paragraph (1) unless the Administrator determines that a period of use of greater duration or mileage is appropriate; and

(3) in the case of any motorcycle or motorcycle engine, be a period of use the Administrator shall determine.

(e) New power sources or propulsion systems. In the event a new power source or propulsion system for new motor vehicles or new motor vehicle engines is submitted for certification pursuant to section 206(a) [42 USCS § 7525(a)], the Administrator may postpone certification until he has prescribed standards for any air pollutants emitted by such vehicle or engine which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger the public health or welfare but for which standards have not been prescribed under subsection (a).

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(f) High altitude regulations.

(1) The high altitude regulation in effect with respect to model year 1977 motor vehicles shall not apply to the manufacture, distribution, or sale of 1978 and later model year motor vehicles. Any future regulation affecting the sale or distribution of motor vehicles or engines manufactured before the model year 1984 in high altitude areas of the country shall take effect no earlier than model year 1981.

(2) Any such future regulation applicable to high altitude vehicles or engines shall not require a percentage of reduction in the emissions of such vehicles which is greater than the required percentage of reduction in emissions from motor vehicles as set forth in section 202(b) [subsec. (b) of this section]. This percentage reduction shall be determined by comparing any proposed high altitude emission standards to high altitude emissions from vehicles manufactured during model year 1970. In no event shall regulations applicable to high altitude vehicles manufactured before the model year 1984 establish a numerical standard which is more stringent than that applicable to vehicles certified under non-high altitude conditions.

(3) Section 307(d) [42 USCS § 7607(d)] shall apply to any high altitude regulation referred to in paragraph (2) and before promulgating any such regulation, the Administrator shall consider and make a finding with respect to –

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(A) the economic impact upon consumers, individual high altitude dealers, and the automobile industry of any such regulation, including the economic impact which was experienced as a result of the regulation imposed during model year 1977 with respect to high altitude certification requirements;

(B) the present and future availability of emission control technology capable of meeting the applicable vehicle and engine emission requirements without reducing model availability; and

(C) the likelihood that the adoption of such a high altitude regulation will result in any significant improvement in air quality in any area to which it shall apply.

(g) Light-duty trucks up to 6,000 GVWR and light-duty vehicles; standards for model years after 1993.

(1) NMHC, CO, and NO[X]. Effective with respect to the model year 1994 and thereafter, the regulations under subsection (a) applicable to emissions of nonmethane hydrocarbons (NMHC), carbon monoxide (CO), and oxides of nitrogen (NO[X]) from light-duty trucks (LDTs) of up to 6,000 lbs. gross vehicle weight rating (GVWR) and light-duty vehicles (LDVs) shall contain standards which provide that emissions from a percentage of each manufacturer's sales volume of such vehicles and trucks shall comply with the levels specified in table G. The percentage shall be as specified in the implementation schedule below:

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TABLE G. EMISSION STANDARDS FOR  
 NMHC, CO, AND NO<sub>x</sub>; FROM LIGHT-DUTY  
 TRUCKS OF UP TO 6,000 LBS. GVWR  
 AND LIGHT-DUTY VEHICLES

Vehicle type	Column A			Column B		
	(5 yrs/50,000 mi)			(10 yrs/100,000 mi)		
	NMHC	CO	NO <sub>x</sub>	NMHC	CO	NO <sub>x</sub>
LDTs (0-3,750 lbs. LVW) and light-duty vehicles.....	0.25	3.4	0.4*	0.31	4.2	0.6*
LDTs (3,751-5,750 lbs. LVW) .....	0.32	4.4	0.7**	0.40	5.5	0.97

Standards are expressed in grams per mile (gpm).

For standards under column A, for purposes of certification under section 206, the applicable useful life shall be 5 years or 50,000 miles (or the equivalent), whichever first occurs.

For standards under column B, for purposes of certification under section 206, the applicable useful life shall be 10 years or 100,000 miles (or the equivalent), whichever first occurs.

\*In the case of diesel-fueled LDTs (0-3,750 lvw) and light-duty vehicles, before the model year 2004, in lieu of the 0.4 and 0.6 standards for NO<sub>x</sub> the applicable standards for NO<sub>x</sub> shall be 1.0 gpm for a useful life of 5 years or 50,000 miles (or the

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equivalent), whichever first occurs, and 1.25 gpm for a useful life of 10 years or 100,000 miles (or the equivalent) whichever first occurs.

\*\*This standard does not apply to diesel-fueled LDTs (3,751-5,750 lbs. LVW).

IMPLEMENTATION SCHEDULE  
FOR TABLE G STANDARD

Model year	Percentage*
1994.....	40
1995.....	80
after 1995.....	100

\*Percentages in the table refer to a percentage of each manufacturer's sales volume.

(2) PM Standard. Effective with respect to model year 1994 and thereafter in the case of light-duty vehicles and effective with respect to the model year 1995 and thereafter in the case of light-duty trucks (LDTs) of up to 6,000 lbs. gross vehicle weight rating (GVWR), the regulations under subsection (a) applicable to emissions of particulate matter (PM) from such vehicles and trucks shall contain standards which provide that such emissions from a percentage of each manufacturer's sales volume of such vehicles and trucks shall not exceed the levels specified in the table below. The percentage shall be as specified in the Implementation Schedule below.

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PM STANDARD FOR LDTs  
OF UP TO 6,000 LBS. GVWR

Usual life period	Standard
5/50,000.....	0.08 gpm
10/10,000.....	0.10 gpm

The applicable useful life, for purposes of certification under section 206 and for purposes of in-use compliance under section 207, shall be 5 years or 50,000 miles (or the equivalent), whichever first occurs, in the case of the 5/50,000 standard.

The applicable useful life, for purposes of certification under section 206 and for purposes of in-use compliance under section 207, shall be 10 years or 100,000 miles (or the equivalent), whichever first occurs in the case of the 10/100,000 standard.

IMPLEMENTATION SCHEDULE  
FOR PM STANDARDS

Model year	Light-duty vehicles	LDTs
1994.....	40%*	
1995.....	80%*	40%*
1996.....	100%*	80%*
after 1996.....	100%*	100%*

\*Percentages in the table refer to a percentage of each manufacturer's sales volume.

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(h) Light-duty trucks of more than 6,000 lbs. GVWR; standards for model years after 1995. Effective with respect to the model year 1996 and thereafter, the regulations under subsection (a) applicable to emissions of nonmethane hydrocarbons (NMHC), carbon monoxide (CO), oxides of nitrogen (NO[X]), and particulate matter (PM) from light-duty trucks (LDTs) of more than 6,000 lbs. gross vehicle weight rating (GVWR) shall contain standards which provide that emissions from a specified percentage of each manufacturer's sales volume of such trucks shall comply with the levels specified in table H. The specified percentage shall be 50 percent in model year 1996 and 100 percent thereafter.

TABLE H. EMISSION STANDARDS  
FOR NMHC AND CO FROM GASOLINE  
AND DIESEL FUELED LIGHT-DUTY TRUCKS  
OF MORE THAN 6,000 LBS. GVWR

LDT Test Weight	Column A			Column B			
	(5 yrs/50,000 mi)			(11 yrs/120,000 mi)			
	NMHC	CO	NO <sub>x</sub>	NMHC	CO	NO <sub>x</sub>	PM
3,751-5,750 lbs. TW .....	0.32	4.4	0.7*	0.46	6.4	0.98	0.10
Over 5,750 lbs. TW .....	0.39	5.0	1.1*	0.56	7.3	1.53	0.12

Standards are expressed in grams per mile (gpm).

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For standards under column A, for purposes of certification under section 206, the applicable useful life shall be 5 years or 50,000 miles (or the equivalent), whichever first occurs.

For standards under column B, for purposes of certification under section 206, the applicable useful life shall be 11 years or 120,000 miles (or the equivalent), whichever first occurs.

\*Not applicable to diesel-fueled LDTs.

(i) Phase II study for certain light-duty vehicles and light-duty trucks.

(1) The Administrator, with the participation of the Office of Technology Assessment, shall study whether or not further reductions in emissions from light-duty vehicles and light-duty trucks should be required pursuant to this title. The study shall consider whether to establish with respect to model years commencing after January 1, 2003, the standards and useful life period for gasoline and diesel-fueled light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less specified in the following table:

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TABLE 3. PENDING EMISSION STANDARDS  
FOR GASOLINE AND DIESEL FUELED  
LIGHT-DUTY VEHICLES AND LIGHT-DUTY  
TRUCKS 3,750 LBS. LVW OR LESS

Pollutant	Emission Level*
NMHC .....	0.125 GPM
NO <sub>x</sub> .....	0.2 GPM
CO .....	1.7 GPM

\*Emission levels are expressed in grams per mile (GPM). For vehicles and engines subject to this subsection for purposes of section 202(d) and any reference thereto, the useful life of such vehicles and engines shall be a period of 10 years or 100,000 miles (or the equivalent), whichever first occurs.

Such study shall also consider other standards and useful life periods which are more stringent or less stringent than those set forth in table 3 (but more stringent than those referred to in subsections (g) and (h)).

(2) (A) As part of the study under paragraph (1), the Administrator shall examine the need for further reductions in emissions in order to attain or maintain the national ambient air quality standards, taking into consideration the waiver provisions of section 209(b) [42 USCS § 7543(b)]. As part of such study, the Administrator shall also examine –

(i) the availability of technology (including the costs thereof), in the case of light-duty

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vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less, for meeting more stringent emission standards than those provided in subsections (g) and (h) for model years commencing not earlier than after January 1, 2003, and not later than model year 2006, including the lead time and safety and energy impacts of meeting more stringent emission standards; and

(ii) the need for, and cost effectiveness of, obtaining further reductions in emissions from such light-duty vehicles and light-duty trucks, taking into consideration alternative means of attaining or maintaining the national primary ambient air quality standards pursuant to State implementation plans and other requirements of this Act, including their feasibility and cost effectiveness.

(B) The Administrator shall submit a report to Congress no later than June 1, 1997, containing the results of the study under this subsection, including the results of the examination conducted under subparagraph (A). Before submittal of such report the Administrator shall provide a reasonable opportunity for public comment and shall include a summary of such comments in the report to Congress.

(3) (A) Based on the study under paragraph (1) the Administrator shall determine, by rule, within 3 calendar years after the report is submitted to Congress, but not later than December 31, 1999, whether –

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(i) there is a need for further reductions in emissions as provided in paragraph (2)(A);

(ii) the technology for meeting more stringent emission standards will be available, as provided in paragraph (2)(A)(i), in the case of light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less, for model years commencing not earlier than January 1, 2003, and not later than model year 2006, considering the factors listed in paragraph (2)(A)(i); and

(iii) obtaining further reductions in emissions from such vehicles will be needed and cost effective, taking into consideration alternatives as provided in paragraph (2)(A)(ii).

The rulemaking under this paragraph shall commence within 3 months after submission of the report to Congress under paragraph (2)(B).

(B) If the Administrator determines under subparagraph (A) that –

(i) there is no need for further reductions in emissions as provided in paragraph (2)(A);

(ii) the technology for meeting more stringent emission standards will not be available as provided in paragraph (2)(A)(i), in the case of light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less, for model years commencing not earlier than January 1,

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2003, and not later than model year 2006, considering the factors listed in paragraph (2)(A)(i); or

(iii) obtaining further reductions in emissions from such vehicles will not be needed or cost effective, taking into consideration alternatives as provided in paragraph (2)(A)(ii), the Administrator shall not promulgate more stringent standards than those in effect pursuant to subsections (g) and (h). Nothing in this paragraph shall prohibit the Administrator from exercising the Administrator's authority under subsection (a) to promulgate more stringent standards for light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less at any other time thereafter in accordance with subsection (a).

(C) If the Administrator determines under subparagraph (A) that –

(i) there is a need for further reductions in emissions as provided in paragraph (2)(A);

(ii) the technology for meeting more stringent emission standards will be available, as provided in paragraph (2)(A)(i), in the case of light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less, for model years commencing not earlier than January 1, 2003, and not later than model year 2006, considering the factors listed in paragraph (2)(A)(i); and

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(iii) obtaining further reductions in emissions from such vehicles will be needed and cost effective, taking into consideration alternatives as provided in paragraph (2)(A)(ii), the Administrator shall either promulgate the standards (and useful life periods) set forth in Table 3 in paragraph (1) or promulgate alternative standards (and useful life periods) which are more stringent than those referred to in subsections (g) and (h). Any such standards (or useful life periods) promulgated by the Administrator shall take effect with respect to any such vehicles or engines no earlier than the model year 2003 but not later than model year 2006, as determined by the Administrator in the rule.

(D) Nothing in this paragraph shall be construed by the Administrator or by a court as a presumption that any standards (or useful life period) set forth in Table 3 shall be promulgated in the rule-making required under this paragraph. The action required of the Administrator in accordance with this paragraph shall be treated as a nondiscretionary duty for purposes of section 304(a)(2) [42 USCS § 7604(a)(2)] (relating to citizen suits).

(E) Unless the Administrator determines not to promulgate more stringent standards as provided in subparagraph (B) or to postpone the effective date of standards referred to in Table 3 in paragraph (1) or to establish alternative standards as provided in subparagraph (C), effective with respect to model years commencing after January 1,

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2003, the regulations under subsection (a) applicable to emissions of nonmethane hydrocarbons (NMHC), oxides of nitrogen (NO[X]), and carbon monoxide (CO) from motor vehicles and motor vehicle engines in the classes specified in Table 3 in paragraph (1) above shall contain standards which provide that emissions may not exceed the pending emission levels specified in Table 3 in paragraph (1).

(j) Cold CO standards.

(1) Phase I. Not later than 12 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 5, 1990], the Administrator shall promulgate regulations under subsection (a) of this section applicable to emissions of carbon monoxide from 1994 and later model year light-duty vehicles and light-duty trucks when operated at 20 degrees Fahrenheit. The regulations shall contain standards which provide that emissions of carbon monoxide from a manufacturer's vehicles when operated at 20 degrees Fahrenheit may not exceed, in the case of light-duty vehicles, 10.0 grams per mile, and in the case of light-duty trucks, a level comparable in stringency to the standard applicable to light-duty vehicles. The standards shall take effect after model year 1993 according to a phase-in schedule which requires a percentage of each manufacturer's sales volume of light-duty vehicles and light-duty trucks to comply with applicable standards after model year 1993. The percentage shall be as specified in the following table:

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PHASE-IN SCHEDULE FOR  
COLD START STANDARDS

Model year	Percentage
1994.....	40
1995.....	80
1996 and after.....	100

(2) Phase II.

(A) Not later than June 1, 1997, the Administrator shall complete a study assessing the need for further reductions in emissions of carbon monoxide and the maximum reductions in such emissions achievable from model year 2001 and later model year light-duty vehicles and light-duty trucks when operated at 20 degrees Fahrenheit.

(B) (i) If as of June 1, 1997, 6 or more nonattainment areas have a carbon monoxide design value of 9.5 ppm or greater, the regulations under subsection (a)(1) of this section applicable to emissions of carbon monoxide from model year 2002 and later model year light-duty vehicles and light-duty trucks shall contain standards which provide that emissions of carbon monoxide from such vehicles and trucks when operated at 20 degrees Fahrenheit may not exceed 3.4 grams per mile (gpm) in the case of light-duty vehicles and 4.4 grams per mile (gpm) in the case of light-duty trucks up to 6,000 GVWR and a level comparable in stringency in the case of light-duty trucks 6,000 GVWR and above.

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(ii) In determining for purposes of this subparagraph whether 6 or more nonattainment areas have a carbon monoxide design value of 9.5 ppm or greater, the Administrator shall exclude the areas of Steubenville, Ohio, and Oshkosh, Wisconsin.

(3) Useful-life for phase I and phase II standards. In the case of the standards referred to in paragraphs (1) and (2), for purposes of certification under section 206 [42 USCS § 7525] and in-use compliance under section 207 [42 USCS § 7541], the applicable useful life period shall be 5 years or 50,000 miles, whichever first occurs, except that the Administrator may extend such useful life period (for purposes of section 206, or section 207 [42 USCS § 7525 or § 7541], or both) if he determines that it is feasible for vehicles and engines subject to such standards to meet such standards for a longer useful life. If the Administrator extends such useful life period, the Administrator may make an appropriate adjustment of applicable standards for such extended useful life. No such extended useful life shall extend beyond the useful life period provided in regulations under subsection (d).

(4) Heavy-duty vehicles and engines. The Administrator may also promulgate regulations under subsection (a)(1) applicable to emissions of carbon monoxide from heavy-duty vehicles and engines when operated at cold temperatures.

(k) Control of evaporative emissions. The Administrator shall promulgate (and from time

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to time revise) regulations applicable to evaporative emissions of hydrocarbons from all gasoline-fueled motor vehicles –

- (1) during operation; and
- (2) over 2 or more days of nonuse;

under ozone-prone summertime conditions (as determined by regulations of the Administrator). The regulations shall take effect as expeditiously as possible and shall require the greatest degree of emission reduction achievable by means reasonably expected to be available for production during any model year to which the regulations apply, giving appropriate consideration to fuel volatility, and to cost, energy, and safety factors associated with the application of the appropriate technology. The Administrator shall commence a rulemaking under this subsection within 12 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990]. If final regulations are not promulgated under this subsection within 18 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall submit a statement to the Congress containing an explanation of the reasons for the delay and a date certain for promulgation of such final regulations in accordance with this Act. Such date certain shall not be later than 15 months after the expiration of such 18 month deadline.

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(1) Mobile source-related air toxics.

(1) Study. Not later than 18 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall complete a study of the need for, and feasibility of, controlling emissions of toxic air pollutants which are unregulated under this Act and associated with motor vehicles and motor vehicle fuels, and the need for, and feasibility of, controlling such emissions and the means and measures for such controls. The study shall focus on those categories of emissions that pose the greatest risk to human health or about which significant uncertainties remain, including emissions of benzene, formaldehyde, and 1, 3 butadiene. The proposed report shall be available for public review and comment and shall include a summary of all comments.

(2) Standards. Within 54 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall, based on the study under paragraph (1), promulgate (and from time to time revise) regulations under subsection (a)(1) or section 211(c)(1) [42 USCS § 7545(c)(1)] containing reasonable requirements to control hazardous air pollutants from motor vehicles and motor vehicle fuels. The regulations shall contain standards for such fuels or vehicles, or both, which the Administrator determines reflect the greatest degree of emission reduction achievable through the application of technology which will be available,

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taking into consideration the standards established under subsection (a), the availability and costs of the technology, and noise, energy, and safety factors, and lead time. Such regulations shall not be inconsistent with standards under section 202(a) [subsec. (a) of this section]. The regulations shall, at a minimum, apply to emissions of benzene and formaldehyde.

(m) Emissions control diagnostics.

(1) Regulations. Within 18 months after the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall promulgate regulations under subsection (a) requiring manufacturers to install on all new light duty vehicles and light duty trucks diagnostics [sic] systems capable of –

(A) accurately identifying for the vehicle's useful life as established under this section, emission-related systems deterioration or malfunction, including, at a minimum, the catalytic converter and oxygen sensor, which could cause or result in failure of the vehicles to comply with emission standards established under this section,

(B) alerting the vehicle's owner or operator to the likely need for emission-related components or systems maintenance or repair,

(C) storing and retrieving fault codes specified by the Administrator, and

(D) providing access to stored information in a manner specified by the Administrator.

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The Administrator may, in the Administrator's discretion, promulgate regulations requiring manufacturers to install such onboard diagnostic systems on heavy-duty vehicles and engines.

(2) Effective date. The regulations required under paragraph (1) of this subsection shall take effect in model year 1994, except that the Administrator may waive the application of such regulations for model year 1994 or 1995 (or both) with respect to any class or category of motor vehicles if the Administrator determines that it would be infeasible to apply the regulations to that class or category in such model year or years, consistent with corresponding regulations or policies adopted by the California Air Resources Board for such systems.

(3) State inspection. The Administrator shall by regulation require States that have implementation plans containing motor vehicle inspection and maintenance programs to amend their plans within 2 years after promulgation of such regulations to provide for inspection of onboard diagnostics systems (as prescribed by regulations under paragraph (1) of this subsection) and for the maintenance or repair of malfunctions or system deterioration identified by or affecting such diagnostics systems. Such regulations shall not be inconsistent with the provisions for warranties promulgated under section 207(a) and (b) [42 USCS § 7541(a),(b)].

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(4) Specific requirements. In promulgating regulations under this subsection, the Administrator shall require –

(A) that any connectors through which the emission control diagnostics system is accessed for inspection, diagnosis, service, or repair shall be standard and uniform on all motor vehicles and motor vehicle engines;

(B) that access to the emission control diagnostics system through such connectors shall be unrestricted and shall not require any access code or any device which is only available from a vehicle manufacturer; and

(C) that the output of the data from the emission control diagnostics system through such connectors shall be usable without the need for any unique decoding information or device.

(5) Information availability. The Administrator, by regulation, shall require (subject to the provisions of section 208(c) [42 USCS § 7542(c)] regarding the protection of methods or processes entitled to protection as trade secrets) manufacturers to provide promptly to any person engaged in the repairing or servicing of motor vehicles or motor vehicle engines, and the Administrator for use by any such persons, with any and all information needed to make use of the emission control diagnostics system prescribed under this subsection and such other information including instructions for making emission related diagnosis and repairs. No such information may be

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withheld under section [sic] 208(c) [42 USCS § 7542(c)] if that information is provided (directly or indirectly) by the manufacturer to franchised dealers or other persons engaged in the repair, diagnosing, or servicing of motor vehicles or motor vehicle engines.

Such information shall also be available to the Administrator, subject to section 208(c) [42 USCS § 7542(c)], in carrying out the Administrator's responsibilities under this section.

[(n)](f) Model years after 1990. For model years prior to model year 1994, the regulations under section 202(a) [subsec. (a) of this section] applicable to buses other than those subject to standards under section 219 [42 USCS § 7554] shall contain a standard which provides that emissions of particulate matter (PM) from such buses may not exceed the standards set forth in the following table:

PM STANDARD FOR BUSES

Model year	Standard*
1991.....	0.25
1992.....	0.25
1993 and thereafter.....	0.10

\*Standards are expressed in grams per brake horsepower hour (g/bhp/hr).

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\* \* \* Current through PL 113-3, approved 2/4/13 \* \* \*

TITLE 42. THE PUBLIC HEALTH AND WELFARE  
CHAPTER 85. AIR POLLUTION PREVENTION  
AND CONTROL GENERAL PROVISIONS

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42 USCS § 7607

§ 7607. Administrative proceedings and judicial review

(a) Administrative subpoenas; confidentiality; witnesses. In connection with any determination under section 110(f) [42 USCS § 7410(f)], or for purposes of obtaining information under section 202(b)(4) or 211(c)(3) [42 USCS § 7521(b)(4) or 7545(c)(3)], any investigation, monitoring, reporting requirement, entry, compliance inspection, or administrative enforcement proceeding under the [this] Act (including but not limited to section 113, section 114, section 120, section 129, section 167, section 205, section 206, section 208, section 303, or section 306 [42 USCS § 7413, 7414, 7420, 7429, 7477, 7524, 7525, 7542, 7603, or 7606][,], the Administrator may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and he may administer oaths. Except for emission data, upon a showing satisfactory to the Administrator by such owner or operator that such papers, books, documents, or information or particular part thereof, if made public, would divulge trade secrets or secret processes of such owner or operator,

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the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such paper, book, document, or information may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out this Act, to persons carrying out the National Academy of Sciences' study and investigation provided for in section 202(c) [42 USCS § 7521(c)], or when relevant in any proceeding under this Act. Witnesses summoned shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. In case of contumacy or refusal to obey a subpoena served upon any person under this subparagraph, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Administrator to appear and produce papers, books, and documents before the Administrator, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(b) Judicial review.

(1) A petition for review of action of the Administrator in promulgating any national primary or secondary ambient air quality standard, any emission standard or requirement under section 112 [42 USCS § 7412], any standard of performance or requirement

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under section 111 [42 USCS § 7411][,], any standard under section 202 [42 USCS § 7521] (other than a standard required to be prescribed under section 202(b)(1) [42 USCS § 7521(b)(1)]), any determination under section 202(b)(5) [42 USCS § 7521(b)(5)], any control or prohibition under section 211 [42 USCS § 7545], any standard under section 231 [42 USCS § 7571] any rule issued under section 113, 119, or under section 120 [42 USCS § 7413, 7419, or 7420], or any other nationally applicable regulations promulgated, or final action taken, by the Administrator under this Act may be filed only in the United States Court of Appeals for the District of Columbia. A petition for review of the Administrator's action in approving or promulgating any implementation plan under section 110 or section 111(d) [42 USCS § 7410 or 7411(d)], any order under section 111(j) [42 USCS § 7411(j)], under section 112 [42 USCS § 7412][,] under section 119 [42 USCS § 7419], or under section 120 [42 USCS § 7420], or his action under section 119(c)(2)(A), (B), or (C) (as in effect before the date of enactment of the Clean Air Act Amendments of 1977) or under regulations thereunder, or revising regulations for enhanced monitoring and compliance certification programs under section 114(a)(3) of this Act, or any other final action of the Administrator under this Act (including any denial or disapproval by the Administrator under title I [42 USCS §§ 7401 et seq.]) which is locally or regionally applicable may be filed only in the United States Court of Appeals for the appropriate circuit. Notwithstanding the preceding sentence a petition for review of any action referred to

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in such sentence may be filed only in the United States Court of Appeals for the District of Columbia if such action is based on a determination of nationwide scope or effect and if in taking such action the Administrator finds and publishes that such action is based on such a determination. Any petition for review under this subsection shall be filed within sixty days from the date notice of such promulgation, approval, or action appears in the Federal Register, except that if such petition is based solely on grounds arising after such sixtieth day, then any petition for review under this subsection shall be filed within sixty days after such grounds arise. The filing of a petition for reconsideration by the Administrator of any otherwise final rule or action shall not affect the finality of such rule or action for purposes of judicial review nor extend the time within which a petition for judicial review of such rule or action under this section may be filed, and shall not postpone the effectiveness of such rule or action.

(2) Action of the Administrator with respect to which review could have been obtained under paragraph (1) shall not be subject to judicial review in civil or criminal proceedings for enforcement. Where a final decision by the Administrator defers performance of any nondiscretionary statutory action to a later time, any person may challenge the deferral pursuant to paragraph (1).

(c) Additional evidence. In any judicial proceeding in which review is sought of a determination under this Act required to be made on the record after notice and

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opportunity for hearing, if any party applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Administrator, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Administrator, in such manner and upon such terms and conditions as [to] the court may deem proper. The Administrator may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken and he shall file such modified or new findings, and his recommendation, if any, for the modification or setting aside of his original determination, with the return of such additional evidence.

(d) Rulemaking.

(1) This subsection applies to –

(A) the promulgation or revision of any national ambient air quality standard under section 109 [42 USCS § 7409],

(B) the promulgation or revision of an implementation plan by the Administrator under section 110(c) [42 USCS § 7410(c)],

(C) the promulgation or revision of any standard of performance under section 111 [42 USCS § 7411], or emission standard or limitation under section 112(d) [42 USCS § 7412(d)], any standard under section 112(f) [42 USCS § 7412(f)], or any

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regulation under section 112(g)(1)(D) and (F) [42 USCS§ 7412(g)(1)(D),(F)], or any regulation under section 112(m) or (n) [42 USCS § 7412(m) or (n)],

(D) the promulgation of any requirement for solid waste combustion under section 129 [42 USCS § 7429],

(E) the promulgation or revision of any regulation pertaining to any fuel or fuel additive under section 211 [42 USCS § 7545],

(F) the promulgation or revision of any aircraft emission standard under section 231 [42 USCS § 7571],

(G) the promulgation or revision of any regulation under title IV (relating to control of acid deposition),

(H) promulgation or revision of regulations pertaining to primary nonferrous smelter orders under section 119 [42 USCS § 7419] (but not including the granting or denying of any such order),

(I) promulgation or revision of regulations under title VI [42 USCS §§ 7671 et seq.] (relating to stratosphere and ozone protection),

(J) promulgation or revision of regulations under subtitle C of title I [42 USCS §§ 7470 et seq.] (relating to prevention of significant deterioration of air quality and protection of visibility),

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(K) promulgation or revision of regulations under section 202 [42 USCS § 7521] and test procedures for new motor vehicles or engines under section 206 [42 USCS § 7525], and the revision of a standard under section 202(a)(3) [42 USCS § 7521(a)(3)],

(L) promulgation or revision of regulations for noncompliance penalties under section 120 [42 USCS § 7420],

(M) promulgation or revision of any regulations promulgated under section 207 [42 USCS § 7541] (relating to warranties and compliance by vehicles in actual use),

(N) action of the Administrator under section 126 [42 USCS § 7426] (relating to interstate pollution abatement),

(O) the promulgation or revision of any regulation pertaining to consumer and commercial products under section 183(e) [42 USCS § 7511b(e)],

(P) the promulgation or revision of any regulation pertaining to field citations under section 113(d)(3) [42 USCS § 7413(d)(3)],

(Q) the promulgation or revision of any regulation pertaining to urban buses or the clean-fuel vehicle, clean-fuel fleet, and clean fuel programs under part C of title II [42 USCS §§ 7581 et seq.],

(R) the promulgation or revision of any regulation pertaining to nonroad engines or nonroad vehicles under section 213 [42 USCS § 7547],

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(S) the promulgation or revision of any regulation relating to motor vehicle compliance program fees under section 217 [42 USCS § 7552],

(T) the promulgation or revision of any regulation under title IV [42 USCS §§ 7641 et seq.] (relating to acid deposition),

(U) the promulgation or revision of any regulation under section 183(f) [42 USCS § 7511b(f)] pertaining to marine vessels, and

(V) such other actions as the Administrator may determine.

The provisions of section 553 through 557 and section 706 of title 5 of the United States Code shall not, except as expressly provided in this subsection, apply to actions to which this subsection applies. This subsection shall not apply in the case of any rule or circumstance referred to in subparagraphs (A) or (B) of subsection 553(b) of title 5 of the United States Code.

(2) Not later than the date of proposal of any action to which this subsection applies, the Administrator shall establish a rulemaking docket for such action (hereinafter in this subsection referred to as a “rule”). Whenever a rule applies only within a particular State, a second (identical) docket shall be simultaneously established in the appropriate regional office of the Environmental Protection Agency.

(3) In the case of any rule to which this subsection applies, notice of proposed rulemaking shall be

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published in the Federal Register, as provided under section 553(b) of title 5, United States Code, shall be accompanied by a statement of its basis and purpose and shall specify the period available for public comment (hereinafter referred to as the “comment period”). The notice of proposed rulemaking shall also state the docket number, the location or locations of the docket, and the times it will be open to public inspection. The statement of basis and purpose shall include a summary of –

(A) the factual data on which the proposed rule is based;

(B) the methodology used in obtaining the data and in analyzing the data; and

(C) the major legal interpretations and policy considerations underlying the proposed rule.

The statement shall also set forth or summarize and provide a reference to any pertinent findings, recommendations, and comments by the Scientific Review Committee established under section 109(d) [42 USCS § 7409(d)] and the National Academy of Sciences, and, if the proposal differs in any important respect from any of these recommendations, an explanation of the reasons for such differences. All data, information, and documents referred to in this paragraph on which the proposed rule relies shall be included in the docket on the date of publication of the proposed rule.

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(4)(A) The rulemaking docket required under paragraph (2) shall be open for inspection by the public at reasonable times specified in the notice of proposed rulemaking. Any person may copy documents contained in the docket. The Administrator shall provide copying facilities which may be used at the expense of the person seeking copies, but the Administrator may waive or reduce such expenses in such instances as the public interest requires. Any person may request copies by mail if the person pays the expenses, including personnel costs to do the copying.

(B)(i) Promptly upon receipt by the agency, all written comments and documentary information on the proposed rule received from any person for inclusion in the docket during the comment period shall be placed in the docket. The transcript of public hearings, if any, on the proposed rule shall also be included in the docket promptly upon receipt from the person who transcribed such hearings. All documents which become available after the proposed rule has been published and which the Administrator determines are of central relevance to the rulemaking shall be placed in the docket as soon as possible after their availability.

(ii) The drafts of proposed rules submitted by the Administrator to the Office of Management and Budget for any interagency review process prior to proposal of any such rule, all documents accompanying such drafts, and all written comments thereon by other agencies and all written responses to such

## App. 210

written comments by the Administrator shall be placed in the docket no later than the date of proposal of the rule. The drafts of the final rule submitted for such review process prior to promulgation and all such written comments thereon, all documents accompanying such drafts, and written responses thereto shall be placed in the docket no later than the date of promulgation.

(5) In promulgating a rule to which this subsection applies (i) the Administrator shall allow any person to submit written comments, data, or documentary information; (ii) the Administrator shall give interested persons an opportunity for the oral presentation of data, views, or arguments, in addition to an opportunity to make written submissions; (iii) a transcript shall be kept of any oral presentation; and (iv) the Administrator shall keep the record of such proceeding open for thirty days after completion of the proceeding to provide an opportunity for submission of rebuttal and supplementary information.

(6)(A) The promulgated rule shall be accompanied by (i) a statement of basis and purpose like that referred to in paragraph (3) with respect to a proposed rule and (ii) an explanation of the reasons for any major changes in the promulgated rule from the proposed rule.

(B) The promulgated rule shall also be accompanied by a response to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the comment period.

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(C) The promulgated rule may not be based (in part or whole) on any information or data which has not been placed in the docket as of the date of such promulgation.

(7)(A) The record for judicial review shall consist exclusively of the material referred to in paragraph (3), clause (i) of paragraph (4)(B), and subparagraphs (A) and (B) of paragraph (6).

(B) Only an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment (including any public hearing) may be raised during judicial review. If the person raising an objection can demonstrate to the Administrator that it was impracticable to raise such objection within such time or if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule, the Administrator shall convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed. If the Administrator refuses to convene such a proceeding, such person may seek review of such refusal in the United States court of appeals for the appropriate circuit (as provided in subsection (b)). Such reconsideration shall not postpone the effectiveness of the rule. The effectiveness of the rule may be stayed during such reconsideration, however, by the Administrator or the court for a period not to exceed three months.

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(8) The sole forum for challenging procedural determinations made by the Administrator under this subsection shall be in the United States court of appeals for the appropriate circuit (as provided in subsection (b)) at the time of the substantive review of the rule. No interlocutory appeals shall be permitted with respect to such procedural determinations. In reviewing alleged procedural errors, the court may invalidate the rule only if the errors were so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made.

(9) In the case of review of any action of the Administrator to which this subsection applies, the court may reverse any such action found to be –

(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

(B) contrary to constitutional right, power, privilege, or immunity;

(C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; or

(D) without observance of procedure required by law, if (i) such failure to observe such procedure is arbitrary or capricious, (ii) the requirement of paragraph (7)(B) has been met, and (iii) the condition of the last sentence of paragraph (8) is met.

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(10) Each statutory deadline for promulgation of rules to which this subsection applies which requires promulgation less than six months after date of proposal may be extended to not more than six months after date of proposal by the Administrator upon a determination that such extension is necessary to afford the public, and the agency, adequate opportunity to carry out the purposes of this subsection.

(11) The requirements of this subsection shall take effect with respect to any rule the proposal of which occurs after ninety days after the date of enactment of the Clean Air Act Amendments of 1977 [enacted Aug. 7, 1977].

(e) Other methods of judicial review not authorized. Nothing in this Act shall be construed to authorize judicial review of regulations or orders of the Administrator under this Act, except as provided in this section.

(f) Costs. In any judicial proceeding under this section, the court may award costs of litigation (including reasonable attorney and expert witness fees) whenever it determines that such award is appropriate.

(g) Stay, injunction, or similar relief in proceedings relating to noncompliance penalties. In any action respecting the promulgation of regulations under section 120 [42 USCS § 7420] or the administration or enforcement of section 120 [42 USCS § 7420] no

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court shall grant any stay, injunctive, or similar relief before final judgment by such court in such action.

(h) Public Participation. It is the intent of Congress that, consistent with the policy of the Administrative Procedures Act [5 USCS §§ 551 et seq.], the Administrator in promulgating any regulation under this Act, including a regulation subject to a deadline, shall ensure a reasonable period for public participation of at least 30 days, except as otherwise expressly provided in section [sections] 107(d), 172(a), 181(a) and (b), and 186(a) and (b) [42 USCS § 7407(d), 7502(a), 7511(a) and (b), 7512(a) and (b)].

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From: Gregory Schultz <gschultz@riag.ri.gov>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: FW: Coalition for Responsible Regulation v. EPA, et al and consolidated cases; Courtesy Copy of Pacific Legal Foundation Petition for Writ of Certiorari  
Date: Fri Mar 22 2013 13:31:03 EDT  
Attachments: Petition for Writ of Certiorari (Commonwealth v EPA) (Ct. Filed).pdf

---

Mike:

Is this how the VA AG signs off on all emails? Am I a "distrustful soul"?

Greg

-----Original Message-----

From: Taylor, Kimberly E. [mailto:KTaylor@oag.state.va.us] On Behalf Of Getchell, Earle D.  
Sent: Friday, March 22, 2013 1:13 PM  
To: Sean Donahue; Ted Hadzi-Antich  
Cc: twebster@sidley.com; pkeisler@sidley.com; amacbeth@sidley.com; holmes.carol@epa.gov; mallory.brenda@epa.gov; jon.lipshultz@usdoj.gov; angeline.purdy@usdoj.gov; eric.hostetler@usdoj.gov; perry.rosen@usdoj.gov; amanda.berman@usdoj.gov; david.gunter2@usdoj.gov; thomas.lorenzen@usdoj.gov; kim.smaczniak@usdoj.gov; michele.walter@usdoj.gov; peter.glaser@troutmansanders.com; mark.nagle@troutmansanders.com; matthew.dukes@troutmansanders.com; reed.clay@oag.state.tx.us; michaelp.murphy@oag.state.tx.us; mpmurf@gmail.com; jonathan.mitchell@texasattorneygeneral.gov; bcobb@jw.com; rtambling@ago.state.al.us; katie.spohn@nebraska.gov; maiolson@nd.gov; roxanne.giedd@state.sd.us; agesmith@ag.state.sc.us; Getchell, Earle D.; Cuccinelli, Ken; gavin.mccabe@doj.ca.gov; dsherid@ag.state.ia.us; mraivel@mde.state.md.us; gkarr@atg.state.il.us; jerry.reid@maine.gov; carol.iancu@state.ma.us; sfarris@nmag.gov; paul.s.logan@doj.state.or.us; tschwartz@atg.state.vt.us; michael.myers@oag.state.ny.us; cking@law.nyc.gov; Gregory Schultz; Mike Rubin; ttierney@riag.ri.gov; leslies@atg.wa.gov; mbernstein@ncdoj.gov; ajern@ncdoj.gov; john.west@ky.gov; BurschJ@michigan.gov; fc.docket@oag.ok.gov; scott.pruitt@oag.ok.gov; Kimberly.Massicotte@ct.gov; scott.koschwitz@ct.gov; jocelyn.olson@ag.state.mn.us; bbrownell@hunton.com; Awood@hunton.com; pday@hollandhart.com; hmacdougald@cwlaw.org; Shannon@southeasternlegal.org; jeffrey.clark@kirkland.com; william.burgess@kirkland.com; rgasaway@kirkland.com; aweeks@catf.us; jlewis@catf.us; rludwiszewski@gibsondunn.com; john.campbell@ksag.org; jmassey@masseygail.com; ayresr@ayreslawgroup.com; vpardee@biologicaldiversity.org; bcummings@biologicaldiversity.org; RS Radford; Pamela G. Spring  
Subject: RE: Coalition for Responsible Regulation v. EPA, et al and consolidated cases; Courtesy Copy of Pacific Legal Foundation Petition for Writ of Certiorari

Kimberly  
(804) 786-2436 (office)

Distrustful souls see only darkness burdening the face of the earth. We prefer instead to reaffirm all our confidence in our Savior who has not abandoned the world which he redeemed. Pope John XXIII

-----Original Message-----

From: Sean Donahue [mailto:sean@donahuegoldberg.com]

Sent: Friday, March 22, 2013 12:56 PM

To: Ted Hadzi-Antich

Cc: twebster@sidley.com; pkeisler@sidley.com; amacbeth@sidley.com; holmes.carol@epa.gov; mallory.brenda@epa.gov; jon.lipshultz@usdoj.gov; angeline.purdy@usdoj.gov; eric.hostetler@usdoj.gov; perry.rosen@usdoj.gov; amanda.berman@usdoj.gov; david.gunter2@usdoj.gov; thomas.lorenzen@usdoj.gov; kim.smaczniak@usdoj.gov; michele.walter@usdoj.gov; peter.glaser@troutmansanders.com; mark.nagle@troutmansanders.com; matthew.dukes@troutmansanders.com; reed.clay@oag.state.tx.us; michael.p.murphy@oag.state.tx.us; mpmurf@gmail.com; jonathan.mitchell@texasattorneygeneral.gov; bcobb@jw.com; rtambling@ago.state.al.us; katie.spohn@nebraska.gov; maiolson@nd.gov; roxanne.giedd@state.sd.us; agesmith@ag.state.sc.us; Getchell, Earle D.; Cuccinelli, Ken; gavin.mccabe@doj.ca.gov; dsherid@ag.state.ia.us; mraivel@mde.state.md.us; gkarr@atg.state.il.us; jerry.reid@maine.gov; carol.iancu@state.ma.us; sfarris@nmag.gov; paul.s.logan@doj.state.or.us; tschwartz@atg.state.vt.us; michael.myers@oag.state.ny.us; cking@law.nyc.gov; gschultz@riag.ri.gov; mrubin@riag.ri.gov; ttierney@riag.ri.gov; leslies@atg.wa.gov; mbernstein@ncdoj.gov; ajern@ncdoj.gov; john.west@ky.gov; BurschJ@michigan.gov; fc.docket@oag.ok.gov; scott.pruitt@oag.ok.gov; Kimberly.Massicotte@ct.gov; scott.koschwitz@ct.gov; jocelyn.olson@ag.state.mn.us; bbrownell@hunton.com; Awood@hunton.com; pday@hollandhart.com; hmacdougald@cwlaw.org; Shannon@southeasternlegal.org; jeffrey.clark@kirkland.com; william.burgess@kirkland.com; rgasaway@kirkland.com; aweeks@catf.us; jlewis@catf.us; rludwiszewski@gibsondunn.com; john.campbell@ksag.org; jmassey@masseygail.com; ayresr@ayreslawgroup.com; vpardee@biologicaldiversity.org; bcummings@biologicaldiversity.org; RS Radford; Pamela G. Spring  
Subject: Re: Coalition for Responsible Regulation v. EPA, et al and consolidated cases; Courtesy Copy of Pacific Legal Foundation Petition for Writ of Certiorari

Thank you, Ted. It would be much appreciated if any other parties that have filed cert petitions so far could send around electronic copies (of the petition(s), not appendices).

-Sean

On Thu, Mar 21, 2013 at 1:17 PM, Ted Hadzi-Antich <tha@pacificlegal.org> wrote:

> Dear Counsel:

>

>

>  
> Attached please find an electronic courtesy copy of Pacific Legal  
> Foundation's Petition for Writ of Certiorari to the United States  
> Supreme Court from the decision of the D.C. Circuit in the cases  
> consolidated under the case name Coalition for Responsible Regulation,  
  
> et. al v. Environmental Protection Agency, et al., along with an  
> electronic copy of the courtesy copy service list. Because not all  
> counsel in the consolidated cases were included in the D.C. Circuit's  
> ECF system, we are sending first class courtesy copies as well.

>  
>  
>  
> Sincerely,  
>  
> Theodore Hadzi-Antich  
> Senior Staff Attorney  
> Pacific Legal Foundation  
> 930 G Street  
> Sacramento, CA 95814  
>  
> 916-419-7111

> \*\*\*\*\*

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--  
Sean H. Donahue  
Donahue & Goldberg, LLP  
2000 L St., NW Suite 808  
Washington, DC 20036  
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Thank you.

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Owner: Gregory Schultz <gschultz@riag.ri.gov>  
Filename: Petition for Writ of Certiorari (Commonwealth v EPA) (Ct. Filed).pdf  
Last Modified: Fri Mar 22 13:31:03 EDT 2013

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No. \_\_\_\_\_

**In The  
Supreme Court of the United States**

COMMONWEALTH OF VIRGINIA, *et al.*,  
*Petitioners,*

v.

ENVIRONMENTAL PROTECTION AGENCY,  
*Respondent.*

**On Petition For A Writ Of Certiorari  
To The United States Court Of Appeals  
For The District Of Columbia Circuit**

**PETITION FOR A WRIT OF CERTIORARI**

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March 20, 2013

*Counsel for the  
Commonwealth of Virginia*

[Additional Counsel Listed On Inside Cover]

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## **QUESTIONS PRESENTED**

- 1) Did Virginia and other Petitioners below demonstrate that there was evidence of central relevance to the EPA's Endangerment Finding not available during the comment period such that the Administrator was obligated to convene a proceeding for reconsideration with procedural rights of notice and comment?
- 2) Did the EPA correctly apply the standard for demonstrating central relevance?
- 3) Did the EPA err when it found the objections material enough to require resort to extensive new evidence outside of the record while denying the rights of notice and comment on that evidence?
- 4) Did the EPA err initially and on Petition for Reconsideration by delegating its Statutory Authority to outside entities?

## **PARTIES AND CORPORATE DISCLOSURE STATEMENT**

The United States Court of Appeals for the District of Columbia Circuit consolidated the following cases for review:

09-1322 (Lead), 10-1024, 10-1025, 10-1026, 10-1030, 10-1035, 10-1036, 10-1037, 10-1038, 10-1039, 10-1040, 10-1041, 10-1042, 10-1044, 10-1045, 10-1046, 10-1234, 10-1235, 10-1239, 10-1245, 10-1281, 10-1310, 10-1318, 10-1319, 10-1320, 10-1321

### **Parties, Intervenors, and Amici**

#### **Petitioners**

Alliance for Natural Climate Change Science and  
William Orr (10-1049)  
Alpha Natural Resources, Inc. (09-1322)  
American Farm Bureau Federation (10-1026)  
American Iron and Steel Institute (10-1038)  
American Petroleum Institute (10-1044)  
Attorney General Greg Abbott (10-1041)  
Barry Smitherman, Chairman of the  
Texas Public Utility Commission (10-1041)  
Brick Industry Association (10-1044)  
Chamber of Commerce of the United States of  
America (10-1030)  
Coalition for Responsible Regulation, Inc. (09-1322)  
Collins Industries, Inc. (10-1035)  
Collins Trucking Company, Inc. (10-1035)  
Commonwealth of Virginia *ex rel.*  
Attorney General Kenneth T. Cuccinelli (10-1036)  
Competitive Enterprise Institute (10-1045)  
Corn Refiners Association (10-1044)

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

Freedomworks (10-1045)  
Georgia Agribusiness Council, Inc. &  
Georgia Motor Trucking Association, Inc. (10-1035)  
Gerdau Ameristeel Corporation (10-1037)  
Great Northern Project Development, L.P. (09-1322)  
Industrial Minerals Association –  
North America (09-1322)  
J&M Tank Lines, Inc. (10-1035)  
Kennesaw Transportation, Inc. (10-1035)  
Langdale Company (10-1035)  
Langdale Forest Products Company (10-1035)  
Langdale Farms, LLC (10-1035)  
Langdale Fuel Company (10-1035)  
Langdale Chevrolet-Pontiac, Inc. (10-1035)  
Langdale Ford Company (10-1035)  
Langboard, Inc.-MDF (10-1035)  
Langboard, Inc.-OSB (10-1035)  
Massey Energy Company (09-1322)  
National Association of Manufacturers (10-1044)  
National Association of Home Builders (10-1044)  
National Cattlemen’s Beef Association (09-1322)  
National Mining Association (10-1024)  
National Oilseed Processors Association (10-1044)  
National Petrochemical and  
Refiners Association (10-1044)  
Ohio Coal Association (10-1040)  
Peabody Energy Company (10-1025)  
Portland Cement Association (10-1046)  
Rosebud Mining Company (09-1322)  
Science and Environmental Policy Project (10-1045)  
Southeast Trailer Mart Inc. (10-1035)  
Southeastern Legal Foundation, Inc. (10-1035)

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

State of Alabama (10-1039)  
State of Texas (10-1041)  
Rick Perry, Governor of Texas (10-1041)  
Texas Commission on Environmental Quality (10-1041)  
Texas Agriculture Commission (10-1041)  
U.S. Representative Dana Rohrabacher (10-1035)  
U.S. Representative Jack Kingston (10-1035)  
U.S. Representative John Linder (10-1035)  
U.S. Representative John Shimkus (10-1035)  
U.S. Representative Kevin Brady (10-1035)  
U.S. Representative Lynn Westmoreland (10-1035)  
U.S. Representative Michele Bachmann (10-1035)  
U.S. Representative Nathan Deal (10-1035)  
U.S. Representative Paul Broun (10-1035)  
U.S. Representative Phil Gingrey (10-1035)  
U.S. Representative Steve King (10-1035)  
U.S. Representative Tom Price (10-1035)  
Utility Air Regulatory Group (10-1042)  
Western States Petroleum Association (10-1044)

**Respondents**

Environmental Protection Agency (Respondent IN ALL CONSOLIDATED CASES)

Lisa P. Jackson, Administrator, United States Environmental Protection Agency (Respondent in Nos. 10-1030, 10-1044, 10-1049, and 10-1235)

**Intervenors for Petitioners**

Associated Industries of Arkansas  
Arkansas State Chamber of Commerce

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

Colorado Association of Commerce & Industry  
Glass Packaging Institute  
Haley Barbour, Governor for the State of Mississippi  
Idaho Association of Commerce and Industry  
Independent Petroleum Association of America  
Indiana Cast Metals Association  
Kansas Chamber of Commerce and Industry  
Louisiana Oil and Gas Association  
Michigan Manufacturers Association  
Mississippi Manufacturers Association  
National Electrical Manufacturers Association  
Nebraska Chamber of Commerce and Industry  
North American Die Casting Association  
Ohio Manufacturers Association  
Pennsylvania Manufacturers Association  
Portland Cement Association  
State of Alaska  
State of Florida  
State of Indiana  
State of Kentucky  
State of Louisiana  
State of Michigan  
State of Nebraska  
State of North Dakota  
State of Oklahoma  
State of South Carolina  
State of South Dakota  
State of Utah  
Steel Manufacturers Association  
Tennessee Chamber of Commerce and Industry  
Virginia Manufacturers Association

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

West Virginia Manufacturers Association  
Wisconsin Manufacturers and Commerce

**Intervenors for Respondents**

City of New York  
Commonwealth of Massachusetts  
Commonwealth of Pennsylvania  
Conservation Law Foundation  
Department of Environmental Protection  
Environmental Defense Fund  
Natural Resources Defense Council  
National Wildlife Federation  
Sierra Club  
State of Arizona  
State of California  
State of Connecticut  
State of Delaware  
State of Illinois  
State of Iowa  
State of Maine  
State of Maryland  
State of Minnesota  
State of New Hampshire  
State of New Mexico  
State of New York  
State of Oregon  
State of Rhode Island  
State of Vermont  
State of Washington  
Wetlands Watch

**PARTIES AND CORPORATE  
DISCLOSURE STATEMENT – Continued**

**Amici Curiae for Petitioners**

Atlantic Legal Foundation  
Landmark Legal Foundation  
Mountain States Legal Foundation  
National Federation of Independent Business Small  
Business Legal Center

**Amici Curiae for Respondents**

Great Waters Coalition  
Union of Concerned Scientists

Virginia, Kentucky, and Utah are States of the  
Union with no interests required to be disclosed.

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**PETITION FOR WRIT OF CERTIORARI**  
**OPINION BELOW**

The panel opinion affirming the rulemaking of the EPA is reported as *Coalition for Responsible Regulation, Inc. v. Environmental Protection Agency*, 684 F.3d 102 (D.C. Cir. 2012). Both the order and opinions relating to denial of rehearing are unpublished, but are available at 2012 U.S. App. LEXIS 25997, 2012 WL 6621785, and, through PACER, as U.S.C.A.

Case No. 09-1322, Doc. 1411145 (Dec. 20, 2012).<sup>1</sup> See SUP. CT. R. 12(7). And both are reprinted in the Appendix (“App.”) at App. 1-103, 104-63.



**JURISDICTION**

Section 307 of the Clean Air Act (CAA) grants exclusive jurisdiction to the United States Court of Appeals for the District of Columbia Circuit over petitions for review that challenge nationally applicable final actions of the Administrator of the EPA. 42 U.S.C. § 7607(b)(1) (“A petition for review of . . . final action taken[ ] by the Administrator under [the CAA] may be filed only in the United States Court of

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<sup>1</sup> All references to “Doc.” are to the appellate record in case number 09-1322, and collected cases, from the United States Court of Appeals for the District of Columbia Circuit and are available via that Court’s PACER system.

Appeals for the District of Columbia”). With regard to the Endangerment Finding and follow-on rulemaking, the D.C. Circuit received a number of timely petitions, and interventions, including those of the Commonwealth of Kentucky and the State of Utah, consolidated them, and, on June 26, 2012, issued an opinion denying the petitions and affirming the EPA’s rulemaking. *Responsible Regulation*, 684 F.3d at 102, 149. Timely petitions for rehearing *en banc* were received, circulated to the circuit court, voted on, and denied on a 6 to 2 vote on December 20, 2012. *See Coalition for Responsible Regulation, Inc. v. Evtl. Protection Agency (Responsible Regulation II)*, No. 09-1322, 2012 U.S. App. LEXIS 25997, 2012 WL 6621785 (D.C. Cir. Dec. 2012) (unpublished); Doc. 1411145; App. at 104-63. This petition for certiorari has been timely filed within 90 days of the denial of rehearing, *see* SUP. CT. R. 13(1) & (3), and so is now properly within this Court’s jurisdiction. *See* 28 U.S.C. § 1254(1).



## STATUTES AND REGULATIONS

The statutes and regulations involved in this case are 42 U.S.C. §§ 7521 and 7607; 74 Fed. Reg. 66,496 (Dec. 15, 2009), 75 Fed. Reg. 49,556 (Aug. 13, 2010). Because they are lengthy, the relevant statutory provisions are reprinted in the Appendix and the Federal Register provisions are cited from the Joint Appendix below. *See* SUP. CT. R. 14(f).



## STATEMENT OF THE CASE

This Court found in *Massachusetts v. EPA*, 549 U.S. 497, 534 (2007), that the EPA had both the jurisdiction and the obligation to decide “whether sufficient information exists to make an endangerment finding” with respect to CO<sub>2</sub>. The EPA published its Endangerment Finding on December 15, 2009. *Endangerment and Cause or Contribute Findings (Endangerment Finding)*, 74 Fed. Reg. at 66,496; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 29 of 695. Petitions for review of that finding were permitted “within sixty days from the date notice” was published in the Federal Register. 42 U.S.C. § 7607(b)(1). Virginia, Texas, and others filed timely petitions for review, invoking the jurisdiction of the United States Court of Appeals for the District of Columbia Circuit. *See id.*

By statute, the EPA Administrator must “convene a proceeding for reconsideration also of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed” if a person raising an objection to agency action can demonstrate that “the grounds for . . . objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule.” *Id.* § 7607(d)(7)(B). The comment period for the Endangerment Finding closed on June 23, 2009. *See EPA’s Response to the Petitions to Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases under*

*Section 202(a) of the Clean Air Act (RTP)*, 75 Fed. Reg. at 49,556, 49,560 (Aug. 13, 2010); J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), pp. 82, 86 of 695. On November 17, 2009, internal emails and documents from the Climate Research Unit (CRU) at the University of East Anglia (UEA) became available to the public. These documents were sufficiently damaging to the data upon which the EPA relied in making its Endangerment Finding that the release is now commonly known as “climategate.” See John M. Broder, *Scientists Taking Steps to Defend Work on Climate*, N.Y. Times, Mar. 2, 2012, at A11, <http://www.nytimes.com/2010/03/03/science/earth/03climate.html>. In the wake of these revelations, ten petitions for reconsideration also were timely filed within the period for appeal of the Endangerment Finding, including those of Virginia and Texas. The EPA refused to convene the statutory proceeding and flatly denied the petitions. See *RTP*, 75 Fed. Reg. at 49,557; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 83 of 695.

The Clean Air Act requires that information relied upon for rulemaking be in the administrative record, subject to public comment, and also provides for rehearing in the event additional information comes to light after the comment period has closed. With respect to the rulemaking record, Section 307(d)(4)(B) requires that “[a]ll documents which become available after the proposed rule has been published and which the Administrator determines are of central relevance to the rulemaking shall be placed in the docket as soon as possible after their availability.” 42 U.S.C. § 7607(d)(4)(B)(i). Once this

process is complete, Section 307(d)(6)(C) states that the “promulgated rule may not be based (in part or whole) on any information or data which has not been placed in the docket as of the date of such promulgation.” 42 U.S.C. § 7607(d)(6)(C). As for rehearing, Section 307(d)(7)(B) of the Act provides *inter alia*:

If the person raising an objection can demonstrate to the Administrator that . . . the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule, the Administrator shall convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed.

42 U.S.C. § 7607(d)(7)(B).

Ever since 1980, the EPA has consistently interpreted this rehearing standard, CAA § 307(d)(7)(B), 42 U.S.C. § 7607(d)(7)(B), as a heightened relevancy standard. That is, the EPA grants reconsideration when new evidence would “provide substantial support *for the argument* that the regulation should be revised.” *Denial of Petition to Revise NSPS for Stationary Gas Turbines*, 45 Fed. Reg. at 81,653 n.3 (Dec. 11, 1980) (emphasis added); see *Prevention of Significant Deterioration and Non-Attainment New Source Review: Reconsideration*, 68 Fed. Reg. 63,021 (Nov. 7, 2003) (codified at 40 CFR pts. 51, 52); *Denial of Petition for Reconsideration of National Ambient Air*

*Quality Standards for Particulate Matter*, 53 Fed. Reg. 52,698 (Dec. 29, 1988). Consistent with its past practice, the EPA announced that it would apply its usual standard to the petitions for reconsideration of the endangerment finding. *RTP*, 75 Fed. Reg. at 49,561.

In denying rehearing, the EPA relied in part on “a 3-volume, roughly 360-page Response to Petitions document,” which included both new information (developed after close of the comment period) and additional information not otherwise in the record and thus not subject to notice or comment. *RTP*, 75 Fed. Reg. at 49,556. The agency also relied upon investigations conducted by third parties:

Inquiries from the UK House of Commons, Science and Technology Committee, the University of East Anglia, Oxburgh Panel, the Pennsylvania State University, and the University of East Anglia, Russell Panel, all entirely independent from EPA, have examined the issues and many of the same allegations brought forward by the petitioners as a result of the disclosure of the private CRU e-mails. These inquiries are now complete. Their conclusions are in line with EPA’s review and analysis of these same CRU e-mails.

*RTP*, 75 Fed. Reg. at 49,557; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 83 of 695. However, none of these reports dealt with the central question raised by the reconsideration petitions: whether climategate undercut the reliability of the science upon which the EPA relied. See Pet’rs’ Opening Br. at 5-9; U.S.C.A.

Case 09-1322 Doc. 1309185, pp. 23-27 of 90. And obviously none of them addressed whether the information uncovered was of “central relevance” for purposes of 42 U.S.C. § 7607(d)(4)(B)(i) or (7)(B).

In support of rehearing, Petitioners argued that there were copious quantities of new information that had become public after the Endangerment Finding’s publication; that climategate emails suggested that the IPCC data and conclusion upon which the EPA relied were manipulated; that critical IPCC records were lost or destroyed; that the peer review process was corrupted and dissent suppressed; that IPCC personnel had conflicts of interest; and that the EPA’s reliance on IPCC data ensured that the process underlying the Endangerment Finding lacked transparency. The Rehearing Petitions also pointed out mistakes reflecting on the reliability of the underlying data, such as the EPA’s reliance on an IPCC report that purported to “distill[ IPCC’s] most important science into a form accessible to politicians and policy makers.” FoxNews.com, *Africa-Gate? U.N. fears of food shortages questioned* (Feb. 8, 2010), <http://www.foxnews.com/scitech/2010/02/08/british-scientist-says-panel-losing-credibility>; see IPCC, *Climate Change 2007: Synthesis Report*, [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf). In it, IPCC claimed that anthropogenic GHGs could cut many African countries’ yields from rain-fed agriculture in half. *IPCC Synthesis Report* § 3.3.2 at 50. The source of this alarmist conclusion was a 2003 policy paper from a Canadian think tank. J.A. Vol. IX, Doc.

1339079 (Oct. 31, 2011), pp. 451-53 of 649. *See* Int'l Inst. for Sustainable Dev., *Vulnerability of North African Countries to Climate Change: Adaptation and Implementation Strategies for Climate Change* (2003) at 5, [http://www.iisd.org/cckn/pdf/north\\_africa.pdf](http://www.iisd.org/cckn/pdf/north_africa.pdf). Petitioners argued that climategate revealed other significant errors and misstatements that the EPA failed to detect and on which the public could not comment before the finding's publication, including the percentage of the Netherlands lying below sea level, J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), p. 456 of 649, errors in the projection of glacier melt in the Himalayas, J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), pp. 448-51 of 649; *see* IPCC, *Statement on the melting of Himalayan Glaciers* (Jan. 20, 2010), <http://www.ipcc.ch/pdf/presentations/himalaya-statement-20january2010.pdf>, projected Amazon rainforest die-off, J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), pp. 453-54 of 649, and projections of more violent storms. J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), pp. 459-61 of 649; *see* Pet'rs' Opening Br. at 12-13 n.14; Doc. 1341062 (Nov. 10, 2011), pp. 30-31 n.14 of 90.

Finally, the Petitioners argued that, in adopting the Endangerment Finding, the Administrator viewed the IPCC, the National Research Council (NRC), and the U.S. Global Change Research Program (USGCRP) as representing independent, mutually reinforcing data, rather than data sets heavily dependent on the IPCC, which derives from a small number of collaborative "climate scientists." In the 360-page RTP – which consisted of new material that

had never been commented upon by the public, that was added to the docket by the agency for the first time after the comment period, and that was created, in some instances, after the Endangerment Finding was finalized – the EPA rejected Petitioners’ objections raised in the rehearing petitions, without notice and comment, on the ground that the objections did not change the EPA’s own conclusions. 75 Fed. Reg. at 49,558 (“The petitioners do not provide any substantial support for the argument that the Endangerment Finding should be revised.”), 49,569; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), pp. 84, 95 of 695. After the close of the comment period, the EPA also added more than four hundred documents to the record, and cited more than fifty of these documents in its RTP. *RTP* Vols. I through III; J.A. Vol. X, Doc. 1339079 (Oct. 31, 2011), pp. 29 through 401 of 403. For example, the EPA in the RTP cited a newly published NRC study entitled “Advancing the Science of Climate Change” to reinforce the now questioned IPCC study, noting that it was “not aware of any published criticisms” of the study. *RTP* Vol. I at 50; J.A. Vol. X, Doc. 1339079 (Oct. 31, 2011), p. 85 of 403.

By procedural order, the D.C. Circuit identified denial of reconsideration as one of the issues to be briefed and argued. D.C. Cir. Order, Doc. 1357330 (Feb. 8, 2012), 4 of 5. On the merits, the panel decision minimized the significance of identified errors in light of the size of the record without discussing the overarching reliability issues arising from the politicized, agenda-driven science disclosed by climategate

and without considering whether the EPA applied the wrong standard. *Responsible Regulation*, 684 F.3d at 125. The panel also rejected the claim that the EPA had necessarily revised its Endangerment Finding by supplementing it, and the record. The D.C. Circuit rejected this argument on a mere ipse dixit basis without analysis or citation to authority. *Id.* at 126.

The court of appeals, by procedural order, also identified delegation issues arising from the Endangerment Finding as matters to be briefed and argued. D.C. Cir. Order, Doc. 1357330 (Feb. 8, 2012). However, the panel in its opinion expressed dislike of the word “delegate,” branding it as “little more than a semantic trick.” *Responsible Regulation*, 684 F.3d at 124. In any case, that court rejected the delegation claim based upon the “extreme degree of deference” afforded factual and scientific decisions by agencies, *id.* at 120, and the precautionary principle, which operates to increase deference as evidence becomes “‘more difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge.’” *Responsible Regulation*, 684 F.3d at 121 (quoting *Ethyl Corp. v. EPA*, 541 F.2d 1, 28 (D.C. Cir. 1976)).

The D.C. Circuit permitted two days for oral argument on the numerous petitions challenging the Endangerment Finding and follow-on regulations. *See* D.C. Cir. Order, Doc. 1357330 (Feb. 8, 2012). However, this petition addresses only those reconsideration and delegation issues on which Virginia was lead on briefing and which Virginia argued. Other petitioners intend to present other issues by separate petitions for writs of certiorari in the coming weeks. *See*

*Chamber of Commerce v. EPA*, No. 12A871 (Mar. 5, 2013); *Am. Chemistry Council v. EPA*, No. 12A876 (Mar. 8, 2013); *Coalition for Responsible Regulation, Inc. v. EPA*, No. 12A877 (Mar. 8, 2013); *Energy-Intensive Mfrs. Working Grp. on Greenhouse Gas Regulation v. EPA*, No. 12A879 (Mar. 8, 2013); *South-eastern Legal Found. v. EPA*, No. 12A881 (Mar. 7, 2013); *Texas v. EPA*, No. 12A884 (Mar. 8, 2013). And, of course, parties below may advance only one petition each. Sup. Ct. R. 12(4). The parties to this brief pray the Court to grant petitions on all issues so that the decision of the D.C. Circuit may be comprehensively reviewed.



### **REASONS FOR GRANTING THE PETITION**

Supreme Court Rule 10 contains illustrative bases for granting certiorari. Rule 10(a)-(b) deals with issues of uniformity of Federal law. Because the D.C. Circuit had exclusive jurisdiction over this appeal, considerations of uniformity could never arise. Rule 10(c) states that certiorari is appropriate where “a United States court of appeals has decided an important question of Federal law that has not been, but should be, settled by this Court.” An example of an exercise of jurisdiction predicated on unusual public importance is provided by the predecessor case of *Massachusetts v. EPA*, 549 U.S. at 505-06, which cited “the unusual importance of the underlying issue,” authority to regulate greenhouse gases, as justification for granting a writ despite no conflict between the lower courts on the issue.

It would be difficult to overstate the importance of the decision below. The judges concurring in denial of rehearing were agreed on this:

To be sure, the stakes here are high. The underlying policy questions and the outcome of this case are undoubtedly matters of exceptional importance.

*Responsible Regulation II*, No. 09-1322, 2012 U.S. App. LEXIS 25997 at 28, 62, 2012 WL 6621785 at 3, 14; App. at 111, 139; Doc. 1411145, pp. 8 & 32 of 52. The significant regulatory and economic burden of greenhouse gas regulation has been the subject of testimony before both Houses of Congress on multiple occasions prior to and after the EPA issued the Endangerment Finding. See Testimony of Dr. Margo Thorning on The Impact of EPA Regulation of GHGs under the Clean Air Act on U.S. Investment and Job Growth before H. Subcomm. on Energy & Power (Feb. 9, 2011), American Council for Capital Formation, Publications, <http://accf.org/news/publication/the-impact-of-epa-regulation-of-ghgs-under-the-clean-air-act-on-u-s-investment-and-job-growth> (explaining the macroeconomic effect of the Endangerment Finding); Testimony of William L. Kovacs on Regulation of Greenhouse Gases under The Clean Air Act before the S. Comm. on Envt. & Public Works (Sept. 23, 2008), U.S. Chamber of Commerce, <http://www.uschamber.com/issues/testimony/2008/testimony-regulation-greenhouse-gases-under-clean-air-act> (explaining the wide range of activities that would be made subject to EPA permitting once an Endangerment Finding had been

reached); *see generally* Congressional Budget Office, The Economic Effects of Legislation to Reduce Greenhouse-Gas Emissions Report (Sept. 17, 2009), <http://www.cbo.gov/publication/41266>. It has been estimated that the EPA's regulation of greenhouse gases could decrease U.S. investment by between five to fifteen percent over the three-year period ending in 2014, with a potential reduction in employment from between one-half to 1.5 million jobs and with compliance costs ranging in the tens of billions "annually, a figure that does not include the costs of actually acquiring and implementing the Best Available Control Technology, as required under the PSD program." *See* Thorning Testimony at 4-5, 9.

And the CBO, in modeling various legislative programs deemed by some to be more efficient than the EPA approach, estimated that such regulation will reduce the annual rate of GDP growth by less than 1 percent of GDP this decade, but would rise sharply over time as the loss in wealth "multiplies." CBO Report at 12-13 (Table 1). Obviously, even a small reduction of GDP growth results in a large loss in societal wealth, jobs, and other measures of human flourishing. U.S. Dep't of Commerce, Bureau of Economic Analysis, "National Income and Product Accounts: Gross Domestic Product, 4th Quarter and Annual 2012 (second estimate)," (Feb. 28, 2013), [http://www.bea.gov/newsreleases/national/gdp/2013/gdp4q12\\_2nd.htm](http://www.bea.gov/newsreleases/national/gdp/2013/gdp4q12_2nd.htm). In sum, this Petition, challenging the EPA's adoption of regulations aimed at limiting the previous conduct of citizens in order to reduce CO<sub>2</sub>

and other greenhouse gas emissions, presents a matter of utmost importance to the vitality of our Nation. See *Responsible Regulation II*, No. 09-1322, 2012 U.S. App. LEXIS 12980 at 63; 2012 WL 6621785 at 14 (Kavanaugh, J., dissenting from denial of reh’g en banc) (“Put simply, the economic and environmental policy stakes are very high.”); App. at 139.

With respect to whether this is a case that “has not been, but should be, settled by this Court,” the judges of the panel thought that the outcome was predetermined by this Court in *Massachusetts v. EPA*. See *Responsible Regulation*, 684 F.3d at 120. But only this Court can definitely say that. Furthermore, the rehearing and delegation issues raised in this petition, and essential to public participation in the administrative process and informed agency decisionmaking, have never been decided by this Court.

Not only does this Petition raise matters of first impression, but the arguments against the EPA’s actions are weighty and substantial.

**A. The Administrator Was Obligated to Grant Reconsideration Because Petitioners Demonstrated that their Timely Objections Were Based on Evidence of Central Relevance to the Outcome of the Endangerment Finding.**

For over thirty years, the EPA has consistently held that a timely motion for reconsideration is due to be granted where new evidence would “provide

substantial support for the argument that the regulation should be revised.” See 45 Fed. Reg. at 81,653; 53 Fed. Reg. at 52,698; 68 Fed. Reg. at 63,021. Reversing the old saw “let’s not and say we did,” the EPA, in response, produced a 360-page, three-volume supplement to the Endangerment Finding and added numerous documents to shore up its scientific bases, but maintained that it had not reconsidered its original decision. Having supplemented its findings, the agency’s claim that the new information was unlikely to cause it to revise its action rang hollow. See *West Virginia v. EPA*, 362 F.3d 861 (D.C. Cir. 2004). The EPA, for foreign diplomatic reasons, had issued the Endangerment Finding as a free-standing document unassociated with any implementing rule. See John M. Broder, *Greenhouse Gases Imperil Health, E.P.A. Announces*, N.Y. Times, Dec. 7, 2009, at A18, [http://www.nytimes.com/2009/12/08/science/earth/08epa.html?\\_r=1&](http://www.nytimes.com/2009/12/08/science/earth/08epa.html?_r=1&) (“The announcement was timed to coincide with the opening of the United Nations conference on climate change in Copenhagen, strengthening President Obama’s hand as more than 190 nations struggle to reach a global accord.”). Having done so, any objection cogent enough to require a response relying on extensive new extra-record evidence plainly provided substantial support for an argument that the Finding needed reworking. Indeed, the rehearing petitions were not merely likely to lead to a revision, they in fact led to a *de facto* revision. Put another way, an Endangerment Finding whose supporting bases have to be materially supplemented and reweighed to adequately respond

to objections triggers reconsideration under notice and comment standards. This is the plain meaning of 42 U.S.C. § 7607(d)(7)(B), and the court of appeals erred in holding otherwise. *See Responsible Regulation*, 684 F.3d at 125-26.

### **B. The Administrator Misapplied the Central Relevance Standard.**

The EPA departed from its clear and consistent use of its heightened relevance standard without adequate explanation when it found that the data supplied by Petitioners did not change its mind on the Endangerment Finding. The Endangerment Finding was promulgated as the first step in rulemaking under Section 202(a) of the Clean Air Act, codified at 42 U.S.C. § 7521. *See Endangerment Finding*, 74 Fed. Reg. at 66,496; J.A. Vol. I, Doc. 1339709 (Oct. 31, 2011), p. 30 of 695. As a consequence, the associated rulemaking was required to be accompanied by “a statement of basis and purpose,” as well as “a response to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the comment period.” 42 U.S.C. § 7607(d)(6)(A)(i) & (d)(6)(B). In no event could the Endangerment Finding “be based (in part or whole) on any information or data which ha[d] not been placed in the docket as of the date of such promulgation.” 42 U.S.C § 7607(d)(6)(C). Thus, after promulgation on December 15, 2009, any revision to the statement of basis and purpose or to the response to comments was a revision requiring the same

process as that required in the initial promulgation. 42 U.S.C. § 7607(d)(1)(K). See *Donner Hanna Coke Corp. v. Costle*, 464 F. Supp. 1295 (W.D.N.Y. 1979) (EPA enforcement officials cannot circumvent rule-making requirements of 42 U.S.C. § 7607 by making substantial changes in testing methods without notice and hearing).

Whatever the 360-page tome “appears to be,” *Responsible Regulation*, 684 F.3d at 126, the EPA misapplied the central relevance and likelihood of revision test because, in purporting to deny reconsideration, the EPA did, in fact, revise the statement of basis and purpose and its response to comments. This is not only an arbitrary and capricious violation of the EPA’s own standard, but is also a facial violation of the Clean Air Act, or of the APA if the Endangerment Finding is not considered a rule for purposes of 42 U.S.C. § 7607(d)(8).

**C. The EPA Administrator Erred by Making Determinations without Notice or Comment.**

42 U.S.C. § 7607(d)(3) forbids the revision of any rule without notice and comment and limits the basis for such revision to data, information, and documents contained in the docket when the revision is published. 42 U.S.C. § 7607(d)(7)(B) requires any reconsideration to be conducted with rights of notice and comment. Moreover, 42 U.S.C. § 7607(h) declares, with exceptions not here relevant, a congressional

intent, “consistent with the policy of the Administrative Procedures Act,” that the Administrator “ensure a reasonable period for public participation of at least 30 days.” Finally, 42 U.S.C. § 7607(d)(6)(A) provides that any promulgated rule “shall be accompanied by (i) a statement of basis and purpose,” among other things. A revision of the statement of basis and purpose is, therefore, a revision requiring notice and comment. The Endangerment Finding itself is nothing more than an overarching statement of basis and purpose intended to support all subsequent rulemaking on the subject.

This is well-established:

To have any reasonable prospect of obtaining judicial affirmance of a major rule, an agency must set forth the basis and purpose of the rule in a detailed statement, often several hundred pages long, in which the agency refers to the evidentiary basis for all factual predicates, explains its method of reasoning from factual predicates to the expected effects of the rule, relates the factual predicates and expected effects of the rule to each of the statutory goals or purposes the agency is required to further or to consider, responds to all major criticisms contained in the comments on its proposed rule, and explains why it has rejected at least some of the plausible alternatives to the rule it has adopted.

1 Richard J. Pierce, Jr., *Administrative Law Treatise* 593 (5th ed. 2010). “Failure to fulfill one of these

judicially prescribed requirements of a ‘concise general statement of basis and purpose’ has become the most frequent basis for judicial reversal of agency rules.” *Id.* Supplementing the statement of basis and purpose with a 360-page response to objections, which includes data not included in the Endangerment Finding and, in some cases, not even compiled prior to its publication, is a revision that violates this scheme when conducted without rights of notice and comment. In fact, procedurally and institutionally, an agency in the present context is incapable of knowing and deciding scientific matters in the absence of notice and comment, and simply permitting reconsideration petitions affords no substitute. *See Kennecott Corp. v. EPA*, 684 F.2d 1007, 1018-19 (D.C. Cir. 1982).

**D. The EPA’s Reasons for Relying on the IPCC Were Undermined by the Climategate Data Provided in the Reconsideration Petitions which Data Compel the Conclusion that the Endangerment Finding Fails to meet essential Information Quality Standards such that Reconsideration Is Required.**

The EPA Administrator sought to justify her reliance on the “assessment literature” by claiming that the agency carefully reviewed the processes by which this literature was prepared, confirming thereby that these processes met the standards to which the EPA is subject in preparing scientific findings. *Endangerment Finding*, 74 Fed. Reg. at 66,511-13; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), pp. 45-47 of

695. *EPA Response to Public Comments (RTC)* at 1-2 (based on its review of IPCC procedures, “EPA has determined that the approach taken provided the high level of transparency and consistency outlined by EPA’s” information quality requirements); J.A. Vol. VII, Doc. 1339079 (Oct. 31, 2011), at 253 of 395. Based on this review, the Administrator concluded that her reliance on this literature “is entirely reasonable and allows EPA to rely on the best available science.” *Endangerment Finding*, 74 Fed. Reg. at 66,511 (footnote omitted); J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 45 of 695. Of course, as the EPA Inspector General found, not only was this not so, but the Administrator, in making the Endangerment Finding, lacked access to the information necessary to evaluate the quality of the IPCC’s scientific conclusions, violated the agency’s own peer-review standards, and, by having no procedure for evaluating the circumstances in which it is appropriate to rely on outside data, comprehensively delegated her statutory duties to the IPCC and other outside groups. *See* Report of the EPA Inspector General, Data Quality Processes, Report 11-P-0702 (Sept. 26, 2011), <http://www.epa.gov/oig/reports/2011/20110926-11-P-0702.pdf>) (“Inspector General Report”).

As discussed in the previous section, even if IPCC’s scientific procedures had been of sterling quality, the Administrator still would have been required to exercise her own judgment on climate science, and this she did not do. In issuing the Endangerment Finding, the EPA failed to comply even with its own standards for evaluating externally

generated information, insufficient as the EPA Inspector General subsequently found them to be. Accordingly, it should come as no surprise that climategate revealed that the quality of IPCC's science was anything but sterling, and that there is a yawning gap between the way IPCC operated in reality compared with the way the EPA says it did based on its review of IPCC's written procedures. Indeed, by relying so heavily on the IPCC, the agency failed to observe basic information quality standards to which it is subject.

**1. The EPA failed to ensure that Endangerment Finding's information was "accurate, reliable and unbiased."**

The EPA is subject to rigorous data quality obligations under the Information Quality Act (IQA), Pub. L. No. 106-554, 114 Stat. 2763 (2000), and the EPA's IQA Guidelines, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency (IQA Guidelines)* (Oct. 2002), [http://www.epa.gov/QUALITY/informationguidelines/documents/EPA\\_InfoQualityGuidelines.pdf](http://www.epa.gov/QUALITY/informationguidelines/documents/EPA_InfoQualityGuidelines.pdf). Because the Endangerment Finding meets the EPA's definition of "influential information," information having "a clear and substantial impact (i.e., potential change or effect) on important public policies or private sector decisions," *id.* at 19, the Endangerment Finding is "subject to a higher degree of quality (for example, transparency about data and methods) than

[other] information.” *Id.* at 20. The substance of the information underlying the Endangerment Finding must be “accurate, reliable and unbiased,” requiring use of “the best available science and supporting studies conducted in accordance with sound and objective scientific practices, including, when available, peer reviewed science and supporting studies; and (ii) data collected by accepted methods or best available methods (if the reliability of the method and the nature of the decision justifies the use of the data).” *Id.* at 22.

As demonstrated in detail in the petitions for reconsideration, however, the IPCC reports frequently relied on unscientific “studies” that were prepared by advocacy groups such as the World Wildlife Fund (WWF), Greenpeace, and other similar organizations. This led, among other numerous examples, to the IPCC having to retract its embarrassing assertion, which was relied on in the *Endangerment Finding*, 74 Fed. Reg. at 66,523; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 57 of 695. *TSD*, J.A. Vol. VII, Doc. 1339079 (Oct. 31, 2011), p. 202 of 395; *RTC*, J.A. Vol. X, Doc. 1339079 (Oct. 31, 2011), p. 210 of 403, that Himalyan glaciers would melt by 2035, which turned out to be based on faulty information from an unpublished, unpeered review study by an advocacy organization. J.A. Vol. IX, Doc. 1339079 (Oct. 31, 2011), p. 448-51 of 649. The IPCC had been aware of the data problems in the study but had decided to rely on it anyway for public relations impact. The coordinating Lead Author of that section of the IPCC report, Dr. Murai Lai, has stated:

It related to several countries in this region and their water sources. *We thought that if we can highlight it, it will impact policy-makers and politicians and encourage them to take some concrete action.* It had importance for the region, so we thought we should put it in.

David Rose, “Glacier Scientist: I knew data hadn’t been verified,” UK Daily Mail (Jan. 24, 2010), <http://www.dailymail.co.uk/news/article-1245636/Glacier-scientists-says-knew-data-verified.html>.

This degree of goal-oriented “science” ought not, but can be expected to, inform decisions of momentous public policy import where an agency fails to follow its procedures, as the EPA did prior to the release of the Endangerment Finding TSD. *See* EPA Inspector General’s Report, *supra* at 28-29; *see also id.* at Executive Summary (reporting that the agency “did not meet all OMB requirements for peer review of a highly influential scientific assessment primarily because the review results and the EPA’s response were not publicly reported, and because 1 of the 12 reviewers was an EPA employee.”). What is more, while the EPA told the Inspector General that it engaged in ex post review in response to the petitions for reconsideration, *id.* at 29, the Inspector General found the agency’s procedures for reliance on outside entities to be inadequate and recommended that it “establish minimum review and documentation requirements for assessing and accepting data from other organizations.” *Id.*

## **2. The EPA's reliance on IPCC reports undermined the Public's right to comment.**

The EPA's reliance on the "assessment literature" rendered the public's right to comment meaningless. But ex ante the agency did not think that much of a public comment period was necessary at all. While recognizing the enormous complexity of climate science: "very wide range of risks and harms that need to be considered," *Endangerment Finding*, 74 Fed. Reg. at 66,509; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 43 of 695, the EPA limited the comment period to a mere 60 days based in part on the agency's (mistaken and irrelevant) view that the public had had an opportunity to comment previously. *Id.* at 66,503; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 37 of 695.

There was another defect with the comment process. The EPA time and again responded to public comments on a particular scientific point by saying that the "assessment literature" had reached a different conclusion. The fundamental purpose of the comment process, however, is to ensure that a "genuine interchange" is carried on between the agency and the public, where the agency makes available all the underlying studies and data and the public is able to provide "meaningful commentary." *Conn. Light & Power v. NRC*, 673 F.2d 525, 530-31 (D.C. Cir. 1982). No such interchange occurs when the Administrator dismisses public comments on the ground that a third party disagrees with them. Furthermore the EPA's reflexive citation to the "assessment literature," some of which was not part of the TSD, undermined the

substantive credibility of the agency's findings. *See Chamber of Commerce v. SEC*, 443 F.3d 890, 900 (D.C. Cir. 2006) (“By requiring the ‘most critical factual material’ used by the agency be subjected to informed comment, the APA provides a procedural device to ensure that agency regulations are tested through exposure to public comment . . .”).

Finally, in the Endangerment Finding, the EPA justified its use of third-party synthesis and assessment reports as “allow[ing] EPA to rely on the best available science.” 74 Fed. Reg. at 66,511; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 45 of 695. Now, however, the EPA argues that it was entitled to deny reconsideration in part because other institutions found “no evidence of scientific misconduct or intentional data manipulation” by the climate researchers on whom the IPCC had so extensively relied. *RTP*, 75 Fed. Reg. at 49,558; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 84 of 695. Informal reconsideration without notice or comment based on a “no evidence of scientific misconduct or intentional data manipulation” standard is nowhere authorized by the Clean Air Act.

### **3. The EPA's reliance on IPCC reports prevented public transparency.**

Under § 6.3 of the EPA's IQA Guidelines, the Endangerment Finding, as “Influential Information,” was required to have “a higher degree of transparency regarding (1) the source of the data used, (2) the various assumptions employed, (3) the analytic methods applied, and (4) the statistical procedures

employed.” *IQA Guidelines* at 21. Climategate revealed the hollowness of the EPA’s claim that IPCC met this same level of transparency, as key IPCC authors routinely relied on their own studies while simultaneously refusing to disclose to other scientists the data underlying those studies. The United Kingdom House of Commons Science and Technology report cited by the EPA in denying reconsideration found an “unacceptable” “culture of withholding information – from those perceived by CRU to be hostile to global warming.” Parliament of the United Kingdom – Science & Technology Comm., *The Disclosure of climate data from the Climatic Research Unit at the University of East Anglia: Conclusions & Recommendations* ¶13 (Mar. 31, 2010), <http://www.publications.parliament.uk/pa/cm200910/cmselect/cmstech/387/38709.htm>. Another review panel report cited by the EPA found “a consistent pattern of failing to display the proper degree of openness.” The Independent Climate Change E-mails Review: Findings § 1.3(15) (July 2010), <http://www.cce-review.org/pdf/FINAL%20REPORT.pdf>. As stated by the President of the National Academy of Sciences in commenting on climategate, “[f]ailure to make research data and related information accessible not only impedes science, it also breeds conflicts.” Ralph J. Cicerone, Editorial: Ensuring Integrity in Science, 327 *Science* 624 (2010), <http://www.nasonline.org/about-nas/leadership/president/cicerone-editorial-science.pdf>. It is also completely at odds with the “high” level of transparency demanded by the IQA Guidelines in order to ensure the high quality of the EPA’s science.

**E. In Issuing the Endangerment Finding and in Denying Rehearing, the EPA Impermissibly Delegated its Statutory Authority to Outside Entities.**

The EPA violated the CAA when it delegated its judgment to outside groups. Congress empowered the EPA Administrator to decide whether, “*in his judgment,*” pollutants emitted from motor vehicles endanger public health and welfare. 42 U.S.C. § 7521(a)(1) (emphasis added). But rather than independently assessing the data as required by the CAA, the EPA impermissibly delegated that responsibility to outside organizations.

By its own admission, the EPA placed “primary and significant weight on the[] assessment reports” of the IPCC, the NRC, and the USGCRP in making the endangerment finding. *Endangerment Finding*, 74 Fed. Reg. at 66,511; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 45 of 695. And rather than assessing the actual scientific data, these reports served as the EPA’s “primary scientific and technical basis” for its endangerment decision. *Id.* at 66,510; *see also* J.A. Vol. VII, TSD Executive Summary, Doc. 1339079 (Oct. 31, 2011), p. 34 of 395 (explaining that the document’s data and conclusions “are primarily drawn from the assessment reports of the Intergovernmental Panel on Climate Change (IPCC), the U.S. Climate Change Science Program (CCSP), the U.S. Global Change Research Program (USGCRP), and the National Research Council (NRC)”); *RTC* at Resp. 1-5 (“We did not develop new science to support the finding, but rather relied primarily on the conclusions of the

major assessment reports of USGCRP/CCSP, IPCC, and NRC and the evaluation of the public comments received.”); J.A. Vol. VII, Doc. 1339079 (Oct. 31, 2011), p. 256 of 394. However, to avoid an arbitrary decision, “the agency must examine the relevant data and articulate a satisfactory explanation for its action including a ‘rational connection between the facts found and the choice made.’” *Motor Vehicle Mfrs. Ass’n of the U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (emphasis added) (quoting *Burlington Truck Lines, Inc. v. United States*, 371 U.S. 156, 168 (1962)); see 42 U.S.C. § 7521(a)(1). The EPA failed to do so here.

Federal administrative agencies generally may not delegate their authority to outside parties. *U.S. Telecom Ass’n v. FCC*, 359 F.3d 554, 556 (D.C. Cir. 2004). An agency may look to outside groups for advice and policy recommendations, as the EPA did in proposed rulemakings, e.g., *Advance Notice of Proposed Rulemaking for Endangerment Finding*, 73 Fed. Reg. at 44,354 (July 30, 2008); J.A. Vol. I, Doc. 1339709 (Oct. 31, 2011), p. 122 of 695, but delegation is improper because “lines of accountability may blur, undermining an important democratic check on government decision-making.” *U.S. Telecom Ass’n*, 359 F.3d at 565-66, 568. Because outside sources do not necessarily “share the agency’s ‘national vision and perspective,’” the goals of the outside parties may be “inconsistent with those of the agency and the underlying statutory scheme.” *Id.* at 566 (quoting *Nat’l Park & Conservation Ass’n v. Stanton*, 54 F. Supp. 2d 7, 20 (D.D.C. 1999)).

The EPA's wrongful delegation in this case powerfully illustrates those dangers. The agency relied on the judgment of a number of outside groups, but the IPCC's Fourth Assessment Report was accorded special weight. See J.A. Vol. XI, Doc. 1339079 (Oct. 31, 2011), pp. 29 through 184 of 355. Not only did the EPA cite it more often than the others, but the USGCRP – another of EPA's major sources – also relied heavily on the IPCC Report for its “own” findings. See *Endangerment Finding*, 74 Fed. Reg. at 66,511 (noting that the “USGCRP incorporates a number of key findings from the [IPCC Report]” including “the attribution of observed climate change to human emissions of greenhouse gases, and the future projected scenarios of climate change for the global and regional scales”); J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), p. 45 of 695. Despite the serious deficiencies of the IPCC process demonstrated in the reconsideration petitions and the fact that scientific data underlying the assessments is not in the administrative record, in violation of the CAA, see 42 U.S.C. § 7607(d)(3) (“All data, information, and documents . . . on which the proposed rule relies shall be included” in the rulemaking docket “on the date of publication of the proposed rule”), the EPA used the same assessments again to unilaterally reject reconsideration without notice or comment. 75 Fed. Reg. at 49,565-66; J.A. Vol. I, Doc. 1339079 (Oct. 31, 2011), pp. 91-92 of 695; see *Nat'l Welfare Rights Org. v. Mathews*, 533 F.2d 637, 648 (D.C. Cir. 1976) (explaining that “judicial review is meaningless where the administrative record is insufficient to determine

whether the action is arbitrary and capricious”). In sum, the EPA’s delegation of its statutory duties was unreasonable and illegal.



**CONCLUSION**

Wherefore the petition should be granted and the Endangerment Finding reversed and remanded for further proceeding in accordance with law, including rehearing with rights of notice and comment.

Respectfully submitted,

KENNETH T. CUCCINELLI, II Attorney General of Virginia	PATRICIA L. WEST Chief Deputy Attorney General
E. DUNCAN GETCHELL, JR. Solicitor General of Virginia dgetchell@oag.state.va.us <i>Counsel of Record</i>	WESLEY G. RUSSELL, JR. Deputy Attorney General
MICHAEL H. BRADY Assistant Solicitor General	OFFICE OF THE ATTORNEY GENERAL 900 East Main Street Richmond, Virginia 23219 Telephone: (804) 786-7240 Facsimile: (804) 371-0200
March 20, 2013	<i>Counsel for the Commonwealth of Virginia</i>

**APPENDIX**

App. 1

684 F.3d 102

United States Court of Appeals,  
District of Columbia Circuit.  
COALITION FOR RESPONSIBLE  
REGULATION, INC., et al., Petitioners

v.

ENVIRONMENTAL PROTECTION AGENCY,  
Respondent  
State of Michigan, et al., Intervenors.  
Coalition for Responsible Regulation, Inc., et al.,  
Petitioners

v.

Environmental Protection Agency, Respondent  
American Frozen Food Institute, et al., Intervenors.  
Coalition for Responsible Regulation, Inc., et al.,  
Petitioners

v.

Environmental Protection Agency, Respondent  
Langboard, Inc. – MDF, et al., Intervenors.  
American Chemistry Council, Petitioner

v.

Environmental Protection Agency and Lisa Perez  
Jackson, Administrator, U.S. Environmental  
Protection Agency, Respondents  
Chamber of Commerce of the United States of  
America, et al., Intervenors.

Nos. 09-1322, 10-1024, 10-1025, 10-1026, 10-  
1030, 10-1035, 10-1036, 10-1037, 10-1038, 10-1039,  
10-1040, 10-1041, 10-1042, 10-1044, 10-1045, 10-  
1046, 10-1234, 10-1235, 10-1239, 10-1245, 10-1281,

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10-1310, 10-1318, 10-1319, 10-1320, 10-1321, 10-1073, 10-1083, 10-1099, 10-1109, 10-1110, 10-1114, 10-1118, 10-1119, 10-1120, 10-1122, 10-1123, 10-1124, 10-1125, 10-1126, 10-1127, 10-1128, 10-1129, 10-1131, 10-1132, 10-1145, 10-1147, 10-1148, 10-1199, 10-1200, 10-1201, 10-1202, 10-1203, 10-1206, 10-1207, 10-1208, 10-1210, 10-1211, 10-1212, 10-1213, 10-1216, 10-1218, 10-1219, 10-1220, 10-1221, 10-1222, 10-1092, 10-1094, 10-1134, 10-1143, 10-1144, 10-1152, 10-1156, 10-1158, 10-1159, 10-1160, 10-1161, 10-1162, 10-1163, 10-1164, 10-1166, 10-1182, 10-1167, 10-1168, 10-1169, 10-1170, 10-1173, 10-1174, 10-1175, 10-1176, 10-1177, 10-1178, 10-1179, 10-1180.

Argued Feb. 28 and 29, 2012.

Decided June 26, 2012.

On Petitions for Review of Final Actions of the Environmental Protection Agency. Patrick R. Day, Harry W. MacDougald, and Jeffrey Bossert Clark argued the causes for Non-State Petitioners and Supporting Intervenors. With them on the briefs were John J. Burns, Attorney General, Office of the Attorney General of the State of Alaska, Steven E. Mulder, Chief Assistant Attorney General, Peter Glaser, Mark E. Nagle, Matthew Dukes, Paul D. Phillips, John A. Bryson, Ellen Steen, Eric Groten, John P. Elwood, James A. Holtkamp, Chet M. Thompson, Robin S. Conrad, Rachel L. Brand, Sheldon Gilbert, Quentin Riegel, Jeffrey A. Rosen, Robert R. Gasaway, William H. Burgess, Sam Kazman, Hans Bader, Matthew G. Paulson, Harry Moy Ng, Michele Marie Schoeppe, Michael R. Barr,

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Alexandra M. Walsh, Adam J. White, Jeffrey A. Lamken, Timothy K. Webster, Roger R. Martella, Neal J. Cabral, Theodore Hadzi-Antich, Ashley C. Parrish, Cynthia A.M. Stroman, Scott C. Oostdyk, Gordon R. Alphonso, Shannon L. Goessling, Edward A. Kazmarek, F. William Brownell, Norman W. Fichthorn, Henry V. Nickel, and Allison D. Wood. Paul D. Clement, Mark W. DeLaquil, Andrew M. Grossman, and David B. Rivin, Jr. entered appearances.

E. Duncan Getchell, Jr., Solicitor General, Office of the Attorney General for the Commonwealth of Virginia, argued the cause for State Petitioners Texas and Virginia on Denial of Reconsideration of the Endangerment Finding and State Petitioners and Supporting Intervenors on Endangerment Finding Delegation Issues. With him on the briefs were Kenneth T. Cuccinelli, II, Attorney General, Stephen R. McCullough, Senior Appellate Counsel, Charles E. James Jr., Chief Deputy Attorney General, and Wesley G. Russell, Jr., Deputy Attorney General.

Greg Abbott, Attorney General, Office of the Attorney General for the State of Texas, Bill Cobb, Deputy Attorney General for Civil Litigation, J. Reed Clay, Jr., Special Assistant and Senior Counsel to the Attorney General, Jonathan F. Mitchell, Solicitor General, Michael P. Murphy, Assistant Solicitor General, Luther Strange III, Attorney General, Office of the Attorney General for the State of Alabama, Pamela Jo Bondi, Attorney General, Office of the Attorney General for the State of Florida, Gregory F.

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Zoeller, Attorney General, Office of the Attorney General for the State of Indiana, Jack Conway, Attorney General, Office of the Attorney General for the Commonwealth of Kentucky, James D. "Buddy" Caldwell, Attorney General, Office of the Attorney General for the State of Louisiana, Bill Schuette, Attorney General, Office of the Attorney General for the State of Michigan, John J. Bursch, Solicitor General, Neil D. Gordon, Assistant Attorney General, Gary C. Rikard, Jon Bruning, Attorney General, Office of the Attorney General for the State of Nebraska, Katherine J. Spohn, Special Counsel to the Attorney General, Wayne Stenehjem, Attorney General, Office of the Attorney General for the State of North Dakota, Margaret Olson, Assistant Attorney General, Scott Pruitt, Attorney General, Office of the Attorney General for the State of Oklahoma, Alan Wilson, Attorney General, Office of the Attorney General for the State of South Carolina, Marty Jackley, Attorney General, Office of the Attorney General for the States of South Dakota, Roxanne Giedd, Chief, Civil Litigation Division, Mark L. Shurtleff, Attorney General, Office of the Attorney General for the State of Utah, and Kenneth T. Cuccinelli, II, Attorney General, Office of the Attorney General for the Commonwealth of Virginia were on the briefs for State Petitioners and Supporting Intervenors. Robert D. Tambling, Assistant Attorney General, Office of the Attorney General for the State of Alabama, entered an appearance.

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Christian J. Ward, Scott A. Keller, and April L. Farris were on the brief for amici curiae Scientists in support of Petitioners.

Derek Schmidt, Attorney General, Office of the Attorney General for the State of Kansas, and John Campbell, Chief Deputy Attorney General, were on the brief for amicus curiae State of Kansas in support of Petitioners.

Martin R. Levin, Michael J. O'Neill, Donald M. Falk, Mark S. Kaufman, Steven J. Lechner, and Richard P. Hutchison were on the brief for amici curiae Landmark Legal Foundation, et al. in support of Petitioners.

Jon M. Lipshultz and Angeline Purdy, Attorneys, U.S. Department of Justice, argued the causes for respondent. With them on the brief were John Hannon, Carol Holmes, and Steven Silverman, U.S. Environmental Protection Agency, Attorneys. Thomas A. Lorenzen, Attorney, U.S. Department of Justice, entered an appearance.

Carol Iancu, Assistant Attorney General, Office of the Attorney General for the Commonwealth of Massachusetts, argued the cause for State and Environmental Intervenors in support of respondents. With her on the briefs were Martha Coakley, Attorney General, William L. Pardee, Attorney Assistant General, Sean H. Donahue, Howard I. Fox, David S. Baron, Megan Ceronsky, Vickie L. Patton, Peter Zalzal, Kamala D. Harris, Attorney General, Office of the Attorney General for

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the State of California, Kathleen A. Kenealy, Senior Assistant Attorney General, Marc N. Melnick and Nicholas Stern, Deputy Attorneys General, Joseph R. Biden, III, Attorney General, Office of the Attorney General for the State of Delaware, Valerie M. Satterfield, Deputy Attorney General, George Jepsen, Attorney General, Office of the Attorney General for the State of Connecticut, Kimberly P. Massicotte, Matthew I. Levine, Scott N. Koschwitz, Assistant Attorneys General, Lisa Madigan, Attorney General, Office of the Attorney General for the State of Illinois, Gerald T. Karr, Assistant Attorney General, Thomas J. Miller, Attorney General, Office of the Attorney General for the State of Iowa, David R. Sheridan, Assistant Attorney General, Douglas F. Gansler, Attorney General, Office of the Attorney General for the State of Maryland, Mary E. Raivel, Assistant Attorney General, Michael A. Delaney, Attorney General, Office of the Attorney General for the State of New Hampshire, K. Allen Brooks, Senior Assistant Attorney General, William J. Schneider, Attorney General, Office of the Attorney General for the State of Maine, Gerald D. Reid, Assistant Attorney General, Lori Swanson, Attorney General, Office of the Attorney General for the State of Minnesota, Jocelyn F. Olson, Assistant Attorney General, Gary K. King, Attorney General, Office of the Attorney General for the State of New Mexico, Stephen R. Farris, Assistant Attorney General, Eric T. Schneiderman, Attorney General, Office of the Attorney General for the State of New York, Michael J. Myers and Yueh-Ru Chu, Assistant Attorneys General, John Kroger, Attorney

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General, Office of the Attorney General for the State of Oregon, Paul Logan, Assistant Attorney-in-Charge, Robert M. McKenna, Attorney General, Office of the Attorney General for the State of Washington, Leslie R. Seffern, Assistant Attorney General, Peter F. Kilmartin, Attorney General, Office of the Attorney General for the State of Rhode Island, Gregory S. Schultz, Special Assistant Attorney General, William H. Sorrell, Attorney General, Office of the Attorney General for the State of Vermont, Thea J. Schwartz, Assistant Attorney General, Christopher King, Assistant Corporation Counsel, Corporation Counsel for the City Of New York, Ann B. Weeks, Helen D. Silver, David Doniger, Meleah Geertsma, Morgan Butler, Frank W. Rambo, Joseph Mendelson III, Craig Holt Segall, and Joanne Spalding.

Deborah Sivas, Douglas A. Ruley, Edward Lloyd, and Susan J. Kraham were on the brief for amici curiae America's Great Waters Coalition, et al. in support of respondent. James K. Thornton entered an appearance.

Jonathan F. Mitchell, Solicitor General, Office of the Attorney General for the State of Texas, argued the cause for State Petitioners and Supporting Intervenor. With him on the briefs were Gregg Abbott, Attorney General, Bill Cobb, Deputy Attorney General, J. Reed Clay, Jr., Special Assistant and Senior Counsel to the Attorney General, Michael P. Murphy and James P. Sullivan, Assistant Solicitors General, Luther Strange, Attorney General, Office of the Attorney General for the State of Alabama,

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Herman Robinson, Donald Trahan, Kathy M. Wright, Gary C. Rikard, John Bruning, Attorney General, Office of the Attorney General for the State of Nebraska, Katherine J. Spohn, Special Counsel, Wayne Stenehjem, Attorney General, Office of the Attorney General for the State of North Dakota, Margaret Olson, Assistant Attorney General, Alan Wilson, Attorney General, Office of the Attorney General for the State of South Carolina, J. Emory Smith, Jr., Assistant Deputy Attorney General, Marty Jackley, Attorney General, Office of the Attorney General for the State of South Dakota, Roxanne Giedd, Chief, and Kenneth T. Cuccinelli, II, Attorney General, Office of the Attorney General for the Commonwealth of Virginia. Mark W. DeLaquil, Earle D. Getchell, Jr., Assistant Attorney General, Office of the Attorney General for the Commonwealth of Virginia, Andrew M. Grossman, David B. Rivkin, Jr., and Robert D. Tambling, Assistant Attorney General, Office of the Attorney General for the State of Alabama, entered appearances.

F. William Brownell and Peter Keisler argued the causes for Non-State Petitioners and Supporting Intervenors. With them on the briefs were Norman W. Fichthorn, Henry V. Nickel, Allison D. Wood, Charles H. Knauss, Shannon S. Broome, Timothy K. Webster, Roger R. Martella, Eric Groten, Patrick R. Day, John A. Bryson, Matthew G. Paulson, John P. Elwood, Paul D. Phillips, James A. Holtkamp, Shannon L. Goessling, Harry W. MacDougald, William H. Lewis, Jr., Ronald J. Tenpas, Gordon R. Alphonso, Edward A.

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Kazmarek, Chet M. Thompson, Neal J. Cabral, Scott C. Oostdyk, Richard P. Hutchison, John J. McMackin, Jr., Robin S. Conrad, Sheldon Gilbert, Michael W. Steinberg, Levi McAllister, Jeffrey A. Rosen, Robert R. Gasaway, Jeffrey Bossert Clark, William H. Burgess, Ashley C. Parrish, Cynthia A.M. Stroman, Ellen Steen, Leslie Sue Ritts, Peter Glaser, Mark E. Nagle, Terry J. Satterlee, Thomas J. Grever, Margaret Claiborne Campbell, Bryon W. Kirkpatrick, Quentin Riegel, Elizabeth Gaudio, Elizabeth Henry Warner, Harry Moy Ng, Michele Marie Schoeppe, Thomas J. Ward, and Peter H. Wyckoff. Mark A. Behrens, Paul D. Clement, Matthew Dukes, Virginia L. Hudson, and David B. Salmons entered appearances.

Jonathan S. Massey was on the brief for amicus curiae Municipal Gas Commission of Missouri.

John G. Horne, II, Samuel B. Boxerman and Leslie A. Hulse were on the brief for amici curiae the Commonwealth of Kentucky and the American Chemistry Council in support of petitioners. Angus Macbeth entered an appearance.

Amanda Shafer Berman and Perry M. Rosen, Attorneys, U.S. Department of Justice, argued the causes for respondents. With them on the briefs were Howard Hoffman, Elliott Zenick, Brian Doster, and David Orlin, Counsel, U.S. Environmental Protection Agency. Thomas A. Lorenzen and Kim N. Smaczniak, Attorneys, U.S. Department of Justice, and John D. Gunter, II and Michele L. Walter, Counsel, U.S.

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Environmental Protection Agency, entered appearances.

Sean H. Donahue and Michael J. Myers argued the causes for State and Environmental Intervenors in support of respondents. With them on the briefs were Vickie L. Patton, Pamela A. Campos, Megan Ceronsky, Petere Zalzal, Eric T. Schneiderman, Attorney General, Office of the Attorney General for the State of New York, Barbara D. Underwood, Solicitor General, Morgan A. Costello, Assistant Attorney General, Monica Wagner, Howard I. Fox, David S. Baron, Lisa Madigan, Attorney General, Office of the Attorney General for the State of Illinois, Gerald T. Karr, Assistant Attorney General, Joanne Spalding, Nathan Matthews, Craig Holt Segall, Kamala D. Harris, Attorney General, Office of the Attorney General for the State of California, Kathleen A. Kenealy, Senior Assistant Attorney General, Susan Durbin, Raissa Lerner, Marc N. Melnick, and Nicholas Stern, Deputy Attorneys General, Martha Coakley, Attorney General, Office of the Attorney General for the Commonwealth of Massachusetts, William L. Pardee and Carol Iancu, Assistant Attorneys General, David Doniger, Meleah Geertsma, William J. Schneider, Attorney General, Office of the Attorney General for the State of Maine, Gerald D. Ried, Assistant Attorney General, Ann B. Weeks, Helen D. Silver, Thomas J. Miller, Attorney General, Office of the Attorney General for the State of Iowa, David R. Sheridan, Assistant Attorney General, Douglas F. Gansler, Attorney General, Office

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of the Attorney General for the State of Maryland, Mary Raivel, Deputy Attorney General, Michael A. Delaney, Attorney General, Office of the Attorney General for the State of New Hampshire, K. Allen Brooks, Senior Assistant Attorney General, Barbara Baird, William B. Wong, Peter F. Kilmartin, Attorney General, Office of the Attorney General for the State of Rhode Island, Gregory S. Schultz, Special Assistant Attorney General, Frank Rambo, Morgan Butler, Gary K. King, Attorney General, Office of the Attorney General for the State of New Mexico, Stephen Farris, Assistant Attorney General, John Kroger, Attorney General, Office of the Attorney General for the State of Oregon, Paul Logan, Assistant Attorney-in-Charge, Roy Cooper, Attorney General, Office of the Attorney General for the State of North Carolina, and J. Allen Jernigan and Marc Bernstein, Special Deputy Attorneys General. Kenneth P. Alex and Gavin G. McCabe, Deputy Assistant Attorneys General, Office of the Attorney General for the State of California, entered appearances.

Peter Glaser argued the cause for petitioners. With him on the briefs were John P. Elwood, Eric Groten, Patrick R. Day, John A. Bryson, Shannon L. Goessling, Harry W. MacDougald, Paul D. Phillips, James A. Holtkamp, Edward A. Kazmarek, Chet M. Thompson, Sam Kazman, Hans Bader, Gordon R. Alphonso, Richard P. Hutchison, Neal J. Cabral, Scott C. Oostdyk, Ronald J. Tenpas, Michael W. Steinberg, Levi McAllister, John J. McMackin Jr., Robin S.

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Conrad, Rachel L. Brand, Sheldon Gilbert, F. William Brownell, Norman W. Fichthorn, Henry V. Nickel, Allison D. Wood, Ashley C. Parrish, Cynthia A.M. Stroman, Mark E. Nagle, Michael Higgins, Ellen Steen, Timothy K. Webster, Roger R. Martella, Matthew G. Paulson, Charles H. Knauss, Shannon S. Broome, Quentin Riegel, Elizabeth Gaudio, Thomas J. Ward, Harry Moy Ng, and Michele Marie Schoeppe.

Greg Abbott, Attorney General, Office of the Attorney General for the State of Texas, Bill Cobb, Deputy Attorney General for Civil Litigation, Jonathan F. Mitchell, Solicitor General, J. Reed Clay Jr., Special Assistant and Senior Counsel to the Attorney General, Michael P. Murphy, Assistant Solicitor General, Luther Strange, Attorney General, Office of the Attorney General for the State of Alabama, Samuel S. Olens, Attorney General, Office of the Attorney General for the State of Georgia, John E. Hennelly, Senior Assistant Attorney General, Gary C. Rikard, Jon C. Bruning, Attorney General, Office of the Attorney General for the State of Nebraska, Katherine J. Spohn, Special Counsel to the Attorney General, Wayne K. Stenehjem, Attorney General, Office of the Attorney General for the State of North Dakota, Margaret Olson, Assistant Attorney General, Alan Wilson, Attorney General, Office of the Attorney General for the State of South Carolina, J. Emory Smith, Jr., Assistant Deputy Attorney General, Marty Jackley, Attorney General, Office of the Attorney General for the State of North Dakota, Roxanne Giedd, Chief, Civil Litigation Division, and Kenneth

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T. Cuccinelli, II, Attorney General, Office of the Attorney General for the Commonwealth of Virginia, were on the briefs for State Petitioners and Supporting Intervenor. Paul D. Clement, James W. Coleman, Wayne J. D'Angelo, Mark W. DeLaquil, E. Duncan Getchell Jr., Solicitor General, Office of the Attorney General for the Commonwealth of Virginia, Andrew M. Grossman, Virginia L. Hudson, David B. Rivkin Jr., and Robert D. Tambling, Assistant Attorney General, Office of the Attorney General for the State of Alabama, entered appearances.

Samuel B. Boxerman and Leslie A. Hulse were on the brief for amicus curiae American Chemistry Council in support of petitioners. Angus Macbeth entered an appearance.

Eric G. Hostetler, Attorney, U.S. Department of Justice, argued the cause for respondents. With him on the brief were John Hannon and Steven Silverman, Attorneys, U.S. Environmental Protection Agency.

Raymond B. Ludwiszewski argued the cause for intervenors Association of Global Automakers, et al. With him on the brief were Kathleen M. Sullivan, Sanford I. Weisburst, and William B. Adams.

Gavin G. McCabe, Deputy Attorney General, Office of the Attorney General for the State of California, argued the cause for intervenor State of California. On the brief were Kamala D. Harris, Attorney General, Kathleen A. Kenealy, Senior Assistant Attorney General, Marc N. Melnick and Nicholas

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Stern, Deputy Attorneys General, Sean H. Donahue, Howard I. Fox, David S. Baron, Pamela Campos, Megan Ceronsky, Vickie L. Patton, Peter Zalzal, Joseph R. Biden, III, Attorney General, Office of the Attorney General for the State of Delaware, Valerie M. Satterfield, Deputy Attorney General, Thomas J. Miller, Attorney General, Office of the Attorney General for the State of Iowa, David R. Sheridan, Assistant Attorney General, Douglas F. Gansler, Attorney General, Office of the Attorney General for the State of Maryland, Roberta R. James, Assistant Attorney General, Lisa Madigan, Attorney General, Office of the Attorney General for the State of Illinois, Gerald T. Karr, Assistant Attorney General, William T. Schneider, Attorney General, Office of the Attorney General for the State of Maine, Gerald D. Reid, Assistant Attorney General, Martha Coakley, Attorney General, Office of the Attorney General for the Commonwealth of Massachusetts, Carol Iancu, Tracy Triplett, and William L. Pardee, Assistant Attorneys General, Gary K. King, Attorney General, Office of the Attorney General for the State of New Mexico, Stephen R. Farris, Assistant Attorney General, John Kroger, Attorney General, Office of the Attorney General for the State of Oregon, Paul Logan, Assistant Attorney-in-Charge, William H. Sorrell, Attorney General, Office of the Attorney General for the State of Vermont, Thea J. Schwartz, Assistant Attorney General, Eric T. Schneiderman, Attorney General, Office of the Attorney General for the State of New York, Michael J. Myers and Yueh-Ru Chu, Assistant Attorneys General, Peter F. Kilmartin,

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Attorney General, Office of the Attorney General for the State of Rhode Island, Gregory S. Schultz, Special Assistant Attorney General, Robert M. McKenna, Attorney General, Office of the Attorney General for the State of Washington, Leslie R. Seffern, Assistant Attorney General, Christopher King, Assistant Corporation Counsel, Corporation Counsel for the City of New York, Joanne Spalding, Craig Holt Segall, David Doniger and Meleah Geertsma. Judith A. Stahl Moore, Assistant Attorney General, Office of the Attorney General for the State of New Mexico, and John D. Walke entered appearances.

Richard E. Ayres, Jessica L. Olson, and Kristin L. Hines were on the brief for amicus curiae Honeywell International, Inc. in support of respondents.

Richard L. Revesz, Michael A. Livermore, and Jennifer S. Rosenberg were on the brief for amicus curiae Institute for Policy Integrity at New York University School of Law in support of respondents.

Timothy K. Webster, Roger R. Martella, Jr., James W. Coleman, William H. Lewis, Jr., Ronald J. Tenpas, Charles H. Knauss, Shannon S. Broome, Bryan M. Killian, and Matthew G. Paulson were on the briefs for petitioners. Peter D. Keisler, Leslie A. Hulse, and Quentin Riegel entered appearances.

Amanda Shafer Berman and Perry M. Rosen, Attorneys, U.S. Department of Justice, and Elliott Zenick and Howard J. Hoffman, Counsel, U.S. Environmental Protection Agency, were on the brief for respondents. Jon M. Lipshultz, Senior Counsel,

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U.S. Department of Justice, entered and [sic] appearance.

Ann Brewster Weeks, Sean H. Donahue, Vickie Patton, Peter Zalzal, Joanne Spalding, Craig Segall, David Doniger, and Meleah Geertsma were on the brief of intervenors in support of respondents. David S. Baron, Pamela A. Campos, Colin C. O'Brien, and John D. Walke entered appearances.

Vera P. Pardee, Brendan R. Cummings, and Kevin P. Bundy were on the brief for amicus curiae Center for Biological Diversity in support of respondents.

Before: SENTELLE, Chief Judge; ROGERS and TATEL, Circuit Judges.

Opinion for the Court filed PER CURIAM.

PER CURIAM:

Following the Supreme Court's decision in *Massachusetts v. EPA*, 549 U.S. 497, 127 S.Ct. 1438, 167 L.Ed.2d 248 (2007) – which clarified that greenhouse gases are an “air pollutant” subject to regulation under the Clean Air Act (CAA) – the Environmental Protection Agency promulgated a series of greenhouse gas-related rules. First, EPA issued an Endangerment Finding, in which it determined that greenhouse gases may “reasonably be anticipated to endanger public health or welfare.” *See* 42 U.S.C. § 7521(a)(1). Next, it issued the Tailpipe Rule, which set emission standards for cars and light trucks. Finally, EPA determined that the CAA requires major stationary sources of greenhouse

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gases to obtain construction and operating permits. But because immediate regulation of all such sources would result in overwhelming permitting burdens on permitting authorities and sources, EPA issued the Timing and Tailoring Rules, in which it determined that only the largest stationary sources would initially be subject to permitting requirements.

Petitioners, various states and industry groups, challenge all these rules, arguing that they are based on improper constructions of the CAA and are otherwise arbitrary and capricious. But for the reasons set forth below, we conclude: 1) the Endangerment Finding and Tailpipe Rule are neither arbitrary nor capricious; 2) EPA's interpretation of the governing CAA provisions is unambiguously correct; and 3) no petitioner has standing to challenge the Timing and Tailoring Rules. We thus dismiss for lack of jurisdiction all petitions for review of the Timing and Tailoring Rules, and deny the remainder of the petitions.

**I.**

We begin with a brief primer on greenhouse gases. As their name suggests, when released into the atmosphere, these gases act “like the ceiling of a greenhouse, trapping solar energy and retarding the escape of reflected heat.” *Massachusetts v. EPA*, 549 U.S. at 505, 127 S.Ct. 1438. A wide variety of modern human activities result in greenhouse gas emissions; cars, power plants, and industrial sites all release

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significant amounts of these heat-trapping gases. In recent decades “[a] well-documented rise in global temperatures has coincided with a significant increase in the concentration of [greenhouse gases] in the atmosphere.” *Id.* at 504-05, 127 S.Ct. 1438. Many scientists believe that mankind’s greenhouse gas emissions are driving this climate change. These scientists predict that global climate change will cause a host of deleterious consequences, including drought, increasingly severe weather events, and rising sea levels.

The genesis of this litigation came in 2007, when the Supreme Court held in *Massachusetts v. EPA* that greenhouse gases “unambiguous[ly]” may be regulated as an “air pollutant” under the Clean Air Act (“CAA”). *Id.* at 529, 127 S.Ct. 1438. Squarely rejecting the contention – then advanced by EPA – that “greenhouse gases cannot be ‘air pollutants’ within the meaning of the Act,” *id.* at 513, 127 S.Ct. 1438, the Court held that the CAA’s definition of “air pollutant” “embraces *all* airborne compounds of whatever stripe.” *Id.* at 529, 127 S.Ct. 1438 (emphasis added). Moreover, because the CAA requires EPA to establish motor-vehicle emission standards for “*any* air pollutant . . . which may reasonably be anticipated to endanger public health or welfare,” 42 U.S.C. § 7521(a)(1) (emphasis added), the Court held that EPA had a “statutory obligation” to regulate harmful greenhouse gases. *Id.* at 534, 127 S.Ct. 1438. “Under the clear terms of the Clean Air Act,” the Court concluded, “EPA can avoid taking further action only

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if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.” *Id.* at 533, 127 S.Ct. 1438. The Court thus directed EPA to determine “whether sufficient information exists to make an endangerment finding” for greenhouse gases. *Id.* at 534, 127 S.Ct. 1438.

*Massachusetts v. EPA* spurred a cascading series of greenhouse gas-related rules and regulations. First, in direct response to the Supreme Court’s directive, EPA issued an Endangerment Finding for greenhouse gases. *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* (“Endangerment Finding”), 74 Fed. Reg. 66,496 (Dec. 15, 2009). The Endangerment Finding defined as a single “air pollutant” an “aggregate group of six long-lived and directly-emitted greenhouse gases” that are “well mixed” together in the atmosphere and cause global climate change: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. *Id.* at 66,536-37. Following “common practice,” EPA measured the impact of these gases on a “carbon dioxide equivalent basis,” (CO<sub>2</sub>e) which is based on the gases’ “warming effect relative to carbon dioxide . . . over a specified timeframe.” *Id.* at 66,519. (Using the carbon dioxide equivalent equation, for example, a mixture of X amount of nitrous oxide and Y amount of sulfur hexafluoride is expressed as Z amount of CO<sub>2</sub>e). After compiling and

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considering a considerable body of scientific evidence, EPA concluded that motor-vehicle emissions of these six well-mixed gases “contribute to the total greenhouse gas air pollution, and thus to the climate change problem, which is reasonably anticipated to endanger public health and welfare.” *Id.* at 66,499.

Next, and pursuant to the CAA’s requirement that EPA establish motor-vehicle emission standards for “any air pollutant . . . which may reasonably be anticipated to endanger public health or welfare,” 42 U.S.C. § 7521(a)(1), the agency promulgated its Tailpipe Rule for greenhouse gases. *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule* (“Tailpipe Rule”), 75 Fed. Reg. 25,324 (May 7, 2010). Effective January 2, 2011, the Tailpipe Rule set greenhouse gas emission standards for cars and light trucks as part of a joint rulemaking with fuel economy standards issued by the National Highway Traffic Safety Administration (NHTSA). *Id.* at 25,326.

Under EPA’s longstanding interpretation of the CAA, the Tailpipe Rule automatically triggered regulation of stationary greenhouse gas emitters under two separate sections of the Act. The first, the Prevention of Significant Deterioration of Air Quality (PSD) program, requires state-issued construction permits for certain types of stationary sources – for example, iron and steel mill plants – if they have the potential to emit over 100 tons per year (tpy) of “any air pollutant.” *See* 42 U.S.C. §§ 7475; 7479(1). All other stationary sources are subject to PSD

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permitting if they have the potential to emit over 250 tpy of “any air pollutant.” *Id.* § 7479(1). The second provision, Title V, requires state-issued operating permits for stationary sources that have the potential to emit at least 100 tpy of “any air pollutant.” *Id.* § 7602(j). EPA has long interpreted the phrase “any air pollutant” in both these provisions to mean any air pollutant that is regulated under the CAA. *See Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans* (“1980 Implementation Plan Requirements”), 45 Fed. Reg. 52,676, 52,711 (Aug. 7, 1980) (PSD program); *Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule* (“Tailoring Rule”), 75 Fed. Reg. 31,514, 31,553-54 (June 3, 2010) (discussing history of Title V regulation and applicability). And once the Tailpipe Rule set motor-vehicle emission standards for greenhouse gases, they became a regulated pollutant under the Act, requiring PSD and Title V greenhouse permitting.

Acting pursuant to this longstanding interpretation of the PSD and Title V programs, EPA issued two rules phasing in stationary source greenhouse gas regulation. First, in the Timing Rule, EPA concluded that an air pollutant becomes “subject to regulation” under the Clean Air Act – and thus subject to PSD and Title V permitting – only once a regulation requiring control of that pollutant takes effect. *Reconsideration of Interpretation of Regulations That Determine Pollutants Covered by*

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*Clean Air Act Permitting Programs* (“Timing Rule”), 75 Fed. Reg. 17,004 (Apr. 2, 2010). Therefore, EPA concluded, major stationary emitters of greenhouse gases would be subject to PSD and Title V permitting regulations on January 2, 2011 – the date on which the Tailpipe Rule became effective, and thus, the date when greenhouse gases first became regulated under the CAA. *Id.* at 17,019.

Next, EPA promulgated the Tailoring Rule. In the Tailoring Rule, EPA noted that greenhouse gases are emitted in far greater volumes than other pollutants. Indeed, millions of industrial, residential, and commercial sources exceed the 100/250 tpy statutory emissions threshold for CO<sub>2</sub>e. Tailoring Rule, 75 Fed. Reg. at 31,534-36. Immediately adding these sources to the PSD and Title V programs would, EPA predicted, result in tremendous costs to industry and state permitting authorities. *See id.* As a result, EPA announced that it was “relieving overwhelming permitting burdens that would, in the absence of this rule, fall on permitting authorities and sources.” *Id.* at 31,516. Departing from the CAA’s 100/250 tpy emissions threshold, the Tailoring Rule provided that only the largest sources – those exceeding 75,000 or 100,000 tpy CO<sub>2</sub>e, depending on the program and project – would initially be subject to greenhouse gas permitting. *Id.* at 31,523. (The Tailoring Rule further provided that regulated sources must also emit greenhouse gases at levels that exceed the 100/250 tpy emissions threshold on a *mass* basis. That is, they must emit over 100/250 tpy of actual pollutants, in

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addition to exceeding the 75,000/100,000 tpy carbon dioxide equivalent. *Id.* at 31,523.)

A number of groups – including states and regulated industries – filed petitions for review of EPA’s greenhouse gas regulations, contending that the agency misconstrued the CAA and otherwise acted arbitrarily and capriciously. This appeal consolidates the petitions for review of the four aforementioned rules: the Endangerment Finding, the Tailpipe Rule, the Timing Rule, and the Tailoring Rule.

“The Clean Air Act empowers us to reverse the Administrator’s action in rulemaking if it is ‘arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law.’” *Med. Waste Inst. & Energy Recovery Council v. EPA*, 645 F.3d 420, 424 (D.C.Cir.2011) (quoting 42 U.S.C. § 7607(d)(9)(A)). Questions of statutory interpretation are governed by the familiar *Chevron* two-step: “First . . . if the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.” *Chevron, U.S.A. Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 842-43, 104 S.Ct. 2778, 81 L.Ed.2d 694 (1984). But “if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency’s answer is based on a permissible construction of the statute.” *Id.* at 843, 104 S.Ct. 2778.

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This opinion proceeds in several steps. Part II explains why the Endangerment Finding was neither arbitrary nor capricious, while Part III does the same for the Tailpipe Rule. Turning to stationary source regulation, Part IV examines whether any petitioners may timely challenge EPA's longstanding interpretation of the PSD statute. Because we conclude that they may, Part V addresses the merits of their statutory arguments, and explains why EPA's interpretation of the CAA was compelled by the statute. Next, Part VI explains why petitioners lack standing to challenge the Timing and Tailoring Rules themselves. Finally, Part VII disposes of several arguments that have nothing to do with the rules under review, and thus are not properly before us.

**II.**

We turn first to State and Industry Petitioners' challenges to the Endangerment Finding, the first of the series of rules EPA issued after the Supreme Court remanded *Massachusetts v. EPA*. In the decision ordering the remand, the Supreme Court held that EPA had failed in its statutory obligations when it "offered no reasoned explanation for its refusal to decide whether greenhouse gases cause or contribute to climate change." *Massachusetts v. EPA*, 549 U.S. at 534, 127 S.Ct. 1438. On remand, EPA compiled a substantial scientific record, which is before us in the present review, and determined that "greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to

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endanger public welfare.” Endangerment Finding, 74 Fed. Reg. at 66,497. EPA went on to find that motor-vehicle emissions of greenhouse gases “ contribute to the total greenhouse gas air pollution, and thus to the climate change problem, which is reasonably anticipated to endanger public health and welfare.” *Id.* at 66,499.

State and Industry Petitioners challenge several aspects of EPA’s decision, including (1) EPA’s interpretation of CAA § 202(a)(1), which sets out the endangerment-finding standard; (2) the adequacy of the scientific record supporting the Endangerment Finding; (3) EPA’s decision not to “quantify” the risk of endangerment to public health or welfare created by climate change; (4) EPA’s choice to define the “air pollutant” at issue as an aggregate of six greenhouse gases; (5) EPA’s failure to consult its Science Advisory Board before issuing the Endangerment Finding; and (6) EPA’s denial of all petitions for reconsideration of the Endangerment Finding. We ultimately conclude that the Endangerment Finding is consistent with *Massachusetts v. EPA* and the text and structure of the CAA, and is adequately supported by the administrative record.

**A.**

Industry Petitioners contend that EPA improperly interpreted CAA § 202(a)(1) as restricting the Endangerment Finding to a science-based judgment devoid of considerations of policy concerns

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and regulatory consequences. They assert that CAA § 202(a)(1) requires EPA to consider, *e.g.*, the benefits of activities that require greenhouse gas emissions, the effectiveness of emissions regulation triggered by the Endangerment Finding, and the potential for societal adaptation to or mitigation of climate change. They maintain that eschewing those considerations also made the Endangerment Finding arbitrary and capricious.

These contentions are foreclosed by the language of the statute and the Supreme Court's decision in *Massachusetts v. EPA*. Section 202(a) of the CAA states in relevant part that EPA's Administrator

shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.

42 U.S.C. § 7521(a)(1). This language requires that the endangerment evaluation “relate to whether an air pollutant ‘cause[s], or contribute[s] to, air pollution which may reasonably be anticipated to endanger public health or welfare.’” *Massachusetts v. EPA*, 549 U.S. at 532-33, 127 S.Ct. 1438. At bottom, § 202(a)(1) requires EPA to answer only two questions: whether particular “air pollution” – here,

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greenhouse gases – “may reasonably be anticipated to endanger public health or welfare,” and whether motor-vehicle emissions “cause, or contribute to” that endangerment.

These questions require a “scientific judgment” about the potential risks greenhouse gas emissions pose to public health or welfare – not policy discussions. *Massachusetts v. EPA*, 549 U.S. at 534, 127 S.Ct. 1438. In *Massachusetts v. EPA*, the Supreme Court rebuffed an attempt by EPA itself to inject considerations of policy into its decision. At the time, EPA had “offered a laundry list of reasons not to regulate” greenhouse gases, including

that a number of voluntary Executive Branch programs already provide an effective response to the threat of global warming, that regulating greenhouse gases might impair the President’s ability to negotiate with “key developing nations” to reduce emissions, and that curtailing motor-vehicle emissions would reflect “an inefficient, piecemeal approach to address the climate change issue.”

*Id.* at 533, 127 S.Ct. 1438 (citations omitted). The Court noted that “these policy judgments . . . have nothing to do with whether greenhouse gas emissions contribute to climate change. Still less do they amount to a reasoned justification for declining to form a scientific judgment.” *Id.* at 533-34, 127 S.Ct. 1438. In the Court’s view, EPA’s policy-based explanations contained “no reasoned explanation for

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[EPA's] refusal to decide" the key part of the endangerment inquiry: "whether greenhouse gases cause or contribute to climate change." *Id.* at 534, 127 S.Ct. 1438.

As in *Massachusetts v. EPA*, a "laundry list of reasons not to regulate" simply has "nothing to do with whether greenhouse gas emissions contribute to climate change." *Id.* at 533-34, 127 S.Ct. 1438. The additional exercises State and Industry Petitioners would have EPA undertake – *e.g.*, performing a cost-benefit analysis for greenhouse gases, gauging the effectiveness of whatever emission standards EPA would enact to limit greenhouse gases, and predicting society's adaptive response to the dangers or harms caused by climate change – do not inform the "scientific judgment" that § 202(a)(1) requires of EPA. Instead of focusing on the question whether greenhouse gas emissions may reasonably be anticipated to endanger public health or welfare, the factors State and Industry Petitioners put forth only address what might happen were EPA to answer that question in the affirmative. As EPA stated in the Endangerment Finding, such inquiries "muddle the rather straightforward scientific judgment about whether there may be endangerment by throwing the potential impact of responding to the danger into the initial question." 74 Fed. Reg. at 66,515. To be sure, the subsection following § 202(a)(1), § 202(a)(2), requires that EPA address limited questions about the cost of compliance with new emission standards and the availability of technology for meeting those

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standards, *see infra* Part III, but these judgments are not part of the § 202(a)(1) endangerment inquiry. The Supreme Court made clear in *Massachusetts v. EPA* that it was not addressing the question “whether policy concerns can inform EPA’s actions in the event that it makes such a finding,” 549 U.S. at 534-35, 127 S.Ct. 1438, but that policy concerns were not part of the calculus for the determination of the endangerment finding in the first instance. The Supreme Court emphasized that it was holding “that EPA must ground its reasons for action or inaction in the statute.” *Id.* at 535, 127 S.Ct. 1438. The statute speaks in terms of endangerment, not in terms of policy, and EPA has complied with the statute.

State and Industry Petitioners insist that because statutes should be interpreted to avoid absurd results, EPA should have considered at least the “absurd” consequences that would follow from an endangerment finding for greenhouse gases. Specifically: having made an endangerment finding, EPA will proceed to promulgate emission standards under § 202(a)(1). Issuing those standards triggers regulation – under EPA’s PSD and Title V programs – of stationary sources that emit greenhouse gases at levels above longstanding statutory thresholds. Because greenhouse gases are emitted in much higher volumes than other air pollutants, hundreds of thousands of small stationary sources would exceed those thresholds. This would subject those sources to PSD and Title V permitting requirements despite what Petitioners claim was Congress’s clear intent

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that the requirements apply only to large industrial sources. Petitioners assert that even EPA believed such overbroad regulation to be an absurd result, which it attempted to rectify by adopting the Tailoring Rule to raise the statutory thresholds, *see infra* Part VI.

However “absurd” Petitioners consider this consequence, though, it is still irrelevant to the endangerment inquiry. That EPA adjusted the statutory thresholds to accommodate regulation of greenhouse gases emitted by stationary sources may indicate that the CAA is a regulatory scheme less-than-perfectly tailored to dealing with greenhouse gases. But the Supreme Court has already held that EPA indeed wields the authority to regulate greenhouse gases under the CAA. *See Massachusetts v. EPA*. The plain language of § 202(a)(1) of that Act does not leave room for EPA to consider as part of the endangerment inquiry the stationary-source regulation triggered by an endangerment finding, even if the degree of regulation triggered might at a later stage be characterized as “absurd.”

**B.**

State and Industry Petitioners next challenge the adequacy of the scientific record underlying the Endangerment Finding, objecting to both the type of evidence upon which EPA relied and EPA’s decision to make an Endangerment Finding in light of what

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Industry Petitioners view as significant scientific uncertainty. Neither objection has merit.

## 1.

As an initial matter, State and Industry Petitioners question EPA's reliance on "major assessments" addressing greenhouse gases and climate change issued by the Intergovernmental Panel on Climate Change (IPCC), the U.S. Global Climate Research Program (USGCRP), and the National Research Council (NRC). Endangerment Finding, 74 Fed. Reg. at 66,510-11. These peer-reviewed assessments synthesized thousands of individual studies on various aspects of greenhouse gases and climate change and drew "overarching conclusions" about the state of the science in this field. *Id.* at 66,511. The assessments provide data and information on, *inter alia*, "the amount of greenhouse gases being emitted by human activities"; their continued accumulation in the atmosphere; the resulting observed changes to Earth's energy balance, temperature and climate at global and regional levels, and other "climate-sensitive sectors and systems of the human and natural environment"; the extent to which these changes "can be attributed to human-induced buildup of atmospheric greenhouse gases"; "future projected climate change"; and "projected risks and impacts to human health, society and the environment." *Id.* at 66,510-11.

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State and Industry Petitioners assert that EPA improperly “delegated” its judgment to the IPCC, USGCRP, and NRC by relying on these assessments of climate-change science. See *U.S. Telecom Ass’n v. FCC*, 359 F.3d 554, 566 (D.C.Cir.2004). This argument is little more than a semantic trick. EPA did not delegate, explicitly or otherwise, any decision-making to any of those entities. EPA simply did here what it and other decision-makers often must do to make a science-based judgment: it sought out and reviewed existing scientific evidence to determine whether a particular finding was warranted. It makes no difference that much of the scientific evidence in large part consisted of “syntheses” of individual studies and research. Even individual studies and research papers often synthesize past work in an area and then build upon it. This is how science works. EPA is not required to re-prove the existence of the atom every time it approaches a scientific question.

Moreover, it appears from the record that EPA used the assessment reports not as substitutes for its own judgment but as evidence upon which it relied to make that judgment. EPA evaluated the processes used to develop the various assessment reports, reviewed their contents, and considered the depth of the scientific consensus the reports represented. Based on these evaluations, EPA determined the assessments represented the best source material to use in deciding whether greenhouse gas emissions may be reasonably anticipated to endanger public

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health or welfare. Endangerment Finding, 74 Fed. Reg. at 66,510-11. It then reviewed those reports along with comments relevant to the scientific considerations involved to determine whether the evidence warranted an endangerment finding for greenhouse gases as it was required to do under the Supreme Court's mandate in *Massachusetts v. EPA*.

**2.**

Industry Petitioners also assert that the scientific evidence does not adequately support the Endangerment Finding. As we have stated before in reviewing the science-based decisions of agencies such as EPA, “[a]lthough we perform a searching and careful inquiry into the facts underlying the agency’s decisions, we will presume the validity of agency action as long as a rational basis for it is presented.” *Am. Farm Bureau Fed’n v. EPA*, 559 F.3d 512, 519 (D.C.Cir.2009) (internal quotation marks omitted). In so doing, “we give an extreme degree of deference to the agency when it is evaluating scientific data within its technical expertise.” *Id.* (internal quotation marks omitted).

The body of scientific evidence marshaled by EPA in support of the Endangerment Finding is substantial. EPA’s scientific evidence of record included support for the proposition that greenhouse gases trap heat on earth that would otherwise dissipate into space; that this “greenhouse effect” warms the climate; that human activity is

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contributing to increased atmospheric levels of greenhouse gases; and that the climate system is warming.

Based on this scientific record, EPA made the linchpin finding: in its judgment, the “root cause” of the recently observed climate change is “very likely” the observed increase in anthropogenic greenhouse gas emissions. Endangerment Finding, 74 Fed. Reg. at 66,518. EPA found support for this finding in three lines of evidence. First, it drew upon our “basic physical understanding” of the impacts of various natural and manmade changes on the climate system. For instance, EPA relied on evidence that the past half-century of warming has occurred at a time when natural forces such as solar and volcanic activity likely would have produced cooling. Endangerment Finding, Response to Comments (RTC) Vol. 3, at 20. Other evidence supports EPA’s conclusion that the observed warming pattern – warming of the bottommost layer of the atmosphere and cooling immediately above it – is consistent with greenhouse-gas causation. *Id.*

EPA further relied upon evidence of historical estimates of past climate change, supporting EPA’s conclusion that global temperatures over the last half-century are unusual. Endangerment Finding, 74 Fed. Reg. at 66,518. Scientific studies upon which EPA relied place high confidence in the assertion that global mean surface temperatures over the last few decades are higher than at any time in the last four centuries. Technical Support Document for the

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Endangerment Finding (TSD), at 31. These studies also show, albeit with significant uncertainty, that temperatures at many individual locations were higher over the last twenty-five years than during any period of comparable length since 900 A.D. *Id.*

For its third line of evidence that anthropogenic emissions of greenhouse gases spurred the perceived warming trend, EPA turned to computer-based climate-model simulations. Scientists have used global climate models built on basic principles of physics and scientific knowledge about the climate to try to simulate the recent climate change. These models have only been able to replicate the observed warming by including anthropogenic emissions of greenhouse gases in the simulations. Endangerment Finding, 74 Fed. Reg. at 66,523.

To recap, EPA had before it substantial record evidence that anthropogenic emissions of greenhouse gases “very likely” caused warming of the climate over the last several decades. EPA further had evidence of current and future effects of this warming on public health and welfare. Relying again upon substantial scientific evidence, EPA determined that anthropogenically induced climate change threatens both public health and public welfare. It found that extreme weather events, changes in air quality, increases in food-and water-borne pathogens, and increases in temperatures are likely to have adverse health effects. *Id.* at 66,497-98. The record also supports EPA’s conclusion that climate change endangers human welfare by creating risk to food

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production and agriculture, forestry, energy, infrastructure, ecosystems, and wildlife. Substantial evidence further supported EPA's conclusion that the warming resulting from the greenhouse gas emissions could be expected to create risks to water resources and in general to coastal areas as a result of expected increase in sea level. *Id.* at 66,498. Finally, EPA determined from substantial evidence that motor-vehicle emissions of greenhouse gases contribute to climate change and thus to the endangerment of public health and welfare.

Industry Petitioners do not find fault with much of the substantial record EPA amassed in support of the Endangerment Finding. Rather, they contend that the record evidences too much uncertainty to support that judgment. But the existence of some uncertainty does not, without more, warrant invalidation of an endangerment finding. If a statute is "precautionary in nature" and "designed to protect the public health," and the relevant evidence is "difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge," EPA need not provide "rigorous step-by-step proof of cause and effect" to support an endangerment finding. *Ethyl Corp. v. EPA*, 541 F.2d 1, 28 (D.C.Cir.1976). As we have stated before, "Awaiting certainty will often allow for only reactive, not preventive, regulation." *Id.* at 25.

Congress did not restrict EPA to remedial regulation when it enacted CAA § 202(a). That section mandates that EPA promulgate new emission

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standards if it determines that the air pollution at issue “may reasonably be anticipated to endanger public health or welfare.” 42 U.S.C. § 7521(a)(1). This language requires a precautionary, forward-looking scientific judgment about the risks of a particular air pollutant, consistent with the CAA’s “precautionary and preventive orientation.” *Lead Indus. Ass’n, Inc. v. EPA*, 647 F.2d 1130, 1155 (D.C.Cir.1980). Requiring that EPA find “certain” endangerment of public health or welfare before regulating greenhouse gases would effectively prevent EPA from doing the job Congress gave it in § 202(a) – utilizing emission standards to prevent reasonably anticipated endangerment from maturing into concrete harm. *Cf. id.* (“[R]equiring EPA to wait until it can conclusively demonstrate that a particular effect is adverse to health before it acts is inconsistent with both the [CAA]’s precautionary and preventive orientation and the nature of the Administrator’s statutory responsibilities. Congress provided that the Administrator is to use his judgment in setting air quality standards precisely to permit him to act in the face of uncertainty.”).

In *Massachusetts v. EPA* the Supreme Court confirmed that EPA may make an endangerment finding despite lingering scientific uncertainty. Indeed, the Court held that the existence of “some residual uncertainty” did not excuse EPA’s decision to decline to regulate greenhouse gases. *Massachusetts v. EPA*, 549 U.S. at 534, 127 S.Ct. 1438. To avoid regulating emissions of greenhouse gases, EPA would

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need to show “scientific uncertainty . . . so profound that it precludes EPA from making a reasoned judgment as to whether greenhouse gases contribute to global warming.” *Id.* Clearly, then, EPA may issue an endangerment finding even while the scientific record still contains at least “some residual uncertainty.” Industry Petitioners have shown no more than that.

In the end, Petitioners are asking us to re-weigh the scientific evidence before EPA and reach our own conclusion. This is not our role. As with other reviews of administrative proceedings, we do not determine the convincing force of evidence, nor the conclusion it should support, but only whether the conclusion reached by EPA is supported by substantial evidence when considered on the record as a whole. *See, e.g., New York v. EPA*, 413 F.3d 3, 30 (D.C.Cir.2005). When EPA evaluates scientific evidence in its bailiwick, we ask only that it take the scientific record into account “in a rational manner.” *Am. Petroleum Inst. v. Costle*, 665 F.2d 1176, 1187 (D.C.Cir.1981). Industry Petitioners have not shown that EPA failed to do so here.

**C.**

State Petitioners, here led by Texas, contend that the Endangerment Finding is arbitrary and capricious because EPA did not “define,” “measure,” or “quantify” either the atmospheric concentration at which greenhouse gases endanger public health or

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welfare, the rate or type of climate change that it anticipates will endanger public health or welfare, or the risks or impacts of climate change. According to Texas, without defining these thresholds and distinguishing “safe” climate change from climate change that endangers, EPA’s Endangerment Finding is just a “subjective conviction.”

It is true that EPA did not provide a quantitative threshold at which greenhouse gases or climate change will endanger or cause certain impacts to public health or welfare. The text of CAA § 202(a)(1) does not require that EPA set a precise numerical value as part of an endangerment finding. Quite the opposite; the § 202(a)(1) inquiry necessarily entails a case-by-case, sliding-scale approach to endangerment because “[d]anger . . . is not set by a fixed probability of harm, but rather is composed of reciprocal elements of risk and harm, or probability and severity.” *Ethyl*, 541 F.2d at 18. EPA need not establish a minimum threshold of risk or harm before determining whether an air pollutant endangers. It may base an endangerment finding on “a lesser risk of greater harm . . . or a greater risk of lesser harm” or any combination in between. *Id.*

*Ethyl* is instructive. There, EPA made an endangerment finding for airborne lead. During its endangerment inquiry, EPA initially tried to do what Texas asks of it here: find a specific concentration of the air pollutant below which it would be considered “safe” and above which it would endanger public health. *Id.* at 56. However, EPA abandoned that

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approach because it failed to account for “the wide variability of dietary lead intake” and lacked predictive value. EPA substituted a “more qualitative” approach, which relied on “predictions based on uncertain data” along with clinical studies. *Id.* at 56-57. This court upheld the endangerment finding that used that qualitative approach despite the lack of a specific endangerment “threshold.”

In its essence, Texas’s call for quantification of the endangerment is no more than a specialized version of Industry Petitioners’ claim that the scientific record contains too much uncertainty to find endangerment. EPA relied on a substantial record of empirical data and scientific evidence, making many specific and often quantitative findings regarding the impacts of greenhouse gases on climate change and the effects of climate change on public health and welfare. Its failure to distill this ocean of evidence into a specific number at which greenhouse gases cause “dangerous” climate change is a function of the precautionary thrust of the CAA and the multivariate and sometimes uncertain nature of climate science, not a sign of arbitrary or capricious decision-making.

**D.**

EPA defined both the “air pollution” and the “air pollutant” that are the subject of the Endangerment Finding as an aggregate of six greenhouse gases, which EPA called “well mixed greenhouse gases”: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide

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(N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Industry Petitioners argue that EPA's decision to include PFCs and SF<sub>6</sub> in this group of greenhouse gases was arbitrary and capricious primarily because motor vehicles generally do not emit these two gases.

No petitioner for review of the Endangerment Finding has established standing to make this argument. Industry Petitioners concede that EPA's decision to regulate PFCs and SF<sub>6</sub> along with the other four greenhouse gases does not injure any motor-vehicle-related petitioner. Nor has any non-motor-vehicle-related petitioner shown an injury-in-fact resulting from EPA's inclusion of these two gases in the six-gas amalgam of "well-mixed greenhouse gases." At oral argument, Industry Petitioners asserted for the first time that certain utility companies – members of associations that petitioned for review of the Endangerment Finding – own utility transformers that emit SF<sub>6</sub>. However, they never demonstrated or even definitively asserted that any of these companies would not be subject to regulation or permitting requirements but for EPA's decision to include SF<sub>6</sub> as part of the "well-mixed greenhouse gases" that are the subject of the Endangerment Finding. *See Sierra Club v. EPA*, 292 F.3d 895, 898-900 (D.C.Cir.2002) (requiring that a petitioner seeking review of agency action demonstrate standing by affidavit or other evidence if standing is not "self-evident" from the administrative record). Absent a petitioner with standing to challenge EPA's inclusion

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of PFCs and SF<sub>6</sub> in the “air pollution” at issue, this court lacks jurisdiction to address the merits of Industry Petitioners’ contention.

**E.**

EPA did not submit the Endangerment Finding for review by its Science Advisory Board (SAB). Industry Petitioners claim that EPA’s failure to do so violates its mandate to “make available” to the SAB “any proposed criteria document, standard, limitation, or regulation under the Clean Air Act” at the time it provides the same “to any other Federal agency for formal review and comment.” 42 U.S.C. § 4365(c)(1); *see Am. Petroleum Inst.*, 665 F.2d at 1188.

To begin with, it is not clear that EPA provided the Endangerment Finding “to any other Federal agency for formal review and comment,” which triggers this duty to submit a regulation to the SAB. EPA only submitted a draft of the Endangerment Finding to the Office of Information and Regulatory Affairs pursuant to Executive Order 12,866. EPA contends that this was merely an *informal* review process, not “formal review and comment” – at least when compared with a statutory review-and-comment requirement in which other agencies are given the opportunity to provide written comments about the impacts of a proposed regulation on the reviewing agency’s universe of responsibility. *See, e.g.*,

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49 U.S.C. § 32902(j). Industry Petitioners failed to respond to this contention.

In any event, even if EPA violated its mandate by failing to submit the Endangerment Finding to the SAB, Industry Petitioners have not shown that this error was “of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made.” 42 U.S.C. § 7607(d)(8); *see Am. Petroleum Inst.*, 665 F.2d at 1188-89 (applying this standard to EPA’s failure to submit an ozone standard to the SAB).

**F.**

Lastly, State Petitioners maintain that EPA erred by denying all ten petitions for reconsideration of the Endangerment Finding. Those petitions asserted that internal e-mails and documents released from the University of East Anglia’s Climate Research Unit (CRU) – a contributor to one of the global temperature records and to the IPCC’s assessment report – undermined the scientific evidence supporting the Endangerment Finding by calling into question whether the IPCC scientists adhered to “best science practices.” *EPA’s Denial of the Petitions To Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* (“Reconsideration Denial”), 75 Fed. Reg. 49,556, 49,556-57 (Aug. 13, 2010). The petitions pointed to factual mistakes in

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the IPCC's assessment report resulting from the use of non-peer-reviewed studies and several scientific studies postdating the Endangerment Finding as evidence that the Endangerment Finding was flawed. *Id.*

On August 13, 2010, EPA issued a denial of the petitions for reconsideration accompanied by a 360-page response to petitions (RTP). *Id.* at 49,556. It determined that the petitions did not provide substantial support for the argument that the Endangerment Finding should be revised. According to EPA, the petitioners' claims based on the CRU documents were exaggerated, contradicted by other evidence, and not a material or reliable basis for questioning the credibility of the body of science at issue; two of the factual inaccuracies alleged in the petitions were in fact mistakes, but both were "tangential and minor" and did not change the key IPCC conclusions; and the new scientific studies raised by some petitions were either already considered by EPA, misinterpreted or misrepresented by petitioners, or put forth without acknowledging other new studies. *Id.* at 49,557-58.

1.

EPA is required to convene a proceeding for reconsideration of a rule if a party raising an objection to the rule

can demonstrate to the Administrator that it was impracticable to raise such objection

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within such time or if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule.

42 U.S.C. § 7607(d)(7)(B). For the purpose of determining whether to commence reconsideration of a rule, EPA considers an objection to be of “central relevance to the outcome” of that rule “if it provides substantial support for the argument that the regulation should be revised.” Reconsideration Denial, 75 Fed. Reg. at 49,561.

State Petitioners have not provided substantial support for their argument that the Endangerment Finding should be revised. State Petitioners point out that some studies the IPCC referenced in its assessment were not peer-reviewed, but they ignore the fact that (1) the IPCC assessment relied on around 18,000 studies that were peer-reviewed, and (2) the IPCC’s report development procedures expressly permitted the inclusion in the assessment of some non-peer-reviewed studies (“gray” literature).

Moreover, as EPA determined, the limited inaccurate information developed from the gray literature does not appear sufficient to undermine the substantial overall evidentiary support for the Endangerment Finding. State Petitioners have not, as they assert, uncovered a “pattern” of flawed science. Only two of the errors they point out seem to be errors at all, and EPA relied on neither in making the Endangerment Finding. First, as State

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Petitioners assert, the IPCC misstated the percentage of the Netherlands that is below sea level, a statistic that was used for background information. However, the IPCC corrected the error, and EPA concluded that the error was “minor and had no impact,” and the Endangerment Finding did not refer to the statistic in any way. *Id.* at 49,576-77. Second, the IPCC acknowledged misstating the rate at which Himalayan glaciers are receding. EPA also did not rely on that projection in the Endangerment Finding. *Id.* at 49,577.

State Petitioners also contend that a new study contradicts EPA’s reliance on a projection of more violent storms in the future as a result of climate change, but the study they cite only concerns past trends, not projected future storms. The record shows that EPA considered the new studies on storm trends and concluded that the studies were consistent with the Endangerment Finding. In sum, State Petitioners have failed to show that these isolated “errors” provide substantial support for their argument to overturn the Endangerment Finding.

## 2.

State Petitioners’ further argument that EPA erred in denying reconsideration fails as well. These Petitioners claim EPA erred by failing to provide notice and comment before denying the petitions for reconsideration because EPA’s inclusion of a 360-page RTP amounted to a revision of the Endangerment

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Finding, and revision of a rule requires notice and comment. The RTP, however, appears to be exactly what EPA called it – a response to the petitions for reconsideration, not a revision of the Endangerment Finding itself. EPA certainly may deny petitions for reconsideration of a rule and provide an explanation for that denial, including by providing support for that decision, without triggering a new round of notice and comment for the rule.

**III.**

State and Industry Petitioners contend that in promulgating the Tailpipe Rule, EPA relied on an improper interpretation of CAA § 202(a)(1), and was arbitrary and capricious in failing to justify and consider the cost impacts of its conclusion that the Rule triggers stationary-source regulation under the PSD and Title V provisions. They do not challenge the substantive standards of the Rule and focus principally on EPA's failure to consider the cost of stationary-source permitting requirements triggered by the Rule. Positing an absurd-consequences scenario, Petitioners maintain that if EPA had considered these costs it "would have been forced" to exclude carbon dioxide from the scope of the emission standards, to decline to issue greenhouse gas emission standards at all, or "to interpret the statute so as not to automatically trigger stationary source regulation." Industry Tailpipe Br. 17; *see also* Industry Tailpipe Reply Br. 8-9. Both the plain text of

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Section 202(a) and precedent refute Petitioners' contentions.

A.

Section 202(a)(1) provides:

The Administrator shall by regulation prescribe . . . standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.

42 U.S.C. § 7521(a)(1). By employing the verb “shall,” Congress vested a non-discretionary duty in EPA. See *Sierra Club v. Jackson*, 648 F.3d 848, 856 (D.C.Cir.2011). The plain text of Section 202(a)(1) thus refutes Industry Petitioners' contention that EPA had discretion to defer issuance of motor-vehicle emission standards on the basis of stationary-source costs. Neither the adjacent text nor the statutory context otherwise condition this clear “language of command,” *id.* (citation omitted). Having made the Endangerment Finding pursuant to CAA § 202(a), 42 U.S.C. § 7521(a), EPA lacked discretion to defer promulgation of the Tailpipe Rule on the basis of its trigger of stationary-source permitting requirements under the PSD program and Title V.

The Supreme Court's decision in *Massachusetts v. EPA* compels this interpretation of Section 202(a)(1).

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“If EPA makes a finding of endangerment, the Clean Air Act requires the [a]gency to regulate emissions of the deleterious pollutant from new motor vehicles.” 549 U.S. at 533, 127 S.Ct. 1438. “Under the clear terms of the Clean Air Act, EPA can avoid taking further action *only if* it determines that greenhouse gases do not contribute to climate change *or if* it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.” *Id.* (emphasis added). In the Endangerment Finding, EPA determined that motor-vehicle emissions contribute to greenhouse gas emissions that, in turn, endanger the public health and welfare; the agency therefore was in no position to “avoid taking further action,” *id.*, by deferring promulgation of the Tailpipe Rule. Given the non-discretionary duty in Section 202(a)(1) and the limited flexibility available under Section 202(a)(2), which this court has held relates only to the motor-vehicle industry, *see infra* Part III.C, EPA had no statutory basis on which it could “ground [any] reasons for” further inaction, *Massachusetts v. EPA*, 549 U.S. at 535, 127 S.Ct. 1438.

The plain text of Section 202(a)(1) also negates Industry Petitioners’ contention that EPA had discretion to defer the Tailpipe Rule on the basis of NHTSA’s authority to regulate fuel economy. The Supreme Court dismissed a near-identical argument in *Massachusetts v. EPA*, rejecting the suggestion that EPA could decline to regulate carbon-dioxide emissions because the Department of Transportation

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(DOT) had independent authority to set fuel-efficiency standards. *Id.* at 531-32, 127 S.Ct. 1438. “[T]hat DOT sets mileage standards in no way licenses EPA to shirk its environmental responsibilities,” because EPA’s duty to promulgate emission standards derives from “a statutory obligation wholly independent of DOT’s mandate to promote energy efficiency.” *Id.* at 532, 127 S.Ct. 1438. Just as EPA lacks authority to refuse to regulate on the grounds of NHTSA’s regulatory authority, EPA cannot defer regulation on that basis. A comparison of the relevant statutes bolsters this conclusion. *Compare* 49 U.S.C. § 32902(f) (“When deciding maximum feasible average fuel economy . . . , the Secretary of Transportation shall consider . . . the effect of other motor vehicle standards of the Government on fuel economy. . . .”), *with* 42 U.S.C. § 7521(a) (including no such direction). Nor, applying the same reasoning, was EPA required to treat NHTSA’s proposed regulations as establishing the baseline for the Tailpipe Rule. Furthermore, the Tailpipe Rule provides benefits above and beyond those resulting from NHTSA’s fuel-economy standards. *See, e.g.*, Tailpipe Rule, 75 Fed. Reg. at 25,490 (Table III.F.1-2), 25,636 (Table IV.G.1-4). Petitioners’ related contentions regarding the PSD permitting triggers are addressed in Part V.

**B.**

Turning to the APA, Industry Petitioners contend, relying on *Small Refiner Lead Phase-Down*

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*Task Force v. EPA*, 705 F.2d 506, 525 (D.C.Cir.1983), and *Ethyl Corp. v. EPA*, 541 F.2d 1 (D.C.Cir.1976), that EPA failed both to justify the Tailpipe Rule in terms of the risk identified in the Endangerment Finding and to show that the proposed standards “would meaningfully mitigate the alleged endangerment,” Industry Tailpipe Br. 35. Instead, they maintain that EPA “separated these two integral steps,” *id.* at 11, and “concluded that it had no obligation to show . . . ‘the resulting emissions control strategy or strategies will have some significant degree of harm reduction or effectiveness in addressing the endangerment,’” *id.* at 11-12 (quoting Endangerment Finding, 74 Fed. Reg. at 66,508). These contentions fail.

Petitioners’ reliance on *Small Refiner*, 705 F.2d at 525, is misplaced; the court there laid out guidelines for assessing EPA’s discretion to set numerical standards and Petitioners do not challenge the substance of the emission standards. In *Ethyl*, 541 F.2d at 7, the court assessed the scope of EPA’s authority, under CAA § 211(c)(1), 42 U.S.C. § 1857f-6c(c)(1) (1970) (*currently codified as amended at 42 U.S.C. § 7545(c)(1)*), to regulate lead particulate in motor-vehicle emissions. The court rejected the argument that the regulations had to “be premised upon factual proof of actual harm,” *Ethyl*, 541 F.2d at 12, and instead deferred to EPA’s reasonable interpretation that regulations could be based on a “significant risk of harm,” *id.* at 13. Nothing in *Ethyl* implied that EPA’s authority to regulate was

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conditioned on evidence of a particular level of mitigation; only a showing of significant *contribution* was required. EPA made such a determination in the Endangerment Finding, concluding that vehicle emissions are a significant contributor to domestic greenhouse gas emissions. *See, e.g.*, Endangerment Finding, 74 Fed. Reg. at 66,499. Further, in the preamble to the Tailpipe Rule itself, EPA found that the emission standards would result in meaningful mitigation of greenhouse gas emissions. For example, EPA estimated that the Rule would result in a reduction of about 960 million metric tons of CO<sub>2</sub>e emissions over the lifetime of the model year 2012-2016 vehicles affected by the new standards. *See* Tailpipe Rule, 75 Fed. Reg. at 25,488-90. Other precedent is likewise unhelpful to Petitioners: in *Chemical Manufacturers Association v. EPA*, 217 F.3d 861, 866 (D.C.Cir.2000), “nothing in the record” indicated that the challenged regulatory program would “directly or indirectly, further the Clean Air Act’s environmental goals,” whereas here the record is fulsome, *see supra* Part II.

## C.

Petitioners also invoke Section 202(a)(2) as support for their contention that EPA must consider stationary-source costs in the Tailpipe Rule. Section 202(a)(2) provides:

Any regulation prescribed under paragraph (1) of this subsection . . . shall take effect

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after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.

42 U.S.C. § 7521(a)(2). State Petitioners maintain the reference to compliance costs encompasses those experienced by stationary sources under the PSD program, while Industry Petitioners maintain stationary-source costs are a relevant factor in EPA's Section 202(a)(1) rulemaking. This court, however, has held that the Section 202(a)(2) reference to compliance costs encompasses only the cost to the motor-vehicle industry to come into compliance with the new emission standards, and does not mandate consideration of costs to other entities not directly subject to the proposed standards. *See Motor & Equip. Mfrs. Ass'n, Inc. v. EPA*, 627 F.2d 1095, 1118 (D.C.Cir.1979).

**D.**

Petitioners' remaining challenges to the Tailpipe Rule fail as well. In Part II, the court rejects the contention that the Tailpipe Rule fails due to flaws in the underlying Endangerment Finding. The record also refutes Industry Petitioners' suggestion that EPA "employed a shell game to avoid," Industry Tailpipe Reply Br. 9 (capitalization removed), responding to comments regarding stationary-source costs. Industry Tailpipe Br. 19-20; *see also* Industry Tailpipe Reply Br. 14-15. EPA adequately responded to "significant

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comments,” 42 U.S.C. § 7607(d)(6)(B). *See, e.g.*, Tailpipe Rule, 75 Fed. Reg. at 25,401-02; Tailpipe Rule, Response to Comments at 7-65 to 7-69. And, assuming other statutory mandates provide a basis for judicial review, *see* Industry Tailpipe Br. 21-22 (listing mandates); *see, e.g., Small Refiner*, 705 F.2d at 537-39, the record shows EPA’s compliance, *see* Tailpipe Rule, 75 Fed. Reg. at 25,539-42, and that EPA was not arbitrary and capricious by not considering stationary-source costs in its analyses. *See, e.g., Michigan v. EPA*, 213 F.3d 663, 689 (D.C.Cir.2000); *Mid-Tex Elec. Coop., Inc. v. FERC*, 773 F.2d 327, 341-42 (D.C.Cir.1985). EPA’s economic impact assessment conducted pursuant to CAA § 317, 42 U.S.C. § 7617, does not provide grounds for granting the petitions because Petitioners’ contentions that EPA, “[i]n defiance of these requirements, . . . refused to estimate or even consider the costs of the [Tailpipe Rule] for stationary sources,” Industry Tailpipe Br. 22, are no more than another attempt to avoid the plain text of Section 202(a). *See also* 42 U.S.C. § 7617(e).

**IV.**

We turn next to the stationary source regulations. As noted *supra* in Part I, EPA’s interpretation of the CAA requires PSD and Title V permits for stationary sources whose potential emissions exceed statutory thresholds for *any* regulated pollutant – including greenhouse gases. Industry Petitioners now challenge EPA’s

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longstanding interpretation of the scope of the permitting requirements for construction and modification of major emitting facilities under CAA Sections 165(a) and 169(1), 42 U.S.C. §§ 7475(a) & 7479(1) (“the PSD permitting triggers”). EPA maintains that this challenge is untimely because its interpretation of the PSD permitting triggers was set forth in its 1978, 1980, and 2002 Rules.

In 1978, EPA defined “major stationary source” as a source that emits major amounts of “any air pollutant regulated under the [CAA].” *Part 51 – Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Prevention of Significant Air Quality Deterioration* (“1978 Implementation Plan Requirements”), 43 Fed. Reg. 26,380, 26,382 (June 19, 1978). Industry petitioners’ challenge to the 1978 Rule in *Alabama Power Co. v. Costle*, 636 F.2d 323 (D.C.Cir.1980) reflected their understanding that EPA would apply the PSD permitting program to both pollutants regulated pursuant to National Ambient Air Quality Standards (NAAQS) and other regulated pollutants. *See* Br. for Industry Pet’rs on Regulation of Pollutants other than Sulfur Dioxide and Particulates, No. 78-1006 (and consolidated cases) (Dec. 19, 1978) at 10, 12. In the 1980 Rule, EPA highlighted that to be subject to PSD review, a “source need only emit *any* pollutant in major amounts (i.e., the amounts specified in [CAA § 169(1)]) and be located in an area designated attainment or unclassifiable for that or any other pollutant.” 1980 Implementation Plan Requirements,

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45 Fed. Reg. at 52,711 (emphasis in original). EPA explained that “any pollutant” meant “both criteria pollutants, for which national ambient air quality standards have been promulgated, and non-criteria pollutants subject to regulation under the Act.” *Id.* The same explanation of EPA’s interpretation appeared in the 2002 Rule. *Prevention of Significant Deterioration and Nonattainment New Source Review*, 67 Fed. Reg. 80,186, 80,239-40, 80,264 (Dec. 31, 2002).

CAA Section 307(b)(1) provides that a petition for review of any promulgated nationally applicable regulations:

“shall be filed within sixty days from the date notice of such promulgation . . . appears in the Federal Register, except that if such petition is based solely on grounds arising after such sixtieth day, then any petition for review . . . shall be filed within sixty days after such grounds arise.”

42 U.S.C. § 7607(b)(1). The exception encompasses the occurrence of an event that ripens a claim. *See Chamber of Commerce v. EPA*, 642 F.3d 192, 208 n. 14 (D.C.Cir.2011); *Am. Rd. & Transp. Builders Ass’n v. EPA*, 588 F.3d 1109, 1113 (D.C.Cir.2009). EPA acknowledges this precedent, but maintains that the “new grounds” exception is narrow and inapplicable because Industry Petitioners’ challenge to EPA’s interpretation of the PSD permitting triggers is based on legal arguments that were available during the normal judicial review

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periods for the 1978, 1980, and 2002 Rules, and the “new ground” on which they now rely is a factual development, namely the regulation of greenhouse gases by the Tailpipe Rule. This is correct so far as it goes, but fails to demonstrate that Industry Petitioners’ challenge is untimely.

Industry Petitioners point out that two petitioners – the National Association of Home Builders (NAHB) and National Oilseed Processors Association (NOPA) – have newly ripened claims as a result of the Tailpipe Rule, which had the effect of expanding the PSD program to never-regulated sources:

- NAHB’s members construct single family homes, apartment buildings, and commercial buildings. According to the Vice President of Legal Affairs, prior to the Tailpipe Rule, no member of NAHB was a major source of any regulated pollutant, and thus no member was ever required to obtain a PSD permit. Decl. of Thomas J. Ward, Vice President of Legal Affairs for NAHB, ¶ 6 (May 10, 2011). Since the Tailpipe Rule rendered greenhouse gases a regulated pollutant, it is now certain that NAHB members that engage in construction projects that emit greenhouse gases in major amounts will have to obtain PSD permits sometime in the future. *Id.* at ¶¶ 7, 8. Indeed, EPA estimated that 6,397 multifamily buildings and 515 single family homes would trigger PSD review

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annually absent the Tailoring Rule. *See Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule; Proposed Rule* (“Proposed Tailoring Rule”), 74 Fed. Reg. 55,292, 55,338 (Oct. 27, 2009).

- NOPA’s members are large companies that monthly produce millions of tons of vegetable meals and over a billion pounds of oils from oilseeds, such as soybeans. *See, e.g.*, NOPA, January 2012 Statistical Report (Feb. 14, 2012) *available at www.nopa.org* ; NOPA, February 2012 Statistical Report (Mar. 14, 2012), *available at www.nopa.org*. According to the Executive Vice President of Regulatory Affairs, NOPA members operate facilities that are major sources of criteria pollutants and, for this reason, are subject to PSD review. Decl. of David C. Ailor, Executive Vice President of Regulatory Affairs of NOPA, ¶ 8 (May 10, 2011). Prior to promulgation of the Tailpipe Rule, no member’s facility had triggered PSD review by virtue of emissions of a non-criteria pollutant. *Id.* Now that greenhouse gases are a regulated non-criteria pollutant, many NOPA members will have to obtain PSD permits as result of their facilities’ emissions of a non-criteria pollutant. *Id.* at ¶¶ 9, 10. For some NOPA members this time is not far off because renovations to their facilities will result in greenhouse gas

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emissions above the significance thresholds set by the Tailoring Rule, 75 Fed. Reg. at 31,567. *Id.* at ¶ 9.

Industry Petitioners thus maintain that because NAHB and NOPA filed their petitions on July 6, 2010, within 60 days of the promulgation of the Tailpipe Rule in the Federal Register on May 7, 2010, their challenges are timely.

“Ripeness, while often spoken of as a justiciability doctrine distinct from standing, in fact shares the constitutional requirement of standing that an injury in fact be certainly impending.” *Nat’l Treasury Emp. Union v. United States*, 101 F.3d 1423, 1427 (D.C.Cir.1996). During an initial review period, although purely legal claims may be justiciable and, thus, prudentially ripe, a party without an immediate or threatened injury lacks a constitutionally ripe claim. *See Baltimore Gas & Elec. Co. v. ICC*, 672 F.2d 146, 149 (D.C.Cir.1982). EPA’s position would conflate the constitutional and prudential considerations. Constitutional ripeness exists where a challenge “involve[s], at least in part, the existence of a live ‘Case or Controversy.’” *Duke Power Co. v. Carolina Envtl. Study Group*, 438 U.S. 59, 81, 98 S.Ct. 2620, 57 L.Ed.2d 595 (1978). Prudential considerations embodied in the ripeness doctrine relate to “the fitness of the issues for judicial decision and the hardship to the parties of withholding court consideration.” *Abbott Labs. v. Gardner*, 387 U.S. 136, 149, 87 S.Ct. 1507, 18 L.Ed.2d 681 (1967); *see Duke Power*, 438 U.S. at 81, 98 S.Ct. 2620. Standing to

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challenge agency action exists where a petitioner can demonstrate an “injury in fact” that is fairly traceable to the challenged action and is likely to be redressed by a favorable judicial decision. *Reyblatt v. NRC*, 105 F.3d 715, 721 (D.C.Cir.1997) (citing *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560-61, 112 S.Ct. 2130, 119 L.Ed.2d 351 (1992)).

Had NAHB and NOPA challenged EPA’s interpretation of the PSD permitting triggers in 1978, 1980, or 2002, as EPA suggests, the court would have lacked jurisdiction under Article III of the Constitution because their alleged injuries were only speculative. See, e.g., *Occidental Permian Ltd. v. FERC*, 673 F.3d 1024, 1026 (D.C.Cir.2012); *Baltimore Gas & Elec. Co.*, 672 F.2d at 149. At that time, NAHB and NOPA could have shown only the possibility that their members would be injured if EPA were someday to determine that greenhouse gases were a pollutant that endangers human health and welfare and to adopt a rule regulating the greenhouse gas emissions of stationary sources. EPA does not challenge the assertions in the NAHB and NOPA declarations, which establish no such rule was promulgated prior to the Tailpipe Rule.

The NAHB and NOPA challenges ceased to be speculative when EPA promulgated the Tailpipe Rule regulating greenhouse gases and their challenges ripened because of the “substantial probability” of injury to them. See *Baltimore Gas & Elec. Co.*, 672 F.2d at 149. Although, as EPA notes, other Industry Petitioners’ challenges to EPA’s interpretation of the

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PSD permitting triggers ripened decades earlier, this court has assured petitioners with unripe claims that “they will not be foreclosed from judicial review when the appropriate time comes,” *Grand Canyon Air Tour Coalition v. FAA*, 154 F.3d 455, 473 (D.C.Cir.1998), and that they “need not fear preclusion by reason of the 60-day stipulation [barring judicial review],” *Baltimore Gas & Elec. Co.*, 672 F.2d at 149-50. EPA expresses concern that allowing NAHB and NOPA to litigate their newly ripened claims will have far-reaching implications for finality of agency actions, but “the ripeness doctrine reflects a judgment that the disadvantages of a premature review that may prove too abstract or unnecessary ordinarily outweigh the additional costs of – even repetitive – . . . litigation.” *Ohio Forestry Ass’n, Inc. v. Sierra Club*, 523 U.S. 726, 735, 118 S.Ct. 1665, 140 L.Ed.2d 921 (1998). Some limitations inhere in doctrines such as *stare decisis* or the law-of-the-circuit doctrine, see *LaShawn A. v. Barry*, 87 F.3d 1389, 1395 (D.C.Cir.1996) (en banc).

Because petitioners NAHB and NOPA’s challenges to EPA’s PSD permitting triggers are newly ripened upon promulgation of the Tailpipe Rule and they filed petitions for review within sixty days thereof, their challenge to EPA’s interpretation of the PSD permitting triggers is timely.

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## V.

Having established that Industry Petitioners' challenges to the PSD permitting triggers are both timely and ripe, we turn to the merits of their claims.

## A.

CAA Title I, Part C – entitled “Prevention of Significant Deterioration of Air Quality” (PSD) – largely focuses on the maintenance of national ambient air quality standards (NAAQS). Under the PSD program, EPA designates specific pollutants as “NAAQS pollutants” and sets national ambient air quality standards for those pollutants – requiring, for example, that the concentration of a given NAAQS pollutant may not exceed more than a certain number of parts per billion in the ambient air. *See generally* 42 U.S.C. § 7407. Thus far, EPA has designated six NAAQS pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide. None of these NAAQS pollutants is one of the six well-mixed greenhouse gases defined as an “air pollutant” in the Endangerment Finding. *See* Environmental Protection Agency, National Ambient Air Quality Standards, *available at* <http://www.epa.gov/air/criteria.html> (last visited May 3, 2012); Endangerment Finding, 74 Fed. Reg. 66,536-37.

Acting upon information submitted by states, EPA then determines whether each region of the country is in “attainment” or “nonattainment” with the promulgated air quality standard for each

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NAAQS pollutant, or, alternatively, whether a region is “unclassifiable” for that pollutant. 42 U.S.C. § 7407(d)(1)(A). An area in attainment for a NAAQS pollutant is “any area . . . that meets the . . . ambient air quality standard for the pollutant.” *Id.* § 7407(d)(1)(A)(ii). By contrast, an area in nonattainment for a NAAQS pollutant is “any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national . . . ambient air quality standard for the pollutant.” *Id.* § 7407(d)(1)(A)(i). Finally, an unclassifiable area is any area that “cannot be classified on the basis of available information as meeting or not meeting the . . . ambient air quality standard for the pollutant.” *Id.* § 7407(d)(1)(A)(iii).

The PSD program applies to those areas of the United States designated as in “attainment” or “unclassifiable” for any NAAQS pollutant, *see id.* § 7471, and requires permits for major emitting facilities embarking on construction or modification projects in those regions. *Id.* § 7475(a). A separate part of Title I of the CAA, Part D, governs the construction and modification of sources in nonattainment regions. *See id.* §§ 7501, 7502. It bears emphasis that attainment classifications are pollutant-specific: depending on the levels of each NAAQS pollutant in an area, a region can be designated as in attainment for NAAQS pollutant A, but in nonattainment for NAAQS pollutant B. If a major emitting facility in such a region wishes to undertake a construction or modification project, both

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Part C and Part D's substantive requirements apply – that is, the source must obtain a general PSD permit and must also abide by Part D's more stringent, pollutant-specific requirements for any NAAQS pollutants for which the area is in nonattainment. *See* 1980 Implementation Plan Requirements, 45 Fed. Reg. at 52,711-12 (“where a source emits in major amounts a pollutant for which the area in which the source would locate is designated nonattainment, Part D NSR rather than Part C PSD review should apply to those pollutants.”) (emphasis added).

The key substantive provision in the PSD program is CAA Section 165(a), which establishes permitting requirements for “major emitting facilities” located in attainment or unclassifiable regions. In relevant part, section 165(a) provides that “[n]o major emitting facility . . . may be constructed in any area to which this part applies unless” the facility obtains a PSD permit. 42 U.S.C. § 7475(a). To obtain a PSD permit, a covered source must, among other things, install the “best available control technology [BACT] for each pollutant subject to regulation under [the CAA]” – regardless of whether that pollutant is a NAAQS pollutant. *Id.* § 7475(a)(4). Since the Tailpipe Rule became effective, EPA has regulated automotive greenhouse gas emissions under Title II of the Act. Thus, greenhouse gases are now a “pollutant subject to regulation under” the Act, and, as required by the statute itself, any “major emitting facility” covered by the PSD program must install BACT for greenhouse gases. *See id.*

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The dispute in this case centers largely on the scope of the PSD program – specifically, which stationary sources count as “major emitting facilities” subject to regulation. CAA Section 169(1) defines “major emitting facility,” for the purposes of the PSD program, as a stationary source “which emit[s], or [has] the potential to emit” either 100 tons per year (tpy) or 250 tpy of “any air pollutant.” 42 U.S.C. § 7479(1) (emphasis added). As discussed *supra* in Part I, whether the 100 or 250 tpy threshold applies depends on the type of source. Certain listed categories of sources – for example, iron and steel mill plants – qualify as “major emitting facilities” if they have the potential to emit over 100 tons per year of “any air pollutant.” *Id.* All other stationary sources are “major emitting facilities” if they have the potential to emit over 250 tons per year of “any air pollutant.” *Id.*

As mentioned above, since 1978 EPA has interpreted the phrase “any air pollutant” in the definition of “major emitting facility” as “any air pollutant regulated under the CAA.” *See* 1978 Implementation Plan Requirements, 43 Fed. Reg. at 26,388, 26,403; *supra* Part IV. Thus, because the PSD program covers “major emitting facilities” in “any area to which this part applies,” 42 U.S.C. § 7475, EPA requires PSD permits for stationary sources that 1) are located in an area designated as attainment or unclassifiable for any NAAQS pollutant, and 2) emit 100/250 tpy of any regulated air pollutant, regardless of whether that pollutant is itself a NAAQS pollutant.

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*See* 1980 Implementation Plan Requirements, 45 Fed. Reg. at 52,710-11. Consequently, once the Tailpipe Rule took effect and made greenhouse gases a regulated pollutant under Title II of the Act, the PSD program automatically applied to facilities emitting over 100/250 tpy of greenhouse gases. But because immediate regulation of greenhouse gas-emitting sources exceeding the 100/250 tpy benchmark would result in “overwhelming permitting burdens that would . . . fall on permitting authorities and sources,” Tailoring Rule, 75 Fed. Reg. at 31,516, EPA’s Tailoring Rule provided that, for now, sources are subject to PSD permitting requirements only if they have the potential to emit over 100,000 tpy of greenhouse gases (for a construction project) or 75,000 tpy (for a modification project). *Id.* at 31,523; *see also infra*, Part VI.

According to EPA, its longstanding interpretation of the phrase “any air pollutant” – “any air pollutant regulated under the CAA” – is compelled by the statute. *See id.* at 31,517. Disputing this point, Industry Petitioners argue that the phrase is capable of a far more circumscribed meaning and that EPA could have – and should have – avoided extending the PSD permitting program to major greenhouse gas emitters. For the reasons discussed below, we agree with EPA that its longstanding interpretation of the PSD permitting trigger is statutorily compelled. Thus, as EPA argues, it “must give effect to the unambiguously expressed intent of Congress,” *Chevron*, 467 U.S. at 843, 104 S.Ct. 2778, which here

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requires PSD coverage for major emitters of any regulated air pollutant.

We begin our analysis, as we must, with the statute's plain language. *See Chevron*, 467 U.S. at 842, 104 S.Ct. 2778 (“First, always, is the question whether Congress has directly spoken to the precise question at issue.”). CAA Section 169(1) requires PSD permits for stationary sources emitting major amounts of “*any* air pollutant.” 42 U.S.C. § 7479(1) (emphasis added). On its face, “the word ‘any’ has an expansive meaning, that is, ‘one or some indiscriminately of whatever kind,’” *United States v. Gonzales*, 520 U.S. 1, 5, 117 S.Ct. 1032, 137 L.Ed.2d 132 (1997) (quoting WEBSTER’S THIRD NEW INTERNATIONAL DICTIONARY 97 (1976)). Greenhouse gases are indisputably an “air pollutant.” *See Massachusetts v. EPA*, 549 U.S. at 528-29, 127 S.Ct. 1438. Congress’s use of the broad, indiscriminate modifier “any” thus strongly suggests that the phrase “any air pollutant” encompasses greenhouse gases.

This plain-language reading of the statute is buttressed by the Supreme Court’s decision in *Massachusetts v. EPA*. There the Court determined that CAA’s overarching definition of “air pollutant” in Section 302(g) – which applies to all provisions of the Act, including the PSD program – unambiguously includes greenhouse gases. Noting that “[t]he Clean Air Act’s sweeping definition of ‘air pollutant’ includes ‘*any* air pollution agent or combination of such agents. . . . which is emitted into or otherwise enters

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the ambient air,” the Court held that “the definition embraces *all* airborne compounds of whatever stripe, *and underscores that intent through repeated use of the word ‘any.’*” *Id.* at 529, 127 S.Ct. 1438 (quoting 42 U.S.C. § 7602(g)) (second and third emphases added). Crucially for purposes of the issue before us, the Court concluded that “[t]he statute is unambiguous.” *Id.*

Thus, we are faced with a statutory term – “air pollutant” – that the Supreme Court has determined unambiguously encompasses greenhouse gases. This phrase is preceded by the expansive term “any,” a word the Court held “underscores” Congress’s intent to include “all” air pollutants “of whatever stripe.” *See id.* Absent some compelling reason to think otherwise, “‘any’ . . . means any,” *Ford v. Mabus*, 629 F.3d 198, 206 (D.C.Cir.2010), and Petitioners have given us no reason to construe that word narrowly here. To the contrary: given both the statute’s plain language and the Supreme Court’s decision in *Massachusetts v. EPA*, we have little trouble concluding that the phrase “any air pollutant” includes *all* regulated air pollutants, including greenhouse gases.

In reaching this conclusion, we recognize that EPA’s definition of “any air pollutant” slightly narrows the literal statutory definition, which nowhere requires that “any air pollutant” be a *regulated* pollutant. *See* 42 U.S.C. § 7479(1). But this does not make the statutory language ambiguous. Indeed, “any regulated air pollutant” is the only logical reading of the statute. The CAA’s universal

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definition of “air pollutant” – the one at issue in *Massachusetts v. EPA* – provides that the term includes “any physical, chemical, biological [or] radioactive . . . substance or matter which is emitted into or otherwise enters the ambient air.” *Id.* § 7602(g). Of course, nothing in the CAA requires regulation of a substance simply because it qualifies as an “air pollutant” under this broad definition. As discussed *supra* in Parts II and III, for example, the Act requires EPA to prescribe motor vehicle “standards applicable to the emission of any air pollutant” only if that pollutant “cause[s], or contribute[s] to, air pollution which may reasonably be anticipated to endanger public health or welfare.” *Id.* § 7521(a)(1). But if “any air pollutant” in the definition of “major emitting facility” was read to encompass both regulated and nonregulated air pollutants, sources could qualify as major emitting facilities – and thus be subjected to PSD permitting requirements – if they emitted 100/250 tpy of a “physical, chemical, [or] biological” substance EPA had determined was harmless. It is absurd to think that Congress intended to subject stationary sources to the PSD permitting requirements due to emissions of substances that do not “endanger public health or welfare.” *Id.* § 7521(a)(1). Thus, “any regulated air pollutant” is, in this context, the only plausible reading of “any air pollutant.”

We find further support for this definition throughout the CAA. First, as previously mentioned, the PSD program provides that all major emitting

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facilities must install BACT for “each pollutant subject to regulation under [the CAA].” *Id.* § 7475(a)(4). “Each pollutant subject to regulation under” the Act is, of course, synonymous with “any air pollutant regulated under the Act.” Thus, EPA’s interpretation of “any air pollutant” in the definition of “major emitting facilities” harmonizes the PSD program’s scope (i.e., which pollutants trigger PSD coverage) with its substantive requirements (i.e., which pollutants must be controlled to obtain a permit). In other words, because a covered source must control greenhouse gas emissions, it makes sense that major emissions of greenhouse gases would subject that source to the PSD program.

Second, a PSD permittee is required to establish that it

will not cause, or contribute to, air pollution in excess of any (A) maximum allowable increase or maximum allowable concentration for any pollutant in any area to which this part applies more than one time per year, (B) national ambient air quality standard in any air quality control region, or (C) any other applicable emission standard or standard of performance under [the CAA].

*Id.* § 7475(a)(3). Subsections (A) and (B) prohibit a permitted source from contributing to a concentration of NAAQS pollutants that exceeds EPA’s standards. By contrast, subsection (C) has an entirely different focus: it prohibits a permitted

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source from causing or contributing to air pollution in excess of *any* CAA emission standard. Thus, as EPA notes, “what this provision establishes is that while the PSD program was certainly directed towards NAAQS-criteria pollutants, it also was directed at maintaining air quality for other pollutants regulated under other provisions.” EPA Timing & Tailoring Br. 101. EPA’s determination that “any air pollutant” means “any air pollutant regulated under the Act” – encompassing the greenhouse gases regulated under Title II – is entirely consistent with this focus.

Finally, Congress made perfectly clear that the PSD program was meant to protect against precisely the types of harms caused by greenhouse gases. The PSD provision contains a section entitled “Congressional declaration of purpose,” which provides, in relevant part, that “[t]he purposes of this part are . . . to protect public health and welfare from any actual or potential adverse effect which in the Administrator’s judgment may reasonably be anticipated to occur from air pollution.” 42 U.S.C. § 7470(1). The CAA further provides that “[a]ll language referring to effects on welfare includes, but is not limited to, effects on . . . weather . . . and climate.” *Id.* § 7602(h). As previously noted, EPA in the Endangerment Finding “marshaled . . . substantial. . . scientific evidence . . . for the proposition that greenhouse gases trap heat on earth that would otherwise dissipate into space [and] that this ‘greenhouse effect’ warms the climate.” Part II, *supra* at 28-29. It further concluded that this

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“anthropogenically induced climate change” was likely to threaten the public welfare through, among other things, “extreme weather events.” *Id.* at 15-16. Thus, one express purpose of the program is to protect against the harms caused by greenhouse gases.

In sum, we are faced with a statutory term – “any air pollutant” – that the Supreme Court has determined is “expansive,” and “unambiguous[ly]” includes greenhouse gases. *Massachusetts v. EPA*, 549 U.S. at 529, 127 S.Ct. 1438. Moreover, the PSD program requires covered sources to install control technology for “each pollutant” regulated under the CAA, 42 U.S.C. § 7475(a)(4), and to establish that they “will not cause, or contribute to, air pollution in excess of *any* . . . emission standard . . . under [the CAA].” *Id.* § 7475(a)(3) (emphasis added). These provisions demonstrate that the PSD program was intended to control pollutants regulated under every section of the Act. Finally, Congress’s “Declaration of Purpose” expressly states that the PSD program was meant, in part, to protect against adverse effects on “weather” and “climate” – precisely the types of harm caused by greenhouse gases. *See id.* § 7470(1). Given all this, we have little trouble concluding that “any air pollutant” in the definition of “major emitting facility” unambiguously means “any air pollutant regulated under the CAA.”

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**B.**

Industry Petitioners offer three alternative interpretations of the PSD permitting triggers, none of which cast doubt on the unambiguous nature of the statute.

As a preliminary matter, we note that none of Petitioners' alternative interpretations applies to Title V. To the contrary, all of the proposed alternative interpretations are based on the structure of – and purported Congressional intent behind – the PSD program. Indeed, Industry Petitioners never argue that their proposed alternative interpretations are relevant to Title V. Petitioners have thus forfeited any challenges to EPA's greenhouse gas-inclusive interpretation of Title V. *See, e.g., Nat'l Steel & Shipbuilding Co. v. NLRB*, 156 F.3d 1268, 1273 (D.C.Cir.1998) (petitioners forfeit an argument by failing to raise it in their opening brief).

Industry Petitioners' first alternative is simple enough. Because the PSD program focuses on “the air people breathe in certain geographically defined . . . areas,” Coalition for Responsible Reg. Timing & Tailoring Br. 38, Industry Petitioners contend that the term “pollutant” in the PSD statute encompasses only air pollutants that, unlike greenhouse gases, “pollute locally.” *Id.* at 35. Industry Petitioners would thus apply a greenhouse gas-exclusive interpretation of “pollutant” throughout the statute's PSD provision. Under this reading, a source would qualify as a “major emitting facility” only if it emits 100/250 tpy of

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“any air pollutant” except greenhouse gases. *See* 42 U.S.C. § 7479(1). Moreover, sources that *are* subject to PSD permitting requirements would be required to install BACT for “each pollutant subject to regulation under [the CAA]” – except greenhouse gases. *Id.* § 7475(a)(4).

We can easily dispose of Industry Petitioners’ argument that the PSD program’s “concerns with local emissions,” Coalition for Responsible Reg. Timing & Tailoring Br. 36, somehow limit the BACT provision. The statutory text provides, without qualification, that covered sources must install the “best available control technology for *each pollutant subject to regulation* under [the CAA].” 42 U.S.C. § 7475(a)(4) (emphasis added). Because greenhouse gases are indisputably a pollutant subject to regulation under the Act, it is crystal clear that PSD permittees must install BACT for greenhouse gases. “When the words of a statute are unambiguous . . . judicial inquiry is complete.” *Connecticut Nat’l Bank v. Germain*, 503 U.S. 249, 254, 112 S.Ct. 1146, 117 L.Ed.2d 391 (1992) (internal quotation marks omitted).

Equally without merit is Industry Petitioners’ argument that the PSD program’s regional focus requires a greenhouse gas-exclusive interpretation of “any air pollutant” in the definition of “major emitting facility.” In support of this contention, Industry Petitioners note that CAA Section 161 provides that states’ implementation plans for the PSD program “shall contain emission limitations and

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such other measures as may be necessary . . . to prevent *significant deterioration of air quality in each region.*” 42 U.S.C. § 7471 (emphasis added). The term “air quality,” Industry Petitioners contend, implies a focus on “the air people breathe,” and the term “in each region” suggests that Congress was concerned about local, not global, effects. See *Coalition for Responsible Reg. Timing & Tailoring* Br. 36. Moreover, Industry Petitioners note that when Congress enacted the PSD program in 1977, it did so “against the backdrop of a known universe of CAA-regulated pollutants.” *Id.* All these pollutants, Industry Petitioners argue, “were regulated because they could cause elevated ground-level concentrations in ambient air people breathe.” *Id.* And as Industry Petitioners point out, EPA itself has concluded that greenhouse gases are problematic for reasons other than local health and environmental concerns. In EPA’s Advance Notice of Proposed Rulemaking for the regulations at issue here, for example, the agency noted that “[a] significant difference between the major [greenhouse gases] and most air pollutants regulated under the CAA is that [greenhouse gases] have much longer atmospheric lifetimes [and] . . . can remain in the atmosphere for decades to centuries.” *Regulating Greenhouse Gas Emissions Under the Clean Air Act* (“Greenhouse Gas Advance Notice”), 73 Fed. Reg. 44,354, 44,400-01 (July 30, 2008). Moreover, “unlike traditional air pollutants,” greenhouse gases “become well mixed throughout the global atmosphere so that the long-term distribution of [greenhouse gas] concentrations is not dependant [sic] on local

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emission sources.” *Id.* Thus, Industry Petitioners conclude, greenhouse gases are problematic for reasons entirely distinct from the local concerns that provided the basis for the PSD program. Given this, the phrase “any air pollutant” cannot be applied to greenhouse gases in the context of the regionally-focused PSD program.

As an initial matter, we note that the Supreme Court rejected a very similar argument in *Massachusetts v. EPA*. There, EPA attempted to distinguish between greenhouse gases and other air pollution agents “because greenhouse gases permeate the world’s atmosphere rather than a limited area near the earth’s surface.” *Massachusetts v. EPA*, 549 U.S. at 529 n. 26, 127 S.Ct. 1438. The Court held that this was “a plainly unreasonable reading of a sweeping statutory provision designed to capture ‘any physical, chemical . . . substance or matter which is emitted into or otherwise enters the ambient air,’” *id.* (quoting 42 U.S.C. § 7602(g)), thus rejecting the dissent’s view that “EPA’s exclusion of greenhouse gases . . . is entitled to deference.” *Id.* As the Court noted, the purported distinction between greenhouse gases and “traditional” air pollutants “finds no support in the text of the statute, which uses the phrase ‘the ambient air’ without distinguishing between atmospheric layers.” *Id.* *Massachusetts v. EPA* thus forecloses Industry Petitioners’ argument that because greenhouse gases do not “cause elevated ground-level concentrations in ambient air people breathe,” Coalition for Responsible Reg. Timing &

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Tailoring Br. 36, EPA should have adopted a greenhouse gas-exclusive interpretation of “any air pollutant.”

We also have little trouble disposing of Industry Petitioners’ argument that the PSD program is specifically focused solely on localized air pollution. True, as Industry Petitioners note, one part of the PSD program requires states to “prevent significant deterioration of air quality in each region.” 42 U.S.C. § 7471 (emphasis added). But while localized air quality is obviously one concern of the PSD program, a comprehensive reading of the statute shows it was also meant to address a much broader range of harms. As an initial matter, the PSD provision’s “Congressional declaration of purpose” section expansively provides that the program is intended “to protect public health and welfare from *any* actual or potential adverse effect . . . *from air pollution.*” *Id.* § 7470(1) (emphasis added). Nothing in this section limits the PSD program to adverse effects on local air quality; to the contrary, the word “any” here gives this clause an “expansive meaning” which we see “no reason to contravene.” *New York*, 443 F.3d at 885 (internal quotation marks omitted). Indeed, the CAA expressly provides that effects on “welfare” means “effects on . . . weather . . . and climate.” 42 U.S.C. § 7602(h). It seems quite clear to us, then, that the PSD program was intended to protect against precisely the types of harms caused by greenhouse gases. This broad understanding of the PSD program’s scope is buttressed by the fact that the

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program requires covered sources to control “each pollutant subject to regulation under [the CAA],” and further requires sources to comply with “*any* . . . emission standard” under the CAA. *Id.* § 7475(a)(3); (a)(4) (emphasis added). These substantive requirements amount to further evidence that Congress wanted the PSD program to cover all regulated pollutants, regardless of the type of harm those pollutants cause.

In light of the PSD program’s broad scope of regulation and the express purposes of the program, we conclude – consistent with the Supreme Court in *Massachusetts v. EPA* – that Industry Petitioners’ greenhouse gas-exclusive interpretation of “pollutant” is “a plainly unreasonable reading” of the statute. *Massachusetts v. EPA*, 549 U.S. at 529 n. 26, 127 S.Ct. 1438.

## 1.

For their second alternative interpretation, Industry Petitioners argue that the PSD program’s definition of “major emitting facility” establishes a “pollutant-specific situs requirement.” Am. Chemistry Council Br. 33. Under this reading of the statute, a stationary source is subject to PSD permitting requirements only if “(1) a source has major emissions of a NAAQS criteria pollutant and (2) the source is located in an area attaining *that pollutant’s*” air quality standard. Coalition for Responsible Reg. Timing & Tailoring Br. 23. Thus, for example, a

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source would be subject to the PSD permitting requirements if it 1) emits over 100/250 tpy of sulfur dioxide (a NAAQS criteria pollutant), and 2) is located in an area that is in “attainment,” or is “unclassifiable,” for sulfur dioxide. But under this approach, a stationary source could never be subject to the PSD program solely because of its greenhouse gas emissions. After all, Industry Petitioners observe, EPA declined to make greenhouse gases a NAAQS criteria pollutant. Instead, EPA regulated greenhouse gases only under Title II of the Act, dealing with motor vehicle emissions. Because “no major source of [greenhouse gases] can be located in an area attaining the nonexistent [air quality standard] for [greenhouse gases],” *id.* at 24, Industry Petitioners point out that their reading of the statute would bring no new stationary sources under the PSD program’s ambit – alleviating any “absurd results” caused by excessive permitting requirements, *id.* at 25.

Industry Petitioners emphasize that, unlike their first proposed alternative, nothing in this approach would “wholly exempt [greenhouse gases] from PSD.” Coalition for Responsible Reg. Timing & Tailoring Reply Br. 20. Although a pollutant-specific situs requirement would limit the *number* of sources subject to the PSD program, nothing in this proposed reading of the statute would alter the substantive requirements for PSD permits, including the requirement that all regulated sources install BACT “for each pollutant subject to regulation under [the

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CAA].” 42 U.S.C. § 7475(a)(4). So, for example, under this interpretation, a hypothetical stationary source emitting more than 100/250 tpy of sulfur dioxide and located in an area designated as “in attainment” for sulfur dioxide, must still install BACT for “each pollutant subject to regulation” under the Act, including greenhouse gases. Their key point, though, is that sources emitting only major amounts of greenhouse gases – but not major amounts of a NAAQS criteria pollutant – would escape PSD permitting requirements.

Industry Petitioners’ argument in support of this interpretation proceeds in several steps. First, they argue that the term “any air pollutant,” though “capacious and flexible by itself,” “is a chameleon term” when placed in certain contexts. *Am. Chemistry Council Br. 38*. Indeed, Industry Petitioners note that EPA has already narrowed the literal meaning of the term “any air pollutant” here. After all, and as discussed *supra*, although the statutory term “air pollutant” includes “any physical [or] chemical . . . substance or matter,” 42 U.S.C. § 7602(g), EPA has long maintained that the term “any air pollutant” in the definition of “major emitting facility” encompasses only air pollutants regulated under the Act. Moreover, Industry Petitioners point out that when interpreting CAA Part C, Subpart 2, entitled “Visibility Protection,” EPA determined that the term “any pollutant” in the definition of “major stationary source” meant “any visibility-impairing pollutant.” *See Coalition for*

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Responsible Reg. Timing & Tailoring Br. 34 (emphasis added). The statute’s definition of “major stationary source” in the visibility-protection subpart is quite similar to the definition of “major emitting facility” in the PSD subpart: for the purposes of the visibility program, a “major stationary source” is defined as a “stationary source[] with the potential to emit 250 tons or more of any pollutant.” 42 U.S.C. § 7491(g)(7); *compare* 42 U.S.C. § 7479(1) (“major emitting facility” for the purposes of the PSD program is a source which “emit[s], or [has] the potential to emit,” either 100 or 250 tons per year “of any air pollutant”). These narrowed interpretations, Industry Petitioners argue, prove that the seemingly capacious term “any air pollutant” is, notwithstanding that the Supreme Court called this term “expansive” and “sweeping,” *Massachusetts v. EPA*, 549 U.S. at 529 nn. 25-26, 127 S.Ct. 1438, capable of a far more circumscribed meaning.

According to Industry Petitioners, EPA should have adopted that more circumscribed meaning by interpreting “any air pollutant” as establishing a pollutant-specific situs requirement. As Industry Petitioners point out, the PSD program requires permits for “major emitting facilit[ies] . . . in any area to which this part applies,” 42 U.S.C. § 7479(1), and defines “major emitting facilities” as stationary sources emitting 100/250 tpy of “any air pollutant.” *Id.* § 7475(a). In this context, Industry Petitioners contend, the phrases “any air pollutant” and “in any area to which this part applies” must be read in

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concert. And, Industry Petitioners argue, these phrases “*together* mean” that a source is subject to PSD permitting requirements only if it emits major amounts of “any [NAAQS] air pollutant whose NAAQS an area is attaining.” Am. Chemistry Council Br. 33.

In support of this supposedly holistic interpretation of the statute, Industry Petitioners cite CAA § 163(b), a different section of the PSD provision in which the phrase “any air pollutant” and “any area to which this part applies” are used in conjunction with one another. Unlike § 165(a), which sets permitting requirements for sources covered by the PSD program, § 163 provides guidelines for *areas* designated as “in attainment” under the program. Specifically, § 163(b) limits the “maximum allowable increase in concentrations of” airborne NAAQS pollutants that may occur in an attainment area before that area’s “attainment” status is jeopardized. *See* 42 U.S.C. § 7473(b)(1). Subsections (1) through (3) of § 163(b) – not directly relevant here – set limits on the maximum allowable increases for two specific NAAQS pollutants, sulfur dioxide and particulate matter. Subsection (4) is a catchall provision, which limits the maximum allowable increases for all other NAAQS pollutants. It is in subsection (4) that Industry Petitioners find what they believe is their payoff: the terms “any air pollutant” and “any area to which this part applies” in conjunction with one another. Section 163(b)(4) provides:

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The maximum allowable concentration of *any air pollutant in any area to which this part applies* shall not exceed a concentration for such pollutant for each period of exposure equal to –

(A) the concentration permitted under the national secondary ambient air quality standard, or

(B) the concentration permitted under the national primary ambient air quality standard,

whichever concentration is lowest for such pollutant for such period of exposure.

42 U.S.C. § 7473(b)(4) (emphasis added). As Industry Petitioners correctly point out, in this context the phrase “any air pollutant” must mean “any NAAQS pollutant,” and “in any area to which this part applies” must mean “any area that is in attainment for that NAAQS pollutant.” After all, the statute states that the “maximum allowable concentration of any air pollutant . . . shall not exceed” either the primary or secondary national ambient air quality standards. But, as Industry Petitioners observe, national ambient air standards exist only for NAAQS pollutants, so even if “any air pollutant” in CAA § 163(b)(4) was read to include non-NAAQS pollutants, the phrase, in context, would have no practical effect for those pollutants. Moreover, “any area to which this part applies” must mean “any area that is in attainment for that NAAQS pollutant,” because if an area was in nonattainment

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for a particular pollutant, Part D – rather than the PSD program – would govern emissions limits for that specific pollutant. *See id.* § 7501 (2) (“[t]he term ‘nonattainment area’ means, for any air pollutant, an area which is designated ‘nonattainment’ with respect to that pollutant”); § 7502 (c) (setting out required “Nonattainment plan provisions”). Finally, Industry Petitioners correctly note that a pollutant-specific reading of the phrase “air pollutant” must also apply to CAA § 165(a)(3)(A), which prohibits PSD permittees from “caus[ing], or contribut[ing] to, air pollution in excess of any . . . maximum allowable concentration for *any air pollutant in any area to which this part applies* more than one time per year.” *Id.* § 7475(a)(3) (A) (emphasis added). This clause, as Industry Petitioners point out, piggybacks off the NAAQS pollutant-specific definition of “maximum allowable concentration” in § 163(b)(4), prophylactically restricting PSD permittees from endangering an area’s attainment status. *See* Am. Chemistry Council Br. 32 (describing the interplay between the two provisions as “Section 163(b)(4) (and Section 165(a)(3)(A), which implements it) . . .”).

Based on all of this, Industry Petitioners conclude that because the phrase “any air pollutant in any area to which this part applies” in § 163(b)(4) means “any NAAQS pollutant in any area in attainment for that NAAQS pollutant,” an identical reading must apply to the definition of “major emitting facility.” As a result, a stationary source may be subject to the PSD program only if it emits 100/250

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typy of any NAAQS pollutant and is located in an area designated as in attainment for that NAAQS pollutant. We are unpersuaded.

Although we agree that the term “any air pollutant” is, in some contexts, capable of narrower interpretations, we see nothing in the definition of “major emitting facility” that would allow EPA to adopt a NAAQS pollutant-specific reading of that phrase. The contrast with the visibility program is instructive. There, EPA determined that “any pollutant” in the definition of “major stationary source” meant “any visibility-impairing pollutant.” *See* 40 C.F.R. pt. 51, App. Y, § II.A. But as EPA notes, the entire visibility program, codified in CAA Part C, Subpart 2, deals with visibility-impairing pollutants, as reflected in that subpart’s title: “Visibility Protection.” *See* 42 U.S.C. prec. § 7491. From this, “it naturally follows that EPA’s regulations under that section should address ‘visibility-impairing pollutants.’” EPA Timing & Tailoring Br. 99 n.19. No similar guidance can be garnered from Part C, Subpart 1, which contains the phrase “any air pollutant” at issue here. Dealing with far more than NAAQS pollutants, Part C, Subpart 1 requires, for example, covered sources to install BACT for “each pollutant subject to regulation under [the CAA].” 42 U.S.C. § 7475(a)(4). Indeed, Subpart 1 is simply – and expansively – entitled “Clean Air.” *Id.* prec. § 7470. Moreover, Congress designed the PSD program broadly to protect against “adverse effect[s]” on “public health and welfare,” *Id.* § 7470(1), including

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effects on global problems like weather and climate. *Id.* § 7602(h).

Furthermore, the phrases “any air pollutant” and “in any area to which this part applies” are used differently in Section 163(b)(4) and in the PSD program’s definition of “major emitting facility.” The presumption that “[a] term appearing in several places in a statutory text is generally read the same way each time it appears,” *Ratzlaf v. United States*, 510 U.S. 135, 143, 114 S.Ct. 655, 126 L.Ed.2d 615 (1994), “readily yields whenever there is such variation in the connection in which the words are used as reasonably to warrant the conclusion that they were employed in different parts of the act with different intent,” *Atl. Cleaners & Dyers, Inc. v. United States*, 286 U.S. 427, 433, 52 S.Ct. 607, 76 L.Ed. 1204 (1933). Here, the focus and structure of § 163(b)(4) is entirely distinct from the PSD permitting trigger. Section 163(b)(4) provides that “[t]he maximum allowable concentration of any air pollutant in any area to which this part applies shall not exceed a [particular] concentration.” 42 U.S.C. § 7473(b)(4). By contrast, § 165(a) provides that “[n]o major emitting facility . . . may be constructed in any area to which this part applies” unless certain conditions are met, *id.* § 7475(a), and § 169(1) defines “major emitting facility” as any stationary source that emits or has the potential to emit threshold amounts of “any air pollutant,” *id.* § 7479(1). The differences between these two provisions are manifest. In § 163(b)(4), the phrases “any air pollutant” and “in any area to which

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this part applies” appear next to one another, and it is the concentration of the pollutant in an area that matters. In the PSD permitting trigger, the phrases appear in different subsections and it is the location of the facility that matters. Section 163(b)(4) thus does nothing to undermine the unambiguous meaning of “any air pollutant” in the definition of “major emitting facility.”

Industry Petitioners’ pollutant-specific reading of “any air pollutant” is further undermined by contrasting Part C of the Act (the PSD program) with Part D (which regulates areas in nonattainment). Unlike Part C, Part D is expressly pollutant-specific, providing that “[t]he term ‘nonattainment area’ means, for any air pollutant, an area which is designated ‘nonattainment’ *with respect to that pollutant.*” *Id.* § 7501(2) (emphasis added). Congress thus clearly knew how to promulgate a narrow, pollutant-specific definition of “any air pollutant.” That it did so in Part D but not in Part C strongly suggests that the phrase “any air pollutant” in Part C was meant to be construed broadly. *Keene Corp. v. United States*, 508 U.S. 200, 208, 113 S.Ct. 2035, 124 L.Ed.2d 118 (1993) (“[W]here Congress includes particular language in one section of a statute but omits it in another . . . , it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion.”) (quoting *Russello v. United States*, 464 U.S. 16, 23, 104 S.Ct. 296, 78 L.Ed.2d 17 (1983)).

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A final point: Industry Petitioners observe that every area in the country has always been in attainment for at least one NAAQS criteria pollutant. *See* Tailoring Rule, 75 Fed. Reg. at 31,561. Thus, pursuant to EPA's pollutant-indifferent reading of § 165(a), under which a major emitting facility must abide by PSD requirements so long as it is located in an attainment area for *any* NAAQS pollutant, every facility in the United States has always been in an "area to which this part applies." Consequently, Industry Petitioners argue, "[i]f EPA's interpretation were right, Congress simply could have left out the phrase 'in any area to which this part applies'" in the PSD permitting trigger. Am. Chemistry Council Br. 36. But "Congress does not enact 'stillborn' laws," *id.* (quoting *Sosa v. Alvarez-Machain*, 542 U.S. 692, 714, 124 S.Ct. 2739, 159 L.Ed.2d 718 (2004)), and interpretations that render statutory language superfluous are disfavored. Am. Chemistry Council Reply Br. 19. The fact that the PSD program has applied nationwide since its inception, Industry Petitioners conclude, thus militates against EPA's pollutant-indifferent approach.

This argument fails at its premise, for Industry Petitioners confuse a lack of practical import with a lack of meaning. To say that the phrase "in any area to which this part applies" is currently without practical import is quite different than showing that the phrase means nothing. Indeed, under different circumstances, the phrase would have a significant effect. If, hypothetically, one area of the country was

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designated as “nonattainment” for every NAAQS pollutant, the phrase “in any area to which this part applies” would limit PSD coverage, as covered sources in that area would be subject only to Part D requirements. In fact, Environmental Intervenors point out that when Congress drafted the PSD permitting triggers “the prospect that some areas could be in nonattainment for all NAAQS was not far-fetched.” *Sierra Club Historic Reg. Br. 23*. “In the years leading up to 1977, EPA air quality data identified a number of areas that failed to meet all five of the then-current [air quality standards] for which EPA had gathered data.” *Id.* Accordingly, “in any area to which this part applies” is a meaningful phrase under EPA’s pollutant-indifferent interpretation of the PSD permitting triggers: it provides that sources need not obtain PSD permits if they are located in areas designated “nonattainment” for all six NAAQS pollutants.

In short, although we agree with Industry Petitioners that phrases like “any air pollutant” are, in certain contexts, capable of a more limited meaning, they have failed to identify any reasons that the phrase should be read narrowly here. Nor do we know of one. We thus conclude that EPA’s 34-year-old interpretation of the PSD permitting triggers is statutorily compelled: a source must obtain a permit if it emits major amounts of any regulated pollutant and is located in an area that is in attainment or unclassifiable for any NAAQS pollutant.

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## 2.

We can quickly dispose of Industry Petitioners' third alternative interpretation, namely, that in order to regulate new pollutants through the PSD program, EPA was required to go through the process prescribed by CAA § 166. Section 166 provides specific steps that EPA must take when designating new "pollutants for which national ambient air quality standards" apply. 42 U.S.C. § 7476(a). Here, Industry Petitioners argue, EPA unlawfully failed to follow the steps laid out in Section 166, including a required study of the pollutant and a one-year delay before the effective date of regulations, before adding greenhouse gases "to the PSD [c]onstellation." Coalition for Responsible Reg. Timing & Tailoring Br. 41.

This argument fails on its face. By its terms, § 166 applies only to new "pollutants *for which national ambient air quality standards*" apply, 42 U.S.C. § 7476(a) (emphasis added), i.e., NAAQS criteria pollutants for which regions may be classified as in "attainment," "non-attainment," or "unclassifiable." And EPA never classified greenhouse gases as a NAAQS criteria pollutant. Instead, it simply determined that under § 165, major emitters of greenhouse gases are subject to the PSD program and all covered sources must install BACT for greenhouse gases. Contrary to Industry Petitioners' arguments, then, § 166 has no bearing on this addition of greenhouse gases into "the PSD [c]onstellation." Coalition for Responsible Reg. Timing

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& Tailoring Br. 41. Indeed, we rejected a nearly identical argument in *Alabama Power*, holding that there is “no implied or apparent conflict between sections 165 and 166; nor . . . must the requirements of section 165 be ‘subsumed’ with those of section 166.” *Alabama Power*, 636 F.2d at 406. Stating what should have been obvious from the text of the statute, we concluded: “[S]ection 166 has a different focus from section 165.” *Id.*

Thus, because EPA has never classified greenhouse gases as a NAAQS criteria pollutant, the § 166 requirements are entirely inapplicable here. This section of the CAA has absolutely no bearing on our conclusion that EPA’s interpretation of the PSD permitting trigger is compelled by the statute itself.

**VI.**

Having concluded that the CAA requires PSD and Title V permits for major emitters of greenhouse gases, we turn to Petitioners’ challenges to the Tailoring and Timing Rules themselves.

As an initial matter, we note that Petitioners fail to make any real arguments against the Timing Rule. To be sure, at one point State Petitioners contend that the Timing Rule constitutes an attempt “to extend the PSD and Title V permitting requirements to greenhouse-gas emissions,” State Pet’rs’ Timing & Tailoring Br. 67. This is plainly incorrect. As discussed in the previous section, greenhouse gases are regulated under PSD and Title V pursuant to

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automatic operation of the CAA. All the Timing Rule did was delay the applicability of these programs, providing that major emitters of greenhouse gases would be subject to PSD and Title V permitting requirements only once the Tailpipe Rule actually took effect on January 2, 2011. *See* Timing Rule, 75 Fed. Reg. at 17,017-19. Despite this, Petitioners confusingly urge us to vacate “[t]he Tailoring *and* Timing Rules,” *e.g.* State Pet’rs’ Timing & Tailoring Br. 24 (emphasis added), although it is unclear what practical effect vacature of the Timing Rule would have. Nonetheless, given this phrasing of their argument, and given our conclusion that Petitioners lack Article III standing to challenge *both* rules, we shall, where appropriate, discuss the Timing Rule in conjunction with the Tailoring Rule.

In the Tailoring Rule, EPA announced that it was “relieving overwhelming permitting burdens that would, in the absence of this rule, fall on permitting authorities and sources.” Tailoring Rule, 75 Fed. Reg. at 31,516. Although the PSD statute requires permits for sources with the potential to emit 100/250 tpy of “any air pollutant,” 42 U.S.C. § 7479(1), EPA noted that immediate application of that threshold to greenhouse gas-emitting sources would cause permit applications to jump from 280 per year to over 81,000 per year. Tailoring Rule, 75 Fed. Reg. at 31,554. Many of these applications would come from commercial and residential sources, which would “each incur, on average, almost \$60,000 in PSD permitting expenses.” *Id.* at 31,556. Similarly, if the Title V 100

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tpy threshold applied immediately to greenhouse gases, sources needing operating permits would jump from 14,700 per year to 6.1 million per year. *Id.* at 31,562. “The great majority of these sources would be small commercial and residential sources” which “would incur, on average, expenses of \$23,175.” *Id.* And were permitting authorities required to hire the 230,000 full-time employees necessary to address these permit applications, “authorities would face over \$21 billion in additional permitting costs each year due to [greenhouse gases], compared to the current program cost of \$62 million each year.” *Id.* at 31,563.

Thus, instead of immediately requiring permits for all sources exceeding the 100/250 tpy emissions threshold, EPA decided to “phas[e] in the applicability of these programs to [greenhouse gas] sources, starting with the largest [greenhouse gas] emitters.” *Id.* at 31,514. The Tailoring Rule established the first two steps in this phased-in process. During Step One, only sources that were “subject to PSD requirements for their conventional pollutants anyway” (i.e., those sources that exceeded the statutory emissions threshold for non-greenhouse gas pollutants) were required to install BACT for their greenhouse gas emissions. *Id.* at 31,567. Step Two, which took effect on July 1, 2011, also requires PSD permits for sources with the potential to emit over 100,000 tpy CO<sub>2</sub>e after a proposed construction project, or 75,000 tpy CO<sub>2</sub>e after a proposed modification project. *Id.* at 31,523. Step Two further requires Title V permits for sources

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which have the potential to emit over 100,000 tpy CO<sub>2</sub>e. *Id.* at 31,516. EPA has since proposed – but has yet to finalize – a “Step Three,” which would maintain the current thresholds while the agency evaluates the possibility of regulating smaller sources. *See* EPA’s 28(j) Letter 1-2, February 27, 2012.

In the Tailoring Rule, EPA justified its phased-in approach on three interrelated grounds, each of which rests on a distinct doctrine of administrative law. First, EPA concluded “the costs to sources and administrative burdens . . . that would result from [immediate] application of the PSD and title V programs . . . at the statutory levels . . . should be considered ‘absurd results,’” which Congress never intended. *Id.* at 31,517; *see Am. Water Works Ass’n v. EPA*, 40 F.3d 1266, 1271 (D.C.Cir.1994) (“[W]here a literal reading of a statutory term would lead to absurd results, the term simply has no meaning . . . and is the proper subject of construction by EPA and the courts.”). Thus, under the “absurd results” doctrine, EPA concluded that the PSD and Title V programs “should not [immediately] be read to apply to all [greenhouse gas] sources at or above the 100/250 tpy threshold.” Tailoring Rule, 75 Fed. Reg. at 31,554. Second, emphasizing that immediate regulation at the 100/250 tpy threshold would cause tremendous administrative burden, EPA justified its deviation from this threshold on the basis of the “administrative necessity” doctrine. *Id.* at 31,576; *see Env’tl. Def. Fund, Inc. v. EPA*, 636 F.2d 1267, 1283 (D.C.Cir.1980) (“[A]n agency may depart from the

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requirements of a regulatory statute . . . to cope with the administrative impossibility of applying the commands of the substantive statute.”). Finally, asserting that there exists a judicial doctrine that allows agencies to implement regulatory programs in a piecemeal fashion, EPA stated that the Tailoring Rule was justified pursuant to this “one-step-at-a-time” doctrine. Tailoring Rule, 75 Fed. Reg. at 31,578; see *Massachusetts v. EPA*, 549 U.S. at 524, 127 S.Ct. 1438 (“Agencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop.”).

Petitioners – particularly State Petitioners – argue that none of these doctrines permit EPA to “depart unilaterally from the [CAA’s] permitting thresholds and replace them with numbers of its own choosing.” State Pet’rs’ Timing & Tailoring Br. 29. Admitting the “lamentable policy consequences of adhering to the unambiguous numerical thresholds in the Clean Air Act,” State Petitioners rather colorfully argue that EPA’s attempts to alleviate those burdens “establish only that EPA is acting as a benevolent dictator rather than a tyrant.” *Id.* at 26. And because EPA exceeded the boundaries of its lawful authority Petitioners urge us to vacate the Tailoring Rule.

Before we may address the merits of these claims, however, we must determine whether we have jurisdiction. “No principle,” the Supreme Court has repeatedly explained, “is more fundamental to the judiciary’s proper role in our system of government than the constitutional limitation of federal-court

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jurisdiction to actual cases or controversies.” *Raines v. Byrd*, 521 U.S. 811, 818, 117 S.Ct. 2312, 138 L.Ed.2d 849 (1997) (internal quotation marks omitted). The doctrine of standing “is an essential and unchanging part of the case-or-controversy requirement.” *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560, 112 S.Ct. 2130, 119 L.Ed.2d 351 (1992). To establish standing, a petitioner must have suffered an “injury in fact” that is 1) “concrete and particularized . . . [and] actual or imminent, not conjectural or hypothetical,” 2) was caused by the conduct complained of, and 3) is “likely, as opposed to merely speculative [to] be redressed by a favorable decision.” *Id.* at 560-61, 112 S.Ct. 2130 (internal quotation marks and citations omitted).

Petitioners fall far short of these “irreducible constitutional . . . elements” of standing, *id.* at 560, 112 S.Ct. 2130. Simply put, Petitioners have failed to establish that the Timing and Tailoring Rules caused them “injury in fact,” much less injury that could be redressed by the Rules’ vacatur. Industry Petitioners contend that they are injured because they are subject to regulation of greenhouse gases, Coalition for Responsible Reg. Timing & Tailoring Br. 14. State Petitioners claim injury because they own some regulated sources and because they now carry a heavier administrative burden. State Pet’rs’ Timing & Tailoring Br. 22-23. But as discussed above, *see supra* Part V, the CAA mandates PSD and Title V coverage for major emitters of greenhouse gases. Thus, Industry Petitioners were regulated and State

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Petitioners required to issue permits not because of anything EPA did in the Timing and Tailoring Rules, but by automatic operation of the statute. Given this, neither the Timing nor Tailoring Rules caused the injury Petitioners allege: having to comply with PSD and Title V for greenhouse gases.

Indeed, the Timing and Tailoring Rules actually mitigate Petitioners' purported injuries. Without the Timing Rule, Petitioners may well have been subject to PSD and Title V for greenhouse gases before January 2, 2011. Without the Tailoring Rule, an even greater number of industry and state-owned sources would be subject to PSD and Title V, and state authorities would be overwhelmed with millions of additional permit applications. Thus, Petitioners have failed to "show that, absent the government's allegedly unlawful actions, there is a substantial probability that they would not be injured and that, if the court affords the relief requested, the injury will be removed." *Chamber of Commerce v. EPA*, 642 F.3d 192, 201 (D.C.Cir.2011) (quotations and alterations omitted). Far from it. If anything, vacature of the Tailoring Rule would significantly exacerbate Petitioners' injuries.

Attempting to remedy this obvious jurisdictional defect, State Petitioners present two alternative theories, neither of which comes close to meeting the "irreducible constitutional . . . elements" of standing. *Lujan*, 504 U.S. at 560, 112 S.Ct. 2130. First, State Petitioners counterintuitively suggest that they actually want EPA to immediately "appl[y] the

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100/250 tpy permitting thresholds to greenhouse-gas emissions.” State Pet’rs’ Timing & Tailoring Reply Br. 15. Admitting that vacature of the Tailoring Rule would result in astronomical costs and unleash chaos on permitting authorities, State Petitioners predict that Congress will be forced to enact “corrective legislation” to relieve the overwhelming permitting burdens on permitting authorities and sources, thus mitigating their purported injuries. *Id.*

This theory fails. To establish standing, plaintiffs must demonstrate that it is “likely, as opposed to merely speculative, that the injury will be redressed by a favorable decision,” *Lujan*, 504 U.S. at 561, 112 S.Ct. 2130 (internal quotation marks omitted), but here, State Petitioners simply hypothesize that Congress will enact “corrective legislation.” State Pet’rs’ Timing & Tailoring Reply Br. 15. We have serious doubts as to whether, for standing purposes, it is ever “likely” that Congress will enact legislation at all. After all, a proposed bill must make it through committees in both the House of Representatives and the Senate and garner a majority of votes in both chambers – overcoming, perhaps, a filibuster in the Senate. If passed, the bill must then be signed into law by the President, or go back to Congress so that it may attempt to override his veto. As a generation of schoolchildren knows, “by that time, it’s very unlikely that [a bill will] become a law. It’s not easy to become a law.” Schoolhouse Rock, *I’m Just a Bill*, at 2:41, available at <http://video.google.com/videoplay?docid=7266360872513258185#> (last visited June 1, 2012).

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And even if the astronomical costs associated with a 100/250 tpy permitting threshold make *some* Congressional action likely, State Petitioners are still unable to show that it is “likely, as opposed to merely speculative,” *Lujan*, 504 U.S. at 561, 112 S.Ct. 2130, that Congress will redress their injury. State Petitioners apparently assume that if the 100/250 tpy permitting threshold was immediately applied to greenhouse gases, Congress would exempt those pollutants from the PSD and Title V programs entirely. But this is just one of many forms “corrective legislation” could take. For example, were we to vacate the Tailoring Rule, Congress could decide to readopt its key provisions in the PSD and Title V statutes. Or it could set PSD and Title V permitting thresholds at 25,000 tpy for greenhouse gases – higher than the 100/250 tpy threshold, but lower (and thus more costly to Petitioners) than the thresholds promulgated in the Tailoring Rule. Or it could do something else entirely. All of this is guesswork, which is precisely the point: State Petitioners’ faith that Congress will alleviate their injury is inherently speculative.

State Petitioners’ second alternative theory of standing fares no better. In their reply brief, they contend that even if vacating the Timing or Tailoring Rules would indeed exacerbate their costs and administrative burdens (the purported injuries they claimed in their opening brief), “then State Petitioners can establish Article III standing under *Massachusetts* by asserting injuries caused by EPA’s

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failure to regulate sooner.” State Pet’rs’ Timing & Tailoring Reply Br. 5. Essentially, State Petitioners’ reply brief contends that, contrary to the position taken in the opening brief, they want more regulation, not less, and that they wanted regulation sooner rather than later. And because the Commonwealth of Massachusetts had standing to seek regulation of greenhouse gases in *Massachusetts v. EPA*, State Petitioners argue that they now have standing to seek more regulation of greenhouse gases as well.

This argument is completely without merit. As an initial matter, we are aware of no authority which permits a party to assert an entirely new injury (and thus, an entirely new theory of standing) in its reply brief. Quite to the contrary, we have held that, where standing is not self-evident, “[i]n its *opening* brief, the petitioner should . . . include . . . a concise recitation of the basis upon which it claims standing.” *Sierra Club v. EPA*, 292 F.3d 895, 901 (D.C.Cir.2002) (emphasis added); *see also* D.C.Cir. R. 28(a)(7) (“[i]n cases involving direct review in this court of administrative actions, the brief of the appellant or petitioner must set forth the basis for the claim of standing.”); *American Library Ass’n v. FCC*, 401 F.3d 489, 493-94 (D.C.Cir.2005) (discussing limitations on this principle). After all, “it is often the case . . . that some of the relevant facts are known only to the petitioner, to the exclusion of both the respondent and the court.” *Sierra Club*, 292 F.3d at 901. If “the petitioner does not submit evidence of those facts

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with its opening brief,” the respondent is “left to flail at the unknown in an attempt to prove the negative.” *Id.* This principle is particularly important here, for State Petitioners’ asserted fear of global warming stands in stark contrast to the position they took throughout this litigation. In an earlier brief, for example, they characterized the Endangerment Finding as “a subjective conviction” State Pet’rs’ Endangerment Br. 19, “supported by highly uncertain climate forecasts,” *id.* at 18, and “offer[ing] no criteria for determining a harmful, as opposed to a safe, climate,” *id.* at 17. Given this, EPA could not possibly have anticipated that State Petitioners, abruptly donning what they themselves call “an environmentalist hat,” State Pet’rs’ Timing & Tailoring Reply Br. 4, would assert that global warming causes them concrete and particularized harm.

In any event, State Petitioners fail to cite any record evidence to suggest that they are adversely affected by global climate change. This is in stark contrast to the evidence put forward in *Massachusetts v. EPA*, where the Commonwealth submitted unchallenged affidavits and declarations showing that 1) rising sea tides due to global warming had “already begun to swallow Massachusetts’ coastal land,” and 2) “[t]he severity of that injury will only increase over the course of the next century.” *Massachusetts v. EPA*, 549 U.S. at 522-23, 127 S.Ct. 1438. These specific, factual submissions were key to the standing analysis in *Massachusetts v. EPA*: the

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Court held that “petitioners’ *submissions as they pertain to Massachusetts* have satisfied the most demanding standards of the adversarial process.” *Id.* at 521, 127 S.Ct. 1438 (emphasis added). It is true, as State Petitioners emphasize, that the Supreme Court held that states are “entitled to special solicitude in our standing analysis.” *Id.* at 522, 127 S.Ct. 1438. But nothing in the Court’s opinion remotely suggests that states are somehow exempt from the burden of establishing a concrete and particularized injury in fact. State Petitioners, like Industry Petitioners, failed to do so here. We shall thus dismiss all challenges to the Timing and Tailoring Rules for lack of jurisdiction.

**VII.**

Following promulgation of the Timing and Tailoring Rules, EPA issued a series of rules ordering states to revise their PSD State Implementation Plans (SIPs) to accommodate greenhouse gas regulation. See *Action to Ensure Authority to Issue Permits Under the Prevention of Significant Deterioration Program to Sources of Greenhouse Gas Emissions: Finding of Substantial Inadequacy and SIP Call*, 75 Fed. Reg. 53,892 (Sept. 2, 2010), 75 Fed. Reg. 77,698 (Dec. 13, 2010); *Action to Ensure Authority to Issue Permits Under the Prevention of Significant Deterioration Program to Sources of Greenhouse Gas Emissions: Finding of Failure to Submit State Implementation Plan Revisions Required for Greenhouse Gases*, 75 Fed. Reg. 81,874

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(Dec. 29, 2010). Industry Petitioners present several challenges to these SIP-related rules. But our review in this case is limited to four EPA decisions: the Endangerment Finding, the Tailpipe Rule, and the Timing and Tailoring Rules. We thus lack jurisdiction over the SIP-related rules. Moreover, challenges to these rules are currently pending in at least two separate cases before this court. *See Utility Air Regulatory Group v. EPA*, No. 11-1037 (consolidating various challenges); *Texas v. EPA*, No. 10-1425 (challenge brought by Texas). We decline Industry Petitioners' invitation to rule on the merits of cases which are properly before different panels.

**VIII.**

For the foregoing reasons, we dismiss all petitions for review of the Timing and Tailoring Rules, and deny the remainder of the petitions.

*So ordered.*

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United States Court of Appeals  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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Filed: December 20, 2012

No. 09-1322

COALITION FOR RESPONSIBLE REGULATION, INC., ET AL.,  
PETITIONERS

v.

ENVIRONMENTAL PROTECTION AGENCY, RESPONDENT  
STATE OF MICHIGAN, ET AL., INTERVENORS

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Consolidated with 10-1024, 10-1025, 10-1026,  
10-1030, 10-1035, 10-1036, 10-1037, 10-1038,  
10-1039, 10-1040, 10-1041, 10-1042, 10-1044,  
10-1045, 10-1046, 10-1234, 10-1235, 10-1239,  
10-1245, 10-1281, 10-1310, 10-1318, 10-1319,  
10-1320, 10-1321

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No. 10-1073

COALITION FOR RESPONSIBLE REGULATION, INC., ET AL.,  
PETITIONERS

v.

ENVIRONMENTAL PROTECTION AGENCY, RESPONDENT  
AMERICAN FROZEN FOOD INSTITUTE, ET AL.,  
INTERVENORS

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Consolidated with 10-1083, 10-1099, 10-1109,  
10-1110, 10-1114, 10-1118, 10-1119, 10-1120, 10-1122,  
10-1123, 10-1124, 10-1125, 10-1126, 10-1127, 10-1128,  
10-1129, 10-1131, 10-1132, 10-1145, 10-1147, 10-1148,  
10-1199, 10-1200, 10-1201, 10-1202, 10-1203,  
10-1206, 10-1207, 10-1208, 10-1210, 10-1211,  
10-1212, 10-1213, 10-1216, 10-1218, 10-1219,  
10-1220, 10-1221, 10-1222

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No. 10-1092

COALITION FOR RESPONSIBLE REGULATION, INC., ET AL.,  
PETITIONERS

v.

ENVIRONMENTAL PROTECTION AGENCY, RESPONDENT  
LANGBOARD, INC.-MDF, ET AL., INTERVENORS

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Consolidated with 10-1094, 10-1134, 10-1143,  
10-1144, 10-1152, 10-1156, 10-1158, 10-1159, 10-1160,  
10-1161, 10-1162, 10-1163, 10-1164, 10-1166, 10-1182

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No. 10-1167

AMERICAN CHEMISTRY COUNCIL, PETITIONER

v.

ENVIRONMENTAL PROTECTION AGENCY AND  
LISA PEREZ JACKSON, ADMINISTRATOR,  
U.S. ENVIRONMENTAL PROTECTION AGENCY,  
RESPONDENTS

CHAMBER OF COMMERCE OF THE UNITED STATES  
OF AMERICA, ET AL., INTERVENORS

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Consolidated with 10-1168, 10-1169, 10-1170,  
10-1173, 10-1174, 10-1175, 10-1176, 10-1177,  
10-1178, 10-1179, 10-1180

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On Petitions for Rehearing En Banc

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Before: SENTELLE\*, *Chief Judge*, and  
HENDERSON, ROGERS\*, TATEL\*, GARLAND,  
BROWN\*, GRIFFITH, and KAVANAUGH\*, *Circuit  
Judges*.

**ORDER**

The petition of the Chamber of Commerce of the United States of America, joined by the State of Alaska, Peabody Energy Company, Southeastern Legal Foundation, et al., State Petitioners and Intervenors for Petitioners, for rehearing en banc; and the petition of the National Association of Manufacturers, et al. for rehearing en banc in No. 10-1073, et al. and No. 10-1167, et al., and the responses to the petitions were circulated to the full court, and a vote was requested. Thereafter, a majority of the judges eligible to participate did not vote in favor of the petitions. Upon consideration of the foregoing, it is



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many of the arguments her dissent now presses. In particular, it rebuffed EPA's attempt to use "postenactment congressional actions and deliberations" to obscure "the meaning of an otherwise-unambiguous statute," *id.* at 529, and found EPA's reliance on *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120 (2000), "similarly misplaced," *Massachusetts v. EPA*, 549 U.S. at 530. Seeking to revive the *Brown & Williamson* argument, Judge Brown suggests that the Court never considered the "far-reaching effects" of extending greenhouse gas regulation to stationary sources. *See* Dissenting Op. at 18 (Brown, J.). But this is inaccurate – the briefs before the Court explicitly raised the argument that interpreting "air pollutant" to include greenhouse gases could have tremendous consequences for stationary-source regulation. *See, e.g.,* Brief of Respondent CO<sub>2</sub> Litigation Group, *Massachusetts v. EPA*, 549 U.S. 497 (2007) (No. 05-1120), 2006 WL 3043971 at \*19-\*31.

To the extent Judge Brown attempts to bypass *Massachusetts v. EPA* by focusing on the statutory condition that air pollution "*reasonably be anticipated to endanger* public health or welfare," 42 U.S.C. § 7521(a)(1) (emphasis added), her quarrel is not just with the Supreme Court, but also with EPA's assessment of the science. Of course, we agree that the statute requires EPA to find a particular causal nexus between the pollutant and the harm in order to regulate. *See* Dissenting Op. at 9 (Brown, J.). But that is exactly what EPA did: it found that

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“greenhouse gases in the atmosphere may *reasonably be anticipated* both to endanger public health and to endanger public welfare.” *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66,496, 66,497 (Dec. 15, 2009). And, as the panel opinion explains, EPA’s scientific judgment about the causal relationship between greenhouse gases and climate change is a scientific determination entitled to “an extreme degree of deference.” *Coalition for Responsible Regulation v. EPA*, 684 F.3d 102, 120 (D.C. Cir. 2012) (quoting *American Farm Bureau Federation v. EPA*, 559 F.3d 512, 519 (D.C. Cir. 2009)). The dissent’s suggestion that EPA was somehow statutorily precluded from finding the requisite nexus between greenhouse gases and harm to public health and welfare, *see* Dissenting Op. at 10-11 (Brown, J.), is belied by the Supreme Court’s decision to remand precisely this question. *See Massachusetts v. EPA*, 549 U.S. at 532-35.

Judge Kavanaugh’s dissent relates to the scope of the Prevention of Significant Deterioration (“PSD”) program, an aspect of the panel opinion Judge Brown also rejects. Specifically, Judge Kavanaugh disagrees with EPA’s longstanding interpretation of the term “any air pollutant,” 42 U.S.C. § 7479(1), arguing that, in the context of the PSD program, “any air pollutant” refers not to all pollutants regulated under the Clean Air Act, but only to the six NAAQS pollutants. Because taking the statute at its word and interpreting “any air pollutant” to include greenhouse

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gases would lead to what he considers absurd results, Judge Kavanaugh insists that EPA and this Court are obligated to read “any air pollutant” more narrowly. *See* Dissenting Op. at 3-10 (Kavanaugh, J.). This argument, however, hinges on the proposition that both readings are plausible interpretations of an ambiguous statutory provision. *See* Dissenting Op. at 2-3, 10 (Kavanaugh, J.). But as the panel opinion explains at length, the statute is clear. *See Coalition for Responsible Regulation*, 684 F.3d at 132-44. Congress did not say “certain ‘air pollutants.’” Dissenting Op. at 2 (Kavanaugh, J.). It said “any air pollutant,” and it meant it. *See Coalition for Responsible Regulation*, 684 F.3d at 136. Thus, unlike the unreasonable interpretation rejected in *Kloeckner v. Solis*, No. 11-184, slip op. at 7-13 (U.S. 2012), the panel’s interpretation of the statute is the only plausible one.

Moreover – and again, as the panel opinion explains at length, *see Coalition for Responsible Regulation*, 684 F.3d at 135-36 – considering “any air pollutant” in context buttresses rather than undermines the panel’s interpretation. The statute frames the purpose of the PSD program in broad – not NAAQS-specific – terms, emphasizing that the program’s goal is “to protect public health and welfare from any actual or potential adverse effect which . . . may reasonably be anticipate[d] to occur from air pollution.” 42 U.S.C. § 7470(1). And although certain aspects of the program are specifically directed at NAAQS pollutants, *see, e.g., id.* § 7473(b)(4), the

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program as a whole plainly has a more expansive scope. For instance, covered sources are required to (1) install the best available control technology for “*each* pollutant subject to regulation under [the Act],” *id.* § 7475(a)(4) (emphasis added), and (2) demonstrate that they will not cause or contribute to “*any* . . . applicable emission standard” under the Act, *id.* § 7475(a)(3) (emphasis added).

In the end, we agree that “the question here is: Who Decides?” Dissenting Op. at 18 (Kavanaugh, J.). We also agree that “Congress (with the President) sets the policy through statutes, agencies implement that policy within statutory limits, and courts in justiciable cases ensure that agencies stay within the statutory limits set by Congress.” Dissenting Op. at 18 (Kavanaugh, J.). Here, Congress spoke clearly, EPA fulfilled its statutory responsibilities, and the panel, playing its limited role, gave effect to the statute’s plain meaning. *See Chevron, U.S.A., Inc. v. NRDC*, 467 U.S. 837, 842-43 (1984) (“If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.”).

To be sure, the stakes here are high. The underlying policy questions and the outcome of this case are undoubtedly matters of exceptional importance. The legal issues presented, however, are straightforward, requiring no more than the application of clear statutes and binding Supreme Court precedent. There is no cause for en banc review.

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BROWN, *Circuit Judge*, dissenting from the denial of rehearing en banc: In the summer of 1974, while waiting to start classes at UCLA, I was lucky enough to obtain a summer job house sitting in the pleasant, upscale neighborhood of Pasadena. Known mostly for its Rose Parade and Rose Bowl, Pasadena is one of the more scenic exurbs of Los Angeles. I inhabited a sparsely furnished, modest-but-pricey bungalow set among the lush landscape typical of southern California. This is a place where Birds of Paradise grow ten feet tall and the magenta blossoms of Bougainvillea fall like lavish draperies from redwood garden trellises. After staying in the house more than a month and spending a restless night listening to the agitated thrashings of the jacaranda trees in a fitful wind, I stumbled bleary-eyed into the kitchen, looked out the window, and stopped – utterly dumbfounded. There – looking like it was but a few feet beyond the back fence – stood a mountain. Not a foothill. Not an unobtrusive mesa. A mountain! Closer inspection revealed not a lone majestic peak, but a whole mountain range I later identified as the San Gabriels. In those days, the air in the Los Angeles basin was so thick with smog that a mountain, or even a nearby mountain range, could simply disappear.

Although the Los Angeles basin was among the most notorious examples of the phenomenon, it was by no means unique and certainly not the worst. It was this crisis of ambient air quality that precipitated the enactment of the Clean Air Act (CAA). But as the CAA's history, language, and

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structure make clear, Congress never intended the Act to serve as an environmental cure-all. It was targeted legislation designed to remedy a particular wrong: the harmful direct effects of poisoned air on human beings and their local environs. This is what Congress understood as “air pollution which may reasonably be anticipated to endanger public health” in the tailpipe emissions provision, 42 U.S.C. § 7521(a)(1). The Supreme Court in *Massachusetts v. EPA*, 549 U.S. 497 (2007), however, concluded otherwise. In dicta too suggestive to ignore, the Court implicitly assumed that climate change could provide the basis for an endangerment finding in the tailpipe context. *See id.* at 532-33.

Bound as I am by *Massachusetts*, I reluctantly concur with the Panel’s determination that EPA may regulate GHGs in tailpipe emissions. But I do not choose to go quietly. Because the most significant regulations of recent memory rest on the shakiest of foundations, Part I of this statement engages *Massachusetts’s* interpretive shortcomings in the hope that either Court or Congress will restore order to the CAA. Part II, by contrast, reflects my belief that *Massachusetts* does not compel the same result for Title V and the Prevention of Significant Deterioration of Air Quality (PSD) program. Although I agree with Judge Kavanaugh’s dissent, *Coal. for Responsible Regulation v. EPA*, Nos. 09-1322, et al. (Kavanaugh, J., dissenting from denial of rehearing en banc), I approach the inflection point from a

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slightly different perspective. Part III concludes with a brief note on standing.

Because I would vote for the full court to consider the propriety of extending *Massachusetts* to Title V and the PSD program, I respectfully dissent from this denial of rehearing en banc.

**I.****A.**

The origins of the Clean Air Act are closely tied to fatal fogs and deadly air inversions that, for much of early postindustrial history, seemed to be the inevitable consequence of economic progress. See Arnold W. Reitze, Jr., *A Century of Air Pollution Control Law: What's Worked; What's Failed; What Might Work*, 21 ENVTL. L. 1549, 1575 (1991).<sup>1</sup> Initially regulated at the local and state level, air pollution became the focus of the federal government only after World War II. See *id.* at 1585-86. In October 1948, a severe temperature inversion in the industrial city of Donora, Pennsylvania increased air pollution to such an extent that traffic “was virtually stopped because of lack of visibility.” The inversion killed 20 people, *id.*, and prompted the federal government to begin researching air pollution. *Id.* at 1586. By 1961,

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<sup>1</sup> Inversions, sometimes known as “Londoners,” occur “when a layer of hot air warmed by . . . water exists above cooler ground-level air and traps smoke and particulate matter under the warmer air.” *Id.*

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President Kennedy included a plea for “an effective air pollution program” in his Special Message on the Natural Resources. *Id.* Public pressures for legislation only increased when a “Killer Smog” engulfed London in December 1962, killing at least 340, and a similar inversion in New York City allegedly claimed the lives of 200. *Id.* Eventually, legislation recommended by President Kennedy in February 1963 led to the enactment of the CAA, which President Johnson signed into law on December 17, 1963. *Id.* at 1586-87. Seven years later, President Nixon signed The Clean Air Amendments of 1970. The 1970 Amendments authorized the EPA to prescribe national ambient air quality standards (NAAQS) and created the statutory framework that still exists today.

**B.**

It was no happy accident that congressional draftsmen titled the legislation the “*Clean Air Act.*” Ambient air quality was the point, purpose, and focus of the CAA. Congress had set its sights on the “dirty, visible ‘smokestack’ emissions,” 136 CONG. REC. H2771-03 (1990) (statement of Rep. Roe), and smog caused by vehicle emissions. The CAA was the means by which Congress would grapple with urban air pollution and its attendant health effects, including impaired breathing, heart disease, lung damage and lung disease, and even death. If pollution was the problem, these ills were the specific harms Congress sought to combat. Even a cursory glance at the

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legislative history, with its numerous charts, graphics, and statistics detailing cancer and death rates, will bear this point out. *See, e.g.*, Hearings on Air Pollution – 1968 Before the Subcomm. on Air and Water Pollution of the Sen. Comm. on Pub. Works, 90th Cong. 2nd Sess., pt. 2, 608-20 (1968) (statement of Dr. Samuel S. Epstein, Children’s Cancer Research Foundation.) (“Air Pollution – 1968”).

With the enactment of the 1990 Amendments, Congress expanded the Act beyond its singular emphasis on urban air quality to address hazardous – *i.e.*, toxic – air pollutants, acid rain, and stratospheric ozone. In regulating hazardous pollutants, Congress reemphasized the need for a close and tangible nexus between pollutant and harm. The legislative record, for example, continued to conceive of dangers in terms of their direct effects on human health and well-being. *See, e.g.*, S. Rep. No. 101-228, at 3388 (1989), *reprinted in* 1990 U.S.C.C.A.N. 3385 (“Air pollution can silently damage our lungs and heart or act swiftly in the case of exposure to toxic air pollutants. Rigorous regulation of toxic air pollutants is needed to avoid risk of serious, irreversible damage to human health.”). To the extent the regulation of stratospheric ozone and acid rain suggest a broader nexus between pollutant and harm to human health, the very particular way in which Congress handled these exceptions goes a long way toward proving the rule: Congress only expands the CAA through considered legislative acts.

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In addressing these transnational phenomena, the legislature did not spin regulations out of whole cloth. With ozone concerns, for example, Congress developed solutions through international negotiations, the implementation of which led to the creation of a separate title of the CAA. *See NRDC v. EPA*, 464 F.3d 1, 3 (D.C. Cir. 2006). Likewise, years of contentious discussions with Canada helped bring about the acid rain provisions in the 1990 Amendments. *See generally* Dennis A. Leaf, *Intergovernmental Cooperation: Air Pollution from an U.S. Perspective*, 18 CAN.-U.S. L.J. 245 (1992). Simply put, when Congress became aware of new dangers, it acted judiciously in crafting workable remedies that, when they obtained the necessary political support, were worked into their own discrete provisions under the Act. Neither Congress nor the EPA attempted to force these distinct problems into existing, ill-suited regulatory schemes.

Congressman Waxman, one of the strongest proponents of stringent air pollution controls and a key force behind the 1990 Amendments, has stated that “in recent experience, no legislation has received more scrutiny during its consideration.” The Honorable Henry A. Waxman, *An Overview of the Clean Air Act Amendments of 1990*, 21 ENVTL. L. 1721, 1724 (1991). Hyperbole or not, the admission is telling. The history of the CAA is one of hard-fought incremental gains through which Congress remedied particular environmental wrongs with tailored remedies. Said the Congressman:

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Discrete and extensive new programs are included to grapple with high ambient pollution levels (urban and regional smog), hazardous air pollution, acid rain, and depletion of the stratospheric ozone layer. Each of these programs [was] tailored to the problem it [sought] to address, and each [was] quite different in its approach.”

*Id.* at 1811. Political necessity has forced Congress to calibrate its amendments to the CAA with great specificity and care. Where our Representatives have acted with such caution, any suggestion that Congress has – through a single word – conferred upon EPA the authority to steamroll through Congressional gridlock, upend the Senate’s rejection of the Kyoto Protocol, and regulate GHGs for the whole of American industry must necessarily fail. The legislature, recall, does not “hide elephants in mouseholes.” *Whitman v. Am. Trucking Assocs.*, 531 U.S. 457, 468 (2001).

But we needn’t rely on interpretative canons alone to make this point. In drafting the 1990 Amendments, Congress considered – and *expressly rejected* – proposals authorizing EPA to regulate GHGs under the CAA. *See* S. Rep. No. 101-228, at 377 (1989), *as reprinted in* 1990 U.S.C.C.A.N. 3385, 3760. Even the Executive objected that an attempt to control Carbon Dioxide (CO<sub>2</sub>) emissions – emissions not harmful to health – in order to prevent global warming was premature. *See* Administration’s Amendments – Hearings Before the Subcomm. On

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Health and the Env't of the Comm. on Energy and Commerce, 101st Cong., 1st Sess. (1989) (includes Bush Administration Report on S. 1630). The Executive's critique noted that "unilateral action aimed at addressing a global problem" through a standard limiting tailpipe emissions would not be an effective means of safeguarding the global environment and would "necessarily punish national interests." *Id.* at 792, 813.

That Congress has never deviated from its decision to not regulate GHGs under the CAA was not for lack of opportunity. Congress has considered and rejected countless other bills in the years since the 1990 Amendments that would have authorized GHG regulation. By one estimate, Congressmen have proposed over 400 bills concerning GHGs between 1990 and 2009. See Abigail R. Moncrieff, *Reincarnating the "Major Questions" Exception to Chevron Deference As A Doctrine of Noninterference (or Why Massachusetts v. EPA Got It Wrong)*, 60 ADMIN. L. REV. 593, 636-37 (2008) (tracking proposals). Congress's inability to break this nearly quarter-century long deadlock is incredibly suggestive: this is not an area of policymaking where the legislature has acted rashly or unthinkingly in delegating authority to agencies.

At bottom, Congress understood the dangers of "any air pollutant" in § 7521(a)(1) in terms of the ill-effects caused those who inhale the pollutants, not the broad, attenuated consequences of climate change. The CAA was drafted not to combat the

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threat of flooding or the menace of heat waves, *see* Endangerment and Cause of Contribute Findings for Greenhouse Gases, 74 Fed. Reg. 66,496, 66,526 (Dec. 15, 2009) (“EPA Endangerment Finding”), but the choking, stifling, and degenerative effect of airborne pollutants on human beings and their affected localities. Congress has long quantified this harm in terms of mortality rates, *see, e.g.*, Air Pollution – 1968, 564 (statement of Dr. Roger S. Mitchell, Director, Webb-Waring Institute for Medical Research), not acreage of “costal land” lost. *Massachusetts*, 549 U.S. at 522. To put matters pointedly: the injury sufficient to establish standing need not suffice to establish endangerment as well.

Congress was of course free to circumvent this close cause-health effect nexus by devising a separate provision for GHG regulation, much as it did for stratospheric ozone, but it did no such thing. And nothing in the legislative history suggests that Congress has deviated from this status quo.

The plain language of the CAA only underscores the Act’s non-applicability to GHGs insofar as it requires the harm be of the sort “reasonably [] anticipated to endanger.” 42 U.S.C. § 7251(a)(1) – a term we know to have a discrete meaning.

**C.**

In the present case, this Court had “little trouble” disposing of the argument that the “PSD program is specifically focused solely on localized air pollution”

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because it is “quite clear . . . the PSD program was intended to protect against precisely the types of harms caused by greenhouse gases.” CRR Slp. Op. 62-63 (emphasis added). *Massachusetts* notwithstanding, this statement is a curious thing in light of the uncontradicted legislative history just discussed.<sup>2</sup> So too is the court’s reliance on the statutory text, particularly its finding that “the CAA expressly provides that effects on ‘welfare’ means ‘effects on . . . weather . . . and climate.’” Slp. Op. 62-63 (citing 42 U.S.C. § 7602(h)).

As a textual matter, there is nothing “quite clear” about it. The Supreme Court has declared that GHGs like CO<sub>2</sub> are pollutants within the meaning of the Act. Under the CAA, however, EPA can regulate a pollutant only if the administrator finds that the GHG causes or contributes to “air pollution which *may reasonably be anticipated to endanger* public health or welfare.” 42 U.S.C. § 7251(a)(1) (emphasis added). But in locating the CAA’s conception of “harm” in § 7602(h), the definition of “welfare,” and not § 7251(a)(1) generally, this court effectively skirted the operative statutory language – “may reasonably be anticipated” – and rendered it nugatory. This was in error. Section 7602(h) defines only the potential *objects* of harm; the “reasonably be

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<sup>2</sup> As noted, the weather and climate issues targeted by the CAA involve direct, deleterious, localized effects caused by polluted air people breathe or suspended pollutants that may be deposited on land and crops by precipitation.

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anticipated” language of § 7251(a)(1) supplies the requisite *nexus* between the pollutant and the objects of its harm. The two provisions must be read together if the statute is to be interpreted faithfully. To put matters another way, the “may reasonably be anticipated” language must do some analytical work in the endangerment determination lest it be deemed surplusage. *See, e.g., Conference of State Bank Supervisors v. Conover*, 715 F.2d 604, 627 (D.C. Cir. 1983) (“[I]n construing a statute, we ‘are obliged to give effect, if possible, to every word Congress used.’” (quoting *Reiter v. Sonotone Corp.*, 442 U.S. 330, 339 (1979))). And in view of the CAA’s legislative history, the nature of that work is clear.

In order to reasonably anticipate that a pollutant will contribute to air pollution that endangers public health or welfare, the Agency would have to conclude that pollution created by CO<sub>2</sub> or another GHG is a reasonably direct cause of the damage to public health and welfare. To find that CO<sub>2</sub> may ultimately endanger public health and welfare because sea levels will rise tells us nothing about whether CO<sub>2</sub> concentrations in the ambient air directly harm public health and welfare. The ingredients of a Killer Smog are few and specific; the process through which an air inversion traps particulate matter close to the ground is well understood. With both there is a direct correlation between reducing the concentration of the pollutant and reducing the negative health effects. Questions of public health impacts from air pollution have consistently been based on the direct – that is,

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inhalational – effects of exposure to the pollutant. *See, e.g.*, Joint Opening Brief of Non-State Petitioners and Supporting Intervenors at 58, *Coal. for Responsible Regulation v. EPA*, No. 09-1322 (May 20, 2011); *NRDC, Inc. v. EPA*, 902 F.2d 962, 973 (D.C. Cir. 1990) (concluding that EPA may not consider the health effects of increased unemployment when setting new health-based NAAQS).

In contrast, any harm to human health and welfare flowing from climate change comes at the end of a long speculative chain. The dissent in *Massachusetts* pointed out that EPA had described in great detail the scientific uncertainty that precluded even forming a judgment as to whether greenhouse gases endanger public welfare. *See* 549 U.S. at 553-55 (Scalia, J., dissenting). In that earlier defense of its refusal to form a judgment, EPA explained how predicting climate change involved a “complex web of economic and physical factors,” including:

[o]ur ability to predict future global anthropogenic emissions of GHGs and aerosols; the fate of these emissions once they enter the atmosphere (*e.g.*, what percentage are absorbed by vegetation or are taken up by the oceans); the impact of those emissions that remain in the atmosphere on the radiative properties of the atmosphere; changes in critically important climate feedbacks (*e.g.*, changes in cloud cover and ocean circulation); change in temperature characteristics (*e.g.*, average temperatures, shifts in daytime and evening temperatures);

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changes in other climatic parameters (*e.g.*, shifts in precipitation, storms); and ultimately the impact of such changes on human health and welfare (*e.g.*, increases or decreases in agricultural productivity, human health impacts).

*Id.* If there can be this much logical daylight between the pollutant and the anticipated harm, there is nothing EPA is not authorized to do. If this finding is valid, in a world where six degrees of separation is the compass of all humankind, the right endangerment finding would allow EPA to rule the world. But as this Court has noted before, EPA's authority to regulate is constrained, not enlarged, by the relationship of the term "will endanger" to other sections of the CAA. See *Ethyl v. EPA*, 541 F.2d 1, 29 (D.C. Cir. 1976) (*en banc*).

Of course, nothing here should be taken to imply that a particular GHG does not contribute to climate change. I mean only to suggest that a pollutant might contribute to the nebulous mélange of potential drivers of climate change without having any direct, deleterious impact within the meaning of the CAA. I emphasize too that this is not a problem with science. This is a problem of statutory interpretation. Climate change, with its geologic timeframe and its many uncertainties and imponderables, is and will probably remain a subject of some controversy. EPA finds the science sufficiently convincing for its purposes and it is entitled to a certain amount of deference on questions related to its technical expertise. But it is

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not necessary to quibble with the science of climate change to conclude that the endangerment finding fails on textual and logical terms. There is simply a point at which a difference in degree becomes a difference in kind and we have passed this point many times over in the course of this tortured litigation. The Supreme Court, however, has refused to recognize as much for tailpipe emissions.

**II.****A.**

But we need not follow *Massachusetts* off the proverbial cliff and apply its reasoning to the unique Title V and PSD provisions not considered in that case. The cascading layers of absurdity that flow from that interpretive exercise make clear that the plain language of the CAA compels no such result. As EPA's own rulemaking documents have so unabashedly explained:

To apply the statutory PSD and title V applicability thresholds literally to sources of GHG emissions would bring tens of thousands of small sources and modifications into the PSD program each year, and millions of small sources into the title V program. These extraordinary increases in scope of the permitting programs would mean that the programs would become several hundred-fold larger than what Congress appeared to contemplate.

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PSD and Title V Greenhouse Gas Tailoring Rule; Final Rule, 75 Fed. Reg. 31,514, 31,533 (Jun. 3, 2010) (“Final Tailoring Rule”). Completely oblivious to the irony, EPA added:

For our authority to take this action, we rely in part on the “absurd results” doctrine, because applying the PSD and title V requirements literally (as previously interpreted narrowly by EPA) would not only be inconsistent with congressional intent concerning the applicability of the PSD and title V programs, but in fact would severely undermine congressional purpose for those programs.

*Id.* at 31,541-42. And again:

[I]n this case because a literal reading of the PSD and title V applicability provisions results in insurmountable administrative burdens. Those insurmountable administrative burdens – along with the undue costs to sources – must be considered “absurd results” that would undermine congressional purpose for the PSD and title V programs.

*Id.* at 31,547.

In precincts outside Washington, D.C., this litany might cause a regulator to pause and consider whether results so at odds with Congressional presuppositions could ever be justified as falling within the literal meaning of an enactment. EPA, however, proposes that the absurd result can be easily eliminated by ramping up and gradually

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phasing in the requirements. Faced with the choice of reconsidering the legitimacy of an endangerment finding that sets in motion such a cluster of chaos or rewriting the statute, the agency has blithely done the latter. This is an abuse of the absurdity and administrative necessity doctrines as neither can be invoked to preempt legislative prerogatives. Permitting a statute “to be read to avoid absurd results allows an agency to establish that seemingly clear statutory language does not express the ‘unambiguously expressed intent of Congress,’” but it does not grant the agency “a license to rewrite the statute.” *Mova Pharmaceuticals v. Shalala*, 140 F.3d 1060, 1068 (D.C. Cir. 1998).

But that is not the worst of it. The real absurdity – apparently as invisible to the EPA as the San Gabriels once were to me – cannot be cured by phase in, no matter how subtly Byzantine. The real absurdity is that this unprecedented expansion of regulatory control, this epic overreach, may very well do more damage to the wellbeing of Americans than GHGs could ever do.<sup>3</sup>

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<sup>3</sup> *See, e.g.*, Joint Reply Br. of Non-State Petitioners and Supporting Intervenors at \*1, No. 09-1322 (Nov. 14, 2011) (“Nor does [EPA] dispute that the new rules will impose massive burdens on a struggling economy, or that its program of vehicle standards will affect global mean temperatures by no more than 0.01 degree Celsius by 2100”).

**B.**

A second, more elementary consideration counsels against the mechanical application of *Massachusetts's* tailpipe emissions determination to these distinct CAA provisions: deference to Congress.

As articulated in *Food & Drug Administration v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120 (2000), the Supreme Court's "major questions" canon gives form to the judicial intuition so strongly implicated here: Congress should not be presumed to have deferred to agencies on questions of great significance more properly resolved by the legislature. If there was ever a regulation in recent memory more befitting such a presumption than the present, I confess I do not know of it.

On familiar facts, the Supreme Court in *Brown & Williamson* rebuffed the FDA's expansionist effort to bring tobacco products within its regulatory ambit. The agency's regulation rested on a strained interpretation of the Food, Drug, and Cosmetic Act, 21 U.S.C. § 301 *et seq.*, in which it defined nicotine as a "drug" and cigarettes and smokeless tobacco as "combination products" used to deliver nicotine to the body. *See Brown & Williamson*, 529 U.S. at 125-27. Applying *Chevron U.S.A. Inc. v. Natural Resources Defense Council*, 467 U.S. 837 (1984), the Court first considered the statutory structure. "[I]f tobacco products were within the FDA's jurisdiction," the majority concluded, the normal operation of the "Act would require the FDA to remove them from the

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market entirely,” and this would “contradict Congress’ clear intent as expressed in its more recent, tobacco-specific legislation.” *Brown & Williamson*, 359 U.S. at 143. As the present case confirms, such absurdity is all but inevitable where an agency attempts to regulate that which “simply do[es] not fit” within its regulatory scheme. *Id.* The Court next considered Congress’s 35 year history of tobacco-specific legislation, finding it “clear” that this “legislation has effectively ratified the FDA’s previous position that it lacks jurisdiction to regulate tobacco.” *Id.* at 156.

The Court then closed its lengthy *Chevron* discussion with an appeal to first principles. The “inquiry into whether Congress has directly spoken to the precise question at issue,” the Court explained, “is shaped, at least in some measure, by the nature of the question presented.” *Id.* at 159. *Chevron* deference operates on the assumption “that a statute’s ambiguity constitutes an implicit delegation,” but this tenuous fiction need not hold true in every situation. *Id.* “In extraordinary cases,” the Court went on, “there may be reason to hesitate before concluding that Congress has intended such an implicit delegation.” *Id.* (referencing Stephen Breyer, *Judicial Review of Questions of Law and Policy*, 38 ADMIN. L. REV. 363, 370 (1986) (“A court may also ask whether the legal question is an important one. Congress is more likely to have focused upon, and answered, major questions, while leaving interstitial

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matters to answer themselves in the course of the statute's daily administration").<sup>4</sup>

Declaring *Brown & Williamson* “hardly [the] ordinary case,” the Court reasoned:

Contrary to its representations to Congress since 1914, the FDA has now asserted jurisdiction to regulate an industry constituting a significant portion of the American economy. In fact, the FDA contends that, were it to determine that tobacco products provide no “reasonable assurance of safety,” it would have the authority to ban cigarettes and smokeless tobacco entirely. Owing to its unique place in American history and society, tobacco has its own unique political history. Congress, for better or for worse, has created a distinct regulatory scheme for tobacco products, squarely rejected proposals to give the FDA jurisdiction over tobacco, and repeatedly

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<sup>4</sup> *MCI Telecommunications Corporation v. AT&T Co.*, 512 U.S. 218 (1994), a case the *Brown & Williamson* Court found “instructive,” *Brown & Williamson*, 529 U.S. at 160, had advanced a similar logic. In concluding Congress had spoken to the meaning of the term “modify” as it appears in § 203(b) of the Communications Act of 1934, the Court rejected FCC’s far more expansive interpretation. The Court assumed in dicta that it was “highly unlikely that Congress would leave the determination of whether an industry will be entirely, or even substantially, rate-regulated to agency discretion – and even more unlikely that it would achieve that through such a subtle device as permission to ‘modify’ rate-filing requirements.” *MCI*, 512 U.S. at 231. Certainly the same might be said here as well.

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acted to preclude any agency from exercising significant policymaking authority in the area. Given this history and the breadth of the authority that the FDA has asserted, we are obliged to defer not to the agency's expansive construction of the statute, but to Congress' consistent judgment to deny the FDA this power.

*Brown & Williamson*, 529 U.S. at 159-60.

In view of the language, structure, and history of the CAA, I am simply unable to distinguish this logic from the present case in any meaningful way. To the contrary, with only the slightest of modifications one could rework the above text to apply to GHG emissions.<sup>5</sup>

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<sup>5</sup> Perhaps:

Contrary to its representations in *Massachusetts v. EPA*, the EPA has now asserted jurisdiction to regulate industries constituting a significant portion of the American economy. In fact, the EPA contends that, because greenhouse gases can be regulated as tailpipe emissions, it is obligated to regulate all stationary sources at admittedly "absurd" levels. Owing to its ubiquitous place in the planet's life cycle, greenhouse gases have their own unique political history. Congress, for better or for worse, has declined to create a distinct regulatory scheme for greenhouse gases, squarely rejected proposals to give the EPA jurisdiction over greenhouse gases, and repeatedly acted to preclude any agency from exercising significant policymaking authority in the area. Given this history and the breadth of the authority that the EPA has asserted, we are obliged to defer not to the

(Continued on following page)

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Although the *Massachusetts* Court distinguished *Brown & Williamson*, it did so only in the context of tailpipe emissions. Its reasoning does not extend to Title V and the PSD program.

In the Court's view, *Brown & Williamson* had “found critical at least two considerations that have no counterpart in [*Massachusetts*].” 549 U.S. at 531. First, whereas the regulation of tobacco under the FDCA would have necessarily led to a ban on tobacco products – an outcome that clashed with the “common sense” intuition that Congress never meant to remove those products from circulation – the expansion of EPA's “jurisdiction would lead to no such extreme measures [because] EPA would only *regulate* emissions” and “there is nothing counterintuitive to the notion that EPA can curtail the emission of substances that are putting the global climate out of kilter.” *Id.* But the Court spoke too soon. In the present litigation, EPA argued – and a Panel of this Court readily agreed – that in regulating tailpipe emissions under 42 U.S.C. § 7521, it is obligated to regulate stationary sources under Title V and the PSD program as well. As a threshold matter, the *Massachusetts* Court never considered these far-reaching effects. It limited its brief discussion on the merits to the tailpipe emissions question squarely before it. In this way, the Court never considered the

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agency's expansive construction of the statute, but to Congress' consistent judgment to deny the EPA this power.

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differing ways in which the CAA regulates tailpipes and stationary sources.

With tailpipe emissions, the inclusion of greenhouse gasses within the term “air pollutant” does not directly expand or contract the universe of vehicles and engines subject to the new standards. Consequently, the regulation’s impact will fall primarily on those manufacturers already complying with existing emission requirements. And even then, the Court explained, EPA “would have to delay any action ‘to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance.’” *Massachusetts*, 549 U.S. at 531 (quoting § 7521(a)(2)). Not so with the regulation of stationary sources. Insofar as 42 U.S.C. § 7479(1) defines “major emitting facility” to include those facilities with the “potential to emit” either 100 or 250 “tons per year or more of *any* air pollutant,” the statutory term is necessarily tied to CAA’s jurisdictional scope. Inescapably, then, the regulation of greenhouse gasses as “air pollutants” will radically expand the universe of covered entities far beyond Congress’s intentions. EPA’s decidedly extra-textual Tailoring Rule only confirms the ludicrousness of this result. Nor can it be said that the statutory safeguards operate in the same way as § 7521(a)(2). Permitting authorities may well be able to determine on a case-by-case basis what constitutes the “best available control technology” for a particular emitting facility, 42 U.S.C. § 7479(3), but this is of little consolation for

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the small business owner who previously fell outside the CAA. At bottom, this outcome clashes with the “common sense” understanding that Congress would not have intended such a broad, unchecked expansion of the CAA to potentially millions of businesses from all walks of industry. The Supreme Court in *Massachusetts* simply did not have occasion to consider this absurd and “counterintuitive” outcome, but we do – and we must.

Second, the Court determined that the “unbroken series of congressional enactments” referenced in *Brown & Williamson* “made sense only if adopted ‘against the backdrop of the FDA’s consistent and repeated statements that it lacked authority under the FDCA to regulate tobacco.’” *Massachusetts*, 549 U.S. at 531.<sup>6</sup> By contrast, EPA had “not identified any congressional action that conflicts in any way with the regulation of greenhouse gases from new motor vehicles.” *Id.* And even if it had, “Congress could not have acted against a regulatory ‘backdrop’ of disclaimers of regulatory authority” because “EPA had never disavowed the authority to regulate greenhouse gases, and in 1998 it in fact affirmed that it *had* such authority.” *Id.* When read in context, however, it is clear that the Court’s reasoning was

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<sup>6</sup> The suggestion here seems to be that Congress’s decision to regulate tobacco products would not, by itself, evince its intent to proscribe agencies from doing the same. Doing so in light of FDA’s statements, however, had the effect of implicitly codifying the agency’s long-held view.

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building toward a wholly unspectacular point: because EPA's legislative history failed to establish congressional intent with the same weight and precision as *Brown & Williamson*, it did not justify "read[ing] ambiguity into a clear statute." *Id.* That logic is inapplicable here. In the absence of lexical clarity – which the Court had found in in [sic] CAA's "sweeping definition of 'air pollutant,'" *id.* at 528 – we need legislative history and other indicia of congressional intent to inform our understanding of how GHGs are to be regulated under other CAA provisions.<sup>7</sup>

The *Massachusetts* Court's effort to distinguish *Brown & Williamson* is thus unavailing where we

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<sup>7</sup> Consider the role of NAAQS in this regulatory system. EPA in *Massachusetts* had observed that NAAQS were established to "address air pollution problems that occur primarily at ground level" as well as "concentrations of substances in the ambient air and the related public health and welfare problems." *Massachusetts*, 549 U.S. at 558-59 (Scalia, J., dissenting). EPA thus reasoned that the regulation of the buildup of CO<sub>2</sub> in the upper reaches of the atmosphere – the process alleged to cause global climate change – was not akin to regulating the concentration of a substance that is polluting the air and was "beyond the scope of CAA's authorization to regulate." *Id.* In other words, EPA maintained that had Congress intended the CAA to regulate greenhouse gases [sic] and global climate change, it would have provided some better tool than NAAQS. That defense – offered in response to a demand to regulate tailpipe emissions – applies with even greater potency to Title V and the PSD program. In fact, although EPA now claims it is authorized to regulate greenhouse gases and global climate change, the agency acknowledges that the regulatory framework is as ill-suited to the task as ever.

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deal not with the definitional scope of “any pollutant” and tailpipe emissions, but the particular dangers Congress sought to combat in enacting Title V and the PSD program. When read in conjunction with the CAA’s history, structure, and language, the intuitive logic of the “major questions” doctrine makes clear that the Panel erred in extending *Massachusetts*. Congress simply did not intend for EPA to convert the “Clean Air Act” to the “Warm Air Act” writ large. But that is exactly what the federal courts have done.

As the Chief Justice observed in his *Massachusetts* dissent, impatience is not a juridical principle that can be sustained under our constitutional framework. *See Massachusetts*, 549 U.S. at 535-36 (Roberts, C.J., dissenting). It certainly fares no better as a default measure of institutional choice under *Chevron*. As *Massachusetts* recognized, an agency can only exercise the authority Congress has delegated to it. *See* 549 U.S. at 534-35 (noting that EPA must “ground its reasons for action or inaction in the statute” and “exercise its discretion within defined statutory limits.”). Absurdity can never figure as an adequate substitute for authority in this threshold assessment. Nor can absurdity cure the agency’s failure to establish that the statute unambiguously compels its interpretation or that its interpretation, though discretionary, is actually consistent with statutory text, structure, and purposes. The agency seeks to avoid these pesky constraints here by invoking *Massachusetts*, but Article III judges cannot be a legitimate source of

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legislative authority. By deferring to the distorted claim of delegation advanced here, this Court has transformed *Chevron* from a useful, albeit accidental, touchstone into an idol to which we surrender our constitutional faith.

**III.**

In rejecting State Petitioners' challenge to the Tailoring Rule for want of standing, the Panel invoked that famed preceptor of American civics, Schoolhouse Rock, to great effect. Slp. Op. at 79. ("As a generation of schoolchildren knows, 'by that time, it's very unlikely that [a bill will] become a law. It's not easy to become a law.'"). I certainly do not quarrel with such dispositive authority. Lawmaking is neither easy nor certain. In an ordinary case, the mere possibility of "corrective legislation" will not establish that redress is "likely, as opposed to merely speculative." *Lujan*, 504 U.S. at 561. But it bears repeating that this is not an ordinary case. Where the choice is between non-action or a confessedly "absurd" regulation poised to impress countless billions of dollars in costs on American industry, we have transcended the realm of the speculative. For once, the comparison with *Massachusetts* is apt. The Supreme Court found standing on the basis of an estimated rise in sea level of 20 to 70 centimeters by the year 2100, *see Massachusetts*, 549 U.S. at 542 (Roberts, C.J, dissenting) – a prediction based almost entirely on conjecture. Is it any more speculative to say that specific projections of billions of dollars in

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actual regulatory costs would not suffice to compel Congress to act?

The Panel's alternative contention fares better: because Congress could remedy the issue in countless ways, not all of which inure to State Petitioners' benefit, the inquiry is "inherently speculative." *See Op.* at 79. This argument benefits from the genuine uncertainty in Congress over what, if any, role EPA should play in GHG regulation. But therein lies a frighteningly obtuse logic. If EPA actions are *ultra vires* precisely because disagreement on the Hill prevented Congress from altering the status quo and authorizing such regulation, how then can the very same deadlock be used to *defeat* Petitioners' standing to challenge the Rule through which EPA effectuates its absurdist scheme? The Court cannot have it both ways.

At bottom, bad decisions make bad law. In denying rehearing en banc, this Court has read *Massachusetts* to its illogical ends and it is American industry that will have to pay. That this Court did so is unsurprising, but certainly not fated. *Massachusetts* does not compel this outcome for the PSD and Title V provisions. Had this Court interrogated its own assumptions and yielded not to *Massachusetts's* telos but sound constitutional principles, it would have found that the matter properly belongs before Congress, not courts or agencies. As Schoolhouse Rock long ago explained:

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Ring one, Executive,  
Two is Legislative, that's Congress.  
Ring three, Judiciary.  
See it's kind of like my circus, circus.<sup>8</sup>

And what a circus it is.

For these reasons, I respectfully dissent from the denial of rehearing en banc.

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KAVANAUGH, *Circuit Judge*, dissenting from the denial of rehearing en banc:

This case is plainly one of exceptional importance. A decision in either direction will have massive real-world consequences. The U.S. Chamber of Commerce describes the EPA regulations at issue here as “the most burdensome, costly, far-reaching program ever adopted by a United States regulatory agency.” Petition for Rehearing En Banc at 1. On the other hand, EPA issued these regulations to help address global warming, a policy issue of major long-term significance to the United States. Put simply, the economic and environmental policy stakes are very high.

Of course, our role is not to make the policy choices or to strike the balance between economic and environmental interests. That job is for Congress and

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<sup>8</sup> “Three Ring Government,” Schoolhouse Rocks, *available at* <http://www.schoolhouserock.tv/ThreeRing.html>.

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the President when considering and enacting legislation, and then as appropriate for the Executive Branch – here, EPA, under the ultimate supervision of the President – when exercising its authority within statutory constraints. Our job as a court is more limited: to ensure that EPA has acted within the authority granted to it by Congress. In this case, I conclude that EPA has exceeded its statutory authority. I respectfully disagree with the panel opinion’s contrary conclusion, and given the overall importance of the case, I respectfully dissent from the denial of rehearing en banc.

I

A

This case concerns EPA’s implementation of the Prevention of Significant Deterioration provisions of the Clean Air Act. The Prevention of Significant Deterioration program – which is codified in Sections 7470 to 7479 of Title 42 – is designed to maintain state and local compliance with the National Ambient Air Quality Standards, known as the NAAQS. The NAAQS are currently established for six air pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide. As relevant here, the Prevention of Significant Deterioration statute requires stationary facilities that emit certain “air pollutants” to obtain permits before beginning new construction. *See* 42 U.S.C. §§ 7475(a)(1), 7479(1). To obtain a permit, the facility

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must undergo a lengthy, costly process to analyze the new construction's impact on air quality and to try to demonstrate its compliance with the relevant emissions limits.

A central question in this case is how to construe the term "air pollutant" for purposes of this statutory permitting requirement. In particular, the question is whether the term "air pollutant" here covers not just the NAAQS pollutants, which can cause breathing problems or other health issues, but also greenhouse gases such as carbon dioxide, which contribute to global warming. Under the broader interpretation of "air pollutant" that encompasses greenhouse gases, a far greater number of facilities would fall within the Prevention of Significant Deterioration program and have to obtain pre-construction permits. That in turn would impose significantly higher costs on businesses and individuals that are building new commercial or residential property.

In considering a different Clean Air Act program targeted at motor vehicle emissions, the Supreme Court said that the term "air pollutant" meant "all airborne compounds of whatever stripe," which included greenhouse gases such as carbon dioxide. *Massachusetts v. EPA*, 549 U.S. 497, 529 (2007). But all parties here, including EPA, agree that the *Massachusetts v. EPA* interpretation of the term "air pollutant" cannot control in this case, for purposes of this very different Clean Air Act program for stationary facilities. Rather, as the parties agree, we must look to the text and context of the Prevention of

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Significant Deterioration statute to determine what “air pollutant” covers here.

Looking at the relevant statutory text and context, there would initially appear to be two plausible interpretations of the term “air pollutant” for purposes of the Prevention of Significant Deterioration statute: (i) more broadly, an airborne compound that is deemed harmful and is regulated by EPA in any Clean Air Act program, which would include greenhouse gases such as carbon dioxide; or (ii) more narrowly, the six air pollutants that are regulated by EPA in setting and enforcing the NAAQS, which would cover carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide, but would not include greenhouse gases such as carbon dioxide.

EPA chose the broader interpretation of “air pollutant,” thereby greatly expanding the reach of the Prevention of Significant Deterioration statute. But that broader interpretation has a glaring problem, as EPA itself recognized. In the context of the Prevention of Significant Deterioration statute, EPA’s broader interpretation would not mesh with other provisions of the statute and would lead to absurd results. That’s because the Prevention of Significant Deterioration statute requires pre-construction permits for facilities with the potential to emit more than 250 tons per year (or, for some facilities, 100 tons per year) of any covered pollutant. *See* 42 U.S.C. §§ 7475(a)(1), 7479(1). That would be a very low trigger for emissions of greenhouse gases because

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greenhouse gases are emitted in far greater quantities than the NAAQS pollutants. As a result, the low trigger would mean a dramatically higher number of facilities would fall within the program and have to obtain pre-construction permits.

In an unusual twist, EPA openly acknowledged the unreasonableness – indeed, the absurdity – caused by its interpretation of the statute. If the Prevention of Significant Deterioration program were interpreted to require pre-construction permits based on emissions of greenhouse gases, EPA candidly stated that the result would be “so contrary to what Congress had in mind – and that in fact so undermines what Congress attempted to accomplish with the PSD requirements – that it should be avoided under the ‘absurd results’ doctrine.” 74 Fed. Reg. 55,292, 55,310 (Oct. 27, 2009).

But faced with those absurd consequences from the broader interpretation of the statute, EPA surprisingly did not choose the seemingly obvious option of adopting the narrower and more sensible interpretation of the term “air pollutant” for the Prevention of Significant Deterioration statute – the interpretation limited to NAAQS air pollutants. Instead, EPA plowed ahead with the broader interpretation. And then, to try to deal with the absurd repercussions of that interpretation for the Prevention of Significant Deterioration statute, EPA re-wrote the very specific 250-ton trigger in the permitting requirement of the statute, unilaterally raising that trigger for greenhouse gas emissions

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from 250 tons to 100,000 tons – a 400-fold increase. *See* 75 Fed. Reg. 31,514 (June 3, 2010). EPA believed that re-writing the statute’s permitting-triggers provision in this way would reduce the number of facilities that would require pre-construction permits and thereby “tailor” the absurdity – that is, alleviate some of the absurdity caused by interpreting “air pollutant” to cover greenhouse gases.<sup>1</sup>

This is a very strange way to interpret a statute. When an agency is faced with two initially plausible readings of a statutory term, but it turns out that one reading would cause absurd results, I am aware of no precedent that suggests the agency can still choose the absurd reading and then start rewriting other perfectly clear portions of the statute to try to make it all work out. And just recently, the Supreme Court reminded the Executive Branch and the lower courts that this is not the proper way to interpret a statute: Instead of “reading new words into the statute” to avoid absurd results, as the Government had urged in that case, the Court said that the statute should be interpreted so that “no absurdity arises in the first

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<sup>1</sup> At the same time, EPA reserved the right to ratchet the trigger all the way back down to 250 tons, thereby bringing more and more facilities under the program at EPA’s unilateral discretion. EPA’s assertion of such extraordinary discretionary power both exacerbates the separation of powers concerns in this case and underscores the implausibility of EPA’s statutory interpretation. Put simply, the statute cannot be read to grant discretion to EPA to raise or lower the permitting triggers as EPA sees fit.

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place.” *Kloeckner v. Solis*, No. 11-184, slip op. at 13 (U.S. 2012).

Even limited to this case alone, the practical implications of accepting EPA’s approach are obviously major. And if this case stands as a precedent that influences other agency decisionmaking, the future consequences likewise could be significant: Agencies presumably could adopt absurd or otherwise unreasonable interpretations of statutory provisions and then edit other statutory provisions to mitigate the unreasonableness. Allowing agencies to exercise that kind of statutory re-writing authority could significantly enhance the Executive Branch’s power at the expense of Congress’s and thereby alter the relative balance of powers in the administrative process. I would not go down that road.

## B

In my view, the statutory issue here is reasonably straightforward. The Prevention of Significant Deterioration statute’s definition of “major emitting facility” subjects a facility to the permitting requirement based on the facility’s emissions of “air pollutants.” See 42 U.S.C. §§ 7475(a)(1), 7479(1). In the context of the Prevention of Significant Deterioration program as a whole, it seems evident that the term “air pollutant” refers to the NAAQS air pollutants.

To begin with, as explained above, interpreting “air pollutant” in this context to refer to the NAAQS

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air pollutants would avoid the absurd consequences that EPA's broader interpretation creates – namely, the exponential increase in the number of facilities that would be required to obtain pre-construction permits. That single point alone provides dispositive support for the narrower, NAAQS-specific interpretation. *See, e.g., Taniguchi v. Kan Pacific Saipan, Ltd.*, 132 S. Ct. 1997, 2004-05 (2012) (statutory context supports narrower rather than broader reading of statutory term).

Moreover, other provisions in the Prevention of Significant Deterioration statute likewise plainly use the term “air pollutant” to refer to the NAAQS air pollutants. The Prevention of Significant Deterioration program is codified in Sections 7470 to 7479 of Title 42. Of relevance here, Section 7473 sets guidelines for areas designated as in attainment of the NAAQS and requires that the “concentration of any air pollutant” in those areas not exceed certain concentrations permitted by the NAAQS. 42 U.S.C. § 7473(b)(4). The term “air pollutant” in Section 7473(b)(4) necessarily refers to the NAAQS air pollutants. In addition, several other provisions in the Prevention of Significant Deterioration statute similarly refer to Section 7473(b)(4)'s maximum concentrations for NAAQS pollutants. Each of those references thus also necessarily employs a NAAQS-specific use of the term “air pollutant.” *See, e.g.,* 42 U.S.C. § 7473(c)(1) (listing exclusions from “the maximum allowable increases in ambient concentrations of an air pollutant”); § 7474(a)(B)

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(redesignations cannot cause “concentrations of any air pollutant” to exceed the maximum); *see also* § 7475(a)(3)(A) (facility may not cause air pollution in excess of “maximum allowable concentration for any pollutant”).

So it’s clear that a variety of provisions in the Prevention of Significant Deterioration statute use “air pollutant” to refer to a NAAQS air pollutant. And we presume that, unless otherwise indicated, the term “air pollutant” is used the same way throughout the Prevention of Significant Deterioration statute – and here, we have no reason to conclude otherwise. *See IBP, Inc. v. Alvarez*, 546 U.S. 21, 34 (2005) (“identical words used in different parts of the same statute are generally presumed to have the same meaning”).

By contrast, when Congress wanted, in the Prevention of Significant Deterioration statute, to refer to a broader set of pollutants than the NAAQS pollutants, it did so expressly. Thus, a facility that requires a pre-construction permit because of its emissions of NAAQS pollutants must employ the best available control technology for emissions not just of “air pollutants” but of “each pollutant subject to regulation under this chapter,” which – now that EPA has regulated greenhouse gases in other parts of the Clean Air Act – *does* include greenhouse gases. 42 U.S.C. § 7475(a)(4). By its terms, Section 7475(a)(4) thus applies to greenhouse gases, not just the NAAQS. Importantly, however, Congress did not employ the language “each pollutant subject to

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regulation under this chapter” in the statutory provision setting forth which facilities must obtain a pre-construction permit, the provision at issue in this case. And the policy distinction drawn in Section 7475(a)(4) is rather intuitive: Congress designed the statute’s permitting requirement based on facilities’ NAAQS emissions, but, once those facilities are subject to the permitting requirement, they must also meet a range of other minimum environmental standards.<sup>2</sup>

The overall objectives of the Prevention of Significant Deterioration statute also suggest that “air pollutant” refers to the NAAQS air pollutants for purposes of the permitting requirement. Importantly, the Prevention of Significant Deterioration statute applies only in areas that have met the NAAQS – that is, areas that do not have excessive emissions of the NAAQS air pollutants. If the purpose of this statute were in part to address global warming by requiring pre-construction permits for facilities that emit greenhouse gases, as EPA’s reading suggests, why would the statute target the construction of facilities only in areas that are in *compliance* with the NAAQS – and not elsewhere in the United States?

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<sup>2</sup> Section 7479(1) – the definition of “major emitting facility” – speaks of “any” air pollutant. But the word “any” just begs the question of what the term “air pollutant” covers in the Prevention of Significant Deterioration program. It’s either any air pollutant regulated under the Clean Air Act or any of the NAAQS air pollutants.

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That would make little sense, which in turn further suggests that EPA has misread the statute.

Moreover, as its name indicates, the Prevention of Significant Deterioration statute is designed primarily to prevent “deterioration” of an attainment area’s air quality. The relevant air quality standards that define whether an area is in attainment are the NAAQS. In a statute expressly linked to the NAAQS and designed to ensure that air quality does not “deteriorate” with respect to the NAAQS, it is somewhat illogical to read the statute as requiring pre-construction permits simply because a facility may emit substances that will *not* affect attainment of the NAAQS. Under EPA’s approach, a facility could be covered by the permitting requirement even if it emits no NAAQS air pollutants at all. That, too, makes little sense and suggests that EPA has misread the statute.

A separate canon of interpretation further demonstrates that EPA’s broad reading of the term “air pollutant” is at odds with Congress’s design. By requiring a vastly increased number of facilities to obtain pre-construction permits, EPA’s interpretation will impose enormous costs on tens of thousands of American businesses, with corresponding effects on American jobs and workers; on many American homeowners who move into new homes or plan other home construction projects; and on the U.S. economy more generally. Yet there is literally no indication in the text or legislative record that Members of Congress ever contemplated – much less intended –

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such a dramatic expansion of the permitting requirement of the Prevention of Significant Deterioration statute. Courts do not lightly conclude that Congress intended such major consequences absent some indication that Congress meant to do so. *See FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 159-61 (2000). Here, as elsewhere, we should not presume that Congress hid an elephant in a mousehole.

For all of those reasons – the statutory text, the absurdity principle, the statutory context as demonstrated by related statutory provisions, the overarching objectives of the statute, the major unintended consequences of a broader interpretation – the Prevention of Significant Deterioration statute as a whole overwhelmingly indicates that the permitting requirement is based on emissions of the NAAQS air pollutants.

And just to reiterate, the simple and absolutely dispositive point in this case is the following: The broader interpretation of “air pollutant” adopted by EPA produces what even EPA itself admits are absurd consequences. When an agency is faced with two plausible readings of a statutory term, but one reading would cause absurd results, the agency cannot choose the absurd reading. Here, therefore, EPA was required to adopt the narrower and more sensible interpretation of “air pollutant,” the interpretation limited to the NAAQS pollutants. As the Supreme Court has said, “interpretations of a statute which would produce absurd results are to be

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avoided if alternative interpretations consistent with the legislative purpose are available.” *Griffin v. Oceanic Contractors, Inc.*, 458 U.S. 564, 575 (1982). Such an “alternative interpretation[ ] consistent with the legislative purpose” is readily available here.

## II

If that were the end of the analysis, I would not hesitate to conclude that EPA had adopted an impermissibly broad reading of the term “air pollutant” for purposes of the permitting provision of the Prevention of Significant Deterioration statute. But before reaching that conclusion definitively, we need to consider whether EPA’s approach was mandated by the Supreme Court’s decision in *Massachusetts v. EPA*, 549 U.S. 497 (2007). In that case, the Supreme Court considered the general statutory term “air pollutant” as applied to a different aspect of the Clean Air Act – the motor vehicle emissions program. The Court there interpreted “air pollutant” very broadly to mean “all airborne compounds of whatever stripe,” including greenhouse gases. *Id.* at 529.

Does *Massachusetts v. EPA* dictate EPA’s broader interpretation of “air pollutant” in the different context of the Prevention of Significant Deterioration statute? The panel opinion seemed to think so; its conclusion appears to have been heavily if not dispositively influenced by *Massachusetts v. EPA*. See, e.g., *Coalition for Responsible Regulation, Inc. v. EPA*,

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684 F.3d 102, 134, 136 (D.C. Cir. 2012). In my view, however, the holding in *Massachusetts v. EPA* does not control the result in this case. Indeed, as explained more fully below, even EPA has concluded that *Massachusetts v. EPA* does not control here. The decision in *Massachusetts v. EPA* concerned the motor vehicle emissions program, a point the Supreme Court expressly noted many times in its opinion. The case did not purport to say that every other use of the term “air pollutant” throughout the sprawling and multifaceted Clean Air Act necessarily includes greenhouse gases. Each individual Clean Air Act program must be considered in context.<sup>3</sup>

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<sup>3</sup> As an analogy, take the familiar example of “no vehicles in the park.” Assume that a court has decided that the term “vehicles” generally includes bicycles, and that no bicycles are allowed in the park. Next assume that another park regulation states that “all park service vehicles must have reinforced gas tanks.” In that latter regulation, context tells us that the term “vehicles” obviously does not include bicycles. Bicycles are still vehicles in the abstract, but the gas-tank regulation logically applies only to a specific subset of vehicles (namely, motor vehicles).

So it is with “air pollutant” as used in different parts of the Clean Air Act. *Massachusetts v. EPA* held that the term “air pollutant” generally includes greenhouse gases. But that does not mean that the term “air pollutant” can never be used in a narrower sense. Greenhouse gases may qualify as “air pollutants” in the abstract, but context tells us that the Prevention of Significant Deterioration program uses the term “air pollutant” to refer only to a subset of all air pollutants (namely, the NAAQS pollutants).

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Importantly, in *Massachusetts v. EPA*, the Supreme Court explicitly relied on the fact that the Clean Air Act’s “capacious definition of ‘air pollutant,’” did not appear “counterintuitive” or produce “extreme” consequences in the context of motor vehicle emissions. 549 U.S. at 531-32. But, as explained above, EPA’s capacious definition of “air pollutant” *is* counterintuitive and *does* produce extreme consequences in the context of the Prevention of Significant Deterioration statute, as EPA itself acknowledges. Moreover, in this case, an alternative and sensible interpretation of the term “air pollutant” is readily discernible from the text, context, and structure of the Prevention of Significant Deterioration statute as a whole – namely, the NAAQS-specific interpretation.

To be sure, as noted earlier, the same words used in different parts of an Act are often construed to have the same meaning. See *IBP, Inc. v. Alvarez*, 546 U.S. 21, 34 (2005). If that were an inflexible command, the *Massachusetts v. EPA* interpretation of “air pollutant” would certainly control here and throughout the entire Clean Air Act. But as the Supreme Court recently reminded us – *in the context of interpreting the Clean Air Act* – “the natural presumption that identical words used in different parts of the same act are intended to have the same meaning is not rigid and readily yields whenever there is such variation in the connection in which the words are used as reasonably to warrant the conclusion that they were employed in different parts

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of the act with different intent.” *Environmental Defense v. Duke Energy Corp.*, 549 U.S. 561, 574 (2007) (internal quotation marks and ellipsis omitted). As instructed by the Supreme Court, we must interpret statutory terms based on their context and in light of the statute as a whole, even if that approach on some occasions means that the same term applies differently in different parts of a statute. See, e.g., *General Dynamics Land Systems, Inc. v. Cline*, 540 U.S. 581, 596-97 (2004) (term “age” has different meanings within Age Discrimination in Employment Act); *United States v. Cleveland Indians Baseball Co.*, 532 U.S. 200, 212-13 (2001) (term “wages paid” has different meanings within Social Security Act Amendments of 1939); *Robinson v. Shell Oil Co.*, 519 U.S. 337, 343-44 (1997) (term “employee” has different meanings within Title VII).

The Supreme Court’s application of that interpretive principle in *Environmental Defense v. Duke Energy* – a decision issued on the same day as *Massachusetts v. EPA* – is illuminating. There, the Supreme Court confronted the Clean Air Act’s definition of a stationary source “modification.” See 549 U.S. at 567-68. That term was relevant to both the New Source Performance Standards program and the Prevention of Significant Deterioration program. The Court ruled that EPA could interpret the term “modification” differently for each of those two Clean Air Act programs, even though “the terms share a common statutory definition.” *Id.* at 574. In so holding, the Court analyzed the two programs’

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different regulatory goals, noting that a “given term in the same statute may take on distinct characters from association with distinct statutory objects calling for different implementation strategies.” *Id.*

The Supreme Court’s interpretive approach in *Environmental Defense v. Duke Energy* – which recognizes that the meaning of a statutory term in the Clean Air Act may vary based on the particular program at issue – shows that the *Massachusetts v. EPA* interpretation of “air pollutant” in the context of the motor vehicle emissions program does not necessarily require the same interpretation of “air pollutant” in the context of the Prevention of Significant Deterioration program. In *Massachusetts v. EPA*, the Supreme Court emphasized that the regulation of greenhouse gases in the motor vehicle emissions program would not be “counterintuitive” and would not lead to any “extreme measures.” 549 U.S. at 531. Greenhouse gas standards would simply be added to the other regulations already applicable to manufacturers of new motor vehicles, and any such standards would take into account both cost and technological feasibility. See 42 U.S.C. § 7521(a). By contrast, the regulation of greenhouse gases in the Prevention of Significant Deterioration program would be both counterintuitive and extreme. Tens of thousands of businesses and homeowners would be swept into the Clean Air Act’s purview for the first time and hit with permitting costs averaging \$60,000, not to mention the additional costs of trying to construct and maintain the facility in compliance

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with the relevant emissions limits and technological standards. *See* 75 Fed. Reg. 31,514, 31,556 (June 3, 2010). In addition, the costs associated with a vastly expanded permitting requirement would deter numerous projects from even starting in the first place. The major differences between the motor vehicle emissions program and the Prevention of Significant Deterioration program thus neatly fit the *Environmental Defense v. Duke Energy* paradigm of “distinct statutory objects calling for different implementation strategies.”

In reaching that conclusion, it bears mention that the Clean Air Act is a very complicated statute encompassing several distinct environmental programs. It is no surprise, then, that the motor vehicle emissions program and the Prevention of Significant Deterioration program are not the only parts of the Act to employ a term like “air pollutant” in a context-dependent way. For example, the visibility program applies to facilities based on their emissions of “any pollutant.” 42 U.S.C. § 7491(g)(7). In the context of that program, EPA has interpreted the term “any pollutant” to mean “any visibility-impairing pollutant,” which obviously does not include greenhouse gases. 40 C.F.R. pt. 51, App. Y, § II.A. Similarly, the nonattainment program applies to areas that have been designated as nonattainment “for any air pollutant.” 42 U.S.C. § 7501(2). In the context of that program, the term “air pollutant” is logically limited to the NAAQS air pollutants, which are the only pollutants for which an area can be

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designated as nonattainment. *Id.* § 7407(d)(1)(A). All of that simply underscores that a court should exercise caution before reflexively importing the interpretations applicable to one Clean Air Act program into a distinct Clean Air Act program.

Any lingering doubt that *Massachusetts v. EPA* does not control here is dispelled when we recall that EPA itself has rejected *Massachusetts v. EPA*'s interpretation of "air pollutant" for the Prevention of Significant Deterioration statute. The Court in *Massachusetts v. EPA* said that "air pollutant" meant "all airborne compounds of whatever stripe." 549 U.S. at 529. EPA has acknowledged, however, that such a broad definition cannot possibly extend to the use of the term "air pollutant" in the Prevention of Significant Deterioration statute. EPA understood that it would be absurd to require pre-construction permits because of emissions of any airborne compound, including emissions of airborne compounds that have not been deemed harmful and regulated under the Clean Air Act. To avoid rendering the Prevention of Significant Deterioration statute an absurdity, EPA construed "air pollutant" to mean *certain* air pollutants – in particular, "any regulated air pollutant."

The critical point for present purposes – and it really is a critical point in thinking about the significance of *Massachusetts v. EPA* to the present case – is that EPA itself recognized that the *Massachusetts v. EPA* definition of "air pollutant" cannot and does not control how to interpret "air

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pollutant” in the Prevention of Significant Deterioration context. As it tries to justify its broad interpretation of the Prevention of Significant Deterioration statute, EPA cannot simultaneously latch on to *Massachusetts v. EPA* and reject *Massachusetts v. EPA*.

If *Massachusetts v. EPA* does not control here – and even EPA admits that it does not – then we are back where we started. EPA was faced with two initially plausible interpretations of “air pollutant” for purposes of the permitting requirement of the Prevention of Significant Deterioration statute. One interpretation created patent absurdities and made little sense given the other statutory provisions. The other interpretation fit comfortably and sensibly within the statutory text and context. EPA nonetheless chose the first option. In my view, EPA’s reading of the statute was impermissible. An agency cannot adopt an admittedly absurd interpretation and discard an eminently sensible one.

Given all of this, the case seems reasonably straightforward. So how did the panel opinion reach the opposite conclusion? I respectfully have three main points of disagreement. First, as I read it, the panel opinion was decisively influenced by *Massachusetts v. EPA*’s interpretation of “air pollutant” in the context of the motor vehicle emissions program. But in light of the material differences between the motor vehicle emissions program and the Prevention of Significant Deterioration program, the *Massachusetts v. EPA*

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interpretation cannot control here, as even EPA acknowledges. Second, the panel opinion attempted to buttress its choice of a broad interpretation of the term “air pollutant” by pointing to Section 7475(a)(4), the provision in the Prevention of Significant Deterioration program requiring covered facilities to use the best available control technology. But as explained above, Section 7475(a)(4) actually cuts the other way because it specifically refers to “each pollutant subject to regulation under this chapter,” which now does include greenhouse gases – whereas, by contrast, other statutory provisions in the Prevention of Significant Deterioration program clearly employ a NAAQS-specific interpretation of the unadorned term “air pollutant.” Third, the panel gave insufficient weight to the most critical point in this case, the absurd consequences of EPA’s broad interpretation. This was a mistake because the ultimate clincher in this case is one simple point: EPA chose an admittedly absurd reading over a perfectly natural reading of the relevant statutory text. An agency cannot do that.

## III

In finding EPA’s statutory interpretation legally impermissible, I do not in any way want to diminish EPA’s vital policy objectives. EPA’s regulations for the Prevention of Significant Deterioration statute may well be a good idea as a matter of policy. The task of dealing with global warming is urgent and important. But as in so many cases, the question here is: Who

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Decides? The short answer is that Congress (with the President) sets the policy through statutes, agencies implement that policy within statutory limits, and courts in justiciable cases ensure that agencies stay within the statutory limits set by Congress. A court's assessment of an agency's compliance with statutory limits does not depend on whether the agency's policy is good or whether the agency's intentions are laudatory. Even when that is true, we must enforce the statutory limits. *See Hamdan v. United States*, 696 F.3d 1238 (D.C. Cir. 2012) (ruling that Executive Branch exceeded statutory authority in wartime prosecution of al Qaeda member).

In cases like this one, the bedrock underpinnings of our system of separation of powers are at stake. To be sure, courts must be wary of undue interference with an agency's action implementing its statutory responsibilities. *See American Radio Relay League, Inc. v. FCC*, 524 F.3d 227 (D.C. Cir. 2008) (separate opinion of Kavanaugh, J.); *see also Desert Citizens Against Pollution v. EPA*, 699 F.3d 524 (D.C. Cir. 2012); *National Environmental Development Association's Clean Air Project v. EPA*, 686 F.3d 803 (D.C. Cir. 2012); *American Petroleum Institute v. EPA*, 684 F.3d 1342 (D.C. Cir. 2012); *ATK Launch Systems, Inc. v. EPA*, 669 F.3d 330 (D.C. Cir. 2012); *Natural Resources Defense Council v. EPA*, 661 F.3d 662 (D.C. Cir. 2011); *Medical Waste Institute & Energy Recovery Council v. EPA*, 645 F.3d 420 (D.C. Cir. 2011). To take one salient and important example, the statutory scheme gives EPA significant discretion in setting the

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NAAQS for the NAAQS air pollutants – a discretion the courts must respect.

But at the same time, undue deference or abdication to an agency carries its own systemic costs. If a court mistakenly allows an agency's transgression of statutory limits, then we green-light a significant shift of power from the Legislative Branch to the Executive Branch. The Framers of the Constitution did not grant the Executive Branch the authority to set economic and social policy as it sees fit. Rather, the Framers gave Congress, along with the President, that legislative role (subject to constitutional limits), and they assigned the Executive Branch the executive power to issue rules and enforce the law *within the limits set by Congress*.<sup>4</sup>

It is true that the legislative process can be cumbersome and frustrating, and the Executive Branch often is well-intentioned in wanting to address pressing policy concerns quickly, before the sometimes glacial congressional machinery can be

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<sup>4</sup> In protecting national security, the Executive has some Article II authority to act in certain circumstances in the Nation's defense even without specific congressional authorization. This is known as *Youngstown* category two. See *Youngstown Sheet & Tube Co. v. Sawyer*, 343 U.S. 579, 637 (1952) (Jackson, J., concurring). There is no general *Youngstown* category two authority in the domestic social and economic realms, where the Executive must have statutory authority in order to act.

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stirred to action.<sup>5</sup> The legislative process can be slow because the Constitution makes it far harder to enact legislation than to block it: Under the Constitution, three different entities must agree in order to enact legislation – the House, the Senate, and the President (or two-thirds of both the House and the Senate to override a President’s veto). But the Framers knew the legislative process would be laborious. They designed it that way. The time and difficulty of enacting new legislation has never justified an agency’s contravention of statutory limits. The Framers specifically contemplated, moreover, that there would be situations where the Executive Branch confronts a pressing need that it does not have current authority to address. In those circumstances, the Constitution’s Recommendations Clause provides that the President may “recommend” to Congress “such Measures as he shall judge necessary and expedient.” U.S. CONST. art. II, § 3.

Importantly, the separation of powers and checks and balances of our system are designed not just to ensure that the Branches operate within the proper spheres of their authority, but also to protect individual liberty. As the Supreme Court has

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<sup>5</sup> In 2009, the House of Representatives passed a global warming bill that was supported by the President. But the Senate did not pass it. In the early 2000s, Senators McCain and Lieberman sought to pass global warming legislation, but no law was ultimately enacted. Numerous other bills have been introduced over the years, and various legislative efforts are ongoing.

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explained many times, “while a government of opposite and rival interests may sometimes inhibit the smooth functioning of administration, the Framers recognized that, in the long term, structural protections against abuse of power were critical to preserving liberty. . . . The failures of . . . regulation may be a pressing national problem, but a judiciary that licensed extraconstitutional government with each issue of comparable gravity would, in the long run, be far worse.” *Free Enterprise Fund v. Public Company Accounting Oversight Board*, 130 S. Ct. 3138, 3157 (2010) (internal quotation marks, alterations, and citations omitted).

As a court, it is not our job to make the policy choices and set the statutory boundaries, but it is emphatically our job to carefully but firmly enforce the statutory boundaries. That bedrock separation of powers principle accounts for my concern about this case. Here, as I see it, EPA went well beyond what Congress authorized for the Prevention of Significant Deterioration statute. I respectfully disagree with the panel’s resolution of this issue, and given the overall importance of the case, I respectfully dissent from the denial of rehearing en banc.

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TITLE 42. THE PUBLIC HEALTH AND WELFARE  
CHAPTER 85. AIR POLLUTION PREVENTION  
AND CONTROL EMISSION STANDARDS  
FOR MOVING SOURCES MOTOR VEHICLE  
EMISSION AND FUEL STANDARDS

42 U.S.C. § 7521. Emission standards for new motor vehicles or new motor vehicle engines

(a) Authority of Administrator to prescribe by regulation. Except as otherwise provided in subsec.

(b) –

(1) The Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. Such standards shall be applicable to such vehicles and engines for their useful life (as determined under subsection (d), relating to useful life of vehicles for purposes of certification), whether such vehicles and engines are designed as complete systems or incorporate devices to prevent or control such pollution.

(2) Any regulation prescribed under paragraph (1) of this subsection (and any revision thereof) shall take effect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving

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appropriate consideration to the cost of compliance within such period.

(3) (A) In general.

(i) Unless the standard is changed as provided in subparagraph (B), regulations under paragraph (1) of this subsection applicable to emissions of hydrocarbons, carbon monoxide, oxides of nitrogen, and particulate matter from classes or categories of heavy-duty vehicles or engines manufactured during or after model year 1983 shall contain standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to cost, energy, and safety factors associated with the application of such technology.

(ii) In establishing classes or categories of vehicles or engines for purposes of regulations under this paragraph, the Administrator may base such classes or categories on gross vehicle weight, horsepower, type of fuel used, or other appropriate factors.

(B) Revised standards for heavy duty trucks.

(i) On the basis of information available to the Administrator concerning the effect of air pollutants emitted from heavy-duty vehicles or engines and from other sources of mobile source

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related pollutants on the public health and welfare, and taking costs into account, the Administrator may promulgate regulations under paragraph (1) of this subsection revising any standard promulgated under, or before the date of, the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990] (or previously revised under this subparagraph) and applicable to classes or categories of heavy-duty vehicles or engines.

(ii) Effective for the model year 1998 and thereafter, the regulations under paragraph (1) of this subsection applicable to emissions of oxides of nitrogen (NO[X]) from gasoline and diesel-fueled heavy duty trucks shall contain standards which provide that such emissions may not exceed 4.0 grams per brake horsepower hour (gbh).

(C) Lead time and stability. Any standard promulgated or revised under this paragraph and applicable to classes or categories of heavy-duty vehicles or engines shall apply for a period of no less than 3 model years beginning no earlier than the model year commencing 4 years after such revised standard is promulgated.

(D) Rebuilding practice. The Administrator shall study the practice of rebuilding heavy-duty engines and the impact rebuilding has on engine emissions. On the basis of that study and other information available to the Administrator, the Administrator may prescribe requirements to control rebuilding practices, including standards applicable

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to emissions from any rebuilt heavy-duty engines (whether or not the engine is past its statutory useful life), which in the Administrator's judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare taking costs into account. Any regulation shall take effect after a period the Administrator finds necessary to permit the development and application of the requisite control measures, giving appropriate consideration to the cost of compliance within the period and energy and safety factors.

(E) Motorcycles. For purposes of this paragraph, motorcycles and motorcycle engines shall be treated in the same manner as heavy-duty vehicles and engines (except as otherwise permitted under section 206(f)(1)) unless the Administrator promulgates a rule reclassifying motorcycles as light-duty vehicles within the meaning of this section or unless the Administrator promulgates regulations under subsection (a) applying standards applicable to the emission of air pollutants from motorcycles as a separate class or category. In any case in which such standards are promulgated for such emissions from motorcycles as a separate class or category, the Administrator, in promulgating such standards, shall consider the need to achieve equivalency of emission reductions between motorcycles and other motor vehicles to the maximum extent practicable.

(4) (A) Effective with respect to vehicles and engines manufactured after model year 1978, no emission control device, system, or element of design

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shall be used in a new motor vehicle or new motor vehicle engine for purposes of complying with requirements prescribed under this title if such device, system, or element of design will cause or contribute to an unreasonable risk to public health, welfare, or safety in its operation or function.

(B) In determining whether an unreasonable risk exists under subparagraph (A), the Administrator shall consider, among other factors, (i) whether and to what extent the use of any device, system, or element of design causes, increases, reduces, or eliminates emissions of any unregulated pollutants; (ii) available methods for reducing or eliminating any risk to public health, welfare, or safety which may be associated with the use of such device, system, or element of design, and (iii) the availability of other devices, systems, or elements of design which may be used to conform to requirements prescribed under this title without causing or contributing to such unreasonable risk. The Administrator shall include in the consideration required by this paragraph all relevant information developed pursuant to section 214 [42 USCS § 7548].

(5) (A) If the Administrator promulgates final regulations which define the degree of control required and the test procedures by which compliance could be determined for gasoline vapor recovery of uncontrolled emissions from the fueling of motor vehicles, the Administrator shall, after consultation with the Secretary of Transportation with respect to motor vehicle safety, prescribe, by regulation, fill pipe

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standards for new motor vehicles in order to insure effective connection between such fill pipe and any vapor recovery system which the Administrator determines may be required to comply with such vapor recovery regulations. In promulgating such standards the Administrator shall take into consideration limits on fill pipe diameter, minimum design criteria for nozzle retainer lips, limits on the location of the unleaded fuel restrictors, a minimum access zone surrounding a fill pipe, a minimum pipe or nozzle insertion angle, and such other factors as he deems pertinent.

(B) Regulations prescribing standards under subparagraph (A) shall not become effective until the introduction of the model year for which it would be feasible to implement such standards, taking into consideration the restraints of an adequate leadtime for design and production.

(C) Nothing in subparagraph (A) shall (i) prevent the Administrator from specifying different nozzle and fill neck sizes for gasoline with additives and gasoline without additives or (ii) permit the Administrator to require a specific location, configuration, modeling, or styling of the motor vehicle body with respect to the fuel tank fill neck or fill nozzle clearance envelope.

(D) For the purpose of this paragraph, the term "fill pipe" shall include the fuel tank fill pipe, fill neck, fill inlet, and closure.

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(6) Onboard vapor recovery. Within 1 year after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall, after consultation with the Secretary of Transportation regarding the safety of vehicle-based (“onboard”) systems for the control of vehicle refueling emissions, promulgate standards under this section requiring that new light-duty vehicles manufactured beginning in the fourth model year after the model year in which the standards are promulgated and thereafter shall be equipped with such systems. The standards required under this paragraph shall apply to a percentage of each manufacturer’s fleet of new light-duty vehicles beginning with the fourth model year after the model year in which the standards are promulgated. The percentage shall be as specified in the following table:

**IMPLEMENTATION SCHEDULE FOR ON BOARD VAPOR RECOVERY REQUIREMENTS**

Model year commencing after standards promulgated	Percentage*
Fourth .....	40
Fifth.....	80
After Fifth .....	100

\*Percentages in the table refer to a percentage of the manufacturer’s sales volume.

The standards shall require that such systems provide a minimum evaporative emission capture efficiency of 95 percent. The requirements of section

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182(b)(3) [42 USCS § 7511a(b)(3)] (relating to stage II gasoline vapor recovery) for areas classified under section 181 [42 USCS § 7511] as moderate for ozone shall not apply after promulgation of such standards and the Administrator may, by rule, revise or waive the application of the requirements of such section 182(b)(3) [42 USCS § 7511a(b)(3)] for areas classified under section 181 [42 USCS § 7511] as Serious, Severe, or Extreme for ozone, as appropriate, after such time as the Administrator determines that onboard emissions control systems required under this paragraph are in widespread use throughout the motor vehicle fleet.

(b) Emissions of carbon monoxide, hydrocarbons, and oxides of nitrogen; annual report to Congress; waiver of emission standards; research objectives.

(1) (A) The regulations under subsection (a) applicable to emissions of carbon monoxide and hydrocarbons from light-duty vehicles and engines manufactured during model years 1977 through 1979 shall contain standards which provide that such emissions from such vehicles and engines may not exceed 1.5 grams per vehicle mile of hydrocarbons and 15.0 grams per vehicle mile of carbon monoxide. The regulations under subsection (a) applicable to emissions of carbon monoxide from light-duty vehicles and engines manufactured during the model year 1980 shall contain standards which provide that such emissions may not exceed 7.0 grams per vehicle mile. The regulations under subsection (a) applicable to emissions of hydrocarbons from light-duty vehicles

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and engines manufactured during or after model year 1980 shall contain standards which require a reduction of at least 90 percent from emissions of such pollutant allowable under the standards under this section applicable to light-duty vehicles and engines manufactured in model year 1970. Unless waived as provided in paragraph (5), regulations under subsection (a) applicable to emissions of carbon monoxide from light-duty vehicles and engines manufactured during or after the model year 1981 shall contain standards which require a reduction of at least 90 percent from emissions of such pollutant allowable under the standards under this section applicable to light-duty vehicles and engines manufactured in model year 1970.

(B) The regulations under subsection (a) applicable to emissions of oxides of nitrogen from light-duty vehicles and engines manufactured during model years 1977 through 1980 shall contain standards which provide that such emissions from such vehicles and engines may not exceed 2.0 grams per vehicle mile. The regulations under subsection (a) applicable to emissions of oxides of nitrogen from light-duty vehicles and engines manufactured during the model year 1981 and thereafter shall contain standards which provide that such emissions from such vehicles and engines may not exceed 1.0 gram per vehicle mile. The Administrator shall prescribe standards in lieu of those required by the preceding sentence, which provide that emissions of oxides of nitrogen may not exceed 2.0 grams per vehicle mile

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for any light-duty vehicle manufactured during model years 1981 and 1982 by any manufacturer whose production, by corporate identity, for calendar year 1976 was less than three hundred thousand light-duty motor vehicles worldwide if the Administrator determines that –

(i) the ability of such manufacturer to meet emission standards in the 1975 and subsequent model years was, and is, primarily dependent upon technology developed by other manufacturers and purchased from such manufacturers; and

(ii) such manufacturer lacks the financial resources and technological ability to develop such technology.

(C) The Administrator may promulgate regulations under subsection (a)(1) revising any standard prescribed or previously revised under this subsection, as needed to protect public health or welfare, taking costs, energy, and safety into account. Any revised standard shall require a reduction of emissions from the standard that was previously applicable. Any such revision under this title may provide for a phase-in of the standard. It is the intent of Congress that the numerical emission standards specified in subsections (a)(3)(B)(ii),(g),(h), and (i) shall not be modified by the Administrator after the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990] for any model year before the model year 2004.

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(2) Emission standards under paragraph (1), and measurement techniques on which such standards are based (if not promulgated prior to the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990]), shall be promulgated by regulation within 180 days after such date.

(3) For purposes of this part [42 USCS §§ 7521 et seq.] –

(A) (i) The term “model year” with reference to any specific calendar year means the manufacturer’s annual production period (as determined by the Administrator) which includes January 1 of such calendar year. If the manufacturer has no annual production period, the term “model year” shall mean the calendar year.

(ii) For the purpose of assuring that vehicles and engines manufactured before the beginning of a model year were not manufactured for purposes of circumventing the effective date of a standard required to be prescribed by subsection (b), the Administrator may prescribe regulations defining “model year” otherwise than as provided in clause (i).

(B) [Repealed]

(C) The term “heavy duty vehicle” means a truck, bus, or other vehicle manufactured primarily for use on the public streets, roads, and highways (not including any vehicle operated exclusively on a rail or rails) which has a gross vehicle weight (as

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determined under regulations promulgated by the Administrator) in excess of six thousand pounds. Such term includes any such vehicle which has special features enabling off-street or off-highway operation and use.

[(4)](3) Upon the petition of any manufacturer, the Administrator, after notice and opportunity for public hearing, may waive the standard required under subparagraph (B) of paragraph (1) to not exceed 1.5 grams of oxides of nitrogen per vehicle mile for any class or category of light-duty vehicles or engines manufactured by such manufacturer during any period of up to four model years beginning after the model year 1980 if the manufacturer demonstrates that such waiver is necessary to permit the use of an innovative power train technology, or innovative emission control device or system, in such class or category of vehicles or engines and that such technology or system was not utilized by more than 1 percent of the light-duty vehicles sold in the United States in the 1975 model year. Such waiver may be granted only if the Administrator determines –

(A) that such waiver would not endanger public health,

(B) that there is a substantial likelihood that the vehicles or engines will be able to comply with the applicable standard under this section at the expiration of the waiver, and

(C) that the technology or system has a potential for long-term air quality benefit and has the

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potential to meet or exceed the average fuel economy standard applicable under the Energy Policy and Conservation Act upon the expiration of the waiver.

No waiver under this subparagraph [paragraph] granted to any manufacturer shall apply to more than 5 percent of such manufacturer's production or more than fifty thousand vehicles or engines, whichever is greater.

(c) Feasibility study and investigation by National Academy of Sciences; reports to Administrator and Congress; availability of information.

(1) The Administrator shall undertake to enter into appropriate arrangements with the National Academy of Sciences to conduct a comprehensive study and investigation of the technological feasibility of meeting the emissions standards required to be prescribed by the Administrator by subsection (b) of this section.

(2) Of the funds authorized to be appropriated to the Administrator by this Act, such amounts as are required shall be available to carry out the study and investigation authorized by paragraph (1) of this subsection.

(3) In entering into any arrangement with the National Academy of Sciences for conducting the study and investigation authorized by paragraph (1) of this subsection, the Administrator shall request the National Academy of Sciences to submit semiannual reports on the progress of its study and investigation

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to the Administrator and the Congress, beginning not later than July 1, 1971, and continuing until such study and investigation is completed.

(4) The Administrator shall furnish to such Academy at its request any information which the Academy deems necessary for the purpose of conducting the investigation and study authorized by paragraph (1) of this subsection. For the purpose of furnishing such information, the Administrator may use any authority he has under this Act (A) to obtain information from any person, and (B) to require such person to conduct such tests, keep such records, and make such reports respecting research or other activities conducted by such person as may be reasonably necessary to carry out this subsection.

(d) Useful life of vehicles. The Administrator shall prescribe regulations under which the useful life of vehicles and engines shall be determined for purposes of subsection (a)(1) of this section and section 207 [42 USCS § 7541]. Such regulations shall provide that except where a different useful life period is specified in this title [42 USCS §§ 7521 et seq.] useful life shall –

(1) in the case of light duty vehicles and light duty vehicle engines and light-duty trucks up to 3,750 lbs. LVW and up to 6,000 lbs. GVWR, be a period of use of five years or of fifty thousand miles (or the equivalent), whichever first occurs, except that in the case of any requirement of this section which first

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becomes applicable after the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990] where the useful life period is not otherwise specified for such vehicles and engines, the period shall be 10 years or 100,000 miles (or the equivalent), whichever first occurs, with testing for purposes of in-use compliance under section 207 [42 USCS § 7541] up to (but not beyond) 7 years or 75,000 miles (or the equivalent), whichever first occurs;

(2) in the case of any other motor vehicle or motor vehicle engine (other than motorcycles or motorcycle engines), be a period of use set forth in paragraph (1) unless the Administrator determines that a period of use of greater duration or mileage is appropriate; and

(3) in the case of any motorcycle or motorcycle engine, be a period of use the Administrator shall determine.

(e) New power sources or propulsion systems. In the event a new power source or propulsion system for new motor vehicles or new motor vehicle engines is submitted for certification pursuant to section 206(a) [42 USCS § 7525(a)], the Administrator may postpone certification until he has prescribed standards for any air pollutants emitted by such vehicle or engine which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger the public health or welfare but for which standards have not been prescribed under subsection (a).

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(f) High altitude regulations.

(1) The high altitude regulation in effect with respect to model year 1977 motor vehicles shall not apply to the manufacture, distribution, or sale of 1978 and later model year motor vehicles. Any future regulation affecting the sale or distribution of motor vehicles or engines manufactured before the model year 1984 in high altitude areas of the country shall take effect no earlier than model year 1981.

(2) Any such future regulation applicable to high altitude vehicles or engines shall not require a percentage of reduction in the emissions of such vehicles which is greater than the required percentage of reduction in emissions from motor vehicles as set forth in section 202(b) [subsec. (b) of this section]. This percentage reduction shall be determined by comparing any proposed high altitude emission standards to high altitude emissions from vehicles manufactured during model year 1970. In no event shall regulations applicable to high altitude vehicles manufactured before the model year 1984 establish a numerical standard which is more stringent than that applicable to vehicles certified under non-high altitude conditions.

(3) Section 307(d) [42 USCS § 7607(d)] shall apply to any high altitude regulation referred to in paragraph (2) and before promulgating any such regulation, the Administrator shall consider and make a finding with respect to –

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(A) the economic impact upon consumers, individual high altitude dealers, and the automobile industry of any such regulation, including the economic impact which was experienced as a result of the regulation imposed during model year 1977 with respect to high altitude certification requirements;

(B) the present and future availability of emission control technology capable of meeting the applicable vehicle and engine emission requirements without reducing model availability; and

(C) the likelihood that the adoption of such a high altitude regulation will result in any significant improvement in air quality in any area to which it shall apply.

(g) Light-duty trucks up to 6,000 GVWR and light-duty vehicles; standards for model years after 1993.

(1) NMHC, CO, and NO[X]. Effective with respect to the model year 1994 and thereafter, the regulations under subsection (a) applicable to emissions of nonmethane hydrocarbons (NMHC), carbon monoxide (CO), and oxides of nitrogen (NO[X]) from light-duty trucks (LDTs) of up to 6,000 lbs. gross vehicle weight rating (GVWR) and light-duty vehicles (LDVs) shall contain standards which provide that emissions from a percentage of each manufacturer's sales volume of such vehicles and trucks shall comply with the levels specified in table G. The percentage shall be as specified in the implementation schedule below:

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TABLE G. EMISSION STANDARDS FOR  
 NMHC, CO, AND NO<sub>x</sub>; FROM LIGHT-DUTY  
 TRUCKS OF UP TO 6,000 LBS. GVWR  
 AND LIGHT-DUTY VEHICLES

Vehicle type	Column A			Column B		
	(5 yrs/50,000 mi)			(10 yrs/100,000 mi)		
	NMHC	CO	NO <sub>x</sub>	NMHC	CO	NO <sub>x</sub>
LDTs (0-3,750 lbs. LVW) and light-duty vehicles.....	0.25	3.4	0.4*	0.31	4.2	0.6*
LDTs (3,751-5,750 lbs. LVW) .....	0.32	4.4	0.7**	0.40	5.5	0.97

Standards are expressed in grams per mile (gpm).

For standards under column A, for purposes of certification under section 206, the applicable useful life shall be 5 years or 50,000 miles (or the equivalent), whichever first occurs.

For standards under column B, for purposes of certification under section 206, the applicable useful life shall be 10 years or 100,000 miles (or the equivalent), whichever first occurs.

\*In the case of diesel-fueled LDTs (0-3,750 lvw) and light-duty vehicles, before the model year 2004, in lieu of the 0.4 and 0.6 standards for NO<sub>x</sub> the applicable standards for NO<sub>x</sub> shall be 1.0 gpm for a useful life of 5 years or 50,000 miles (or the

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equivalent), whichever first occurs, and 1.25 gpm for a useful life of 10 years or 100,000 miles (or the equivalent) whichever first occurs.

\*\*This standard does not apply to diesel-fueled LDTs (3,751-5,750 lbs. LVW).

IMPLEMENTATION SCHEDULE  
FOR TABLE G STANDARD

Model year	Percentage*
1994.....	40
1995.....	80
after 1995.....	100

\*Percentages in the table refer to a percentage of each manufacturer's sales volume.

(2) PM Standard. Effective with respect to model year 1994 and thereafter in the case of light-duty vehicles and effective with respect to the model year 1995 and thereafter in the case of light-duty trucks (LDTs) of up to 6,000 lbs. gross vehicle weight rating (GVWR), the regulations under subsection (a) applicable to emissions of particulate matter (PM) from such vehicles and trucks shall contain standards which provide that such emissions from a percentage of each manufacturer's sales volume of such vehicles and trucks shall not exceed the levels specified in the table below. The percentage shall be as specified in the Implementation Schedule below.

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PM STANDARD FOR LDTs  
OF UP TO 6,000 LBS. GVWR

Usual life period	Standard
5/50,000.....	0.08 gpm
10/10,000.....	0.10 gpm

The applicable useful life, for purposes of certification under section 206 and for purposes of in-use compliance under section 207, shall be 5 years or 50,000 miles (or the equivalent), whichever first occurs, in the case of the 5/50,000 standard.

The applicable useful life, for purposes of certification under section 206 and for purposes of in-use compliance under section 207, shall be 10 years or 100,000 miles (or the equivalent), whichever first occurs in the case of the 10/100,000 standard.

IMPLEMENTATION SCHEDULE  
FOR PM STANDARDS

Model year	Light-duty vehicles	LDTs
1994.....	40%*	
1995.....	80%*	40%*
1996.....	100%*	80%*
after 1996.....	100%*	100%*

\*Percentages in the table refer to a percentage of each manufacturer's sales volume.

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(h) Light-duty trucks of more than 6,000 lbs. GVWR; standards for model years after 1995. Effective with respect to the model year 1996 and thereafter, the regulations under subsection (a) applicable to emissions of nonmethane hydrocarbons (NMHC), carbon monoxide (CO), oxides of nitrogen (NO[X]), and particulate matter (PM) from light-duty trucks (LDTs) of more than 6,000 lbs. gross vehicle weight rating (GVWR) shall contain standards which provide that emissions from a specified percentage of each manufacturer's sales volume of such trucks shall comply with the levels specified in table H. The specified percentage shall be 50 percent in model year 1996 and 100 percent thereafter.

TABLE H. EMISSION STANDARDS  
FOR NMHC AND CO FROM GASOLINE  
AND DIESEL FUELED LIGHT-DUTY TRUCKS  
OF MORE THAN 6,000 LBS. GVWR

LDT Test Weight	Column A			Column B			
	(5 yrs/50,000 mi)			(11 yrs/120,000 mi)			
	NMHC	CO	NO <sub>x</sub>	NMHC	CO	NO <sub>x</sub>	PM
3,751-5,750 lbs. TW .....	0.32	4.4	0.7*	0.46	6.4	0.98	0.10
Over 5,750 lbs. TW .....	0.39	5.0	1.1*	0.56	7.3	1.53	0.12

Standards are expressed in grams per mile (gpm).

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For standards under column A, for purposes of certification under section 206, the applicable useful life shall be 5 years or 50,000 miles (or the equivalent), whichever first occurs.

For standards under column B, for purposes of certification under section 206, the applicable useful life shall be 11 years or 120,000 miles (or the equivalent), whichever first occurs.

\*Not applicable to diesel-fueled LDTs.

(i) Phase II study for certain light-duty vehicles and light-duty trucks.

(1) The Administrator, with the participation of the Office of Technology Assessment, shall study whether or not further reductions in emissions from light-duty vehicles and light-duty trucks should be required pursuant to this title. The study shall consider whether to establish with respect to model years commencing after January 1, 2003, the standards and useful life period for gasoline and diesel-fueled light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less specified in the following table:

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TABLE 3. PENDING EMISSION STANDARDS  
FOR GASOLINE AND DIESEL FUELED  
LIGHT-DUTY VEHICLES AND LIGHT-DUTY  
TRUCKS 3,750 LBS. LVW OR LESS

Pollutant	Emission Level*
NMHC .....	0.125 GPM
NO <sub>x</sub> .....	0.2 GPM
CO .....	1.7 GPM

\*Emission levels are expressed in grams per mile (GPM). For vehicles and engines subject to this subsection for purposes of section 202(d) and any reference thereto, the useful life of such vehicles and engines shall be a period of 10 years or 100,000 miles (or the equivalent), whichever first occurs.

Such study shall also consider other standards and useful life periods which are more stringent or less stringent than those set forth in table 3 (but more stringent than those referred to in subsections (g) and (h)).

(2) (A) As part of the study under paragraph (1), the Administrator shall examine the need for further reductions in emissions in order to attain or maintain the national ambient air quality standards, taking into consideration the waiver provisions of section 209(b) [42 USCS § 7543(b)]. As part of such study, the Administrator shall also examine –

(i) the availability of technology (including the costs thereof), in the case of light-duty

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vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less, for meeting more stringent emission standards than those provided in subsections (g) and (h) for model years commencing not earlier than after January 1, 2003, and not later than model year 2006, including the lead time and safety and energy impacts of meeting more stringent emission standards; and

(ii) the need for, and cost effectiveness of, obtaining further reductions in emissions from such light-duty vehicles and light-duty trucks, taking into consideration alternative means of attaining or maintaining the national primary ambient air quality standards pursuant to State implementation plans and other requirements of this Act, including their feasibility and cost effectiveness.

(B) The Administrator shall submit a report to Congress no later than June 1, 1997, containing the results of the study under this subsection, including the results of the examination conducted under subparagraph (A). Before submittal of such report the Administrator shall provide a reasonable opportunity for public comment and shall include a summary of such comments in the report to Congress.

(3) (A) Based on the study under paragraph (1) the Administrator shall determine, by rule, within 3 calendar years after the report is submitted to Congress, but not later than December 31, 1999, whether –

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(i) there is a need for further reductions in emissions as provided in paragraph (2)(A);

(ii) the technology for meeting more stringent emission standards will be available, as provided in paragraph (2)(A)(i), in the case of light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less, for model years commencing not earlier than January 1, 2003, and not later than model year 2006, considering the factors listed in paragraph (2)(A)(i); and

(iii) obtaining further reductions in emissions from such vehicles will be needed and cost effective, taking into consideration alternatives as provided in paragraph (2)(A)(ii).

The rulemaking under this paragraph shall commence within 3 months after submission of the report to Congress under paragraph (2)(B).

(B) If the Administrator determines under subparagraph (A) that –

(i) there is no need for further reductions in emissions as provided in paragraph (2)(A);

(ii) the technology for meeting more stringent emission standards will not be available as provided in paragraph (2)(A)(i), in the case of light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less, for model years commencing not earlier than January 1,

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2003, and not later than model year 2006, considering the factors listed in paragraph (2)(A)(i); or

(iii) obtaining further reductions in emissions from such vehicles will not be needed or cost effective, taking into consideration alternatives as provided in paragraph (2)(A)(ii), the Administrator shall not promulgate more stringent standards than those in effect pursuant to subsections (g) and (h). Nothing in this paragraph shall prohibit the Administrator from exercising the Administrator's authority under subsection (a) to promulgate more stringent standards for light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less at any other time thereafter in accordance with subsection (a).

(C) If the Administrator determines under subparagraph (A) that –

(i) there is a need for further reductions in emissions as provided in paragraph (2)(A);

(ii) the technology for meeting more stringent emission standards will be available, as provided in paragraph (2)(A)(i), in the case of light-duty vehicles and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 lbs. or less, for model years commencing not earlier than January 1, 2003, and not later than model year 2006, considering the factors listed in paragraph (2)(A)(i); and

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(iii) obtaining further reductions in emissions from such vehicles will be needed and cost effective, taking into consideration alternatives as provided in paragraph (2)(A)(ii), the Administrator shall either promulgate the standards (and useful life periods) set forth in Table 3 in paragraph (1) or promulgate alternative standards (and useful life periods) which are more stringent than those referred to in subsections (g) and (h). Any such standards (or useful life periods) promulgated by the Administrator shall take effect with respect to any such vehicles or engines no earlier than the model year 2003 but not later than model year 2006, as determined by the Administrator in the rule.

(D) Nothing in this paragraph shall be construed by the Administrator or by a court as a presumption that any standards (or useful life period) set forth in Table 3 shall be promulgated in the rule-making required under this paragraph. The action required of the Administrator in accordance with this paragraph shall be treated as a nondiscretionary duty for purposes of section 304(a)(2) [42 USCS § 7604(a)(2)] (relating to citizen suits).

(E) Unless the Administrator determines not to promulgate more stringent standards as provided in subparagraph (B) or to postpone the effective date of standards referred to in Table 3 in paragraph (1) or to establish alternative standards as provided in subparagraph (C), effective with respect to model years commencing after January 1,

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2003, the regulations under subsection (a) applicable to emissions of nonmethane hydrocarbons (NMHC), oxides of nitrogen (NO[X]), and carbon monoxide (CO) from motor vehicles and motor vehicle engines in the classes specified in Table 3 in paragraph (1) above shall contain standards which provide that emissions may not exceed the pending emission levels specified in Table 3 in paragraph (1).

(j) Cold CO standards.

(1) Phase I. Not later than 12 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 5, 1990], the Administrator shall promulgate regulations under subsection (a) of this section applicable to emissions of carbon monoxide from 1994 and later model year light-duty vehicles and light-duty trucks when operated at 20 degrees Fahrenheit. The regulations shall contain standards which provide that emissions of carbon monoxide from a manufacturer's vehicles when operated at 20 degrees Fahrenheit may not exceed, in the case of light-duty vehicles, 10.0 grams per mile, and in the case of light-duty trucks, a level comparable in stringency to the standard applicable to light-duty vehicles. The standards shall take effect after model year 1993 according to a phase-in schedule which requires a percentage of each manufacturer's sales volume of light-duty vehicles and light-duty trucks to comply with applicable standards after model year 1993. The percentage shall be as specified in the following table:

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PHASE-IN SCHEDULE FOR  
COLD START STANDARDS

Model year	Percentage
1994.....	40
1995.....	80
1996 and after.....	100

(2) Phase II.

(A) Not later than June 1, 1997, the Administrator shall complete a study assessing the need for further reductions in emissions of carbon monoxide and the maximum reductions in such emissions achievable from model year 2001 and later model year light-duty vehicles and light-duty trucks when operated at 20 degrees Fahrenheit.

(B) (i) If as of June 1, 1997, 6 or more nonattainment areas have a carbon monoxide design value of 9.5 ppm or greater, the regulations under subsection (a)(1) of this section applicable to emissions of carbon monoxide from model year 2002 and later model year light-duty vehicles and light-duty trucks shall contain standards which provide that emissions of carbon monoxide from such vehicles and trucks when operated at 20 degrees Fahrenheit may not exceed 3.4 grams per mile (gpm) in the case of light-duty vehicles and 4.4 grams per mile (gpm) in the case of light-duty trucks up to 6,000 GVWR and a level comparable in stringency in the case of light-duty trucks 6,000 GVWR and above.

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(ii) In determining for purposes of this subparagraph whether 6 or more nonattainment areas have a carbon monoxide design value of 9.5 ppm or greater, the Administrator shall exclude the areas of Steubenville, Ohio, and Oshkosh, Wisconsin.

(3) Useful-life for phase I and phase II standards. In the case of the standards referred to in paragraphs (1) and (2), for purposes of certification under section 206 [42 USCS § 7525] and in-use compliance under section 207 [42 USCS § 7541], the applicable useful life period shall be 5 years or 50,000 miles, whichever first occurs, except that the Administrator may extend such useful life period (for purposes of section 206, or section 207 [42 USCS § 7525 or § 7541], or both) if he determines that it is feasible for vehicles and engines subject to such standards to meet such standards for a longer useful life. If the Administrator extends such useful life period, the Administrator may make an appropriate adjustment of applicable standards for such extended useful life. No such extended useful life shall extend beyond the useful life period provided in regulations under subsection (d).

(4) Heavy-duty vehicles and engines. The Administrator may also promulgate regulations under subsection (a)(1) applicable to emissions of carbon monoxide from heavy-duty vehicles and engines when operated at cold temperatures.

(k) Control of evaporative emissions. The Administrator shall promulgate (and from time

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to time revise) regulations applicable to evaporative emissions of hydrocarbons from all gasoline-fueled motor vehicles –

- (1) during operation; and
- (2) over 2 or more days of nonuse;

under ozone-prone summertime conditions (as determined by regulations of the Administrator). The regulations shall take effect as expeditiously as possible and shall require the greatest degree of emission reduction achievable by means reasonably expected to be available for production during any model year to which the regulations apply, giving appropriate consideration to fuel volatility, and to cost, energy, and safety factors associated with the application of the appropriate technology. The Administrator shall commence a rulemaking under this subsection within 12 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990]. If final regulations are not promulgated under this subsection within 18 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall submit a statement to the Congress containing an explanation of the reasons for the delay and a date certain for promulgation of such final regulations in accordance with this Act. Such date certain shall not be later than 15 months after the expiration of such 18 month deadline.

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(1) Mobile source-related air toxics.

(1) Study. Not later than 18 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall complete a study of the need for, and feasibility of, controlling emissions of toxic air pollutants which are unregulated under this Act and associated with motor vehicles and motor vehicle fuels, and the need for, and feasibility of, controlling such emissions and the means and measures for such controls. The study shall focus on those categories of emissions that pose the greatest risk to human health or about which significant uncertainties remain, including emissions of benzene, formaldehyde, and 1, 3 butadiene. The proposed report shall be available for public review and comment and shall include a summary of all comments.

(2) Standards. Within 54 months after the date of the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall, based on the study under paragraph (1), promulgate (and from time to time revise) regulations under subsection (a)(1) or section 211(c)(1) [42 USCS § 7545(c)(1)] containing reasonable requirements to control hazardous air pollutants from motor vehicles and motor vehicle fuels. The regulations shall contain standards for such fuels or vehicles, or both, which the Administrator determines reflect the greatest degree of emission reduction achievable through the application of technology which will be available,

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taking into consideration the standards established under subsection (a), the availability and costs of the technology, and noise, energy, and safety factors, and lead time. Such regulations shall not be inconsistent with standards under section 202(a) [subsec. (a) of this section]. The regulations shall, at a minimum, apply to emissions of benzene and formaldehyde.

(m) Emissions control diagnostics.

(1) Regulations. Within 18 months after the enactment of the Clean Air Act Amendments of 1990 [enacted Nov. 15, 1990], the Administrator shall promulgate regulations under subsection (a) requiring manufacturers to install on all new light duty vehicles and light duty trucks diagnostics [sic] systems capable of –

(A) accurately identifying for the vehicle's useful life as established under this section, emission-related systems deterioration or malfunction, including, at a minimum, the catalytic converter and oxygen sensor, which could cause or result in failure of the vehicles to comply with emission standards established under this section,

(B) alerting the vehicle's owner or operator to the likely need for emission-related components or systems maintenance or repair,

(C) storing and retrieving fault codes specified by the Administrator, and

(D) providing access to stored information in a manner specified by the Administrator.

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The Administrator may, in the Administrator's discretion, promulgate regulations requiring manufacturers to install such onboard diagnostic systems on heavy-duty vehicles and engines.

(2) Effective date. The regulations required under paragraph (1) of this subsection shall take effect in model year 1994, except that the Administrator may waive the application of such regulations for model year 1994 or 1995 (or both) with respect to any class or category of motor vehicles if the Administrator determines that it would be infeasible to apply the regulations to that class or category in such model year or years, consistent with corresponding regulations or policies adopted by the California Air Resources Board for such systems.

(3) State inspection. The Administrator shall by regulation require States that have implementation plans containing motor vehicle inspection and maintenance programs to amend their plans within 2 years after promulgation of such regulations to provide for inspection of onboard diagnostics systems (as prescribed by regulations under paragraph (1) of this subsection) and for the maintenance or repair of malfunctions or system deterioration identified by or affecting such diagnostics systems. Such regulations shall not be inconsistent with the provisions for warranties promulgated under section 207(a) and (b) [42 USCS § 7541(a),(b)].

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(4) Specific requirements. In promulgating regulations under this subsection, the Administrator shall require –

(A) that any connectors through which the emission control diagnostics system is accessed for inspection, diagnosis, service, or repair shall be standard and uniform on all motor vehicles and motor vehicle engines;

(B) that access to the emission control diagnostics system through such connectors shall be unrestricted and shall not require any access code or any device which is only available from a vehicle manufacturer; and

(C) that the output of the data from the emission control diagnostics system through such connectors shall be usable without the need for any unique decoding information or device.

(5) Information availability. The Administrator, by regulation, shall require (subject to the provisions of section 208(c) [42 USCS § 7542(c)] regarding the protection of methods or processes entitled to protection as trade secrets) manufacturers to provide promptly to any person engaged in the repairing or servicing of motor vehicles or motor vehicle engines, and the Administrator for use by any such persons, with any and all information needed to make use of the emission control diagnostics system prescribed under this subsection and such other information including instructions for making emission related diagnosis and repairs. No such information may be

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withheld under section [sic] 208(c) [42 USCS § 7542(c)] if that information is provided (directly or indirectly) by the manufacturer to franchised dealers or other persons engaged in the repair, diagnosing, or servicing of motor vehicles or motor vehicle engines.

Such information shall also be available to the Administrator, subject to section 208(c) [42 USCS § 7542(c)], in carrying out the Administrator's responsibilities under this section.

[(n)](f) Model years after 1990. For model years prior to model year 1994, the regulations under section 202(a) [subsec. (a) of this section] applicable to buses other than those subject to standards under section 219 [42 USCS § 7554] shall contain a standard which provides that emissions of particulate matter (PM) from such buses may not exceed the standards set forth in the following table:

PM STANDARD FOR BUSES

Model year	Standard*
1991.....	0.25
1992.....	0.25
1993 and thereafter.....	0.10

\*Standards are expressed in grams per brake horsepower hour (g/bhp/hr).

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\* \* \* Current through PL 113-3, approved 2/4/13 \* \* \*

TITLE 42. THE PUBLIC HEALTH AND WELFARE  
CHAPTER 85. AIR POLLUTION PREVENTION  
AND CONTROL GENERAL PROVISIONS

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42 USCS § 7607

§ 7607. Administrative proceedings and judicial review

(a) Administrative subpoenas; confidentiality; witnesses. In connection with any determination under section 110(f) [42 USCS § 7410(f)], or for purposes of obtaining information under section 202(b)(4) or 211(c)(3) [42 USCS § 7521(b)(4) or 7545(c)(3)], any investigation, monitoring, reporting requirement, entry, compliance inspection, or administrative enforcement proceeding under the [this] Act (including but not limited to section 113, section 114, section 120, section 129, section 167, section 205, section 206, section 208, section 303, or section 306 [42 USCS § 7413, 7414, 7420, 7429, 7477, 7524, 7525, 7542, 7603, or 7606][,], the Administrator may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and he may administer oaths. Except for emission data, upon a showing satisfactory to the Administrator by such owner or operator that such papers, books, documents, or information or particular part thereof, if made public, would divulge trade secrets or secret processes of such owner or operator,

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the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such paper, book, document, or information may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out this Act, to persons carrying out the National Academy of Sciences' study and investigation provided for in section 202(c) [42 USCS § 7521(c)], or when relevant in any proceeding under this Act. Witnesses summoned shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. In case of contumacy or refusal to obey a subpoena served upon any person under this subparagraph, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Administrator to appear and produce papers, books, and documents before the Administrator, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(b) Judicial review.

(1) A petition for review of action of the Administrator in promulgating any national primary or secondary ambient air quality standard, any emission standard or requirement under section 112 [42 USCS § 7412], any standard of performance or requirement

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under section 111 [42 USCS § 7411][,], any standard under section 202 [42 USCS § 7521] (other than a standard required to be prescribed under section 202(b)(1) [42 USCS § 7521(b)(1)]), any determination under section 202(b)(5) [42 USCS § 7521(b)(5)], any control or prohibition under section 211 [42 USCS § 7545], any standard under section 231 [42 USCS § 7571] any rule issued under section 113, 119, or under section 120 [42 USCS § 7413, 7419, or 7420], or any other nationally applicable regulations promulgated, or final action taken, by the Administrator under this Act may be filed only in the United States Court of Appeals for the District of Columbia. A petition for review of the Administrator's action in approving or promulgating any implementation plan under section 110 or section 111(d) [42 USCS § 7410 or 7411(d)], any order under section 111(j) [42 USCS § 7411(j)], under section 112 [42 USCS § 7412][,], under section 119 [42 USCS § 7419], or under section 120 [42 USCS § 7420], or his action under section 119(c)(2)(A), (B), or (C) (as in effect before the date of enactment of the Clean Air Act Amendments of 1977) or under regulations thereunder, or revising regulations for enhanced monitoring and compliance certification programs under section 114(a)(3) of this Act, or any other final action of the Administrator under this Act (including any denial or disapproval by the Administrator under title I [42 USCS §§ 7401 et seq.]) which is locally or regionally applicable may be filed only in the United States Court of Appeals for the appropriate circuit. Notwithstanding the preceding sentence a petition for review of any action referred to

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in such sentence may be filed only in the United States Court of Appeals for the District of Columbia if such action is based on a determination of nationwide scope or effect and if in taking such action the Administrator finds and publishes that such action is based on such a determination. Any petition for review under this subsection shall be filed within sixty days from the date notice of such promulgation, approval, or action appears in the Federal Register, except that if such petition is based solely on grounds arising after such sixtieth day, then any petition for review under this subsection shall be filed within sixty days after such grounds arise. The filing of a petition for reconsideration by the Administrator of any otherwise final rule or action shall not affect the finality of such rule or action for purposes of judicial review nor extend the time within which a petition for judicial review of such rule or action under this section may be filed, and shall not postpone the effectiveness of such rule or action.

(2) Action of the Administrator with respect to which review could have been obtained under paragraph (1) shall not be subject to judicial review in civil or criminal proceedings for enforcement. Where a final decision by the Administrator defers performance of any nondiscretionary statutory action to a later time, any person may challenge the deferral pursuant to paragraph (1).

(c) Additional evidence. In any judicial proceeding in which review is sought of a determination under this Act required to be made on the record after notice and

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opportunity for hearing, if any party applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Administrator, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Administrator, in such manner and upon such terms and conditions as [to] the court may deem proper. The Administrator may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken and he shall file such modified or new findings, and his recommendation, if any, for the modification or setting aside of his original determination, with the return of such additional evidence.

(d) Rulemaking.

(1) This subsection applies to –

(A) the promulgation or revision of any national ambient air quality standard under section 109 [42 USCS § 7409],

(B) the promulgation or revision of an implementation plan by the Administrator under section 110(c) [42 USCS § 7410(c)],

(C) the promulgation or revision of any standard of performance under section 111 [42 USCS § 7411], or emission standard or limitation under section 112(d) [42 USCS § 7412(d)], any standard under section 112(f) [42 USCS § 7412(f)], or any

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regulation under section 112(g)(1)(D) and (F) [42 USCS§ 7412(g)(1)(D),(F)], or any regulation under section 112(m) or (n) [42 USCS § 7412(m) or (n)],

(D) the promulgation of any requirement for solid waste combustion under section 129 [42 USCS § 7429],

(E) the promulgation or revision of any regulation pertaining to any fuel or fuel additive under section 211 [42 USCS § 7545],

(F) the promulgation or revision of any aircraft emission standard under section 231 [42 USCS § 7571],

(G) the promulgation or revision of any regulation under title IV (relating to control of acid deposition),

(H) promulgation or revision of regulations pertaining to primary nonferrous smelter orders under section 119 [42 USCS § 7419] (but not including the granting or denying of any such order),

(I) promulgation or revision of regulations under title VI [42 USCS §§ 7671 et seq.] (relating to stratosphere and ozone protection),

(J) promulgation or revision of regulations under subtitle C of title I [42 USCS §§ 7470 et seq.] (relating to prevention of significant deterioration of air quality and protection of visibility),

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(K) promulgation or revision of regulations under section 202 [42 USCS § 7521] and test procedures for new motor vehicles or engines under section 206 [42 USCS § 7525], and the revision of a standard under section 202(a)(3) [42 USCS § 7521(a)(3)],

(L) promulgation or revision of regulations for noncompliance penalties under section 120 [42 USCS § 7420],

(M) promulgation or revision of any regulations promulgated under section 207 [42 USCS § 7541] (relating to warranties and compliance by vehicles in actual use),

(N) action of the Administrator under section 126 [42 USCS § 7426] (relating to interstate pollution abatement),

(O) the promulgation or revision of any regulation pertaining to consumer and commercial products under section 183(e) [42 USCS § 7511b(e)],

(P) the promulgation or revision of any regulation pertaining to field citations under section 113(d)(3) [42 USCS § 7413(d)(3)],

(Q) the promulgation or revision of any regulation pertaining to urban buses or the clean-fuel vehicle, clean-fuel fleet, and clean fuel programs under part C of title II [42 USCS §§ 7581 et seq.],

(R) the promulgation or revision of any regulation pertaining to nonroad engines or nonroad vehicles under section 213 [42 USCS § 7547],

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(S) the promulgation or revision of any regulation relating to motor vehicle compliance program fees under section 217 [42 USCS § 7552],

(T) the promulgation or revision of any regulation under title IV [42 USCS §§ 7641 et seq.] (relating to acid deposition),

(U) the promulgation or revision of any regulation under section 183(f) [42 USCS § 7511b(f)] pertaining to marine vessels, and

(V) such other actions as the Administrator may determine.

The provisions of section 553 through 557 and section 706 of title 5 of the United States Code shall not, except as expressly provided in this subsection, apply to actions to which this subsection applies. This subsection shall not apply in the case of any rule or circumstance referred to in subparagraphs (A) or (B) of subsection 553(b) of title 5 of the United States Code.

(2) Not later than the date of proposal of any action to which this subsection applies, the Administrator shall establish a rulemaking docket for such action (hereinafter in this subsection referred to as a “rule”). Whenever a rule applies only within a particular State, a second (identical) docket shall be simultaneously established in the appropriate regional office of the Environmental Protection Agency.

(3) In the case of any rule to which this subsection applies, notice of proposed rulemaking shall be

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published in the Federal Register, as provided under section 553(b) of title 5, United States Code, shall be accompanied by a statement of its basis and purpose and shall specify the period available for public comment (hereinafter referred to as the “comment period”). The notice of proposed rulemaking shall also state the docket number, the location or locations of the docket, and the times it will be open to public inspection. The statement of basis and purpose shall include a summary of –

(A) the factual data on which the proposed rule is based;

(B) the methodology used in obtaining the data and in analyzing the data; and

(C) the major legal interpretations and policy considerations underlying the proposed rule.

The statement shall also set forth or summarize and provide a reference to any pertinent findings, recommendations, and comments by the Scientific Review Committee established under section 109(d) [42 USCS § 7409(d)] and the National Academy of Sciences, and, if the proposal differs in any important respect from any of these recommendations, an explanation of the reasons for such differences. All data, information, and documents referred to in this paragraph on which the proposed rule relies shall be included in the docket on the date of publication of the proposed rule.

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(4)(A) The rulemaking docket required under paragraph (2) shall be open for inspection by the public at reasonable times specified in the notice of proposed rulemaking. Any person may copy documents contained in the docket. The Administrator shall provide copying facilities which may be used at the expense of the person seeking copies, but the Administrator may waive or reduce such expenses in such instances as the public interest requires. Any person may request copies by mail if the person pays the expenses, including personnel costs to do the copying.

(B)(i) Promptly upon receipt by the agency, all written comments and documentary information on the proposed rule received from any person for inclusion in the docket during the comment period shall be placed in the docket. The transcript of public hearings, if any, on the proposed rule shall also be included in the docket promptly upon receipt from the person who transcribed such hearings. All documents which become available after the proposed rule has been published and which the Administrator determines are of central relevance to the rulemaking shall be placed in the docket as soon as possible after their availability.

(ii) The drafts of proposed rules submitted by the Administrator to the Office of Management and Budget for any interagency review process prior to proposal of any such rule, all documents accompanying such drafts, and all written comments thereon by other agencies and all written responses to such

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written comments by the Administrator shall be placed in the docket no later than the date of proposal of the rule. The drafts of the final rule submitted for such review process prior to promulgation and all such written comments thereon, all documents accompanying such drafts, and written responses thereto shall be placed in the docket no later than the date of promulgation.

(5) In promulgating a rule to which this subsection applies (i) the Administrator shall allow any person to submit written comments, data, or documentary information; (ii) the Administrator shall give interested persons an opportunity for the oral presentation of data, views, or arguments, in addition to an opportunity to make written submissions; (iii) a transcript shall be kept of any oral presentation; and (iv) the Administrator shall keep the record of such proceeding open for thirty days after completion of the proceeding to provide an opportunity for submission of rebuttal and supplementary information.

(6)(A) The promulgated rule shall be accompanied by (i) a statement of basis and purpose like that referred to in paragraph (3) with respect to a proposed rule and (ii) an explanation of the reasons for any major changes in the promulgated rule from the proposed rule.

(B) The promulgated rule shall also be accompanied by a response to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the comment period.

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(C) The promulgated rule may not be based (in part or whole) on any information or data which has not been placed in the docket as of the date of such promulgation.

(7)(A) The record for judicial review shall consist exclusively of the material referred to in paragraph (3), clause (i) of paragraph (4)(B), and subparagraphs (A) and (B) of paragraph (6).

(B) Only an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment (including any public hearing) may be raised during judicial review. If the person raising an objection can demonstrate to the Administrator that it was impracticable to raise such objection within such time or if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule, the Administrator shall convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed. If the Administrator refuses to convene such a proceeding, such person may seek review of such refusal in the United States court of appeals for the appropriate circuit (as provided in subsection (b)). Such reconsideration shall not postpone the effectiveness of the rule. The effectiveness of the rule may be stayed during such reconsideration, however, by the Administrator or the court for a period not to exceed three months.

App. 212

(8) The sole forum for challenging procedural determinations made by the Administrator under this subsection shall be in the United States court of appeals for the appropriate circuit (as provided in subsection (b)) at the time of the substantive review of the rule. No interlocutory appeals shall be permitted with respect to such procedural determinations. In reviewing alleged procedural errors, the court may invalidate the rule only if the errors were so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made.

(9) In the case of review of any action of the Administrator to which this subsection applies, the court may reverse any such action found to be –

(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

(B) contrary to constitutional right, power, privilege, or immunity;

(C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; or

(D) without observance of procedure required by law, if (i) such failure to observe such procedure is arbitrary or capricious, (ii) the requirement of paragraph (7)(B) has been met, and (iii) the condition of the last sentence of paragraph (8) is met.

App. 213

(10) Each statutory deadline for promulgation of rules to which this subsection applies which requires promulgation less than six months after date of proposal may be extended to not more than six months after date of proposal by the Administrator upon a determination that such extension is necessary to afford the public, and the agency, adequate opportunity to carry out the purposes of this subsection.

(11) The requirements of this subsection shall take effect with respect to any rule the proposal of which occurs after ninety days after the date of enactment of the Clean Air Act Amendments of 1977 [enacted Aug. 7, 1977].

(e) Other methods of judicial review not authorized. Nothing in this Act shall be construed to authorize judicial review of regulations or orders of the Administrator under this Act, except as provided in this section.

(f) Costs. In any judicial proceeding under this section, the court may award costs of litigation (including reasonable attorney and expert witness fees) whenever it determines that such award is appropriate.

(g) Stay, injunction, or similar relief in proceedings relating to noncompliance penalties. In any action respecting the promulgation of regulations under section 120 [42 USCS § 7420] or the administration or enforcement of section 120 [42 USCS § 7420] no

App. 214

court shall grant any stay, injunctive, or similar relief before final judgment by such court in such action.

(h) **Public Participation.** It is the intent of Congress that, consistent with the policy of the Administrative Procedures Act [5 USCS §§ 551 et seq.], the Administrator in promulgating any regulation under this Act, including a regulation subject to a deadline, shall ensure a reasonable period for public participation of at least 30 days, except as otherwise expressly provided in section [sections] 107(d), 172(a), 181(a) and (b), and 186(a) and (b) [42 USCS § 7407(d), 7502(a), 7511(a) and (b), 7512(a) and (b)].

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From: Wood, Allison <awood@hunton.com>  
To: Getchell, Earle D.  
<egetchell@oag.state.va.us>; Sean Donahue  
<sean@donahuegoldberg.com>; Ted Hadzi-Antich  
<tha@pacificlegal.org>  
Cc: twebster@sidley.com  
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<pkeisler@sidley.com>; amacbeth@sidley.com  
<amacbeth@sidley.com>; holmes.carol@epa.gov  
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bcummings@biologicaldiversity.org  
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<rsr@pacificlegal.org>; Pamela G. Spring <pgs@pacificlegal.org>

Bcc:

Subject: RE: Coalition for Responsible Regulation v. EPA, et al and consolidated cases;  
Courtesy Copy of Pacific Legal Foundation Petition for Writ of Certiorari

Date: Fri Mar 22 2013 13:37:47 EDT

Attachments: CCC Final GHG Cert Petition-c.pdf

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Here it the Utility Air Regulatory Group's petition.

-----Original Message-----

From: Taylor, Kimberly E. [mailto:KTaylor@oag.state.va.us] On Behalf Of  
Getchell, Earle D.

Sent: Friday, March 22, 2013 1:13 PM

To: Sean Donahue; Ted Hadzi-Antich

Cc: twebster@sidley.com; pkeisler@sidley.com; amacbeth@sidley.com;  
holmes.carol@epa.gov; mallory.brenda@epa.gov; jon.lipshultz@usdoj.gov;  
angeline.purdy@usdoj.gov; eric.hostetler@usdoj.gov;  
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vpardee@biologicaldiversity.org; bcummings@biologicaldiversity.org; RS  
Radford; Pamela G. Spring  
Subject: RE: Coalition for Responsible Regulation v. EPA, et al and  
consolidated cases; Courtesy Copy of Pacific Legal Foundation Petition  
for Writ of Certiorari

Kimberly  
(804) 786-2436 (office)

Distrustful souls see only darkness burdening the face of the earth. We  
prefer instead to reaffirm all our confidence in our Savior who has not  
abandoned the world which he redeemed. Pope John XXIII

-----Original Message-----

From: Sean Donahue [mailto:sean@donahuegoldberg.com]

Sent: Friday, March 22, 2013 12:56 PM

To: Ted Hadzi-Antich

Cc: twebster@sidley.com; pkeisler@sidley.com; amacbeth@sidley.com;  
holmes.carol@epa.gov; mallory.brenda@epa.gov; jon.lipshultz@usdoj.gov;  
angeline.purdy@usdoj.gov; eric.hostetler@usdoj.gov;  
perry.rosen@usdoj.gov; amanda.berman@usdoj.gov; david.gunter2@usdoj.gov;  
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jmassey@masseygail.com; ayresr@ayreslawgroup.com;  
vpardee@biologicaldiversity.org; bcummings@biologicaldiversity.org; RS  
Radford; Pamela G. Spring  
Subject: Re: Coalition for Responsible Regulation v. EPA, et al and  
consolidated cases; Courtesy Copy of Pacific Legal Foundation Petition  
for Writ of Certiorari

Thank you, Ted. It would be much appreciated if any other parties that

have filed cert petitions so far could send around electronic copies (of the petition(s), not appendices).

-Sean

On Thu, Mar 21, 2013 at 1:17 PM, Ted Hadzi-Antich <tha@pacificlegal.org> wrote:

> Dear Counsel:

>

>

>

> Attached please find an electronic courtesy copy of Pacific Legal  
> Foundation's Petition for Writ of Certiorari to the United States  
> Supreme Court from the decision of the D.C. Circuit in the cases  
> consolidated under the case name Coalition for Responsible Regulation,

> et. al v. Environmental Protection Agency, et al., along with an  
> electronic copy of the courtesy copy service list. Because not all  
> counsel in the consolidated cases were included in the D.C. Circuit's  
> ECF system, we are sending first class courtesy copies as well.

>

>

>

> Sincerely,

>

> Theodore Hadzi-Antich  
> Senior Staff Attorney  
> Pacific Legal Foundation  
> 930 G Street  
> Sacramento, CA 95814

>

> 916-419-7111

>

>

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> \*\*\*\*\*

> CONFIDENTIALITY NOTICE: This communication and any accompanying  
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> in error, please contact the sender at its Internet address above, or  
> by telephone at (916) 419-7111. Thank you.

--

Sean H. Donahue  
Donahue & Goldberg, LLP  
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Washington, DC 20036  
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Thank you.

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Owner: Wood, Allison <awood@hunton.com>  
Filename: CCC Final GHG Cert Petition-c.pdf  
Last Modified: Fri Mar 22 13:37:47 EDT 2013

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No. \_\_\_\_\_

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IN THE  
**Supreme Court of the United States**

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UTILITY AIR REGULATORY GROUP,  
*Petitioner,*

v.

UNITED STATES ENVIRONMENTAL  
PROTECTION AGENCY,  
*Respondent.*

---

**On Petition for a Writ of Certiorari to the  
United States Court of Appeals  
for the District of Columbia Circuit**

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**PETITION FOR A WRIT OF CERTIORARI**

---

F. WILLIAM BROWNELL  
*(Counsel of Record)*  
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HENRY V. NICKEL  
ALLISON D. WOOD  
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(202) 955-1500  
bbrownell@hunton.com

March 20, 2013      *Counsel for Petitioner*

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## QUESTIONS PRESENTED

After this Court decided *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Environmental Protection Agency (EPA) found that its promulgation of motor vehicle greenhouse gas (GHG) emission standards under Title II of the Clean Air Act (CAA), 42 U.S.C. § 7521(a)(1), compelled regulation of carbon dioxide and other GHGs under the CAA's Title I prevention of significant deterioration (PSD) and Title V stationary-source permitting programs. Even though EPA determined that including GHGs in these programs would vastly expand the programs contrary to Congress's intent, EPA adopted rules adding GHGs to the pollutants covered. The panel below held the CAA and *Massachusetts* compelled inclusion of GHGs and, based on that holding, dismissed all petitions to review the GHG permitting program rules on standing grounds. The questions presented are:

1. Whether *Massachusetts* compelled EPA to include GHGs in the PSD and Title V programs when inclusion of GHGs would (i) transform the size and scope of these programs into something that EPA found would be “unrecognizable to ... Congress,” Petition Appendix 345a, 380a, and (ii) expand the PSD program to cover a substance that does not deteriorate the quality of the air that people breathe.

2. Whether dismissal of the petitions to review EPA's GHG permit-program rules was inconsistent with this Court's standing jurisprudence where the panel premised its holding that standing was absent on its merits holding that GHGs are regulated “pursuant to automatic operation of the CAA.” *Id.* at 96a.

## PARTIES TO THE PROCEEDING

The following were parties to the proceedings in the U.S. Court of Appeals for the District of Columbia Circuit:

### **Challenges to 75 Fed. Reg. 17,004 (Apr. 2, 2010) (the “Timing Rule”):**

1. The Utility Air Regulatory Group, petitioner on review, was a petitioner below.

2. The United States Environmental Protection Agency, respondent on review, was a respondent below.

3. Additional petitioners below, who are nominal respondents on review, were Coalition for Responsible Regulation, Inc.; Industrial Minerals Association – North America; National Cattlemen’s Beef Association; Great Northern Project Development, L.P.; Rosebud Mining Co.; Alpha Natural Resources, Inc.; Southeastern Legal Foundation, Inc.; The Langdale Company; Langdale Forest Products Company; Langdale Farms, LLC; Langdale Fuel Company; Langdale Chevrolet-Pontiac, Inc.; Langdale Ford Company; Langboard, Inc. – MDF; Langboard, Inc. – OSB; Georgia Motor Trucking Association, Inc.; Collins Industries, Inc.; Collins Trucking Company, Inc.; Kennesaw Transportation, Inc.; J&M Tank Lines, Inc.; Southeast Trailer Mart, Inc.; Georgia Agribusiness Council, Inc.; John Linder, U.S. Representative, Georgia 7<sup>th</sup> District; Dana Rohrabacher, U.S. Representative, California 46<sup>th</sup> District; John Shimkus, U.S. Representative, Illinois 19<sup>th</sup> District; Phil Gingrey, U.S. Representative, Georgia 11<sup>th</sup> District; Lynn Westmoreland, U.S. Representative, Georgia 3<sup>rd</sup> District; Tom Price, U.S. Representative, Georgia 6<sup>th</sup> District; Paul Broun, U.S. Representative, Geor-

gia 10<sup>th</sup> District; Steve King, U.S. Representative, Iowa 5<sup>th</sup> District; Nathan Deal, U.S. Representative, Georgia 9<sup>th</sup> District; Jack Kingston, U.S. Representative, Georgia 1<sup>st</sup> District; Michele Bachmann, U.S. Representative, Minnesota 6<sup>th</sup> District; Kevin Brady, U.S. Representative, Texas 8<sup>th</sup> District; John Shadegg, U.S. Representative, Arizona 3<sup>rd</sup> District; Marsha Blackburn, U.S. Representative, Tennessee 7<sup>th</sup> District; Dan Burton, U.S. Representative, Indiana 5<sup>th</sup> District; Clean Air Implementation Project; American Iron and Steel Institute; Gerdau Ameristeel US Inc.; Energy-Intensive Manufacturers' Working Group on Greenhouse Gas Regulation; Peabody Energy Company; American Farm Bureau Federation; National Mining Association; Chamber of Commerce of the United States of America; Missouri Joint Municipal Electric Utility Commission; National Environmental Development Association's Clean Air Project; Ohio Coal Association; National Association of Manufacturers; American Frozen Food Institute; American Petroleum Institute; Brick Industry Association; Corn Refiners Association; Glass Packaging Institute; Independent Petroleum Association of America; Indiana Cast Metals Association; Michigan Manufacturers Association; Mississippi Manufacturers Association; National Association of Home Builders; National Federation of Independent Business; National Oilseed Processors Association; National Petrochemical & Refiners Association; North American Die Casting Association; Specialty Steel Industry of North America; Tennessee Chamber of Commerce and Industry; Western States Petroleum Association; West Virginia Manufacturers Association; Wisconsin Manufacturers and Commerce; State of Texas; State of Alabama; State of South Carolina; State of South Dakota; State of Ne-

braska; State of North Dakota; Commonwealth of Virginia; Rick Perry, Governor of Texas; Greg Abbott; Attorney General of Texas; Texas Commission on Environmental Quality; Texas Agriculture Commission; Texas Public Utilities Commission; Texas Railroad Commission; Texas General Land Office; Haley Barbour, Governor of the State of Mississippi; and Portland Cement Association.

4. Petitioner-intervenors below (with respect to certain petitions for review), who are nominal respondents on review, were American Frozen Food Institute; American Fuel & Petrochemical Manufacturers; American Petroleum Institute; Corn Refiners Association; Glass Association of North America; Independent Petroleum Association of America; Indiana Cast Metals Association; Louisiana Department of Environmental Quality; Michigan Manufacturers Association; National Association Manufacturers; National Association of Home Builders; National Oilseed Processors Association; Tennessee Chamber of Commerce and Industry; Western States Petroleum Association; West Virginia Manufacturers Association; and Wisconsin Manufacturers & Commerce.

5. Respondent-intervenors below (with respect to certain petitions for review), who are respondents (or, in some cases, nominal respondents) on review, were American Farm Bureau Federation; Brick Industry Association; Center for Biological Diversity; Commonwealth of Massachusetts; Conservation Law Foundation; Environmental Defense Fund; Georgia ForestWatch; Indiana Wildlife Federation; Michigan Environmental Council; National Environmental Development Association's Clean Air Project; National Mining Association; Peabody Energy Company; Natural Resources Council of Maine; Natural Re-

v

sources Defense Council; Ohio Environmental Council; Sierra Club; South Coast Air Quality Management District; State of California; State of Illinois; State of Iowa; State of Maine; State of Maryland; State of New Hampshire; State of New Mexico; State of New York; State of North Carolina; State of Oregon; State of Rhode Island; Utility Air Regulatory Group; Wild Virginia.

6. A respondent below, who is a nominal respondent on review, was Lisa Perez Jackson, Administrator, United States Environmental Protection Agency. Ms. Jackson ceased to hold the office of Administrator, United States Environmental Protection Agency, on February 15, 2013; that office is currently held in an acting capacity by Robert Perciasepe, Acting Administrator, United States Environmental Protection Agency.

**Challenges to 75 Fed. Reg. 31,514 (June 3, 2010) (the “Tailoring Rule”):**

1. The Utility Air Regulatory Group, petitioner on review, was a petitioner below.

2. The United States Environmental Protection Agency, respondent on review, was a respondent below.

3. Additional petitioners below, who are nominal respondents on review, were Southeastern Legal Foundation, Inc.; John Linder, U.S. Representative, Georgia 7<sup>th</sup> District; Dana Rohrabacher, U.S. Representative, California 46<sup>th</sup> District; John Shimkus, U.S. Representative, Illinois 19<sup>th</sup> District; Phil Gingrey, U.S. Representative, Georgia 11<sup>th</sup> District; Lynn Westmoreland, U.S. Representative, Georgia 3<sup>rd</sup> District; Tom Price, U.S. Representative, Georgia 6<sup>th</sup> District; Paul Broun, U.S. Representative, Geor-

gia 10<sup>th</sup> District; Steve King, U.S. Representative, Iowa 5<sup>th</sup> District; Jack Kingston, U.S. Representative, Georgia 1<sup>st</sup> District; Michele Bachmann, U.S. Representative, Minnesota 6<sup>th</sup> District; Kevin Brady, U.S. Representative, Texas 8<sup>th</sup> District; John Shadegg, U.S. Representative, Arizona 3<sup>rd</sup> District; Marsha Blackburn, U.S. Representative, Tennessee 7<sup>th</sup> District; Dan Burton, U.S. Representative, Indiana 5<sup>th</sup> District; The Langdale Company; Langdale Forest Products Company; Langdale Farms, LLC; Langdale Fuel Company; Langdale Chevrolet-Pontiac, Inc.; Langdale Ford Company; Langboard, Inc. – MDF; Langboard, Inc. – OSB; Georgia Motor Trucking Association, Inc.; Collins Industries, Inc.; Collins Trucking Company, Inc.; Kennesaw Transportation, Inc.; J&M Tank Lines, Inc.; Southeast Trailer Mart, Inc.; Georgia Agribusiness Council, Inc.; Coalition for Responsible Regulation, Inc.; Industrial Minerals Association – North America; National Cattlemen’s Beef Association; Great Northern Project Development, L.P.; Rosebud Mining Co.; Alpha Natural Resources, Inc.; The Ohio Coal Association; American Iron and Steel Institute; Gerdau Ameristeel US Inc.; Chamber of Commerce of the United States of America; Georgia Coalition for Sound Environmental Policy; National Mining Association; American Farm Bureau Federation; Peabody Energy Company; Energy-Intensive Manufacturers’ Working Group on Greenhouse Gas Regulation; South Carolina Public Service Authority; Mark R. Levin; Landmark Legal Foundation; National Environmental Development Association’s Clean Air Project; State of Alabama; State of North Dakota; State of South Dakota; Haley Barbour, Governor of Mississippi; State of South Carolina; State of Nebraska; Missouri Joint Municipal Electric Utility Commission; Clean Air

Implementation Project; National Association of Manufacturers; American Frozen Food Institute; American Fuel & Petrochemical Manufacturers; American Petroleum Institute; Brick Industry Association; Corn Refiners Association; Glass Association of North America; Glass Packaging Institute; Independent Petroleum Association of America; Indiana Cast Metals Association; Michigan Manufacturers Association; Mississippi Manufacturers Association; National Oilseed Processors Association; Tennessee Chamber of Commerce and Industry; Western States Petroleum Association; West Virginia Manufacturers Association; Wisconsin Manufacturers & Commerce; National Association of Home Builders; National Federation of Independent Business; Portland Cement Association; Louisiana Department of Environmental Quality; Rick Perry, Governor of Texas; Greg Abbott; Attorney General of Texas; Texas Commission on Environmental Quality; Texas Department of Agriculture; Texas Public Utilities Commission; Texas Railroad Commission; Texas General Land Office; and State of Texas.

4. Petitioner-intervenors below (with respect to certain petitions for review), who are nominal respondents on review, were American Frozen Food Institute; American Fuel & Petrochemical Manufacturers; American Petroleum Institute; Corn Refiners Association; Glass Association of North America; Independent Petroleum Association of America; Indiana Cast Metals Association; Michigan Manufacturers Association; National Association of Home Builders; National Association of Manufacturers; National Oilseed Processors Association; Tennessee Chamber of Commerce and Industry; Western States Petrole-

um Association; West Virginia Manufacturers Association; and Wisconsin Manufacturers & Commerce.

5. Respondent-intervenors below (with respect to certain petitions for review), who are respondents (or, in some cases, nominal respondents) on review, were American Farm Bureau Federation; Brick Industry Association; Center for Biological Diversity; Clean Air Implementation Project; Commonwealth of Massachusetts; Conservation Law Foundation; Environmental Defense Fund; Georgia ForestWatch; National Environmental Development Association's Clean Air Project; National Mining Association; Natural Resources Council of Maine, Inc.; Natural Resources Defense Council; Peabody Energy Company; Sierra Club; South Coast Air Quality Management District; State of California; State of Illinois; State of Iowa; State of Maine; State of Maryland; State of New Hampshire; State of New Mexico; State of New York; State of North Carolina; State of Oregon; State of Rhode Island; Utility Air Regulatory Group; and Wild Virginia.

6. A respondent below, who is a nominal respondent on review, was Lisa Perez Jackson, Administrator, United States Environmental Protection Agency. Ms. Jackson ceased to hold the office of Administrator, United States Environmental Protection Agency, on February 15, 2013; that office is currently held in an acting capacity by Robert Perciasepe, Acting Administrator, United States Environmental Protection Agency.

**RULE 29.6 DISCLOSURE STATEMENT**

Petitioner Utility Air Regulatory Group (UARG) is a not-for-profit association of individual electric utilities and electric generating companies and national trade associations that participates on behalf of its members collectively in administrative proceedings under the Clean Air Act, and in litigation arising from those proceedings, that affect electric generators. UARG has no outstanding shares or debt securities in the hands of the public and has no parent company. No publicly held company has a 10% or greater ownership interest in UARG.

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## PETITION FOR A WRIT OF CERTIORARI

The Utility Air Regulatory Group respectfully petitions for a writ of certiorari to review the judgment of the United States Court of Appeals for the District of Columbia Circuit dismissing its petitions to review rules of the United States Environmental Protection Agency (EPA) that address (i) the date on which greenhouse gases (GHGs) emitted from stationary sources are considered regulated pollutants under the Title I prevention of significant deterioration (PSD) preconstruction permitting program and the Title V general operating permit program of the Clean Air Act (CAA or Act),<sup>1</sup> 75 Fed. Reg. 17,004 (Apr. 2, 2010) (the Timing Rule), Petition Appendix (Pet. App.) 108a-148a, and (ii) how GHG emissions from stationary sources are to be regulated under those CAA provisions, 75 Fed. Reg. 31,514 (June 3, 2010) (the Tailoring Rule), Pet. App. 149a-597a. This petition does not address other aspects of the D.C. Circuit's opinion and decision, including the aspects of the decision that concern (i) EPA's rule finding that GHG emissions from motor vehicles "endanger" public health and welfare within the meaning of 42 U.S.C. § 7521(a)(1), 74 Fed. Reg. 66,496 (Dec. 15, 2009) (Endangerment Finding), (ii) EPA's denial of reconsideration of that finding, 75 Fed. Reg. 49,556 (Aug. 13, 2010), or (iii) EPA's rule setting GHG emission standards for light-duty motor vehicles under 42

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<sup>1</sup> The PSD preconstruction permitting program is contained in Subpart 1 of Part C of Title I of the CAA. 42 U.S.C. §§ 7470-7479. The Title V program is, as the name indicates, contained in Title V of the Act. *Id.* §§ 7661-7661f.

U.S.C. § 7521(a)(1), 75 Fed. Reg. 25,324 (May 7, 2010) (Motor Vehicle Rule).

### **OPINIONS BELOW**

The opinion of the D.C. Circuit is reported at 684 F.3d 102 and reproduced at Pet. App. 6a-107a. The D.C. Circuit's orders denying panel rehearing and rehearing en banc are reproduced at Pet. App. 598a-663a. Relevant excerpts of the Timing Rule are reproduced at Pet. App. 108a-148a, and the Tailoring Rule is reproduced at Pet. App. 149a-597a.

### **JURISDICTION**

The D.C. Circuit entered judgment dismissing the Tailoring and Timing Rule cases on June 26, 2012, Pet. App. 5a, and denied timely petitions for panel rehearing or rehearing en banc on December 20, 2012, *id.* at 602a, 607a, 663a. This Court has jurisdiction under 28 U.S.C. § 1254(1).

### **CONSTITUTIONAL, STATUTORY, AND REGULATORY PROVISIONS**

The Constitution of the United States provides, in pertinent part, that “[t]he judicial Power [of the United States] shall extend to all Cases, in Law and Equity, arising under this Constitution, the Laws of the United States, and Treaties made, or which shall be made, under their Authority ... [and] to Controversies to which the United States shall be a party.” U.S. Const. art. III, § 2, cl. 1.

Relevant provisions of the CAA, 42 U.S.C. §§ 7401 *et seq.*, are reproduced at Pet. App. 664a-680a.

Relevant provisions of EPA's regulations implementing the CAA are reproduced at Pet. App. 681a-692a.

### INTRODUCTION

Certiorari is needed to address a matter of exceptional importance: Did *Massachusetts v. EPA*, 549 U.S. 497 (2007), compel EPA to regulate GHGs under the CAA Title I PSD and Title V operating permit programs where doing so would (i) extend those programs' coverage to tens of thousands or even millions of small sources that Congress intended *not* to regulate, and (ii) expand a program focused on preventing significant deterioration to include a pollutant – carbon dioxide – that does not deteriorate air quality? As Judge Kavanaugh explained in dissenting from denial of rehearing en banc, EPA's monumental extension of CAA regulatory authority by administrative fiat puts “the bedrock underpinnings of our system of separation of powers ... at stake,” Pet. App. 658a (Kavanaugh, J., dissenting).

Beyond the CAA, this case has significant implications for all complex regulatory statutes that contain separate programs addressing different aspects of the statutes' regulatory objectives. The decision below stands for the principle that, under step one of the two-step test set forth in *Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837 (1984), a regulatory agency must give a term that appears in each of various different programs in a given statute the same broad meaning given that term by the statute's general provisions, regardless of the focus or scope of those individual programs. Here, EPA

insisted it had no choice but to apply to specific CAA programs (*i.e.*, the PSD and Title V programs) the expansive reading this Court in *Massachusetts* gave to “air pollutant” in the Act’s general provisions. As Judge Kavanaugh observed, the fact that “[g]reenhouse gases may qualify as ‘air pollutants’ in the abstract” does not resolve how Congress intended “air pollutant” to be understood in the context of any individual, specialized CAA program. Pet. App. 650a-651a n.3 (Kavanaugh, J., dissenting).

This petition does not ask this Court to revisit its holding in *Massachusetts*. Rather, it asks this Court to address a distinct issue: whether *Massachusetts* obligated EPA to regulate GHGs, including carbon dioxide, under provisions of the Act – the Title I PSD program and the Title V operating permit program – that address regulatory requirements and standards for regulation that are fundamentally different from other CAA programs, including the mobile-source provisions (Title II) at issue in *Massachusetts*.

EPA freely acknowledged that regulation of carbon dioxide emissions under the Title I and Title V permitting programs subjects “an extraordinarily large number of sources” to the CAA for the first time, *contrary to explicit congressional intent* to cover only a limited number of large industrial facilities. Pet. App. 339a, 345a (application of PSD to GHGs would result in “more than 81,000 ... PSD [permits] each year, an increase of almost 300-fold,” “result[ing] in a program that would have been unrecognizable to the Congress that designed PSD”); see also *id.* at 380a (application of the Title V permitting program to

GHGs “would result in a program unrecognizable to the Congress that enacted title V[,] ... expand[ing] [the program] from the current 14,700 sources to some 6.1 million”). This unprecedented expansion of CAA stationary-source jurisdiction, EPA said, would in turn result in insurmountable burdens for (i) state authorities required to conduct millions of new permit proceedings,<sup>2</sup> and (ii) the countless sources that would be subject to the CAA for the first time as a result of carbon dioxide regulation (including shopping malls, hospitals, stadiums, and apartment buildings). *Id.* at 155a.

To postpone results that EPA concluded would, “as a practical matter, vitiate much of the purpose of” the statutory language limiting application of these programs to large industrial facilities, *id.* at 347a, EPA promulgated the Tailoring Rule. EPA designed that rule to exclude initially very small sources of GHG emissions but then, in phases, to expand GHG regulation “one-step-at-a-time,” *id.* at 457a-461a, until *all of the additional sources that Congress never intended to cover are in the program*. In doing so, EPA declined the invitation to interpret the term “air pollutant” as used in the Act’s PSD and Title V provisions to exclude GHGs in order to confine those programs to the bounds EPA recognized had been set by Congress. See EPA, Prevention of Significant Deterioration and Title V GHG Tailoring Rule: EPA’s

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<sup>2</sup> States typically issue PSD and Title V permits to sources within their borders. EPA issues these permits only in the rare situation where the state delegates its responsibility to EPA or EPA disapproves the state’s plan to issue these permits.

Response to Public Comments at 34-43 (May 2010), Docket No. EPA-HQ-OAR-2009-0517-19181 (Response to Comments).

A panel of the D.C. Circuit dismissed petitioner's challenge to the Tailoring Rule after concluding that stationary-source GHG regulation was compelled by "automatic operation of the statute" and "binding Supreme Court precedent." Pet. App. 101a, 612a. According to the panel, because EPA's "one-step-at-a-time" rules would initially mitigate the extraordinarily damaging impacts that "all-at-once" GHG stationary-source regulation would produce, "Petitioners lack Article III standing to challenge" the Tailoring Rule. *Id.* at 96a (emphasis in original). Judges Brown and Kavanaugh wrote opinions dissenting from denial of petitions for en banc rehearing of the panel's decision. *Id.* at 613a-661a.

### STATEMENT OF THE CASE

1. This case concerns the decision of a panel of the lower court that EPA was bound by (i) this Court's decision in *Massachusetts* interpreting 42 U.S.C. § 7602(g) in the context of Title II of the CAA, and (ii) the term "air pollutant" in the Act's PSD and Title V provisions, to regulate stationary source emissions of GHGs under the Title I and Title V permitting programs.<sup>3</sup>

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<sup>3</sup> Because the Title V program provides that requirements applicable to a given stationary source under the CAA be collected in an "operating permit," 42 U.S.C. § 7661a(a), and because the only GHG requirements for stationary sources that currently exist for electric generating facilities owned and operated by

2. Carbon dioxide is the most ubiquitous and the largest by volume of the six pollutants that are encompassed by EPA's definition of GHGs. Carbon dioxide is not a substance like sulfur dioxide, nitrogen oxides, or particulate matter that pollutes the air people breathe. Ground-level carbon dioxide is part of the atmosphere and is necessary to life. Carbon dioxide (like other GHGs) mixes rapidly and is distributed uniformly in the sea of carbon dioxide and other GHGs already present in the atmosphere at ground level (and above). Plants need, and people and animals exhale, carbon dioxide as part of the elementary processes of life. Because carbon dioxide is typically released by stationary sources in amounts that are orders of magnitude greater than other pollutants, hospitals, schools, apartment buildings, shopping malls, and innumerable other small sources would become CAA-regulated stationary sources *if* carbon dioxide is regulated as an air pollutant under Title I and Title V. Pet. App. 154a-155a. As a result, carbon dioxide is unique – fundamentally different from the other substances that have been regulated under the CAA Title I and Title V permitting programs.

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members of petitioner arise from the PSD preconstruction permit program, resolution of the PSD applicability issue here will resolve their existing Title V concerns, cf. Response to Comments at 43 (“EPA agrees ... that where a source has previously been issued a Title V permit, the permit need not be revised ... if the source is not subject to any additional applicable requirements.”). Accordingly, this petition focuses principally on the Title I PSD program.

3. The CAA contains six titles, each of which establishes different programs to address different air pollution problems in different geographic areas and for different types of sources. For example, Title II of the Act addresses emission standards for mobile sources, including motor vehicles and aircraft (42 U.S.C. §§ 7521-7590); Title IV addresses acid rain, including emissions from stationary combustion sources (*id.* §§ 7651-7651o); and Title VI addresses stratospheric ozone protection (*id.* §§ 7671-7671q). Title I of the CAA establishes a variety of programs governing emissions from stationary sources, including programs addressing ambient air quality standards, emission control technology standards, air toxics regulation, visibility protection, and others. Titles I and V also include programs for preconstruction permits (PSD) and operating permits (Title V) for large industrial sources.

4. The starting point for regulating stationary sources under CAA Title I is the national ambient air quality standards (NAAQS) program. *Id.* § 7409; *Union Elec. Co. v. EPA*, 427 U.S. 246, 249 (1976) (the NAAQS program is the “heart” of the CAA). NAAQS define the maximum allowed concentrations of specific pollutants (called “criteria pollutants”) in the “ambient” air – *i.e.*, ground-level air quality concentrations of substances in the air to which people are exposed and which they breathe. See 40 C.F.R. § 50.1(e) (defining “ambient air” as “that portion of the atmosphere, external to buildings, to which the general public has access”); *Train v. Natural Res. Def. Council, Inc.*, 421 U.S. 60, 65 (1975) (ambient air is

the “statute’s term for the outdoor air used by the general public”). EPA sets NAAQS at the level that is requisite to protect public health and welfare. 42 U.S.C. § 7409(b). Following promulgation of a NAAQS, states have primary responsibility to ensure that the ambient air within their borders attains and maintains the NAAQS. *Id.* § 7407. States do this by adopting emission limitations for sources and other measures in a state implementation plan (SIP) that is submitted to EPA for its review and approval (or disapproval). *Id.* § 7410(a), (k). The CAA assigns responsibility for achieving NAAQS on a geographic basis. *Id.* § 7407. With respect to each NAAQS, EPA designates each area as “attainment” (meaning ambient air quality in the area is as good as or better than the level represented by the NAAQS), “nonattainment” (ambient air quality in the area is worse than the NAAQS), or “unclassifiable,” based on measured ambient air quality concentrations in that area. *Id.* § 7407(d)(1)(A). A single geographic area may be in attainment with one NAAQS but nonattainment with another.

The PSD program (the principal program at issue here) originated from litigation that followed EPA’s approval of the first SIPs in 1972. In *Sierra Club v. Ruckelshaus*, 344 F. Supp. 253 (D.D.C.), *aff’d per curiam*, 4 Env’t Rep. Cas. (BNA) 1815 (D.C. Cir. 1972), *aff’d per curiam by an equally divided Court sub nom. Fri v. Sierra Club*, 412 U.S. 541 (1973), EPA was ordered to disapprove any SIP that allowed ambient air quality in an area measured to be in “attainment” to deteriorate to the level of a NAAQS. *Id.*

at 257. In 1974, implementing the district court's decision, EPA established the initial PSD program through rulemaking. 39 Fed. Reg. 42,510, 42,514-17 (Dec. 5, 1974).

EPA's PSD regulations sought to "prevent significant deterioration" of local ambient air quality in attainment areas by requiring preconstruction permits before construction of major new sources or modifications of major existing sources of air pollutants that are subject to NAAQS could occur. Deterioration of local air quality would be avoided by requiring that the source (i) not cause ambient air quality impacts above specified numerical "increments" for two criteria pollutants (sulfur dioxide and particulate matter), in order to prevent the "significant deterioration" of ambient air quality, and (ii) use "best available control technology" (BACT) for these pollutants. The 1974 PSD program applied to sulfur dioxide, nitrogen oxides, and particulate matter, air pollutants that can deteriorate the quality of the air people breathe.

In 1977, Congress enacted a statutory PSD program largely based on the 1974 regulatory program. Like the 1974 regulations, the statutory PSD program required source owners and operators to obtain preconstruction permits for the proposed construction of major new sources and for proposed major modifications of major existing sources, in order to prevent significant deterioration of ambient air quality. 74 Fed. Reg. 55,292, 55,308 (Oct. 27, 2009) ("As the legislative history makes clear, Congress enacted ... PSD ... to resolve issues arising when sources of

criteria pollutants seek to build or expand in areas with air quality that meets the [NAAQS].”).

Concerned about the PSD program’s potentially adverse economic impacts, Congress set precise, numerical tonnage amounts restricting the program’s applicability to a relatively small number of large industrial facilities, which the statute refers to as “major emitting facilities.” See, e.g., S. Rep. No. 95-127, at 96-97 (1977), *reprinted in 3 A Legislative History of the Clean Air Act Amendments of 1977*, at 1375, 1470-71 (1979); see also Pet. App. 344a (“Congress paid careful attention to the types and sizes of sources that would be subject to the PSD program and designed the thresholds deliberately to limit the program’s scope...”). Congress defined “major emitting facility” as a large facility that emits (or has the potential to emit) at least 250 tons per year (tpy) of “any air pollutant,” or at least 100 tpy of “any air pollutant” if the facility is within certain, statutorily enumerated industrial source categories. 42 U.S.C. § 7479(1); see also Pet. App. 346a (“Congress did not expect PSD to apply to large numbers of small sources ... and instead expected the 100/250 tpy thresholds to limit PSD’s applicability to larger sources.”).

Reflecting the PSD program’s focus on pollutants that can deteriorate ambient air quality, Congress in 1977 enacted statutory air quality “increments” to prevent deterioration of ambient air quality with respect to sulfur dioxide and particulate matter. Congress also authorized EPA to promulgate regulations to “prevent[] ... significant deterioration of air quali-

ty” for certain other pollutants with local air quality effects. 42 U.S.C. § 7475(a). And it directed EPA to promulgate regulations for “analysis ... of *the ambient air quality* at the proposed site [of the new facility] and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under this [Act] which will be emitted from such facility.” *Id.* § 7475(e)(1) (emphasis added). Finally, Congress provided that PSD permits are to contain emission limitations based on BACT for pollutants that are “subject to regulation” under the Act. *Id.* § 7475(a)(4).

5. In 1999, public interest groups filed a petition for rulemaking asking EPA to regulate emissions of GHGs, including carbon dioxide, from motor vehicles under Title II of the Act, 42 U.S.C. § 7521(a)(1). See 66 Fed. Reg. 7486 (Jan. 23, 2001). EPA denied the petition on the ground that GHGs are not an “air pollutant” under the general definitional provision in Title III of the Act, *i.e.*, 42 U.S.C. § 7602(g).<sup>4</sup> 68 Fed. Reg. 52,922 (Sept. 8, 2003).

On review, this Court rejected EPA’s arguments that (a) the Act’s general definition of “air pollutant” was not broad enough to encompass GHGs, and (b) GHGs therefore were not an “air pollutant” that was potentially eligible for regulation under Title II.

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<sup>4</sup> 42 U.S.C. § 7602(g) provides that “[t]he term ‘air pollutant’ means any air pollution agent or combination of such agents, including any physical, chemical, biological, [or] radioactive ... substance or matter which is emitted into or otherwise enters the ambient air.”

*Massachusetts*, 549 U.S. at 528-29. According to the Court, “[o]n its face, the [42 U.S.C. § 7602(g)] definition embraces all airborne compounds of whatever stripe.” *Id.* at 529. The Court then turned its attention to Title II of the Act and found that GHG regulation would not fundamentally change the Title II program: “The broad language of § 202(a)(1) reflects an intentional effort to confer the flexibility necessary” to regulate GHG emissions from motor vehicles. *Id.* at 532 (citing 42 U.S.C. § 7521(a)(1)).

6. After this Court decided *Massachusetts*, EPA determined in 2009 in the Endangerment Finding that GHG emissions from vehicles throughout the nation “cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare,” pursuant to 42 U.S.C. § 7521(a)(1). 74 Fed. Reg. at 66,505. EPA did not, and could not, find that GHGs deteriorate local ambient air quality; rather, it found that GHGs disperse throughout the global atmosphere and affect climate. *Id.* at 66,514-16. Following issuance of its 2009 Endangerment Finding, EPA promulgated the Motor Vehicle Rule, regulating GHG emissions from passenger vehicles under 42 U.S.C. § 7521(a) of the Act. 75 Fed. Reg. at 25,324.

7. In 2010, EPA explained that “[c]urrently, EPA does not consider GHG emissions to be ‘regulated ... pollutants’ under the [Title I] PSD program.... EPA is in the process of reviewing its approach to PSD applicability.” 74 Fed. Reg. at 55,299. EPA’s review produced the Title I stationary source rules – the Timing Rule and the Tailoring Rule – at issue here.

In the Timing Rule, EPA addressed when GHGs would become “subject to regulation” for purposes of the PSD program. Pet App. 125a. According to EPA, the Timing Rule “concludes only that ... GHGs would not be considered ‘subject to regulation’ ... earlier than January 2, 2011,” the date the Motor Vehicle Rule took effect. *Id.* at 126a. EPA said it would address in a companion rule “the applicability of PSD requirements for GHG-emitting sources.” *Id.*

In the companion rule (the Tailoring Rule), EPA explained its view that once the Motor Vehicle Rule took effect, regulation of GHG emissions from stationary sources was required by operation of law under the Title I PSD permit program and the Title V operating permit program. *Id.* at 154a. According to EPA, “our legal basis for this rule is our interpretation of the PSD and Title V applicability provisions,” *id.* at 150a, which is “that GHG sources would become subject to the PSD and title V permitting programs upon finalization of the [Motor Vehicle Rule],” Response to Comments at 34.

Given the statutory 100-tpy and 250-tpy PSD applicability thresholds, however, EPA also concluded that regulating GHGs under the PSD and Title V programs would extend the programs to cover sources Congress never intended to regulate. See, e.g., Pet. App. 235a-236a, 380a-381a; 74 Fed. Reg. at 55,304 (“Congress, focused as it was [in 1977] on sources of conventional pollutants and not global warming pollutants, expected that the 100/250 tpy applicability thresholds would limit PSD to larger sources.”). According to EPA, “[t]hese results are not

consistent with other provisions of the PSD and title V requirements, and are inconsistent with – and, indeed, undermine – congressional purposes for the PSD and title V provisions.” Pet. App. 305a. EPA concluded that “applying PSD requirements literally to GHG sources ... would result in a program that would have been unrecognizable to the Congress that designed PSD.” *Id.* at 345a; see also *id.* at 380a (applying Title V requirements literally to GHG sources “would result in a program unrecognizable to the Congress that enacted title V”).

The Tailoring Rule was EPA’s response to what it viewed as a conflict between the explicit statutory 100/250 tpy applicability thresholds and clear congressional intent *not* to apply the PSD program to tens of thousands, and the Title V program to millions, of small sources. In this rule, EPA amended 40 C.F.R. § 51.166 (which provides minimum criteria for PSD provisions in SIPs) by purporting to make GHGs subject to PSD starting on January 2, 2011. This amended rule defines the GHGs regulated under PSD as those GHGs emitted in amounts above 100,000 tpy of “carbon dioxide equivalent”<sup>5</sup> for new construction (and above 75,000 tpy of carbon dioxide equivalent for modifications), *id.* at 587a, and defines the GHGs regulated under Title V as those GHGs

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<sup>5</sup> “GHGs,” as defined by EPA, consist of six separate air pollutants. Each of those pollutants has been assigned a numerical value based on the pollutant’s “global warming potential,” which measures each pollutant relative to carbon dioxide. For example, according to EPA, one ton of methane equals twenty-one tons of carbon dioxide equivalent. Pet. App. 167a.

emitted in amounts above 100,000 tpy of carbon dioxide equivalent, *id.* at 591a. These thresholds are orders of magnitude above the CAA's 100/250-tpy thresholds for PSD and Title V permit applicability.<sup>6</sup> Because EPA interpreted the Act to require that GHGs be regulated the same as other § 7602(g) pollutants, notwithstanding that such regulation would be contrary to congressional intent for PSD and Title V, EPA determined that it would reserve authority to expand regulation of GHGs “step by step” until GHGs became subject to regulation at the statutory 100/250 tpy thresholds. *Id.* at 159a.

8. In promulgating the Tailoring Rule, EPA rejected rulemaking comments arguing that (i) *Massachusetts* did not require EPA to interpret the term “air pollutant” in the Act's PSD provisions to include GHGs, and (ii) EPA was prohibited from undertaking, step by step, to implement a program that contradicts congressional intent. See Response to Comments at 34-43; see also Comments of the Utility Air Regulatory Group on the Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule at 15, 19-40 (Dec. 28, 2009), Docket No. EPA-HQ-OAR-2009-0517-5317 (UARG Comments). A panel of the lower court agreed with EPA on the ground that this result was dictated by “binding Supreme Court precedent.” Pet. App. 612a.

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<sup>6</sup> Under the Tailoring Rule, GHGs emitted below the rule's 75,000-tpy and 100,000-tpy PSD thresholds and the rule's 100,000-tpy Title V threshold are not “air pollutants” subject to regulation under the PSD and Title V programs, respectively.

According to the panel, “Congress made perfectly clear that the PSD program was meant to protect against precisely the types of harms caused by greenhouse gases” because the PSD program’s declaration of purpose includes a reference to the word “welfare,” which, this Court observed in *Massachusetts*, includes effects on weather and climate. *Id.* at 76a (citing 42 U.S.C. § 7602(h)). “[G]iven both the statute’s plain language and the Supreme Court’s decision in *Massachusetts v. EPA*,” the panel said it “ha[d] little trouble concluding that the phrase ‘any air pollutant’ [in PSD] includes *all* regulated air pollutants, including greenhouse gases.” *Id.* at 73a (emphasis in original).

Having concluded that “Industry Petitioners were regulated and State Petitioners required to issue permits not because of anything EPA did in the Timing and Tailoring Rules, but by automatic operation of statute,” the panel then concluded that Petitioners lacked standing to challenge either the Timing Rule or the Tailoring Rule. *Id.* at 100a-101a. According to the panel, “neither the Timing nor Tailoring Rules caused the injury Petitioners allege: having to comply with PSD and Title V for greenhouse gases.” *Id.* at 101a. These injuries, the panel said, were caused by the statute and were not remediable by any judgment of the court.

9. The D.C. Circuit denied petitions for rehearing en banc, with dissenting opinions filed by Judges Brown and Kavanaugh. In a concurring opinion filed by the original panel members, those judges reiterated their conclusions that the Court in *Massachusetts*

“expressly *held* that the Clean Air Act’s ‘sweeping definition of “air pollutant” unambiguously includes greenhouse gases,” *id.* at 609a (emphasis in original), and that, based on that reading of *Massachusetts*, “the panel’s interpretation of the statute is *the only plausible one*,” *id.* at 611a (emphasis added). By contrast, Judges Brown and Kavanaugh explained in dissent that the statute was open to other readings and that those readings, which would avoid conflicts with congressional intent, were plausible. They would have granted rehearing “for the full court to consider the propriety of extending *Massachusetts* to Title V and the PSD program,” *id.* at 614a-615a (Brown, J., dissenting), and “to carefully but firmly enforce the statutory boundaries” that they concluded EPA had transgressed, *id.* at 661a (Kavanaugh, J., dissenting).

#### **REASONS FOR GRANTING THE PETITION**

This Court should grant certiorari to address whether *Massachusetts v. EPA* compels regulation of GHGs under the PSD and Title V permitting programs of the CAA. Certiorari is also needed to clarify that petitioner has standing under this Court’s settled law on justiciability and to ensure that the regulated community can obtain judicial review of agency action regulating GHGs in the D.C. Circuit, which has exclusive jurisdiction to review many agency rulemakings, including national rulemakings under the CAA. Finally, given the expansive regulation that the rules at issue here would compel, this is an issue of great importance to the Nation.

**I. Certiorari Is Needed To Address Whether *Massachusetts* Compels Regulation of GHGs, Which Include Carbon Dioxide, Under the CAA’s Title I PSD Program and Title V of the Act.**

According to the panel, *Massachusetts* unleashed a cascade of CAA requirements automatically and by operation of law. The panel found that because under “*Massachusetts* ... greenhouse gases ‘unambiguous[ly]’ may be regulated as an ‘air pollutant’ under the Clean Air Act,” *id.* at 25a, “once [the Motor Vehicle] Rule took effect and made greenhouse gases a regulated pollutant under Title II of the Act,” that triggered application of the Title I PSD program “*automatically* ... to facilities emitting over 100/250 tpy of greenhouse gases.” *Id.* at 71a (emphasis added).

Because millions of small facilities throughout the Nation emit GHGs at rates greater than 100 tpy, EPA’s interpretation that *Massachusetts* compels regulation of GHGs under these programs would cause a radical expansion of Title I PSD and Title V jurisdiction. Programs that Congress enacted to apply to only a comparative handful of large industrial facilities would be transformed, overnight, into programs encompassing innumerable small sources. *Id.* at 345a-346a. As EPA explained, these programs would thereby become unrecognizable to the Congress that enacted them, *id.* at 345a, and this result “would, as a practical matter, vitiate much of the purpose of the 100 tpy [statutory] cut-off for [CAA applicability to] industrial sources,” *id.* at 347a.

Yet, according to the panel, “given both the statute’s plain language and the Supreme Court’s decision in *Massachusetts v. EPA*, [it had] little trouble concluding that the phrase ‘any air pollutant’ includes *all* regulated air pollutants, including greenhouse gases,” for purposes of PSD and Title V. *Id.* at 73a (emphasis in original). This, the panel held, “forecloses” any argument that EPA had authority to interpret the term “air pollutant” more narrowly for these other CAA programs. *Id.* at 81a; cf. *id.* at 650a (Kavanaugh, J., dissenting) (“The panel opinion ... appears to have been heavily if not dispositively influenced by *Massachusetts v. EPA*.”).

But *Massachusetts* does not compel the conclusion that an “air pollutant” under 42 U.S.C. § 7602(g) is necessarily an air pollutant for purposes of any individual program under the CAA. No party in *Massachusetts* argued that the scope of the term “air pollutant” under 42 U.S.C. § 7521(a)(1) was narrower than the definition of air pollutant in 42 U.S.C. § 7602(g). And this Court found no reason to adopt a narrowing interpretation, concluding that “[t]he broad language of [42 U.S.C. § 7521(a)(1) in Title II] reflects an intentional effort to confer the flexibility” needed to regulate a broad range of substances, including GHGs. *Massachusetts*, 549 U.S. at 532.

42 U.S.C. § 7602(g) defines the outer bounds of the “air pollutants” that are potentially eligible for regulation under the various CAA programs. This is understandable in a lengthy, expansive statute like the CAA, which has different programs addressing different pollution problems. In such a statute with

several titles and programs, a general definition of pollutant has to be broad enough to reflect the entire range of substances that might be regulated under any one or more of the diverse programs it establishes.

EPA's argument in *Massachusetts* that GHGs were not an "air pollutant" under 42 U.S.C. § 7602(g), if accepted, would have been sufficient to resolve the question whether GHGs were pollutants eligible for regulation under 42 U.S.C. § 7521. But, as Judge Kavanaugh observed, the fact that "[g]reenhouse gases may qualify as 'air pollutants' in the abstract" does *not* resolve the definition of "air pollutant" for each individual regulatory program of the CAA. Pet. App. 651a n.3 (Kavanaugh, J., dissenting); cf. *Envtl. Def. v. Duke Energy Corp.*, 549 U.S. 561, 574 (2007) (a CAA case decided the same day as *Massachusetts* and holding that statutory terms must be interpreted in light of their context and the statute as a whole and that the same term may mean different things in different parts of the statute).

Indeed, in implementing the CAA over the past decades, EPA has been careful to define which of the 42 U.S.C. § 7602(g) air pollutants are to be regulated under each individual CAA program. Thus, while 42 U.S.C. § 7411 provides that new source performance standards (NSPS) apply whenever a source undertakes a "physical change ... which increases the amount of *any* air pollutant emitted," 42 U.S.C. § 7411(a)(4) (emphasis added), EPA by regulation has narrowed the universe of air pollutants that trigger

NSPS to those “[air] pollutant[s] to which a standard applies” under 40 C.F.R. part 60. 40 C.F.R. § 60.14(a). Although 42 U.S.C. § 7491 defines “major stationary source[s]” to which the CAA visibility protection program applies as sources that “emit 250 tons or more of *any* pollutant,” 42 U.S.C. § 7491(g)(7) (emphasis added), EPA by regulation has defined the pollutants that trigger this program as a specific set of “visibility-impairing pollutants,” see, e.g., 40 C.F.R. Part 51, App. Y, § III.A.2. And, although 42 U.S.C. § 7479 defines “major emitting facilit[ies]” that are subject to the PSD program as those that emit more than 100 or 250 tpy of “any air pollutant,” 42 U.S.C. § 7479(1), EPA has by regulation narrowed the scope of air pollutants that can trigger PSD to “any regulated NSR [new source review] pollutant,” 40 C.F.R. § 52.21(b)(1). Finally, in the very rulemaking at issue here, although EPA (and the panel) read *Massachusetts* to compel PSD and Title V regulation of *all* GHGs, EPA defined GHGs for PSD and Title V to include only those emitted above the 100,000- or 75,000-tpy levels of carbon dioxide equivalent. Pet. App. 587a, 591a.

The historic approach that identifies which of the 42 U.S.C. § 7602(g) “air pollutants” are air pollutants subject to individual CAA programs makes eminent sense. “Of necessity, Congress selects different regulatory regimes to address different problems.” *Am. Elec. Power Co. v. Connecticut*, 131 S. Ct. 2527, 2538 (2011). And the same term appearing in different statutory programs can (indeed, must) be given different regulatory meanings where congressional in-

tent is different. See *Abbott Labs. v. Young*, 920 F.2d 984, 987 (D.C. Cir. 1990) (“[I]t is not impermissible under *Chevron* for an agency to interpret an imprecise term differently in two separate sections of a statute which have different purposes.”). “A given term in the same statute may take on distinct characters from association with distinct statutory objects calling for different implementation strategies.” *Env'tl. Def.*, 549 U.S. at 574; see also *Gen. Dynamics Land Sys., Inc. v. Cline*, 540 U.S. 581, 596-97 (2004) (“age” has different meanings within Age Discrimination in Employment Act); *United States v. Cleveland Indians Baseball Co.*, 532 U.S. 200, 212-13 (2001) (“wages paid” has different meanings within Social Security Act Amendments of 1939); *Robinson v. Shell Oil Co.*, 519 U.S. 337, 343-44 (1997) (“employee” has different meanings within Title VII of the Civil Rights Act of 1964).

The CAA is not self-implementing. Rather, rule-making is required under each of the separate CAA programs to spell out the specific elements of each, *including the pollutants to which the program applies*. When EPA – or a reviewing court – seeks to give content to the term “air pollutant” as used in each of these programs, 42 U.S.C. § 7602(g)’s broad definition of air pollutant is always the beginning, but not the end, of the analysis.

If EPA had engaged in this inquiry here, it would have narrowed the scope of “air pollutants” covered by the Title I PSD and Title V permitting programs to exclude carbon dioxide entirely from those programs, and not partially and temporarily as EPA did.

First, as EPA acknowledged, the explicit statutory 100/250-tpy “threshold limitations” for PSD applicability served as “Congress’s mechanism for limiting PSD” to a limited number of large industrial facilities. Pet. App. 343a; see also *id.* at 380a-383a (Title V). The Act’s 100/250-tpy “major source” numerical thresholds have a singular meaning that is *not* subject to alteration through “interpretation”; these numerical limitations restrict PSD and Title V’s coverage to relatively few “large industrial sources,” while excluding numerous smaller “commercial and residential sources.” *Id.* at 345a-346a; see also *id.* at 319a (“Congress had reason to expect the total size of the PSD program to be measured in the hundreds of permits a year,” not tens of thousands); *id.* at 382a (“Congress did not expect” to include “small commercial and residential sources” in Title V).

Thus, the 100/250-tpy statutory language must be read to define what pollutants are PSD and Title V-regulated: *only* those pollutants that “a relatively small number of large industrial sources” emit in amounts above the statutory thresholds. *Id.* at 345a; see also Response to Comments at 37 (The statutory “threshold for these source categories makes sense only in terms of conventional pollutants ... and cannot be reconciled with an unbounded reading of the phrase ‘any pollutant subject to regulation.’”). Because many thousands or even millions of small sources emit carbon dioxide above these statutory thresholds, carbon dioxide cannot be a PSD or Title V pollutant.

Furthermore, while 42 U.S.C. § 7521 in Title II of the CAA focuses on emissions whose presence in the atmosphere *generally* may “endanger public health or welfare,” 42 U.S.C. § 7521(a)(1), the PSD program in Title I of the Act focuses on protection of *localized* ambient “air quality” – *i.e.*, the air people breathe in certain geographically defined 42 U.S.C. § 7407 areas within a state. Thus, 42 U.S.C. § 7471 provides that “each applicable [SIP] shall contain emission limitations and such other measures as may be necessary ... to prevent significant deterioration of *air quality* in each [air quality control] region,” *i.e.*, the local air quality control regions designated pursuant to 42 U.S.C. § 7407 based on ground-level pollutant measurements. (Emphasis added). Further, 42 U.S.C. § 7475 directs EPA to promulgate regulations governing analysis of impacts on “ambient air quality” that might flow from “emissions from [the PSD] facility.” *Id.* § 7475(e)(1). Through such provisions, Congress made clear that the statute’s PSD requirements are directed *not* to regulation of emissions of air pollutants that may endanger public health or welfare due to their uniform presence throughout the global atmosphere, but rather to such regulation “as may be necessary ... to prevent significant deterioration” of the air that people breathe. *Id.* § 7471.

The PSD program addresses pollutants that deteriorate local air quality. By contrast, EPA’s regulation of carbon dioxide, the most prevalent GHG included in EPA’s definition of GHGs, is driven *not* by concerns over deterioration of local or regional ground-level air quality but by distinct environmen-

tal concerns. As EPA explained in an Advance Notice of Proposed Rulemaking published in 2008 (prior to concluding that it was compelled by the statute and *Massachusetts* to regulate stationary-source GHG emissions), “GHGs become well mixed throughout the global atmosphere so that the long-term distribution of GHG concentrations is not dependent on local emission sources. Instead, GHG concentrations tend to be relatively uniform around the world.” 73 Fed. Reg. 44,354, 44,401 (July 30, 2008). Thus, according to EPA, “GHGs emitted anywhere in the world affect climate everywhere in the world.” *Id.*

Accordingly, as EPA recognized, the “global nature and effect of GHG emissions raise questions regarding the suitability of CAA provisions [like the PSD provisions] that are designed to protect local and regional air quality by controlling local and regional emission sources.” *Id.* at 44,408. Among other things, “the geographic location of emission sources and reductions [is] generally not important to mitigating global climate change.” *Id.* Moreover, “[c]urrent and projected levels of ambient concentrations” of GHGs, including carbon dioxide, were “not expected to cause any direct adverse health effects, such as respiratory or toxic effects, which would occur as a result of the elevated GHG concentrations themselves.” *Id.* at 44,427. As a result, carbon dioxide simply does not have the characteristics of a PSD pollutant.

Finally, contrary to the panel’s suggestion, see Pet. App. 76a, the existence of the term “welfare” in

the “Congressional declaration of purpose” – a term that the Act describes (at 42 U.S.C. § 7602(h)) as including “effects on ... weather ... and climate” – does not relieve EPA of its statutory responsibility to determine whether a 42 U.S.C. § 7602(g) pollutant such as GHGs falls within the scope of the PSD program. As with “air pollutant,” the CAA broadly defines “welfare” in the general definitions section so as to be able to serve, to the degree relevant, various programs within the Act addressing regulation of specific types of pollution.

In *Massachusetts*, this Court found that regulation of GHGs under Title II, triggered by a general endangerment finding, would not lead to “extreme,” “counterintuitive” measures not contemplated by Congress. *Massachusetts*, 549 U.S. at 531. This Court observed that “EPA has not identified any congressional action that conflicts in any way with the regulation of greenhouse gases *from new motor vehicles*.” *Id.* (emphasis added). By contrast, neither EPA nor the D.C. Circuit ever examined here whether the GHG “welfare” effects targeted for regulation were welfare effects addressed by the PSD program, *i.e.*, effects related to local, ground-level pollution of the quality of the air people breathe. For all the reasons discussed above, whether GHGs present welfare concerns on a global basis is immaterial to the question before EPA here: whether GHGs are a PSD pollutant.

Certiorari should be granted to address the panel’s conclusion that this Court’s decision in *Massachusetts* compelled inclusion of a pollutant in the PSD

program that does not deteriorate air quality, where that inclusion expands regulation demonstrably beyond the bounds set by Congress.

**II. Certiorari Is Needed To Address the Panel's Decision that Petitioners Lack Standing To Challenge the Timing and Tailoring Rules.**

In the proceedings below, petitioner challenged EPA rules that, for the first time in the history of the CAA, make GHGs a regulated air pollutant under the PSD and Title V programs. EPA's Tailoring Rule definition of what GHGs are subject to PSD and Title V covers GHG emissions from facilities owned and operated by members of petitioner, subjecting petitioner's members to new regulatory restrictions. If petitioner's challenge to these rules were accepted on the merits, GHGs could not be included in the PSD program and any further harm to petitioner's members from the rules would thereby be averted.

As predicates for its rulemaking actions at issue here, EPA simultaneously embraced two incompatible principles of administrative law. See Pet. App. 642a-643a n.1. The first was a "traditional tool[] of statutory construction," *Chevron*, 467 U.S. at 843 n.9, that EPA labeled the "absurdity" doctrine. Pet. App. 150a-151a. Under this doctrine, an agency must refrain from adopting the literal – or most expansive – reading of a statutory term where such a construction would be contrary to congressional intent. See, e.g., *United States v. Ron Pair Enters.*, 489 U.S. 235, 242 (1989). The second was the so-called doctrine of "administrative necessity," which applies

where an agency cannot fully implement Congress's clear intent immediately. See, e.g., *Ala. Power Co. v. Costle*, 636 F.2d 323, 400 (D.C. Cir. 1979). The administrative necessity doctrine allows the agency to implement a program in phases – one step at a time, if need be – and thereby, by proceeding incrementally, give full effect to clear congressional intent over time.

Petitioner argued in EPA's Tailoring Rule rulemaking and to the court below that, once EPA found (as it plainly did) that defining "air pollutant" under the PSD and Title V programs to include GHGs would produce results inimical to congressional intent, EPA was obligated to interpret "air pollutant" as used in PSD and Title V more narrowly to exclude GHGs. Administrative necessity, *a doctrine designed to give effect to congressional intent*, could never be invoked to justify agency rulemaking action designed to transform – even incrementally – the PSD and Title V programs into something Congress indisputably never contemplated.

Yet, after reaching its conclusion that *Massachusetts* compelled rejection of petitioner's statutory argument, the panel dismissed for lack of subject matter jurisdiction the petitions for review of the Timing and Tailoring Rules, including the argument of petitioner that "EPA exceeded the boundaries of its lawful [statutory] authority" in adopting a phased program for GHG regulation that would end in PSD and Title V programs that Congress never intended. Pet. App. 99a. According to the panel, the CAA's definition of "air pollutant," 42 U.S.C. § 7602(g), as inter-

preted by this Court in *Massachusetts*, “requires PSD and Title V permits for major emitters of greenhouse gases.” Pet. App. 95a. As a result, the panel concluded,

Industry Petitioners were regulated ... *not* because of anything EPA did in the Timing and Tailoring Rules, *but by automatic operation of the statute*. Given this, neither the Timing nor Tailoring Rules caused the injury Petitioners allege: having to comply with PSD and Title V for greenhouse gases.

Indeed, the Timing and Tailoring Rules actually mitigate Petitioners’ purported injuries.

*Id.* at 100a-101a (emphases added). Only by reaching the merits on *Massachusetts* grounds (without even mentioning the “congressional intent” canon of construction upon which petitioner’s statutory interpretation argument was based) could the panel find that “Petitioners lack Article III standing to challenge both [the Timing and Tailoring] rules.” *Id.* at 96a (emphasis omitted).

In this case, petitioner argued that EPA’s conclusion that PSD and Title V regulation of GHGs would produce results contrary to congressional intent required a narrowing interpretation of the broad definition of “air pollutant” to exclude GHGs for purposes of the PSD and Title V programs. See UARG Comments at 34-39. The panel’s refusal – on purported standing grounds – to “address the merits of [petitioner’s] ... claims” that any EPA phase-in of

GHG requirements would produce results contrary to congressional intent, Pet. App. 99a, improperly conflated the merits with Article III standing. See *Steel Co. v. Citizens for a Better Env't*, 523 U.S. 83, 93, 95-97 (1998) (rejecting an approach that “convert[s] the merits issue in this case into a jurisdictional one”); cf. *Bell v. Hood*, 327 U.S. 678 (1946) (nonexistence of a cause of action not a proper basis for a jurisdictional dismissal).

Here, petitioner suffers injury in fact from EPA rules that require its members’ stationary sources to apply for permits that restrict their GHG emissions beginning January 2, 2011 (the date established by EPA’s Timing Rule). If petitioner’s statutory construction argument were accepted – thereby establishing that GHGs are not an air pollutant that is subject to PSD and Title V requirements – its members’ present injury caused by GHG regulation would be redressed. Nothing more is required for petitioner to demonstrate standing. See *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560-61 (1992). The panel’s decision is, thus, at odds with this Court’s settled case law on justiciability.

The panel’s standing decision is particularly troublesome insofar as it establishes precedent with respect to future phases of EPA’s PSD regulatory program for GHGs. If petitioner lacks Article III standing here – on the asserted grounds that EPA’s pursuit of an expansion of CAA stationary-source jurisdiction that is incompatible with congressional intent in steps, rather than all at once, “mitigate[s] Petitioners’ purported injuries,” Pet. App. 101a – then

petitioner's standing to object to further steps in pursuit of this unlawful end is also at risk. Certiorari is needed to clarify the law on standing for the D.C. Circuit – the court with exclusive jurisdiction to review nationally applicable rules under the CAA and many other federal regulatory statutes – in a context that is of extraordinary importance for the Nation.

### **III. This Petition Raises an Unusually Important Question of Federal Law.**

In *Massachusetts*, this Court recognized the “unusual importance” of questions concerning EPA’s authority to regulate GHG emissions under the CAA. 549 U.S. at 506. This case presents, if anything, issues of even greater importance than the questions presented in that case, given the extraordinary expansion of CAA Title I jurisdiction at stake.

The Court observed in *Massachusetts* that reading 42 U.S.C. § 7521 to encompass regulation of emissions of GHGs under Title II of the CAA from new motor vehicles “would lead to *no ... extreme measures.*” *Id.* at 531 (emphasis added). In fact, the Court observed, regulation of GHG emissions from motor vehicles and engines under Title II would “not directly expand or contract the universe of vehicles and engines subject to” that program. Pet. App. 632a. On this basis the Court distinguished its decision in *Food & Drug Administration v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120 (2000), setting aside a regulatory expansion of Food and Drug Administration authority over tobacco products. *Massachusetts*, 549 U.S. at 531 (“common sense’ intuition

tion [suggested] that Congress never meant to remove those products from circulation”).

In contrast, as EPA acknowledged, extending PSD and Title V requirements to GHG emissions from stationary sources would “subject an extraordinarily large number of sources, more than 81,000, to PSD each year, an increase of almost 300-fold” in CAA jurisdiction, Pet. App. 339a, and would “expand [the Title V program] from the current 14,700 sources to some 6.1 million,” *id.* at 380a. This, EPA observed, would impose impossible burdens on states that are responsible for issuing CAA permits and that will be confronted with a massive and unprecedented escalation in the number of permit proceedings. And because PSD permits are required prior to construction of new and modified sources, reading *Massachusetts* to mandate automatic application of PSD requirements to GHGs threatens to give rise to profound economic impacts across the Nation. As EPA recognized, if source owners and operators are unable to obtain PSD permits authorizing new construction or existing-source modifications for tens of thousands of facilities per year, for any reason – including the states’ and EPA’s inability to process a large number of permits – economic activity in many areas of the country would be seriously impaired. See 74 Fed. Reg. at 55,344 (According to EPA, once GHGs were regulated under Title II, the PSD program, “by its terms, prohibits a source that is subject to PSD from constructing or modifying without a permit.”); see also *id.* at 55,294.

EPA's action here opened uncharted vistas of CAA Title I and Title V jurisdiction over small sources across the country and for every state permitting authority – jurisdiction Congress never contemplated would exist. And because the panel below found that no petitioner had standing to challenge the merits of EPA's two rules authorizing a step-by-step expansion of CAA Title I and Title V jurisdiction to capture hosts of small sources throughout the Nation, EPA's continuing regulatory actions could wholly escape judicial review if the panel's judgment is left undisturbed.

This Court should grant certiorari to address a decision that has profound and far-reaching implications for administrative law generally, for states, for the Nation's economy, and for the present and future administration of the CAA.

35

**CONCLUSION**

For the foregoing reasons, the petition for a writ of certiorari should be granted.

Respectfully submitted,

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Cc:  
Bcc:  
Subject:  
Date: Tue Mar 26 2013 14:00:51 EDT  
Attachments: CRS, Potential Regulation of Stationary Greenhouse Gas Sources Under the CAA  
(May 14, 2009).pdf

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# Climate Change: Potential Regulation of Stationary Greenhouse Gas Sources Under the Clean Air Act

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## Summary

In the 111<sup>th</sup> Congress, both the House and Senate committees of jurisdiction are expected to give climate change legislation high priority. The House Energy and Commerce Committee has already held hearings on draft legislation, and expects to hold markup before Memorial Day. The schedule for Senate action is less certain, but presumably it will follow House consideration. With the inauguration of President Obama, there is a proponent of greenhouse gas (GHG) legislation in the White House, as well, markedly improving the prospects for enacting some sort of legislation to reduce GHG emissions.

Although new legislation to address greenhouse gases is a leading priority of the President and many members of Congress, the ability to limit these emissions already exists under various Clean Air Act authorities that Congress has enacted, a point underlined by the Supreme Court in an April 2007 decision, *Massachusetts v. EPA*. Indeed, the EPA has already begun the process that could lead to greenhouse gas regulations for motor vehicles in response to that court decision.

Thus, controlling GHGs could follow a two-track approach, with Congress and the Administration pursuing new legal authority (for cap-and-trade, carbon tax, or other mechanisms) at the same time that the Administration, through the Environmental Protection Agency (EPA), exercises existing authority under the Clean Air Act to begin regulation of greenhouse gas emissions.

The key to using the Clean Air Act's authority is for the EPA Administrator to find that GHG emissions are air pollutants that endanger public health or welfare. The Administrator proposed such an endangerment finding April 17, 2009, beginning a public comment period that is expected to run through June. It should be noted, despite EPA's apparent commitment to move forward with an endangerment finding, that EPA Administrator Jackson and others in the Administration have made clear their preference that Congress address the climate issue through new legislation.

If an endangerment finding is finalized, the agency could proceed to set GHG emission standards for motor vehicles. (A separate report, CRS Report R40506, *Cars and Climate: What Can EPA Do to Control Greenhouse Gases from Mobile Sources?*, discusses the endangerment finding and possible controls on mobile source GHGs.) The finding might also lead the agency and state permitting authorities to establish controls for stationary sources, including electric power plants and other industrial sources that account for the largest share of GHG emissions.

This report discusses EPA's authority to control GHG emissions from stationary sources under the Act, and the various options that EPA could exercise. Of these, perhaps the strongest basis for establishing a traditional regulatory approach would be Section 111 of the CAA, which provides authority to set New Source Performance Standards and, under Section 111(d), requires the states to control emissions from existing sources of the same pollutants. Other sections of the Act, not previously used, might provide authority to establish a cap-and-trade system for GHG emissions.

The report is not a legal analysis. Our intention is to describe legal issues and arguments that have been raised and to discuss potential EPA approaches to their resolution, without drawing legal conclusions.

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## Introduction

In the 111<sup>th</sup> Congress, both the House and Senate committees of jurisdiction are expected to give climate change legislation high priority. The House Energy and Commerce Committee has already held hearings on draft legislation, and expects to hold markup before Memorial Day. The schedule for Senate action is less certain, but presumably it will follow House consideration. With the inauguration of President Obama, there is a proponent of greenhouse gas (GHG) legislation in the White House, as well, markedly increasing the probability for enacting some sort of legislation to reduce GHG emissions. The President has said that a new energy, environment, and climate policy will be “a leading priority of my presidency, and a defining test of our time.”

Although new legislation to address greenhouse gases is a leading priority of the President and many members of Congress, the ability to limit these emissions already exists under various Clean Air Act (CAA) authorities that Congress has enacted, a point underlined by the Supreme Court in an April 2007 decision (discussed below). Indeed, the U.S. Environmental Protection Agency (EPA) has already begun the process that could lead to greenhouse gas regulations for mobile sources in response to court decisions.

If EPA moves to regulate greenhouse gases from mobile sources, legal and policy drivers would be activated that could lead to regulation of stationary sources as well. The legal drivers are beyond the scope of this report, which is focused on the policy options and control alternatives available to EPA if it were to use existing authorities to regulate greenhouse gases from stationary sources.

Indeed, stationary sources are the major sources of the country’s greenhouse gas emissions. Overall, 72% of U.S. emissions of greenhouse gas come from stationary sources (the remainder come from mobile sources). As indicated in Table 1, relatively large sources of fossil-fuel combustion and other sources are responsible for about one-half the country’s total emissions. If EPA were to embark on a serious effort to reduce greenhouse gas emissions, stationary sources, and in particular large stationary sources, would have to be included. This concentration of greenhouse gas emissions is even more important from a policy standpoint: reductions in greenhouse gas emissions from these sectors are likely to be more timely and cost-effective than attempts to reduce emissions from the transport sector.

This report discusses three major paths and two alternate paths of statutory authorities that have been identified by EPA and others as possible avenues the agency might take in addressing greenhouse gas emissions under existing CAA provisions. After discussing the approaches, we identify categories of control options EPA could consider, including an EPA-coordinated cap-and-trade program. Then we discuss the administrative difficulties in using the Clean Air Act for greenhouse gas control, particularly New Source Review and Title V permitting requirements. Finally, we conclude by putting the issue into the context of previous environmental challenges the CAA has faced.

**Table I. Selected U.S. Stationary Sources of Greenhouse Gases**

Source	2007 Emissions	% of Total GHGs
<b>Electricity Generation (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O)</b>		
Coal-fired	1977.7	27.8%
Natural gas-fired	374.1	5.3%
Fuel Oil-fired	55.4	0.8%
<b>Industrial fossil-fuel combustion (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O)</b> Mostly Petroleum refineries, chemicals, primary metals, paper, food, and nonmetallic mineral products		
Coal-fired	108.1	1.5%
Natural gas-fired	385.6	5.4%
Fuel Oil-fired	353.3	5.0%
<b>Industrial Processes</b>		
Iron and Steel Production (CO <sub>2</sub> , CH <sub>4</sub> )	74.3	1.0%
Cement Production (CO <sub>2</sub> )	44.5	0.6%
Nitric Acid Production (N <sub>2</sub> O)	21.7	0.3%
Substitution of Ozone Depleting Substances (HFCs)	108.3	1.5%
<b>Other</b>		
Natural Gas Systems (CO <sub>2</sub> , CH <sub>4</sub> )	133.4	1.9%
Waste Incineration (CO <sub>2</sub> , N <sub>2</sub> O)	21.2	0.3%
<b>TOTAL</b>	<b>3657.6</b>	<b>51.3%</b>

Source: EPA inventory, April 2009.

## The Entry Point: *Massachusetts vs. EPA*

A regulatory approach using existing Clean Air Act authorities has been under consideration at EPA for more than a decade. In 1998, EPA's General Counsel, Jonathan Cannon, concluded in a memorandum to the EPA Administrator that greenhouse gases were air pollutants within the Clean Air Act's definition of the term, and therefore could be regulated under the Act.<sup>1</sup> Relying on the Cannon memorandum as well as the statute itself, on October 20, 1999, a group of 19

<sup>1</sup> Memorandum from Jonathan Z. Cannon, EPA General Counsel, to Carol M. Browner, EPA Administrator, EPA's Authority to Regulate Pollutants Emitted by Electric Power Generation Sources (April 10, 1998).

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organizations petitioned EPA to regulate greenhouse gas emissions from new motor vehicles under Section 202 of the Act.<sup>2</sup> Section 202 gives the EPA Administrator broad authority to set “standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles” if in her judgment they contribute to air pollution which “may reasonably be anticipated to endanger public health or welfare.”

EPA denied the petition in 2003<sup>3</sup> on the basis of a new General Counsel memorandum issued the same day in which the General Counsel concluded that the CAA does not grant EPA authority to regulate CO<sub>2</sub> and other GHG emissions based on their climate change impacts.<sup>4</sup> The denial was challenged by Massachusetts, eleven other states, and various other petitioners in a case that ultimately reached the Supreme Court. In an April 2, 2007 decision (*Massachusetts v. EPA*), the Court found by 5-4 that EPA *does* have authority to regulate greenhouse gas emissions, since the emissions are clearly “air pollutants” under the Clean Air Act’s definition of that term.<sup>5</sup> The Court’s majority concluded that EPA must, therefore, decide whether emissions of these pollutants from new motor vehicles contribute to air pollution that may reasonably be anticipated to endanger public health or welfare. If it makes this finding of endangerment, the Act requires the agency to establish standards for emissions of the pollutants.<sup>6</sup>

## The Advance Notice of Proposed Rulemaking (ANPR)

For nearly two years following the Court’s decision, the Bush Administration’s EPA did not respond to the original petition nor make a finding regarding endangerment. Its only formal action following the Court decision was to issue a detailed information request, called an Advance Notice of Proposed Rulemaking (ANPR), on July 30, 2008.<sup>7</sup>

The ANPR occupied 167 pages of the *Federal Register*. Besides requesting information, it took the unusual approach of presenting statements from the Office of Management and Budget, four Cabinet Departments (Agriculture, Commerce, Transportation, and Energy), the Chairman of the Council on Environmental Quality, the Director of the President’s Office of Science and Technology Policy, the Chairman of the Council of Economic Advisers, and the Chief Counsel for Advocacy at the Small Business Administration, each of whom expressed their objections to

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<sup>2</sup> The lead petitioner was the International Center for Technology Assessment (ICTA). The petition may be found on their website at <http://www.icta.org/doc/ghgpet2.pdf>.

<sup>3</sup> The agency argued that it lacked statutory authority to regulate greenhouse gases: Congress “was well aware of the global climate change issue” when it last comprehensively amended the Clean Air Act in 1990, according to the agency, but “it declined to adopt a proposed amendment establishing binding emissions limitations.” *Massachusetts v. EPA*, 549 U.S. 497 (2007).

<sup>4</sup> Memorandum from Robert E. Fabricant, EPA General Counsel, to Marianne L. Horinko, EPA Acting Administrator, EPA’s Authority to Impose Mandatory Controls to Address Global Climate Change Under the Clean Air Act (August 28, 2003).

<sup>5</sup> *Massachusetts v. EPA*, 549 U.S. 497 (2007). The majority held: “The Clean Air Act’s sweeping definition of ‘air pollutant’ includes ‘any air pollution agent or combination of such agents, including any physical, chemical ... substance or matter which is emitted into or otherwise enters the ambient air....’ ... Carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons are without a doubt ‘physical [and] chemical ... substances[s] which [are] emitted into ... the ambient air.’ The statute is unambiguous.”

<sup>6</sup> For further discussion of the Court’s decision, see CRS Report RS22665, *The Supreme Court’s Climate Change Decision: Massachusetts v. EPA*, by Robert Meltz.

<sup>7</sup> U.S. EPA, “Regulating Greenhouse Gas Emissions Under the Clean Air Act,” 73 *Federal Register* 44354, July 30, 2008.

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regulating greenhouse gas emissions under the Clean Air Act. The OMB statement began by noting that, “The issues raised during interagency review are so significant that we have been unable to reach interagency consensus in a timely way, and as a result, this staff draft cannot be considered Administration policy or representative of the views of the Administration.”<sup>8</sup> It went on to state that “... the Clean Air Act is a deeply flawed and unsuitable vehicle for reducing greenhouse gas emissions.”<sup>9</sup> The other letters concurred. The ANPR, therefore, was of limited use in reaching a conclusion on the endangerment issue and, in any event, it presents the views of an Administration no longer in office.

The current Administration made review of the endangerment issue a high priority. On April 17, 2009, EPA proposed a finding that GHGs do endanger both public health and welfare and that GHGs from new motor vehicles contribute to that endangerment.<sup>10</sup> Publication of the proposal in the *Federal Register* on April 24 began a 60-day public comment period. In addition, public hearings will be held May 18 in Arlington, VA, and May 21 in Seattle, WA.

## Potential Implications for Stationary Sources

While there has been considerable speculation in the literature about the meaning of *Massachusetts v. EPA* for stationary sources, there have also been several attempts to invoke the various authorities of the Clean Air Act to begin controlling greenhouse gas emissions from stationary sources.<sup>11</sup> Among the legal initiatives currently underway are the following:

- In 2006, the EPA revised the New Source Performance Standard (NSPS) for electric utilities and other steam generating units without including any CO<sub>2</sub> standard, or other requirement. Led by New York, several states filed a petition for review of the new NSPS, challenging the omission of any CO<sub>2</sub> requirement. In September 2007 the D.C. Circuit Court of Appeals remanded the case back to EPA for further proceedings “in light of *Massachusetts v. EPA*.”<sup>12</sup>
- In 2007, EPA Region 8 granted a Prevention of Significant Deterioration (PSD) permit authorizing construction of a waste-coal-fired electric generating plant near Bonanza, Utah. Appealing the decision, the Sierra Club argued to the Agency’s Environmental Appeals Board (EAB) that because the Court had found in *Massachusetts v. EPA* that CO<sub>2</sub> was an air pollutant under the Act, and that EPA has imposed CO<sub>2</sub> monitoring and reporting requirements, the Bonanza plant was required to install Best Available Control Technology (BACT) for CO<sub>2</sub> emissions. The EAB rejected the Sierra Club’s interpretation of the PSD-NSR language, but remanded it back to Region 8 for reconsideration of a CO<sub>2</sub> BACT requirement.<sup>13</sup> In another PSD-NSR (New Source Review) case, EPA Region 9

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<sup>8</sup> “Regulating Greenhouse Gas Emissions Under the Clean Air Act,” 73 *Federal Register* 44356, July 30, 2008.

<sup>9</sup> *Ibid.*

<sup>10</sup> Environmental Protection Agency, “Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act,” PrePublication Copy, April 17, 2009, at <http://epa.gov/climatechange/endangerment/downloads/GHGEndangermentProposal.pdf>.

<sup>11</sup> For a legal discussion of these initiatives, see CRS Report RL32764, *Climate Change Litigation: A Survey*, by Robert Meltz.

<sup>12</sup> *New York v. EPA*, No 06-1322 (D.C. Cir., September 24, 2007)

<sup>13</sup> The Board rejected the Region’s argument that it was limited by an historical agency interpretation to read “subject to regulation” as meaning “subject to a statutory or regulatory provision that requires actual control of emissions of that (continued...) ”

filed a motion with the EAB in April 2009 for a voluntary remand of the PSD permit for the Desert Rock coal-fired power plant in New Mexico to allow for a reconsideration of its permit to include a CO<sub>2</sub> limitation. Region 9 wants to reconsider its decision not to require Desert Rock to install “carbon-ready” integrated gasification combined-cycle technology instead of allowing current pulverized-coal technology.<sup>14</sup>

- In 2009, the Environmental Integrity Project, an environmental group, filed a complaint with the D.C. Circuit Court to force the EPA to review nitrous oxide (N<sub>2</sub>O) emissions from nitric acid plants.<sup>15</sup> The group argues that EPA has not reviewed the NSPS for such plants since 1984, despite the statutory requirements for periodic reviews.

It should be noted that amidst this legal activity and EPA’s apparent commitment to move forward with an endangerment finding, EPA Administrator Jackson and others in the Administration have made clear that their preference would be for Congress to address the climate issue through new legislation. In the press release announcing the proposed endangerment finding, the agency stated, “Notwithstanding this required regulatory process, both President Obama and Administrator Jackson have repeatedly indicated their preference for comprehensive legislation to address this issue and create the framework for a clean energy economy.”

## Potential Paths for GHG Stationary Source Control

When looking at the CAA from the point of view of reducing GHGs from stationary sources, three existing paths are available. As indicated in Table 2, the three paths are (1) to regulate GHGs as criteria air pollutants, (2) to regulate GHGs as hazardous air pollutants, or (3) to regulate GHGs as designated air pollutants. Each of these paths are discussed below, along with two lesser explored trails: Section 115 and Title VI.

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pollutant.” Since EPA has yet to issue a CAA regulation requiring actual control of CO<sub>2</sub> emissions, Region 8 argued, BACT for CO<sub>2</sub> is not required. Hence, the Board remanded the permit to the Region for it to reconsider whether to impose a CO<sub>2</sub> BACT limit. Desert Power Electric Cooperative, PSD Appeal No. 07-03 (E.A.B. November 13, 2008).

<sup>14</sup> For more information on Desert Rock’s PSD-NSR permit, see <http://www.epa.gov/region09/air/permit/desert-rock/>.

<sup>15</sup> Complaint at 2, *Environmental Integrity Project v. EPA*, No. 1:09-cv-00218 (D.C. Circuit, filed February 4, 2009).

**Table 2. Simplified Requirements under Title I for Most Stationary Sources**

	Section 109 <b>(NAAQS)</b>	Section 112 <b>(Air Toxics)</b>	Sections 111(d)/129 <b>(Designated Pollutants)</b>
Minimum Controls	<b>New/Modified Source:</b> EPA-determined NSPS under Sec. 111	<b>New Source:</b> EPA-determined MACT under Sec. 112	<b>New/Modified Source:</b> EPA-determined NSPS under Sec. 111
	<b>Existing Source:</b> Depends on area's attainment status/ visibility provisions	<b>Existing Source:</b> Less stringent EPA- determined MACT	<b>Existing Source:</b> State determination under EPA standards issued under Sec. 111(d)
Implementing Provisions	State Implementation Plans under Sec. 110  New Source Review (NSPS, PSD, nonattainment)  Sec. 126 Petitions	Statutory list under Sec. 112(b)(1)  EPA determination under Sec. 112(b)(2) or (b)(3)	Designated Pollutant Plans under Sec. 111(d)/129  New Source Review (PSD)

**Notes:** NAAQS stands for National Ambient Air Quality Standard and is discussed below. MACT stands for Maximum Achievable Control Technology and is discussed after the discussion of NAAQS.

## Path 1: Regulating GHG through National Ambient Air Quality Standards (NAAQS)

### Importance of NAAQS

The backbone of the Clean Air Act is the creation of National Ambient Air Quality Standards (NAAQS). The need to attain NAAQS, which are set at levels designed to protect public health without consideration of costs or economic impact, is the driving force behind much of clean air regulation.

The authority for NAAQS is found in Sections 108 and 109 of the Act. Under Section 108, EPA is to identify air pollutants that, in the Administrator's judgment, endanger public health or welfare, and whose presence in ambient air results from numerous or diverse sources. Under Section 109, EPA is required to set NAAQS for the identified pollutants.

Section 109 requires the EPA Administrator to set both primary and secondary NAAQS. Primary NAAQS must be set at a level that will protect public health with an adequate margin of safety. Secondary NAAQS are required to protect public welfare from "any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air." Public welfare covers damage to crops, vegetation, soils, wildlife, water, property, building materials, etc., and such broader variables as visibility, climate, economic values, and personal comfort and well-being.

Over the years, EPA has identified six air pollutants or categories of air pollutants for NAAQS: sulfur dioxide (SO<sub>2</sub>), particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), ozone, and lead. These six are referred to as "criteria" pollutants. Each of the criteria pollutants was identified for NAAQS regulation in the 1970s. Since that time, although

the specific standards (the allowed concentrations) have been reviewed and modified, no new criteria pollutants have been identified.

## **NAAQS and Controlling GHGs**

If carbon dioxide (CO<sub>2</sub>) or other greenhouse gases were identified as criteria pollutants, NAAQS would then have to be set. CO<sub>2</sub>, the most important greenhouse gas, is arguably an air pollutant that endangers public health or welfare,<sup>16</sup> and its presence in ambient air results from numerous or diverse sources. Thus, it meets the basic criteria of Section 108. But setting a NAAQS for CO<sub>2</sub> raises a number of potential issues, four of which are discussed in the following sections.

### *Setting a Standard*

An initial difficulty would arise in choosing a level at which to set a NAAQS. Primary and secondary NAAQS are expressed as concentrations of the pollutant in ambient air that endanger public health or welfare. For the six current criteria pollutants, the focus has been on setting *primary* (health-based) standards—i.e., identifying a concentration in ambient air above which ambient concentrations of the pollutant contribute to illness or death. These standards are based on both concentration-response studies undertaken in laboratory conditions (often animal studies, but some involving humans), and on epidemiology that demonstrates a correlation between greater exposure to the pollutant and higher rates of morbidity and mortality.

For CO<sub>2</sub> at current and projected levels, there are not the same direct linkages between higher concentrations and health as there are for each of the current NAAQS. A person exposed to current ambient levels of CO<sub>2</sub> will not be sickened. Nor is it likely that one could demonstrate a connection between CO<sub>2</sub> and morbidity or mortality through epidemiology, in part because CO<sub>2</sub> concentrations are relatively uniform across the globe and change very slowly. The argument that can be made is more indirect: that higher levels of CO<sub>2</sub> are likely over time to cause higher temperatures, and higher temperatures and associated changes in climate-related processes are likely to have health consequences.

If EPA concluded that this connection between CO<sub>2</sub>, higher temperatures, and human health were sufficient to justify establishing a primary NAAQS, it would still be difficult to pick out a specific CO<sub>2</sub> concentration for a standard. Among scientists concerned about greenhouse gas concentrations, some argue for a level of 350 parts per million (ppm) as the concentration that must be attained,<sup>17</sup> others argue for 450 ppm, and some for levels of 550-600 ppm. Current

<sup>16</sup> We say “arguably” because EPA has not yet made this endangerment finding (although it has proposed doing so), and there are climate skeptics who would dispute whether such a finding is justified. On the other hand, the vast majority of the climate science community, as represented by the Intergovernmental Panel on Climate Change, have concluded that “[w]arming of the climate system is unequivocal ...,” and “[m]ost of the observed increase in globally-averaged temperatures since the mid-20<sup>th</sup> century is very likely due to the observed increase in anthropogenic GHG concentrations.” Further, “Most impacts are expected to be adverse (e.g., lower agricultural productivity in many regions, drought, rising sea levels, spread of disease vectors, greater needs for cooling).” See CRS Report RL34266, *Climate Change: Science Highlights*, by Jane A. Leggett. Within EPA, it would appear that the relevant staff concluded that an endangerment finding was justified in 2007, but the agency took no action as the result of the involvement of other agencies and the White House. See Testimony of Jason Burnett, Former Associate Deputy Administrator, EPA, at Senate Environment and Public Works Committee, “Regulation of Greenhouse Gases under the Clean Air Act,” Hearing, September 23, 2008.

<sup>17</sup> The argument for 350 ppm is based largely on concern over melting glaciers, polar ice caps, and sea level, not direct (continued...)

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concentrations in the Earth's atmosphere are about 385 ppm, increasing by 1 or 2 ppm per year. The mechanics of implementing a standard will be discussed in greater detail below, but it is important to note here that unless one chose a standard at or below the current ambient level, establishing a primary NAAQS would have no consequence. It is only if ambient concentrations of the pollutant exceed the standard that action must be taken.

A further point regarding the setting of a NAAQS is the importance of distinguishing primary from secondary standards. If one were to set a NAAQS for CO<sub>2</sub> or other GHGs, it is perhaps the secondary NAAQS that is most relevant to the discussion. As noted above, secondary NAAQS are designed to prevent damage to crops, vegetation, soils, wildlife, water, property, building materials, etc. and such broader variables as visibility, climate, economic values, personal comfort and well-being.

EPA—under both Democratic and Republican Presidents—has generally given short shrift to the setting of secondary NAAQS: most have been set at a level identical to the primary standard, with little discussion of the agency's reasoning. In part, this is because secondary NAAQS have no deadlines attached to their attainment and there is no enforcement mechanism or penalty for failure to attain them.

Thus, it would hardly be worth the effort to establish a NAAQS for GHGs unless one could establish a defensible case for a specific primary standard that was below ambient levels. Primary NAAQS, unlike their secondary kin, do have deadlines: there are consequences for a failure to attain them in a timely manner.

### *Identifying Nonattainment Areas*

If a CO<sub>2</sub> or GHG NAAQS were set by EPA, the next step would be to identify nonattainment areas (i.e., areas where ambient concentrations of CO<sub>2</sub> and/or other GHGs exceed the NAAQS). The procedure for doing so is specified under Section 107 of the Act. For the six current criteria pollutants, there are distinct local and regional concentrations of each pollutant that can generally be linked to stationary or mobile sources in the area. In some cases, the sources may be relatively distant, with pollutants (or precursors) emitted hundreds of miles away. But with all of the current criteria pollutants, there are significant variations in local and regional concentrations, and only those areas with pollutant readings higher than the NAAQS are designated “nonattainment.”

For CO<sub>2</sub>, this would not be the case. Concentrations are relatively homogeneous across the entire country—indeed, across the world. Thus, the entire United States would need to be designated nonattainment if concentrations exceeded the standard.

### *Developing State Implementation Plans*

A third element of NAAQS that appears ill-suited to the regulation of GHGs is the mechanism used to bring about compliance with NAAQS, the State Implementation Plan (SIP) provisions in Section 110 and Sections 171-179B. SIPs describe the sources of pollution in a nonattainment area and the methods that will be used by the area to reduce emissions sufficiently to attain the

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public health considerations.

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standard. They are required to be developed and submitted to EPA for each nonattainment area within three years of its designation.

SIPs build on some national standards (for new motor vehicles and new or modified power plants, for example), but they assume that most sources of the pollution to be controlled are local, and therefore, that the measures needed to reach attainment are measures tailored to local conditions. To the extent that significant emission sources are located in other states, downwind states are authorized under Section 126 to petition EPA for controls on such upwind sources.

If pollution is uniform throughout the country, there is no reason why the measures taken to reduce it should vary from locality to locality. Nor will a nonattainment area be able to demonstrate that its pollution control measures will have any measurable impact on the ambient concentration of most greenhouse gases. Thus, State Implementation Plans tailored to each nonattainment area would be ill-suited to the nature of the problem.

### *Attaining the Standard*

It is also unlikely that any state or nonattainment area on its own could demonstrate reasonable further progress toward attainment of the standard (as is required by Section 172), particularly within the 5- to 10-year period specified in Section 172 for attainment of a NAAQS. Greenhouse gases accumulate in the atmosphere, and some can take hundreds of years to diminish, even if current global emissions decline. Global emissions are increasing. Individual states and nonattainment areas would have little chance of reversing this trend through any set of actions they might undertake on their own.

## **Path 2: Regulating GHGs through Section 112 as Hazardous Air Pollutants**

### **Importance of Section 112**

As revised by the 1990 CAA amendments, Section 112 contains four major provisions: Maximum Achievable Control Technology (MACT) requirements for major sources; health-based standards to be imposed for the residual risks remaining after imposition of MACT standards; standards for stationary “area sources” (small, but numerous sources, such as gas stations or dry cleaners, that collectively emit significant quantities of hazardous pollutants); and requirements for the prevention of catastrophic releases. The MACT and area source provisions would appear to be the most relevant, if GHGs were to be controlled under this section.

The MACT provisions require EPA to set standards for sources of the listed pollutants that achieve “the maximum degree of reduction in emissions” taking into account cost and other non-air-quality factors. MACT standards for new sources “shall not be less stringent than the most stringent emissions level that is achieved in practice by the best controlled similar source.” The standards for existing sources may be less stringent than those for new sources, but generally must be no less stringent than the average emission limitations achieved by the best performing 12% of existing sources. Existing sources are given three years following promulgation of standards to achieve compliance, with a possible one-year extension; additional extensions may be available for special circumstances or for certain categories of sources.

In addition to the technology-based standards for major sources of hazardous air pollution, Section 112 requires EPA to establish standards for stationary “area sources” (small, but numerous, sources such as gas stations or dry cleaners, that collectively emit significant quantities of hazardous air pollutants). In setting these standards, EPA can impose less stringent “generally available” control technologies, rather than MACT.

## **Section 112 and Controlling GHGs**

Could EPA regulate GHG emissions as hazardous air pollutants under Section 112? In its comments on the ANPR, the Bush Administration’s Department of Energy stated that “... it is widely acknowledged that a positive endangerment finding could lead to ... the listing of one or more greenhouse gases as hazardous air pollutants (HAP) under section 112.”<sup>18</sup> EPA, on the other hand, was more circumspect in its analysis, stating:

The effects and findings described in section 112 are different from other sections of the CAA addressing endangerment of public health discussed in previous sections of today’s notice. Given the nature of the effects identified in section 112(b)(2), we request comment on whether the health and environmental effects attributable to GHG fall within the scope of this section.<sup>19</sup>

The language of Section 112 refers to pollutants that may present a threat of adverse human health effects or adverse environmental effects. This language might be broad enough that GHGs could be categorized as hazardous air pollutants and subjected to the regulatory tools provided by the section, but because the section was written to apply to carcinogenic and other toxic air pollutants present in emissions in small quantities, there would be questions as to whether Congress intended the use of the section’s authority for pollutants such as GHGs. The legislative history of the Act makes clear that it was designed primarily to regulate pollutants commonly referred to as “air toxics.” Hazardous air pollutants are defined as “any pollutant listed pursuant to subsection [112](b).” Congress provided an initial list of 189 hazardous air pollutants in that subsection, and it established criteria and procedures for revising the list in Section 112(b)(2). In the 18 years since the criteria were established, EPA has not added any substances to the list.

The procedures for revising the list provide that the Administrator may do so “by rule,” adding pollutants that may present, through inhalation or other routes of exposure, a threat of adverse human health effects, or, through a variety of routes of exposure, adverse environmental effects. The human health effects language is qualified with wording that suggests the type of pollutants Congress had in mind when it drafted this section: substances that include, but are not limited to, ones known or reasonably anticipated to be carcinogenic, mutagenic, teratogenic, neurotoxic, acutely or chronically toxic, or which cause reproductive dysfunction.

The section is also not well-suited to the most common GHGs, such as CO<sub>2</sub>, that are emitted in very large quantities. For example, it defines a major source as one that emits 10 tons per year or more of any hazardous air pollutant. Annual CO<sub>2</sub> emissions in the United States are about 6 billion metric tons, and hundreds of thousands, perhaps millions of sources (including large residential structures) might qualify as major sources if CO<sub>2</sub> were listed as a hazardous air pollutant under this section.

<sup>18</sup> 73 *Federal Register* 44367, July 30, 2008.

<sup>19</sup> *Ibid.*, p. 44493.

Section 112 might be useful, if at all, for regulating small volume chemicals that are very potent greenhouse gases: sulfur hexafluoride (SF<sub>6</sub>), for example. SF<sub>6</sub> has a global warming potential 22,800 times as great as CO<sub>2</sub> and accounted for about one-quarter of one percent of total U.S. GHG emissions in 2007, when measured by its global warming potential. SF<sub>6</sub> emissions were 16.5 million metric tons of CO<sub>2</sub>-equivalent in that year. Actual emissions expressed as SF<sub>6</sub>, however, were only 690 metric tons. Nitrogen trifluoride (NF<sub>3</sub>), another chemical with low emission levels but high global warming potential, might be another candidate, if EPA chose this regulatory route. Section 112 generally considers a major source of emissions to be one that emits more than 10 tons per year of a hazardous air pollutant, and it allows the Administrator to establish a lesser quantity as the major source threshold, based on the potency of the air pollutant or other relevant factors.

Once the source categories for hazardous air pollutants are identified, Section 112 establishes a presumption in favor of regulation of the designated pollutants; it requires regulation unless EPA or a petitioner is able to show “that there is adequate data on the health and environmental effects of the substance to determine that emissions, ambient concentrations, bioaccumulation or deposition of the substance may not reasonably be anticipated to cause any adverse effects to human health or adverse environmental effects.”

### **Path 3: Regulating GHGs through Sections 111 as Designated Air Pollutants**

Given the difficulties in following the first two paths, much of the attention, including EPA’s, has been on the third path. The term “designated pollutant” is a catch-all phrase for any air pollutant that isn’t either a criteria air pollutant under Section 108 or a toxic air pollutant under Section 112. Examples of these include fluorides from phosphate fertilizer manufacturing or primary aluminum reduction, or sulfuric acid mist from sulfuric acid plants.

#### **Importance of Section 111**

The authority to regulate such pollutants is Section 111.<sup>20</sup> Section 111 establishes New Source Performance Standards (NSPS), which are emission limitations imposed on designated categories

<sup>20</sup> In addition to using Section 111, in its July 2008 Advance Notice of Proposed Rulemaking EPA discussed at some length the possibility of using Section 129 of the act to regulate GHG emissions from solid waste combustion units. This would seem to be among the more unlikely routes to regulation of GHGs.

Section 129 is structured differently from most of the other CAA authorities discussed here: there is no provision for an endangerment finding, and there is no blanket authority for the Administrator to regulate pollutants that endanger public health or welfare; there is, instead, a specific list of 10 types of pollution for which the Administrator shall establish standards, with no provision for adding pollutants to the list.

Furthermore, waste incineration is a relatively small source of GHG emissions. According to the latest EPA *Inventory of Greenhouse Gas Emissions and Sinks*, incineration of waste emitted 20.8 million metric tonnes of CO<sub>2</sub> in 2007, less than 0.3% of total U.S. GHG emissions.

To the extent that Section 129 provides broader authority to the Administrator, it does so by referencing Section 111: “The Administrator shall establish performance standards and other requirements pursuant to Section 111 and this section for each category of solid waste incineration units.” Thus, the authority the Administrator has over waste combustion units is addressed in our discussion of EPA’s authority over stationary sources in general under Section 111.

of major new (or substantially modified) stationary sources of air pollution. A new source is subject to NSPS regardless of its location or ambient air conditions.<sup>21</sup>

Section 111 provides authority for EPA to impose performance standards on stationary sources—directly in the case of new (or modified) sources, and through the states in the case of existing sources (Section 111(d)). The authority to impose performance standards on new and modified sources refers to any category of sources that the Administrator judges “causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare” (Sec. 111(b)(1)(A)). In establishing these standards, the Administrator has the flexibility to “distinguish among classes, types, and sizes within categories of new sources” (Sec. 111(b)(2)).

The performance standards themselves are to reflect “the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated” (Sec. 111(a)(1)). Both the Administrator and the individual states have the authority to enforce the NSPS.

### **Controlling GHG through Section 111**

Section 111 appears to provide a strong basis for EPA to establish a traditional regulatory approach to controlling greenhouse gas emissions from large stationary sources. As noted, the section gives EPA considerable flexibility with respect to the source categories regulated, the size of the sources regulated, the particular greenhouse gases regulated, along with the timing and phasing in of regulations. This flexibility extends to the stringency of the regulations with respect to costs, and secondary effects, such as nonair quality, health and environmental impacts, along with energy requirements. This flexibility is encompassed within the Administrator’s authority to determine what control systems she determines have been “adequately demonstrated.” As discussed later, this determination has been used to authorize control regimes that extended beyond the merely commercially available to those technologies that have only been demonstrated, and thus are considered by many to have been “technology-forcing.”

In sum, Section 111 has several advantages in considering greenhouse gas controls including that it (1) has flexibility with respect to the size of the source controlled (Section 111(b)(2)), (2) can prioritize its schedule of performance standards (Section 111(f)(2)), (3) can consider costs and other factors in making determinations, and (4) has discretion with respect to determining technology that has been adequately demonstrated. Essentially, using Section 111, EPA can determine who gets controlled, when they get controlled, how much they get controlled, and at what price.

<sup>21</sup> The federal focus on new facilities arose from several factors. First, it is generally less expensive to design in to new construction necessary control features than to retrofit those features on existing facilities not designed to incorporate them. Second, uniform standards for new construction ensures that individual states will not be tempted to slacken environmental control requirements to compete for new industry. NSPS was also seen as enhancing the potential for long-term growth, ensuring competitiveness between low and high sulfur coals, and creating incentives for new control technologies. See Senator Edmund Muskie, Senate Consideration of the Report of the conference Committee (August 4, 1977), in U.S. Senate, Committee on Environment and Public Works, *A Legislative History of the Clean Air Act Amendments of 1977* (95<sup>th</sup> Congress., 2d session; Serial No. 95-15) (1979), vol. 3, p. 353.

## Going Off the Beaten Path: Regulating under Section 115 or Title VI

### Section 115: International Pollution

On the face of it, Section 115 would appear the ideal provision to address the global issue of climate change. It is focused on international problems and has unique international triggers. Specifically, Section 115 could be invoked by EPA on one of two bases.

First, EPA could act if it receives reports, surveys, or studies from “any duly constituted international agency” that gives EPA:

reason to believe that any air pollutant or pollutants emitted in the United States cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare in a foreign country....<sup>22</sup>

Unlike the endangerment triggers under other sections of the Act, the endangerment finding under Section 115 refers to international effects based on data from internationally recognized sources. Many would argue that reports by the Intergovernmental Panel on Climate Change (IPCC) would fit this requirement. A United Nations body, created by the World Meteorological Organization and United Nations Environment Programme, the group and its results are referenced by EPA in its ANPR and its proposed endangerment finding.

Second, in addition to a unique international endangerment trigger, Section 115 can be invoked without any EPA endangerment finding at all. Specifically, EPA is directed to act “whenever the Secretary of State requests him to do so with respect to such pollution [that endangers public health or welfare in a foreign country] which the Secretary of State alleges is of such a nature...” (Section 115(a)). Thus, an allegation by the Secretary of State is sufficient cause for EPA to act.

The action called for under Section 115 is implemented through Section 110(a)(2)(H)(ii) that requires states to revise their SIPs to prevent or eliminate the endangerment identified. Apparently, based on this reference to SIPs, EPA states in its ANPR that Section 115 could only be exercised if EPA were to promulgate a NAAQS for greenhouse gases.<sup>23</sup> However, this is arguable. Section 110(a)(2)(H)(ii) states that SIPs must be crafted to provide for revisions:

...whenever the Administrator finds on the basis of information available to the Administrator that the plan is substantially inadequate to attain the national ambient air quality standard which it implements *or to otherwise comply with any additional requirements established under this Act.* [emphasis added]

In their article arguing in favor of using Section 115 to address climate change, Martella and Paulson state their opposition to EPA’s blanket assertion that a greenhouse gas NAAQS would be necessary to invoke Section 115:

... based on the plain language of the statute, however, this is unlikely to have been what Congress intended. Section 115 is not in any way limited to criteria pollutants. In fact, the

<sup>22</sup> Section 115(a)

<sup>23</sup> 73 *Federal Register* 44483, July 30, 2008.

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opposite is true. It applies specifically to “any air pollution.” Clean Air Act Section 110(a)(2)(H)(ii) makes it clear that SIP must provide for the revision of the plan not only when the plan is inadequate to attain a NAAQS, but also to otherwise comply with any additional requirements, such as a revision required by Section 115.<sup>24</sup> [footnotes omitted]

The above actions are prefaced on a condition of reciprocity; Section 115 applies “only to a foreign country which the Administrator determines has given the United States essentially the same rights with respect to the prevention or control of air pollution occurring in that country as is given that country by this section.” (Section 115(c)) EPA notes in its ANPR that reciprocity with one or more affected countries may be sufficient to trigger Section 115.<sup>25</sup> Many countries currently attempting to comply with the Kyoto Protocol, such as the European Union, could argue that their efforts to reduce greenhouse gases are being hindered by absent or inadequate U.S. controls. Such countries could argue they meet the criteria under Section 115(c) with respect to reciprocity and point to international studies supporting their position. Secondly, countries at substantial risk from climate change, such as low-lying island countries, could argue endangerment from the lack of U.S. action. Thirdly, countries that only contribute a *de minimis* level of emissions, such as virtually all of Africa, could argue that their low emissions meet the criterion for U.S. action.

Subject to the limitations of the SIP process, EPA notes that Section 115 would provide it with some flexibility in program design. Martella and Paulson take a much more expansive view of the flexibility available, arguing:

While designating SIPs as the implementation vehicle, Section 115 otherwise does not impose strictures on the contours and requirements of any prospective program(s) to reduce greenhouse gas emissions.... A Section 115-based program could therefore include model thresholds and source categories set by EPA, similar to the Northeast Ozone Transport.

Additionally, EPA could develop a holistic model plan to be implemented by the states. Multiple model approaches also could be presented to the states allowing each state to pick the most appropriate solution for its particular mix of greenhouse gas sources....

Additionally, Section 115 provides a mechanism to limit the scope of the program in terms of the sources....<sup>26</sup>

Because EPA asserts that invoking Section 115 would require a greenhouse gas NAAQS, the action would also invoke NSR under Part C and Title V permitting requirements. One of Martella and Paulson’s primary arguments in favor of Section 115 is their belief that Section 115’s unique endangerment requirements (or no endangerment requirement if the Secretary of State alleges endangerment) should not trigger PSD-NSR or Title V permitting requirements.<sup>27</sup>

Finally, it should be noted that Section 115 has never been implemented, and many countries would prefer a negotiated settlement on climate change, rather than this approach.

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<sup>24</sup> Roger Martella and Matthew Paulson, “Regulation of Greenhouse Gases Under Section 115 of The Clean Air Act,” *Daily Environment Report*, March 9, 2009, pp. 12-17.

<sup>25</sup> 73 *Federal Register* 44483, July 30, 2008.

<sup>26</sup> Martella and Paulson, previously cited, pp. 15-16.

<sup>27</sup> *Ibid.*, p. 11.

**Title VI: Stratospheric Ozone Protection**

Added to the Clean Air Act in 1990, Title VI is the country's implementing legislation for the Montreal Protocol and succeeding agreements to address ozone depletion by human-made substances. Some of the substances that deplete the ozone layer also contribute to climate change (e.g., CFCs, HCFCs). In addition, some substances chosen as substitutes for ozone depleting chemicals are themselves greenhouse gases (e.g., HFC-134a, PFCs). Finally, the process of making acceptable substitutes for more powerful ozone-depleting chemicals (e.g., HCFC-22) produces greenhouse gases as a byproduct of production (e.g., HFC-23).

Beyond these chemical relationships, there is continuing research on the atmospheric relationship between the stratosphere (and the ozone layer) and climate change.

There are two provisions of Title VI that could be used to address greenhouse gas emission under certain conditions. They are discussed below.

***Section 612: Safe Alternatives Policy***

As noted above, some substitutes for ozone-depleting substances are greenhouse gases, such as HFCs and PFCs. Section 612 authorizes EPA to the maximum extent practicable, to identify substitutes for ozone-depleting chemicals that reduce overall risks to human health and the environment. Specifically, Section 612(c) requires the EPA to make it unlawful to replace an ozone-depleting substance with any substitute substance which EPA determines "may present adverse effects to human health or the environment" where EPA has identified an available, less harmful substitute. The resulting program is called the Significant New Alternatives Policy (SNAP). With appropriate substitutes identified, SNAP could be used to reduce emissions of HFCs and PFCs without invoking any other provisions of the CAA.

***Section 615: Authority of Administrator***

Like Section 115, Section 615 is potentially a powerful mechanism to control greenhouse gas emissions under certain circumstances. Like Section 115, it has a unique endangerment finding requirement and even broader discretionary authority for EPA to respond. Section 615 states:

If, in the Administrator's judgment, any substance, practice, process, or activity may reasonably be anticipated to affect the stratosphere, especially ozone in the stratosphere, and such effect may reasonably be anticipated to endanger public health or welfare, the Administrator shall promptly promulgate regulations respecting the control of such substance, practice, process or activity, and shall submit notice of the proposal and promulgation of such regulation to the Congress.

Invoking Section 615 in the case of greenhouse gases would involve a two-part judgment by the EPA: First, that greenhouse gases may reasonably be anticipated to affect the stratosphere (particularly the ozone layer) and, second, that the effect on the stratosphere may reasonably be anticipated to endanger public health or welfare. In its ANPR, EPA determined that it was beyond the scope of its ANPR to assess and analyze the available scientific information on the effects of greenhouse gases on the stratosphere.

If EPA were to judge the scientific data adequate to meet the two-part test, the authority available would be broad and deep. As stated by EPA in its ANPR: "... depending on the nature of any

finding made, section 615 authority may be broad enough to establish a cap-and-trade program for the substance, practice, process or activity covered by the finding....<sup>28</sup>

## Potential Control Approaches for Stationary Sources

In its Technical Support Document for its ANPR, EPA takes a narrow view of the alternatives available to it in imposing greenhouse gas performance standards.<sup>29</sup> For existing electric generating sources, the EPA focuses on incremental improvements in the heat rates of existing units through options that “are well known in the industry” with an overall improvement in efficiency likely to be less than 5%. For new electric generating sources, EPA noted the availability of more efficient supercritical coal units, the future availability of ultra-supercritical units, and the possibility of limited biomass co-firing.

Continuing along this line of reasoning, EPA also suggested that it could develop regulations that anticipate future technology. For example, a phase-in approach to applying CO<sub>2</sub> standards to powerplants would be to mandate that “carbon-ready” generating technology be required for new construction. The objective would be to anticipate the widespread need for some form of carbon capture technology in the future by preparing for it with compatible fossil-fuel combustion technology now. The technology most discussed is integrated-gasification, combined-cycle (IGCC). As noted earlier, EPA is considering this option with respect to the *Desert Rock* PSD-NSR permit reconsideration. With respect to some of the carbon capture technology under development, IGCC has certain advantages over pulverized coal technology. However, just how much IGCC is “carbon ready” is subject to debate. EPA states in its ANPR that it believes such a staged approach is available to it under section 111:

EPA believes that section 111 may be used to set both single-phase performance standards based upon current technology and to set two-phased or multi-phased standards with more stringent limits in future years. Future-year limits may permissibly be based on technologies that, at the time of the rulemaking, we find adequately demonstrated to be available for use at some specified future date.<sup>30</sup>

The technical support document does not mention some more aggressive options. These include a fuel-neutral standard or a technology-based standard. For example, for carbon dioxide emissions from a newly-constructed powerplant, a fuel-neutral standard could follow the example set by the 1997 and 2005 NO<sub>x</sub> NSPS and the 2005 NO<sub>x</sub> NSPS for modified existing sources. Under those regulations, the NO<sub>x</sub> emissions standard is the same, regardless of the fuel burned—solid, liquid, or gaseous.<sup>31</sup> This standard is much more expensive for coal-fired facilities to comply with than for natural-gas fired facilities, thus encouraging the lower-carbon gas-fired technologies. Likewise, EPA could choose to set a newly-constructed powerplant standard based on the performance of natural gas burnt in a combined-cycle configuration – the fuel and technology of

<sup>28</sup> 73 *Federal Register* 44519, July 30, 2008.

<sup>29</sup> U.S. Environmental Protection Agency, *Technical Support Document for the Advanced Notice of Proposed Rulemaking for Greenhouse Gases; Stationary Sources, Section VII* (June 5, 2008), final draft.

<sup>30</sup> 73 *Federal Register* 44490, July 30, 2008.

<sup>31</sup> Under Sec. 60.44Da(d)(1), the 1997-2005 NSPS is set at 1.6 lb per megawatt-hour gross energy output, based on a 20-day rolling average; it is lowered to 1.0 lb per megawatt-hour gross energy output for powerplants commencing construction after February 28, 2005 (Sec. 60.44Da(e)(1)). Under Section 60.44Da(e)(3), the 2005 NSPS for modified sources is at either 1.4 lb. A fuel-neutral standard is also set for reconstructed powerplants.

choice for construction of new powerplants for the last two decades. If EPA wanted to encourage the rollover of the existing coal-fired powerplant fleet to natural gas, nuclear, or renewable sources, it could apply a fuel-neutral standard to modified sources as well. For example, a CO<sub>2</sub> emission standard of 0.8 lb. per kilowatt-hour output could be met by a new natural gas-fired, combined-cycle facility, as well as any non-emitting generating technology, such as nuclear power or renewables. In contrast, the standard would require a 60% reduction in emissions from a new coal-fired facility – forcing the development of a carbon control technology, such as carbon capture and storage (CCS), in order for a new coal-fired facility to be built or modified.

The viability of these options, or even more aggressive technology-forcing standards, would depend on how EPA determined whether a technology had been “adequately-demonstrated” and the seriousness of its costs and energy requirements. As discussed below, EPA has used the NSPS to encourage the installation of pollution control equipment on powerplants, even while the equipment’s development status was still being debated.

## **Forcing Commercialization of Technology Through a Regulatory Requirement: An Example from the SO<sub>2</sub> New Source Performance Standards**

It is an understatement to say that the new source performance standards promulgated by the EPA were technology-forcing. Electric utilities went from having no scrubbers on their generating units to incorporating very complex chemical processes. Chemical plants and refineries had scrubbing systems that were a few feet in diameter, but not the 30- to 40-foot diameters required by the utility industry. Utilities had dealt with hot flue gases, but not with saturated flue gases that contained all sorts of contaminants. Industry, and the US EPA, has always looked upon new source performance standards as technology-forcing, because they force the development of new technologies in order to satisfy emissions requirements.<sup>32</sup>

The most direct method to encourage adoption of carbon capture technology would be to mandate it. Mandating a performance standard on stationary sources is not a new idea: The process of forcing the development of emission controls on coal-fired powerplants is illustrated by the 1971 and 1978 SO<sub>2</sub> NSPS for coal-fired electric generating plants. As noted earlier, the Clean Air Act states that NSPS should reflect “the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reductions and any non-air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.”<sup>33</sup> In promulgating its first utility SO<sub>2</sub> NSPS in 1971, EPA determined that a 1.2 pound of SO<sub>2</sub> per million Btu of heat input performance standard met the criteria of Sec. 111—a standard that required, on average, a 70% reduction in new powerplant emissions, and could be met by low-sulfur coal that was available in both the eastern and western parts of the United States, or by the use of emerging flue gas desulfurization (FGD) devices.<sup>34</sup>

<sup>32</sup> Donald Shattuck, et al., *A History of Flue Gas Desulfurization (FGD)—The Early Years*, UE Technical Paper (June 2007), p. 3.

<sup>33</sup> 42 U.S.C. 7411, Clean Air Act, Sec. 111(a)(1).

<sup>34</sup> 40 CFR 60.40-46, Subpart D—Standards of Performance for Fossil-Fuel-Fired Steam Generator for Which Construction is Commenced After August 17, 1971.

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At the time the 1971 Utility SO<sub>2</sub> NSPS was promulgated, there was only one FGD vendor (Combustion Engineering) and only three commercial FGD units in operation—one of which would be retired by the end of the year.<sup>35</sup> The number of units and vendors would increase rapidly, not only because of the NSPS, but also because of the promulgation of the SO<sub>2</sub> NAAQS, the 1973 Supreme Court decision preventing significant deterioration of pristine areas,<sup>36</sup> and state requirements for stringent SO<sub>2</sub> controls, which opened up a market for retrofits of existing coal-fired facilities in addition to the NSPS focus on new facilities. Indeed, most of the growth in FGD installations during the early and mid-1970s was in retrofits. Taylor estimates that between 1973 and 1976, 72% of the FGD market was in retrofits.<sup>37</sup> By 1977, there were 14 vendors offering full-scale commercial FGD installation.<sup>38</sup>

However, despite this growth, only 10% of the new coal-fired facilities constructed between 1973 and 1976 had FGD installations. In addition, the early performance of these devices was not brilliant.<sup>39</sup> In 1974, American Electric Power (AEP) spearheaded an ad campaign to have EPA reject FGD devices as “too unreliable, too impractical for electric utility use” in favor of tall stacks, supplementary controls, and low-sulfur western coal.<sup>40</sup> This effort was ultimately unsuccessful as the Congress chose to modify the NSPS requirements for coal-fired electric generators in 1977 by adding a “percentage reduction” requirement. As promulgated in 1979, the revised SO<sub>2</sub> NSPS retained the 1971 performance standard but added a requirement for a 70%-90% reduction in emissions, depending on the sulfur content of the coal.<sup>41</sup> At the time, this requirement could be met only through use of an FGD device. The effect of the “scrubber requirement” is clear from the data provided in **Figure 1**. Based on their analysis of FGD development, Taylor, Rubin, and Hounshell state the importance of demand-pull instruments:

Results indicate that: regulation and the anticipation of regulation stimulate invention; technology-push instruments appear to be less effective at prompting invention than demand-pull instruments; and regulatory stringency focuses inventive activity along certain technology pathways.<sup>42</sup>

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<sup>35</sup> Margaret R. Taylor, *The Influence of Government Actions on Innovative Activities in the Development of Environmental Technologies to Control Sulfur Dioxide Emissions from Stationary Sources*, Thesis, Carnegie Institute of Technology (January 2001), pp. 37, 40.

<sup>36</sup> *Fri v. Sierra Club*, 412 US 541 (1973). This decision resulted in EPA issuing “prevention of significant deterioration” regulations in 1974; regulations that were mostly codified in the 1977 Clean Air Amendment (Part C).

<sup>37</sup> Taylor, *ibid.*, p. 37.

<sup>38</sup> Taylor, *ibid.*, p. 39.

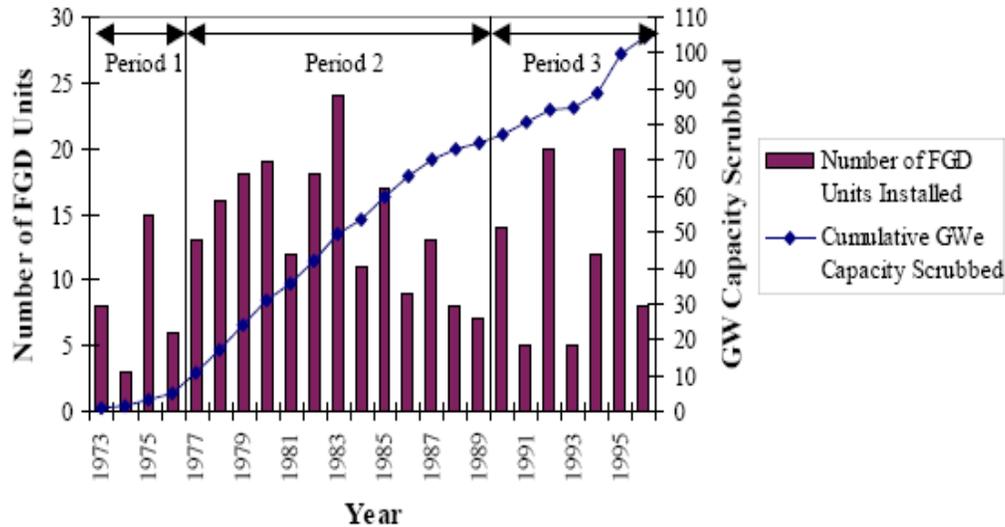
<sup>39</sup> For a discussion of challenges arising from the early development of FGD, see Donald Shattuck, et al., *A History of Flue Gas Desulfurization (FGD)—The Early Years*, UE Technical Paper (June 2007).

<sup>40</sup> Examples include full-page ads in the Washington Post entitled “Requiem for Scrubbers,” “Scrubbers, Described, Examined and Rejected,” and “Amen.” For an example, see *Washington Post*, p. A32 (October 25, 1974).

<sup>41</sup> 40 CFR 60.40Da-52Da, Subpart Da—Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978.

<sup>42</sup> Margaret R. Taylor, Edward S. Rubin, and David A. Hounshell, “Control of SO<sub>2</sub> Emissions from Power Plants: A Case of Induced Technological Innovation in the U.S.,” *Technological Forecasting & Social Change* (July 2005), p. 697.

**Figure I. Number of FGD Units and Cumulative Gigawatt (GW) Capacity of FGD Units: 1973-1996**



**Source:** Adapted by Taylor from Soud (1994). See Margaret R. Taylor, op. cit., 74.

**Note:** Numbers are archival through June 1994, then projected for 1994-96.

That government policy could force the development of a technology through creating a market should not suggest that the government was limited to that role, or that the process was smooth or seamless. On the latter point, Shattuck, et al., summarize the early years of FGD development as follows:

The Standards of Performance for New Sources are technology-forcing, and for the utility industry they forced the development of a technology that had never been installed on facilities the size of utility plants. That technology had to be developed, and a number of installations completed in a short period of time. The US EPA continued to force technology through the promulgation of successive regulations. The development of the equipment was not an easy process. What may have appeared to be the simple application of an equipment item from one industry to another often turned out to be fraught with unforeseen challenges.<sup>43</sup>

The example indicates that technology-forcing regulations can be effective in pulling technology into the market—even when there remain some operational difficulties for that technology. The difference for carbon capture technology is that for long-term widespread development, a new infrastructure of pipelines and storage sites may be necessary in addition to effective carbon capture technology.<sup>44</sup> In the short-term, suitable alternatives, such as enhanced oil recovery needs and in-situ geologic storage, may be available to support early commercialization projects without the need for an integrated transport and storage system. Likewise, with economics more favorable for new facilities than for retrofits, concentrating on using new construction to introduce carbon capture technology might be one path to widespread commercialization. As an

<sup>43</sup> Shattuck, et. al., p. 15.

<sup>44</sup> See CRS Report RL33971, *Carbon Dioxide (CO<sub>2</sub>) Pipelines for Carbon Sequestration: Emerging Policy Issues*, by Paul W. Parfomak and Peter Folger.

entry point to carbon capture deployment, a regulatory approach such as NSPS may represent a first step, as suggested by the SO<sub>2</sub> NSPS example above.

## Potential for Cap-and-Trade

Whether EPA can set up a cap-and-trade program under the Clean Air Act is the subject of considerable debate in the literature.<sup>45</sup> Much of the debate surrounds the provisions of Section 111(d). However, there are other authorities in the Act that might serve as a basis for a EPA-coordinated cap-and-trade program.

### Potential Under Section 111

EPA, along with other commenters, has linked the potential effectiveness of Section 111(d) to whether it can be interpreted to allow a cap-and-trade program for CO<sub>2</sub>. As stated by EPA: “EPA also believes that because of the potential cost savings, it might be possible for the Agency to consider deeper reductions through a cap-and-trade program that allowed trading among sources in various source categories relative to other systems of emissions reduction.”<sup>46</sup> As noted, Section 111 explicitly allows EPA to take cost into consideration in developing performance standards. Whether that consideration could justify a trading program across different greenhouse gases, and across different source categories with different best available systems of emissions reduction is not known. A lead author of the winning brief in *Massachusetts v. EPA* makes a case against such authority:

Numerous parties have argued that section 111 does not authorize the creation of a cap-and-trade program. Among other things, section 111(h) provides a contingency plan in the event performance standards are “not feasible” to implement. In that case, section 111(h) gives EPA the authority to “promulgate a design, equipment, work practice, or operational standard, or combination thereof, which reflects the best technological system of continuous emissions reduction which ... the Administrator determines has been adequately demonstrated.” 42 U.S.C. Section 7411(h)(1). One of the ways a performance standard might prove “not feasible” is if “a pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such pollutants.” 42 U.S.C. 7411(h)(2)(A). Clearly, Congress thought the most likely scenario under section 111 was for pollutants to be “emitted through a conveyance designed and constructed to emit or capture such pollutant[s]” – an assumption at odds with the operation of a trading program. Other aspects of section 111 also point away from the creation of a trading program under this provision [reference omitted].<sup>47</sup>

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<sup>45</sup> See EPA, ANPR, pp. 44514-44516; Lisa Heinzerling, *Testimony Before the Subcommittee on Energy and Air Quality of the Committee on Energy and Commerce*, Hearing (April 10, 2008); Robert R. Nordhaus, “New Wine into Old Bottles: The Feasibility of Greenhouse Gas Regulation Under the Clean Air Act,” *N.Y.U. Environmental Law Journal* (2007), pp. 53-72; Inimai M. Chettiar and Jason A. Schwartz, *The Road Ahead: EPA’s Options and Obligations For Regulating Greenhouse Gases* (April 2009); and Alaine Ginocchio, et al., *The Boundaries of Executive Authority: Using Executive Orders to Implement Federal Climate Change Policy* (February 2008).

<sup>46</sup> U.S. Environmental Protection Agency, “Regulating Greenhouse Gas Emissions Under the Clean Air Act; Proposed Rule,” 73 Federal Register 44490, July 30, 2008.

<sup>47</sup> Lisa Heinzerling, *Testimony Before the Subcommittee on Energy and Air Quality of the Committee on Energy and Commerce*, House of Representatives (April 10, 2008), pp. 12-13.

In sum, whether this authority can be expanded to creating a comprehensive cap-and-trade program is under debate. Focused on existing sources, EPA used Sec. 111(d) to justify its promulgated rule (now vacated) to reduce mercury emissions from powerplants. Although some have argued that the court decision in this case repudiated EPA's reasoning, the case was actually not decided on the basis of Section 111(d).<sup>48</sup>

### Potential Under Other Sections

Three other sections of the Act, (Sections 110, 115, and 615) might also be considered as possible authority for establishing an economy-wide cap-and-trade program for GHG emissions, although each has its own weaknesses. Section 110 of the Act establishes requirements for State Implementation Plans (SIPs). While primarily designed to demonstrate how a state with nonattainment areas will bring those areas into attainment with NAAQS, the section also contains language that might serve as the basis for the use of broader GHG regulatory tools once emission standards were issued under any section of the Act. Specifically, Section 110(a)(2)(A) says that each SIP shall

... include enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements of this Act ....

The predicate is that there must first be an applicable requirement under the Act. Thus, Section 110 would not be an authority that EPA could use to *initiate* regulation of GHGs. Also, although the section mentions economic incentives, marketable permits, and auctions, it is not clear that such authority could be used for economy-wide control measures. The precedents for the authority's use that EPA cited in the ANPR, for example, included such regulations as the NO<sub>x</sub> SIP call, which established a cap-and-trade program for powerplant emissions of NO<sub>x</sub>, and the Clean Air Interstate Rule, which also allowed trading of emission allowances by powerplants.

As stated in the ANPR:

EPA has often incorporated market-oriented emissions trading elements into the more traditional performance standard approach for mobile and stationary sources. Coupling market-oriented provisions with performance standards provides some of the cost advantages and market flexibility of market-oriented solutions while also directly incentivizing technology innovation within the particular sector, as discussed below. For example, performance standards for mobile sources under Title II have for many years been coupled with averaging, banking and trading provisions within a subsector. In general, averaging allows covered parties to meet their emissions obligation on a fleet- or unit-wide basis rather than requiring each vehicle or unit to directly comply. Banking provides direct incentives for additional reductions by giving credit for overcompliance; these credits can be used toward future compliance obligations and, as such, allow manufacturers to put technology improvements in place when they are ready for market, rather than being forced to adhere to a strict regulatory schedule that may or may not conform to industry or company

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<sup>48</sup> *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008). The case was decided on whether EPA could delist electric generating units as a source of hazardous air pollutants without following the criteria laid out in Section 112(c). For a discussion see CRS Report RS22817, *The D.C. Circuit Rejects EPA's Mercury Rules: New Jersey v. EPA*, by Robert Meltz and James E. McCarthy.

developments. Allowing trading of excess emission reductions with other covered parties provides an incentive for reducing emissions beyond what is required.<sup>49</sup>

The two other possible authorities for a cap-and-trade program, Sections 115 and Section 615, have never been used to control any pollutant, much less to establish a cap-and-trade program. Assuming Section 115 could be invoked without a supporting NAAQS, there might be sufficient flexibility to institute a cap-and-trade program. The program would have to be created by each state under Section 110 to comply with EPA-determined state GHG emission caps in response to Section 115. Because it would function through Section 110, EPA could not impose a cap-and-trade system on the states; rather, the states would have to voluntarily agree to cooperate in a EPA-coordinated cap-and-trade scheme.

As noted earlier, if Section 615 could be successfully triggered by the science, EPA's discretion in setting up a regulatory scheme would be substantial. As stated by EPA in its ANPR: "... depending on the nature of any finding made, section 615 authority may be broad enough to establish a cap-and-trade program for the substance, practice, process or activity covered by the finding...."<sup>50</sup>

## Implementation Issues

### New Source Review

Any new or modified facility emitting (or potentially emitting) over 250 tons of any regulated pollutant must undergo preconstruction review and permitting, including the installation of Best Available Control Technology (BACT), except those pollutants regulated under Sections 112 and 211(o). New sources under the Prevention of Significant Deterioration provisions of Part C (PSD-NSR) must undergo preconstruction review and must install BACT as the minimum level of control.<sup>51</sup> State permitting agencies determine BACT on a case-by-case basis, taking into account energy, environmental, and economic impacts. BACT cannot be less stringent than the federal NSPS, but it can be more so. More stringent controls can be required if modeling indicates that BACT is insufficient to avoid violating PSD emission limitations, or the NAAQS itself.

PSD-NSR is required for any pollutant "subject to regulation" under the Clean Air Act, but there are varying interpretations of what the phrase "subject to regulation" means. Environmental groups have argued that CO<sub>2</sub> is already subject to regulation because utilities are required under Section 821 of the Clean Air Act Amendments of 1990 to monitor and report CO<sub>2</sub> emissions to EPA. Others argue that an endangerment finding would make GHGs subject to regulation, and,

<sup>49</sup> ANPR, p. 44412.

<sup>50</sup> 73 *Federal Register* 44519, July 30, 2008.

<sup>51</sup> The 1977 CAA broadened the air quality control regimen with the addition of the Prevention of Significant Deterioration (PSD) and visibility impairment provisions. The PSD program (Part C of Title I of the CAA) focuses on ambient concentrations of SO<sub>2</sub>, NO<sub>x</sub>, and PM in "clean" air areas of the country (i.e., areas where air quality is better than the NAAQS). The provision allows some increase in clean areas' pollution concentrations depending on their classification. In general, historic or recreation areas (e.g., national parks) are classified Class I with very little degradation allowed, while most other areas are classified Class II with moderate degradation allowed. States are allowed to reclassify Class II areas to Class III areas, which would be permitted to degrade up to the NAAQS, but none have ever been reclassified to Class III.

therefore, trigger PSD-NSR requirements for new sources. In its proposed endangerment finding, EPA noted its current interpretation of the law is that a final positive endangerment finding for motor vehicles under Section 202 would not *per se* make greenhouse gas emissions subject to PSD-NSR.<sup>52</sup> However, the interpretive memorandum on which this conclusion is based,<sup>53</sup> issued in December 2008, is currently under review by the new Administration.

## Issue of Case-by-Case BACT Determinations

Two aspects of the New Source Review provision create potential difficulties in using the CAA to control greenhouse gases. First, as noted earlier, PSD-NSR has specified thresholds for triggering its provisions: a “major emitting facility is generally defined as emitting or having the potential to emit 250 tons annually of a regulated pollutant (Sec. 169(1)).<sup>54</sup> With respect to greenhouse gases, this is a fairly low threshold. By comparison, several bills introduced in the 110<sup>th</sup> Congress set thresholds for inclusion in the reduction program at 10,000 metric tons annually.

The second administrative issue for PSD-NSR is the requirement that BACT be determined on a case-by-case basis. Combined with a 250 ton threshold, this could mean a massive increase in state-determinations of BACT. If the threshold was 250 tons annually, the resulting increased permit activity would be at least an order of magnitude, according to EPA (discussed below).

On this second issue, it should be noted that several commenters believe this would not be a major problem (unless a cap-and-trade program is implemented). As stated by the Institute for Policy Integrity:

Since including GHGs in the PSD program may greatly expand the number of permits issued, making case-by-case determinations for each individual source may stretch the resources of EPA and state permitting authorities. Moreover, traditional technological controls may not exist for every GHG emitted by every regulated facility. However, there is flexibility in the statute to resolve these problems.

<sup>52</sup> See Proposed Endangerment Finding, footnote 29 (p. 106).

<sup>53</sup> Memorandum from EPA Administrator Stephen L. Johnson to Regional Administrators, “EPA’s Interpretation of Regulations that Determine Pollutants Covered by Federal Prevention of Significant Deterioration (PSD) Permit Program,” December 18, 2008, 19 pages, at [http://www.epa.gov/nsr/documents/psd\\_interpretive\\_memo\\_12.18.08.pdf](http://www.epa.gov/nsr/documents/psd_interpretive_memo_12.18.08.pdf).

<sup>54</sup> It should be noted that, unlike the definition of major source, the definition of a major modification is defined by regulation, not statute. As defined under the 1970 CAA, a modification is “any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted”(Section 111(a)(4)). In subsequent regulations issued in 1975 with respect to NSPS, EPA defined modification as any physical or operational change that resulted in any increase in the maximum hourly emission rate of any controlled air pollutant.<sup>54</sup> EPA regulations also stated that any replacement of existing components that exceeded 50% of the fixed capital costs of building a new facility placed the plant under NSPS, regardless of any change in emissions. With the advent of National Ambient Air Quality Standards non-attainment provisions (Part D), PSD provisions (Part C), and NSR in 1977, a different approach to defining modification was appropriate as the focus was shifted from enforcing NSPS emission rates to achieving attainment and compliance with PSD. In promulgating regulations for the PSD and non-attainment programs, EPA defined “significant” increase in emissions in terms of tons per year emitted by a major source. For sulfur dioxide and nitrogen oxides, the threshold is 40 tons per year. Facilities exceeding that threshold are subject to NSR.

Given this history of setting *de minimis* emission increases for triggering NSR review for modifications, it is possible EPA could set a substantially higher level for at least carbon dioxide emissions, and perhaps other greenhouse gases, if it determined such thresholds were appropriate

Though BACT determinations are generally to be made on a case-by-case basis, the D.C. Circuit recognized in *Alabama Power* that exceptions can be made if “case-by-case determinations would, as a practical matter, prevent the agency from carrying out the mission assigned to it by Congress.” The development of “presumptive BACT” determinations should be permissible and may help streamline the permitting process [footnote omitted].<sup>55</sup>

In addition, assuming PSD is triggered by regulation under Section 111, the BACT requirements may be identical to the NSPS determinations under Section 111. It is also likely that most small sources would not have an NSPS as EPA applied its discretion under Section 111 in determining the most cost-effective emissions reductions. With no NSPS floor for a BACT determination, it is possible that NSR requirements for sources not covered under Section 111 could be quite lax.

## **Title V and the Size Threshold**

In the ANPR, EPA discussed the possibility that an endangerment finding and subsequent regulation of GHGs as air pollutants under any section of the Act could trigger Title V permit requirements, and that all facilities that have the potential to emit a GHG pollutant in amounts of 100 tons per year or more would be required to obtain permits. Under this reasoning, the regulation of CO<sub>2</sub> from motor vehicles under Section 202, for example, could lead to Title V permit requirements for CO<sub>2</sub> from powerplants and other sources. In the ANPR, the agency stated:

Using available data, which we acknowledge are limited, and engineering judgment in a manner similar to what was done for PSD, EPA estimates that more than 550,000 additional sources would require Title V permits, as compared to the current universe of about 15,000–16,000 Title V sources. If actually implemented, this would be more than a tenfold increase, and many of the newly subject sources would be in categories not traditionally regulated by Title V, such as large residential and commercial buildings.<sup>56</sup>

Thus, like PSD-NSR, a major complication that Title V introduces is the potential for very small sources of greenhouse gases to need permits in order to operate. Furthermore, Title V requires that covered entities pay fees established by the permitting authority, and that the total fees be sufficient to cover the costs of running the permit program.

The potential for increased permitting activity has led to speculation on its potential extent. For example, some agricultural interests have spun the possibility that Title V could be invoked for emissions from agricultural activities and the requirement for permit fees into something they refer to as the “cow tax.” On November 18, 2008, for example, Cattle Network stated “EPA Proposes ‘Cow Tax.’” The article even generated specific amounts for the “tax”: \$175 per dairy cow and \$87.50 per beef cow.<sup>57</sup> EPA says that it has no plans to regulate agricultural activities’ GHG emissions. Indeed, the agency currently exempts most major agricultural sources from any Clean Air Act controls on conventional air pollutants under an arrangement known as the Air

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<sup>55</sup> Inimai M. Chettiar and Jason A. Schwartz, *The Road Ahead: EPA’s Options and Obligations for Regulating Greenhouse Gases*, April 2009, p. 105.

<sup>56</sup> 73 *Federal Register* 44511, July 30, 2008.

<sup>57</sup> Cattle Network, November 18, 2008, at <http://www.cattlenetwork.com/Content.asp?ContentID=269579>.

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Compliance Agreement.<sup>58</sup> Thus, it would seem unlikely that the agency would now make a priority of subjecting small agricultural sources to GHG requirements.

However, the need to deal with the size issue has been noted by EPA and other commenters. Alternatives to lessen the extent and cost of these provisions fall into three categories: (1) legal or regulatory interpretations that increase EPA's flexibility to determine what sources would need permits and when; (2) the expanded use of general permits; (3) interpretation of different endangerment findings to exclude Title V and/or PSD-NSR.

### *Legal or Regulatory Interpretations that Increase Flexibility*

EPA noted two possible legal theories under which it could avoid imposing PSD-NSR or Title V permitting requirements on small sources. Under "the judicial doctrine of administrative necessity," the agency stated that it might be able "to craft relief in the form of narrowed source coverage, exemptions, streamlined approaches or procedures, or a delay of deadlines."<sup>59</sup> The agency also stated that in rare cases, the courts will apply statutory provisions in a manner other than that indicated by the plain meaning, if "absurd, futile, strange, or indeterminate results" would be produced by literal application.

If EPA has the authority, such as under Section 111, it will almost certainly focus on the large sources first. As noted in the introduction, when it comes to stationary sources, size matters. Twenty-eight percent of the country's GHGs comes from an Energy Information Administration (EIA) estimated 670 coal-fired electric powerplants. Farms, by contrast, number more than 2 million, and emit less than 4% of total GHGs. EPA could argue that either administrative necessity or "strange," perhaps "absurd" results (to use EPA's terms) justified priorities and resources being focused on the former with the latter being either substantially delayed or possibly ignored. Methane (CH<sub>4</sub>) provides another interesting contrast in potential priorities. For example, about 1.8% of GHG emissions, in the form of methane, are generated by 1,800 landfills; a slightly larger amount (2.4%) is emitted by roughly a million cattle and swine operations. As stated by the Institute for Policy Integrity:

Courts grant agencies much more leeway in deferring full implementation of a statute than in creating permanent exemptions. Invoking the doctrine of administrative necessity, EPA should be able to justify expanding NSR permit applicability to the largest sources first, and then gradually including smaller sources. The timeline set for phasing in smaller sources could not take longer than reasonably necessary given EPA's administrative burdens, but EPA will have a good deal of discretion to determine its own resources and capability [footnotes omitted].<sup>60</sup>

A second means of reducing the administrative burden is to increase the effective size of an affected source by defining "potential to emit" in terms of potential actual emissions. In particular, EPA suggested in its ANPR that determining the potential to emit in terms of actual usage instead of maximum potential could have some benefit in some cases. For example, if a small boiler's potential to emit was based on actual usage of 1000 hours a year, instead of

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<sup>58</sup> See CRS Report RL32947, *Air Quality Issues and Animal Agriculture: EPA's Air Compliance Agreement*.

<sup>59</sup> 73 *Federal Register* 44512, July 30, 2008. Also see ensuing discussion through page 44514.

<sup>60</sup> Inimai M. Chettiar and Jason A. Schwartz, *The Road Ahead: EPA's Options and Obligations for Regulating Greenhouse Gases*, (April 2009), p. 104.

continuous potential usage (8760 hours), the effective size of the boiler under NSR would increase 8.76 times.<sup>61</sup>

### ***General Permits***

Perhaps the most straightforward method of reducing administrative burden is for EPA to adopt a general permit scheme for PSD-NSR and Title V. For categories with numerous similar sources of emissions, the Clean Air Act provides in Section 504(d) that the permitting authority—be it EPA or a delegated state agency—may issue a “general permit” covering all sources in the category. This provision substantially reduces the administrative burden of issuing permits, allowing notice and opportunity for public hearing on the category as a whole and the provisions of the general permit, rather than requiring the same for each individual source. General permits have been widely used by the agency under the Clean Water Act, and are used by about half the states for control of various air pollution sources. Thus, there is precedent for their use in a Clean Air Act greenhouse gas control program for multiple, relatively minor sources of emissions.

A general permit does not relieve the permittee from filing a permit application or from complying with permit conditions, which would include some sort of monitoring and reporting requirements. But a permit application for a general permit can be relatively simple, and since there are few costs to issuing the permit, permit fees, which are required by Section 502(b) to cover the reasonable costs of the permit program, but are to be utilized only to cover such costs, would be relatively low. A sampling of states using general permit fees for other types of air pollutants found fees ranging from \$100 to \$350 per permittee.

Such an approach may also be available to small sources potentially caught under PSD-NSR. Both EPA in the ANPR and the Institute for Policy Integrity provide arguments for PSD-NSR general permits for small sources to avoid absurd results or respond to administrative necessity.<sup>62</sup>

### **Section 304: Citizen Suits**

If an endangerment finding triggered emissions standards or limitations under the CAA (e.g., Section 111, Part C), it would also bring into play Section 304, Citizen Suits. Section 304 allows any person to commence a civil action against any other person (including government entities and instrumentalities) for violation of an emissions standard or limitation under the Act. It also provides for suits against EPA for failing to perform a nondiscretionary act or duty. Most specifically, Section 304 provides for suits

... against any person who proposes to construct or constructs any new or modified major emitting facility without a permit required under part C of title I (relating to significant deterioration of air quality) or part D of title I (relating to non-attainment) or who is alleged to have violated (if there is evidence that the alleged violation has been repeated) or to be in violation of condition of such permit.<sup>63</sup>

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<sup>61</sup> 73 *Federal Register* 44503, July 30, 2008..

<sup>62</sup> 73 *Federal Register* 44507-44511, July 30, 2008; Inimai M. Chettiar and Jason A. Schwartz, *The Road Ahead: EPA’s Options and Obligations for Regulating Greenhouse Gases*, (April 2009), pp. 103-106.

<sup>63</sup> Section 304(a)(3).

Citizen suits have been widely used by environmental groups to force the Administrator to undertake nondiscretionary duties and to enforce the Act's requirements against emitting facilities. Should the agency fail to move forward with GHG standards following an endangerment finding, suits seeking to force action would almost certainly be filed.

## Conclusion

The current debate on the appropriateness of using the Clean Air Act to regulate greenhouse gas emissions is not the first such debate that has occurred when a new environmental challenge has been directed at the Act. During the 1980s, suggestions were made that acid rain and/or stratospheric ozone depletion could be addressed via then-existing provisions, rather than by new Amendments. For example, in 1985, the CRS stated the following with respect to addressing acid rain through the existing Clean Air Act:

*Various Clean Air Act provisions could be used to address acid precipitation, including issuing more stringent secondary ambient air quality standards, setting a sulfate standard, and enforcing SO<sub>2</sub> reductions more vigorously. (a) Typically, however, such actions require a demonstration of cause-effect relationship that has not been obtained, at least in the view of many policymakers; and/or they require actions under peripherally related provisions such as visibility protection—which are already subject to controversy on their own right. (b) Any such actions would likely be expensive, both in resources and in political/administrative capital. (c) Program administrators have therefore said they will not use the Clean Air Act aggressively and innovatively to combat acid precipitation without an explicit Congressional mandate and/or compelling new evidence linking specific damages to specific pollutants [emphasis in original].<sup>64</sup>*

In both cases, the Congress moved to add new Titles to the Act (Title IV to address acid rain, and Title VI to address stratospheric ozone depletion). In the case of Title IV, a new market-based approach to reducing pollutants was introduced to implement a statutory reduction requirement (i.e., the SO<sub>2</sub> emissions cap) in hope that the cost would be optimized. The result was so successful that it was used by states and EPA to begin addressing interstate transport of smog (i.e., the NO<sub>x</sub> SIP Call) and has been suggested by some as the optimal approach to controlling greenhouse gases.

However, controlling greenhouse gases is a substantially more complex environmental, technical, economic, and social issue than either acid rain or stratospheric ozone depletion are. It is possible that one size does not fit all in this debate. Some sources may not respond significantly to a market-based approach because they are not particularly price-sensitive. Others may be too small or dispersed to include. For example, the European Union's market-based approach covers only about 40% of the EU's emissions. Other instruments are used to address difficult sectors, such as transportation.

Thus, initiatives to use the current Clean Air Act could be designed as a substitute for what is perceived by some as a protracted congressional debate, or as a complementary effort to address sources or gases that a future market-based system may choose to exclude from its provisions. As

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<sup>64</sup> *The Clean Air Act and Proposed Acid Rain Legislation: Can We Get There from Here?* CRS Report 85-50 ENR, by Larry B Parker, John E. Blodgett, Alvin Kaufman, and Donald Dulchinos, p. 9.

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summarized in 2008 by Lisa Heinzerling in testimony to the Subcommittee on Energy and Air Quality of the House Energy and Commerce Committee:

... the Clean Air Act contains numerous provisions that might be used to regulate greenhouse gases. The advantages of using these provisions include: they can be deployed now; they use regulatory strategies that are familiar to, indeed are the bread and butter work of, the Environmental Protection Agency; they call for regulation of numerous and diverse sources and thus, taken as a group, they have an inherent fairness to them; they do not pose unusual enforcement difficulties or untoward administrative burdens.

There are also disadvantages to using existing Clean Air Act provisions to address climate change. Most of the provisions do not have statutory deadlines.... To the extent one favors cap-and-trade as a regulatory mechanism for addressing climate change, one might worry about the lack of clear authority for such a scheme under the existing statute. The NAAQS program is an ungainly framework for regulating globally harmful pollutants. PSD requirements are triggered for sources that are “large” when it comes to conventional pollution but “small” from the perspective of global pollutants.<sup>65</sup>

A final endangerment finding would present EPA with many options. However, the ultimate decision on what the Nation’s greenhouse gas policy should be rests with the Congress. If it disagrees with any approach undertaken by EPA, it can override the agency’s decision, or respond as it did with acid rain and stratospheric ozone depletion—with new statutory authorities.

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<sup>65</sup> Testimony of Lisa Heinzerling, U.S. Congress, House Committee on Energy and Commerce, Subcommittee on Energy and Air Quality, *Strengths and Weaknesses of Regulating Greenhouse Gas Emissions Under Existing Clean Air Act Authorities*, 110<sup>th</sup> Cong., 2<sup>nd</sup> sess., April 10, 2008, pp. 14-15.

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Bcc:  
Subject: Call with CERES  
Date: Fri Mar 29 2013 11:09:23 EDT  
Attachments:

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StartTime: Mon Apr 01 12:00:00 Eastern Daylight Time 2013  
EndTime: Mon Apr 01 13:00:00 Eastern Daylight Time 2013  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: No

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Thanks Tom, much obliged for sending (and even more for the time you guys put into this one). We'll share a draft with Jack and Norman of our response before we file it. Have a good weekend.--Mike

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Mike,

Here's our cert petition, hot off the presses and now in the Court's hands.

Have a good weekend.

Tom

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Subject: RE: Meeting at EPA April 9 at 2:00pm EST  
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Kelly—Morgan and I will be participating by phone. Thanks.--Mike

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Cc: Longstreth, Ben; Geertsma, Meleah  
Subject: Meeting at EPA April 9 at 2:00pm EST

Thank you to those who have responded. If you have not, please let me know ASAP if you are planning to attend this meeting in person at EPA. I need to give a list to Joe's assistant.

So far I have:

David Doniger

David McCabe

Joanne Spalding

Craig Segall

Darin Schroeder

Best,

Kelly

From: Henderson, Kelly

Sent: Monday, April 01, 2013 12:46 PM

To: Doniger, David; 'Craig.Segall@sierraclub.org'; Joanne Spalding; Megan Ceronsky; Vickie Patton; 'tballo@earthjustice.org'; Michael J. Myers; Morgan Costello; Darin Schroeder; Peter Zalzal; Ann Weeks

Cc: Longstreth, Ben; Geertsma, Meleah

Subject: RE:

Dear all,

I have received confirmation from Joe Goffman's team that the meeting at EPA is set for 2:00-3:30pm EST on Tuesday April 9th. Please email me back and let me know whether you plan to attend in person at EPA or if you are planning to dial in.

Best,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | khenderson@nrdc.org | www.nrdc.org

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>

From: Henderson, Kelly

Sent: Wednesday, March 27, 2013 1:06 PM

To: Doniger, David; 'Craig.Segall@sierraclub.org'; Joanne Spalding; Megan Ceronsky; Vickie Patton; 'tballo@earthjustice.org'; Michael J. Myers; Morgan Costello; Darin Schroeder; Peter Zalzal; Ann Weeks

Cc: Longstreth, Ben; Geertsma, Meleah

Subject: RE:

Dear all,

I am suggesting some times below- please indicate which times work best for you and your team:

Thursday April 4

12:30-1:30pm EST

1:00-2:00pm EST

1:30-2:30pm EST

4:30-5:30pm EST

Tuesday April 9

12:00-5:00pm EST

Thursday April 11

10:00-11:00am EST

1:00-2:00pm EST

2:00-3:00pm EST

Best,

Kelly

---

From: Doniger, David

Sent: Wednesday, March 27, 2013 10:33 AM

To: 'Craig.Segall@sierraclub.org'; Joanne Spalding; Megan Ceronsky; Vickie Patton; 'tballo@earthjustice.org'; Michael J. Myers; Morgan Costello; Darin Schroeder; Peter Zalzal; Ann Weeks  
Cc: Longstreth, Ben; Geertsma, Meleah; Henderson, Kelly  
Subject:

I got a call back from Goffman (voice message) saying that he'd gotten messages from me, Mike, and Vickie, and that he and an EPA team (probably Patricia Embry and Peter Tsirigotis) are prepared to meet with us (in person and/or by phone) on methane/oil and gas to share our respective substantive plans and expectations. He suggests we propose a couple of times that would work for our group.

I am asking my assistant Kelly Henderson to poll you for a couple of times to then suggest to Goffman.

David D. Doniger

Policy Director, Climate and Clean Air Program

Natural Resources Defense Council

1152 15th Street, NW, Suite 300

Washington, DC 20005

Phone: (202) 289-2403

Cell: (202) 321-3435

Fax: (202) 289-1060

[ddoniger@nrdc.org](mailto:ddoniger@nrdc.org)

on the web at [www.nrdc.org](http://www.nrdc.org)

read my blog: <http://switchboard.nrdc.org/blogs/ddoniger/>

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: tballo@earthjustice.org  
<tballo@earthjustice.org>; dschroeder@catf.us  
<dschroeder@catf.us>; mgeertsma@nrdc.org <mgeertsma@nrdc.org>  
Cc: dmccabe@catf.us <dmccabe@catf.us>  
Bcc:  
Subject: Re: Pre-call for EPA O&G meeting - need input on availability  
Date: Wed Apr 03 2013 22:00:35 EDT  
Attachments:

---

I can make tomorrow at 5 work. Will need to leave by 6.

Message sent from a Blackberry device

----- Original Message -----

From: Timothy Ballo [mailto:tballo@earthjustice.org]  
Sent: Wednesday, April 03, 2013 09:48 PM  
To: Darin Schroeder <dschroeder@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>  
Cc: Michael J. Myers; David McCabe <dmccabe@catf.us>  
Subject: RE: Pre-call for EPA O&G meeting - need input on availability

Meleah,

Unfortunately, I'll be on a plane on Monday afternoon. But if I can check in with you before the meeting, or if someone can circulate notes, no need to schedule around me.

-Tim

---

From: Darin Schroeder [dschroeder@catf.us]  
Sent: Wednesday, April 03, 2013 5:40 PM  
To: Geertsma, Meleah  
Cc: Timothy Ballo; Michael J. Myers; David McCabe  
Subject: Re: Pre-call for EPA O&G meeting - need input on availability

Sorry- been on a flight. We're in a meeting in St. Louis all day. It may be possible that its over by then, or that one of us can sneak away, but I can't make any promises.

Sent from my iPhone

On Apr 3, 2013, at 4:23 PM, "Geertsma, Meleah" <mgeertsma@nrdc.org<mailto:mgeertsma@nrdc.org>> wrote:

Hi all – of course with so many people, there's not an ideal time slot. There are two that are close, Thurs at 5pm (when Mike isn't available) or Monday at 1pm (when Tim isn't available). Best would be Monday at 1pm (when we only lose Vignesh and Ben, not a big deal b/c we'll have 3 NRDCers on, tech and lawyers) – Tim, is there any chance you could make that slot?

Darin and McCabe, neither of you is available Thurs at 5pm – can you remind me whether you have any flexibility on that day in that time, or is it completely out?

Best,  
Meleah

Meleah Geertsma, J.D., M.P.H.

Staff Attorney, Midwest Program  
Natural Resources Defense Council  
2 N. Riverside Plaza, Suite 2250  
Chicago, IL 60606  
(312) 651-7904

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Power plant notice letter call  
Date: Tue Apr 09 2013 16:44:57 EDT  
Attachments:

---

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton (vpatton@edf.org) <vpatton@edf.org>  
Cc: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>  
Bcc:  
Subject: Fred's visit  
Date: Wed Apr 10 2013 15:42:31 EDT  
Attachments:

---

Vickie, I think I may have mentioned this to you awhile ago, but Fred is doing a brownbag lunch talk to our Bureau in NYC tomorrow on climate change and air pollution efforts EDF is involved in. Do you think it would be fruitful to have a smaller group discussion while Fred is there (we could get you or Megan on the phone) either before or after his talk? It's scheduled for 1230-130 ET. My bureau chief, Lem Srolovic, is available. We could discuss strategy on the various NSPS fronts and perhaps follow up on some of the items we discussed with you by phone on January 17. I know it's a bit last minute and your schedules are tight, so if doesn't work, that's fine. Just let me know. Thanks.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Vickie Patton <vpatton@edf.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>  
Bcc:  
Subject: RE: Fred's visit  
Date: Thu Apr 11 2013 02:19:21 EDT  
Attachments:

---

Hi Mike, I know Fred is very much looking forward to the discussion. I'll try to reach you in the morning. Sincerely yours, Vickie

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, April 10, 2013 1:43 PM  
To: Vickie Patton  
Cc: Morgan Costello; Alan Belenz  
Subject: Fred's visit

Vickie, I think I may have mentioned this to you awhile ago, but Fred is doing a brownbag lunch talk to our Bureau in NYC tomorrow on climate change and air pollution efforts EDF is involved in. Do you think it would be fruitful to have a smaller group discussion while Fred is there (we could get you or Megan on the phone) either before or after his talk? It's scheduled for 1230-130 ET. My bureau chief, Lem Srolovic, is available. We could discuss strategy on the various NSPS fronts and perhaps follow up on some of the items we discussed with you by phone on January 17. I know it's a bit last minute and your schedules are tight, so if doesn't work, that's fine. Just let me know. Thanks.--Mike

Michael J. Myers

Chief, Affirmative Litigation Section

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michael.myers@ag.ny.gov

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton <vpatton@edf.org>  
Cc:  
Bcc:  
Subject: RE: Fred's visit  
Date: Thu Apr 11 2013 13:31:55 EDT  
Attachments:

---

Vickie, the discussion went very well. I now have another call at 3. I'll try you, though, if it gets done before my 4 pm call. Thanks.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Thursday, April 11, 2013 2:19 AM  
To: Michael J. Myers  
Cc: Morgan Costello; Alan Belenz  
Subject: RE: Fred's visit

Hi Mike, I know Fred is very much looking forward to the discussion. I'll try to reach you in the morning. Sincerely yours, Vickie

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, April 10, 2013 1:43 PM  
To: Vickie Patton  
Cc: Morgan Costello; Alan Belenz  
Subject: Fred's visit

Vickie, I think I may have mentioned this to you awhile ago, but Fred is doing a brownbag lunch talk to our Bureau in NYC tomorrow on climate change and air pollution efforts EDF is involved in. Do you think it would be fruitful to have a smaller group discussion while Fred is there (we could get you or Megan on the phone) either before or after his talk? It's scheduled for 1230-130 ET. My bureau chief, Lem Srolovic, is available. We could discuss strategy on the various NSPS fronts and perhaps follow up on some of the items we discussed with you by phone on January 17. I know it's a bit last minute and your schedules are tight, so if doesn't work, that's fine. Just let me know. Thanks.--Mike

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Lorenzen, Thomas (ENRD)  
<thomas.lorenzen@usdoj.gov>; Wood, Allison <awood@hunton.com>;  
Keisler, Peter <pkeisler@sidley.com>; Mitchell, Jonathan  
<jonathan.mitchell@texasattorneygeneral.gov>; Macbeth, Angus  
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<roxanne.giedd@state.sd.us>; agesmith@ag.state.sc.us  
<agesmith@ag.state.sc.us>; dgetchell@oag.state.va.us  
<dgetchell@oag.state.va.us>; kcuccinelli@oag.state.va.us  
<kcuccinelli@oag.state.va.us>; gavin.mccabe@doj.ca.gov  
<gavin.mccabe@doj.ca.gov>; dsherid@ag.state.ia.us  
<dsherid@ag.state.ia.us>; mraivel@mde.state.md.us  
<mraivel@mde.state.md.us>; gkarr@atg.state.il.us  
<gkarr@atg.state.il.us>; jerry.reid@maine.gov  
<jerry.reid@maine.gov>; carol.iancu@state.ma.us  
<carol.iancu@state.ma.us>; sfarris@nmag.gov <sfarris@nmag.gov>;  
paul.s.logan@doj.state.or.us <paul.s.logan@doj.state.or.us>;  
tschwartz@atg.state.vt.us <tschwartz@atg.state.vt.us>;  
cking@law.nyc.gov <cking@law.nyc.gov>; gschultz@riag.ri.gov  
<gschultz@riag.ri.gov>; mrubin@riag.ri.gov  
<mrubin@riag.ri.gov>; ttierney@riag.ri.gov  
<ttierney@riag.ri.gov>; leslies@atg.wa.gov  
<leslies@atg.wa.gov>; sean@donahuegoldberg.com  
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john.west@ky.gov <john.west@ky.gov>; BurschJ@michigan.gov  
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<william.burgess@kirkland.com>; rgasaway@kirkland.com  
<rgasaway@kirkland.com>; aweeks@catf.us <aweeks@catf.us>;  
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<rludwiszewski@gibsondunn.com>; john.campbell@ksag.org  
<john.campbell@ksag.org>; jmassey@masseygail.com  
<jmassey@masseygail.com>; ayresr@ayreslawgroup.com  
<ayresr@ayreslawgroup.com>; vpardee@biologicaldiversity.org  
<vpardee@biologicaldiversity.org>;  
bcummings@biologicaldiversity.org  
<bcummings@biologicaldiversity.org>

Cc:

Bcc:

Subject: RE: GHG service via e-mail

Date: Tue Apr 16 2013 09:45:04 EDT

Attachments:

---

The state-intervenors in support of EPA below hereby consent to electronic service of pleadings in this case. Copied below are the counsel names and addresses. Please also serve a hard copy of any filing by mail on NY's Solicitor General, Barbara Underwood (I believe everyone has our mailing address in NYC but let me know if not). Thanks.--Mike

New York: Michael Myers (Michael.myers@ag.ny.gov), Morgan Costello (morgan.costello@ag.ny.gov), Monica Wagner (monica.wagner@ag.ny.gov), and Cecelia Chang (Cecelia.chang@ag.ny.gov)

California: Joe Barbieri (Joe.Barbieri@doj.ca.gov), Raissa Lerner (Raissa.Lerner@doj.ca.gov), Daniel Lucas (Daniel.Lucas@doj.ca.gov), Gavin McCabe (Gavin.McCabe@doj.ca.gov), and Janill Richards (Janill.Richards@doj.ca.gov)

Connecticut: Kimberly Massicotte (Kimberly.Massicotte@po.state.ct.us), Matthew Levine (Matthew.Levine@po.state.ct.us), and Scott Koschwitz (Scott.Koschwitz@po.state.ct.us)

Delaware: Valerie S. Edge (Valerie.Edge@state.de.us)

Illinois: Matthew Dunn (MDunn@atg.state.il.us), James Gignac (JGignac@atg.state.il.us), and Gerald Karr (GKarr@atg.state.il.us)

Iowa: David Sheridan (DSHERID@ag.state.ia.us) and Tam Ormiston (TORMIST@ag.state.ia.us)

Maine: Jerry Reid (Jerry.Reid@maine.gov)

Massachusetts: Melissa Hoffer (melissa.hoffer@state.ma.us) , Carol Iancu (carol.iancu@state.ma.us) , and Tracy Triplett (tracy.triplett@state.ma.us)

Maryland: Roberta James (RJames@mde.state.md.us) and Mary Raivel (MRaivel@mde.state.md.us)

Minnesota: Karen Olson (Karen.Olson@ag.state.mn.us)

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New Mexico: Stephen Farris (sfarris@nmag.gov) , Tannis Fox (tfox@nmag.gov) , and Ann Moore (amoore@nmag.gov)

North Carolina: Marc Bernstein (Mbern@ncdoj.gov)

Oregon: Paul Garrahan (Paul.Garrahan@doj.state.or.us)

Rhode Island: Gregory Schultz (gschultz@riag.ri.gov)

Vermont: Thea Schwartz (tschwartz@atg.state.vt.us)

Washington: Jay Geck (JayG@atg.wa.gov) , Leslie Seffern (LeslieS@ATG.WA.GOV) , and Mary Sue Wilson (MarySueW@ATG.WA.GOV)

New York City: Chris King (cking@law.nyc.gov) and Carrie Noteboom (cnoteboo@law.nyc.gov)

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Chief, Affirmative Litigation Section  
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New York State Attorney General

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(518) 402-2594  
michael.myers@ag.ny.gov

From: Lorenzen, Thomas (ENRD) [mailto:Thomas.Lorenzen@usdoj.gov]  
Sent: Monday, April 15, 2013 11:05 AM  
To: Wood, Allison; Keisler, Peter; Mitchell, Jonathan; Macbeth, Angus; holmes.carol@epa.gov; SupremeCtBriefs (SMO); Lipshultz, Jon (ENRD); Purdy, Angeline (ENRD); Hostetler, Eric (ENRD); Rosen, Perry (ENRD); Berman, Amanda (ENRD); peter.glaser@troutmansanders.com; mark.nagle@troutmansanders.com; matthew.dukes@troutmansanders.com; Clay, Reed; Murphy, Michael P.; bcobb@jw.com; rtambling@ago.state.al.us; Sorenson, Quin; Webster, Timothy K.; Martella, Roger; katie.spohn@nebraska.gov; maiolson@nd.gov; roxanne.giedd@state.sd.us; agesmith@ag.state.sc.us; dgetchell@oag.state.va.us; kcuccinelli@oag.state.va.us; gavin.mccabe@doj.ca.gov; dsherid@ag.state.ia.us; mraivel@mde.state.md.us; gkarr@atg.state.il.us; jerry.reid@maine.gov; carol.iancu@state.ma.us; sfarris@nmag.gov; paul.s.logan@doj.state.or.us; tschwartz@atg.state.vt.us; Michael J. Myers; cking@law.nyc.gov; gschultz@riag.ri.gov; mrubin@riag.ri.gov; ttierney@riag.ri.gov; leslies@atg.wa.gov; sean@donahuegoldberg.com; mbernstein@ncdoj.gov; ajern@ncdoj.gov; john.west@ky.gov; BurschJ@michigan.gov; fc.docket@oag.ok.gov; scott.pruitt@oag.ok.gov; Kimberly.Massicotte@ct.gov; scott.koschwitz@ct.gov; jocelyn.olson@ag.state.mn.us; Brownell, Bill; pday@hollandhart.com; hmacdougald@cwlaw.org; Shannon@southeasternlegal.org; jeffrey.clark@kirkland.com; william.burgess@kirkland.com; rgasaway@kirkland.com; aweeks@catf.us; jlewis@catf.us; rludwiszewski@gibsondunn.com; john.campbell@ksag.org; jmassey@masseygail.com; ayresr@ayreslawgroup.com; vpardee@biologicaldiversity.org; bcummings@biologicaldiversity.org  
Subject: RE: GHG service via e-mail

All –

EPA has asked me to ask each of you to remove Acting General Counsel Brenda Mallory (Mallory.brenda@epa.gov) from your email list for this case. I believe she is being inundated. Responding in the future to this email, rather than the initial one from Jonathan Mitchell, will do the trick.

Many thanks, and best regards to each of you.

Tom Lorenzen

Thomas A. Lorenzen

Assistant Chief

Environmental Defense Section

Environment & Natural Resources Division

U.S. Department of Justice

Tel: 202-305-0733

E-mail: thomas.lorenzen@usdoj.gov

From: Wood, Allison [mailto:awood@hunton.com]

Sent: Sunday, April 14, 2013 8:38 AM

To: Keisler, Peter; Mitchell, Jonathan; Macbeth, Angus; holmes.carol@epa.gov; mallory.brenda@epa.gov; SupremeCtBriefs (SMO); Lipshultz, Jon (ENRD); Purdy, Angeline (ENRD); Hostetler, Eric (ENRD); Rosen, Perry (ENRD); Berman, Amanda (ENRD); Gunter, David (ENRD); Lorenzen, Thomas (ENRD); Smaczniak, Kim (ENRD); Walter, Michele (ENRD); peter.glaser@troutmansanders.com; mark.nagle@troutmansanders.com; matthew.dukes@troutmansanders.com; Clay, Reed; Murphy, Michael P.; bcobb@jw.com; rtambling@ago.state.al.us; Sorenson, Quin; Webster, Timothy K.; Martella, Roger; katie.spohn@nebraska.gov; maiolson@nd.gov; roxanne.giedd@state.sd.us; agesmith@ag.state.sc.us; dgetchell@oag.state.va.us; kcuccinelli@oag.state.va.us; gavin.mccabe@doj.ca.gov; dsherid@ag.state.ia.us; mraivel@mde.state.md.us; gkarr@atg.state.il.us; jerry.reid@maine.gov; carol.iancu@state.ma.us; sfarris@nmag.gov; paul.s.logan@doj.state.or.us; tschwartz@atg.state.vt.us; michael.myers@oag.state.ny.us; cking@law.nyc.gov; gschultz@riag.ri.gov; mrubin@riag.ri.gov; ttierney@riag.ri.gov; leslies@atg.wa.gov; sean@donahuegoldberg.com; mbernstein@ncdoj.gov; ajern@ncdoj.gov; john.west@ky.gov; BurschJ@michigan.gov; fc.docket@oag.ok.gov; scott.pruitt@oag.ok.gov; Kimberly.Massicotte@ct.gov; scott.koschwitz@ct.gov; jocelyn.olson@ag.state.mn.us; Brownell, Bill; pday@hollandhart.com; hmacdougald@cwlaw.org; Shannon@southeasternlegal.org; jeffrey.clark@kirkland.com; william.burgess@kirkland.com; rgasaway@kirkland.com; aweeks@catf.us; jlewis@catf.us; rludwiszewski@gibsondunn.com; john.campbell@ksag.org; jmassey@masseygail.com; ayresr@ayreslawgroup.com; vpardee@biologicaldiversity.org; bcummings@biologicaldiversity.org  
Subject: RE: GHG service via e-mail

As Peter said, thank you very much for initiating this effort. I would like to clarify that this agreement applies to all GHG petitions including those that have already been filed (by Virginia, et al., the Pacific Legal Foundation, and the Utility Air Regulatory Group) and to those that will be filed later this month.

On behalf of the Utility Air Regulatory Group, we consent to email service. Please serve the following: bbrownell@hunton.com, nfichthorn@hunton.com, hnickel@hunton.com, and awood@hunton.com.

Thanks again.

From: Keisler, Peter [mailto:pkeisler@Sidley.com]

Sent: Saturday, April 13, 2013 9:57 AM

To: Mitchell, Jonathan; Macbeth, Angus; holmes.carol@epa.gov; mallory.brenda@epa.gov; SupremeCtBriefs@USDOJ.gov; jon.lipshultz@usdoj.gov; angeline.purdy@usdoj.gov; eric.hostetler@usdoj.gov; perry.rosen@usdoj.gov; amanda.berman@usdoj.gov; david.gunter2@usdoj.gov; thomas.lorenzen@usdoj.gov; kim.smaczniak@usdoj.gov; michele.walter@usdoj.gov; peter.glaser@troutmansanders.com; mark.nagle@troutmansanders.com; matthew.dukes@troutmansanders.com; Clay, Reed; Murphy, Michael P.; bcobb@jw.com; rtambling@ago.state.al.us; Sorenson, Quin;

Webster, Timothy K.; Martella, Roger; katie.spohn@nebraska.gov; maiolson@nd.gov; roxanne.giedd@state.sd.us; agesmith@ag.state.sc.us; dgetchell@oag.state.va.us; kcuccinelli@oag.state.va.us; gavin.mccabe@doj.ca.gov; dsherid@ag.state.ia.us; mraivel@mde.state.md.us; gkarr@atg.state.il.us; jerry.reid@maine.gov; carol.iancu@state.ma.us; sfarris@nmag.gov; paul.s.logan@doj.state.or.us; tschwartz@atg.state.vt.us; michael.myers@oag.state.ny.us; cking@law.nyc.gov; gschultz@riag.ri.gov; mrubin@riag.ri.gov; ttierney@riag.ri.gov; leslies@atg.wa.gov; sean@donahuegoldberg.com; mbernstein@ncdoj.gov; ajern@ncdoj.gov; john.west@ky.gov; BurschJ@michigan.gov; fc.docket@oag.ok.gov; scott.pruitt@oag.ok.gov; Kimberly.Massicotte@ct.gov; scott.koschwitz@ct.gov; jocelyn.olson@ag.state.mn.us; Brownell, Bill; Wood, Allison; pday@hollandhart.com; hmacdougald@cwlaw.org; Shannon@southeasternlegal.org; jeffrey.clark@kirkland.com; william.burgess@kirkland.com; rgasaway@kirkland.com; aweeks@catf.us; jlewis@catf.us; rludwiszewski@gibsondunn.com; john.campbell@ksag.org; jmassey@masseygail.com; ayresr@ayreslawgroup.com; vpardee@biologicaldiversity.org; bcummings@biologicaldiversity.org  
Subject: RE: GHG service via e-mail

Thanks for initiating this. We agree to email-service. Please serve the following – pkeisler@sidley.com, qsorenson@sidley.com; twebster@sidley.com, and rmartella@sidley.com, -- on behalf of the following parties:

American Chemistry Council, American Frozen Food Institute, American Fuel & Petrochemical Manufacturers, American Iron and Steel Institute, American Petroleum Institute, Brick Industry Association, Clean Air Implementation Project; Corn Refiners Association, Glass Association of North America, Glass Packaging Institute, Independent Petroleum Association of America, Indiana Cast Metals Association, Michigan Manufacturers Association, Mississippi Manufacturers Association, National Association of Home Builders, The National Association of Manufacturers, National Federation of Independent Business, National Oilseed Processors Association, North American Die Casting Association, Portland Cement Association, Specialty Steel Industry of North America, Tennessee Chamber of Commerce and Industry, Western States Petroleum Association, West Virginia Manufacturers Association, and Wisconsin Manufacturers and Commerce

From: Mitchell, Jonathan [mailto:jonathan.mitchell@texasattorneygeneral.gov]  
Sent: Friday, April 12, 2013 5:20 PM  
To: Keisler, Peter; Macbeth, Angus; holmes.carol@epa.gov; mallory.brenda@epa.gov; SupremeCtBriefs@USDOJ.gov; jon.lipshultz@usdoj.gov; angeline.purdy@usdoj.gov; eric.hostetler@usdoj.gov; perry.rosen@usdoj.gov; amanda.berman@usdoj.gov; david.gunter2@usdoj.gov; thomas.lorenzen@usdoj.gov; kim.smaczniak@usdoj.gov; michele.walter@usdoj.gov; peter.glaser@troutmansanders.com; mark.nagle@troutmansanders.com; matthew.dukes@troutmansanders.com; Clay, Reed; Murphy, Michael P.; Mitchell, Jonathan; bcobb@jw.com; rtambling@ago.state.al.us; katie.spohn@nebraska.gov; maiolson@nd.gov; roxanne.giedd@state.sd.us; agesmith@ag.state.sc.us; dgetchell@oag.state.va.us; kcuccinelli@oag.state.va.us; gavin.mccabe@doj.ca.gov; dsherid@ag.state.ia.us; mraivel@mde.state.md.us; gkarr@atg.state.il.us; jerry.reid@maine.gov; carol.iancu@state.ma.us; sfarris@nmag.gov; paul.s.logan@doj.state.or.us; tschwartz@atg.state.vt.us; michael.myers@oag.state.ny.us; cking@law.nyc.gov; gschultz@riag.ri.gov; mrubin@riag.ri.gov; ttierney@riag.ri.gov; leslies@atg.wa.gov; sean@donahuegoldberg.com; mbernstein@ncdoj.gov; ajern@ncdoj.gov; john.west@ky.gov; BurschJ@michigan.gov; fc.docket@oag.ok.gov; scott.pruitt@oag.ok.gov; Kimberly.Massicotte@ct.gov; scott.koschwitz@ct.gov; jocelyn.olson@ag.state.mn.us; bbrownell@hunton.com; Awood@hunton.com; pday@hollandhart.com; hmacdougald@cwlaw.org; Shannon@southeasternlegal.org; jeffrey.clark@kirkland.com; william.burgess@kirkland.com;

rgasaway@kirkland.com; aweeks@catf.us; jlewis@catf.us; rludwiszewski@gibsondunn.com; john.campbell@ksag.org; jmassey@masseygail.com; ayresr@ayreslawgroup.com; vpardee@biologicaldiversity.org; bcummings@biologicaldiversity.org  
Subject: GHG service via e-mail

Counsel:

In an effort to save paper, resources, and the service delay that goes with mailing paper copies, we propose that all service copies to parties in this case be served via email.

If you agree to this proposal, please respond to all with (1) the name of the party you represent and (2) the best contact information for email service.

This email may reach numerous lawyers representing the same client(s); only one representative of each party needs to respond. If you know of any parties that did not receive this email, please forward it to them.

Feel free to contact us anytime with questions.

--Jonathan

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IRS Circular 230 Disclosure: To comply with certain U.S. Treasury regulations, we inform you that, unless expressly stated otherwise, any U.S. federal tax advice contained in this communication, including attachments, was not intended or written to be used, and cannot be used, by any taxpayer for the purpose of avoiding any penalties that may be imposed on such taxpayer by the Internal Revenue Service. In addition, if any such tax advice is used or referred to by other parties in promoting, marketing or recommending any partnership or other entity, investment plan or arrangement, then (i) the advice should be construed as written in connection with the promotion or marketing by others of the transaction(s) or matter(s) addressed in this communication and (ii) the taxpayer should seek advice based on the taxpayer's particular circumstances from an independent tax advisor.  
\*\*\*\*\*

This e-mail is sent by a law firm and may contain information that is privileged or confidential. If you are not the intended recipient, please delete the e-mail and any attachments and notify us immediately.

\*\*\*\*\*

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton <vpatton@edf.org>  
Cc:  
Bcc:  
Subject: RE:  
Date: Wed Apr 17 2013 09:57:12 EDT  
Attachments:

---

Thanks Vickie. Looks like the best time for us to talk would be 1 pm eastern next Thursday, April 25. Let me know if that works. If not, please suggest some other dates/times that week. --Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Sunday, April 14, 2013 8:29 PM  
To: Michael J. Myers  
Subject:

Hi Mike,

Here are some thoughts. We'd very much appreciate the opportunity to discuss further.

Sincerely yours,

Vickie

This e-mail and any attachments may contain confidential and privileged information. If you are not the intended recipient, please notify the sender immediately by return e-mail, delete this e-mail and destroy any copies. Any dissemination or use of this information by a person other than the intended recipient is

unauthorized and may be illegal.

---

From: Vickie Patton <vpatton@edf.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: Time for Discussion  
Date: Thu Apr 18 2013 01:31:19 EDT  
Attachments:

---

Mike, Would it be convenient to talk at 11am or 3pm EDT on April 25th (I have a commitment at 1pm that I cannot alter)? Sincerely yours, Vickie

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, April 17, 2013 7:57 AM  
To: Vickie Patton  
Subject: RE:

Thanks Vickie. Looks like the best time for us to talk would be 1 pm eastern next Thursday, April 25. Let me know if that works. If not, please suggest some other dates/times that week. --Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Sunday, April 14, 2013 8:29 PM  
To: Michael J. Myers  
Subject:

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Sincerely yours,

Vickie

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---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton <vpatton@edf.org>  
Cc:  
Bcc:  
Subject: RE: Time for Discussion  
Date: Thu Apr 18 2013 09:56:30 EDT  
Attachments:

---

Vickie, looks like 1130 or 230 eastern that day would work. Could EDF do either of those?

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Thursday, April 18, 2013 1:31 AM  
To: Michael J. Myers  
Subject: Time for Discussion

Mike, Would it be convenient to talk at 11am or 3pm EDT on April 25th (I have a commitment at 1pm that I cannot alter)? Sincerely yours, Vickie

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, April 17, 2013 7:57 AM  
To: Vickie Patton  
Subject: RE:

Thanks Vickie. Looks like the best time for us to talk would be 1 pm eastern next Thursday, April 25. Let me know if that works. If not, please suggest some other dates/times that week. --Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594

michael.myers@ag.ny.gov

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Sunday, April 14, 2013 8:29 PM  
To: Michael J. Myers  
Subject:

Hi Mike,

Here are some thoughts. We'd very much appreciate the opportunity to discuss further.

Sincerely yours,

Vickie

This e-mail and any attachments may contain confidential and privileged information. If you are not the intended recipient, please notify the sender immediately by return e-mail, delete this e-mail and destroy any copies. Any dissemination or use of this information by a person other than the intended recipient is unauthorized and may be illegal.

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Longstreth, Ben (blongstreth@nrdc.org)  
<blongstreth@nrdc.org>  
Cc:  
Bcc:  
Subject: Energy Efficiency  
Date: Fri Apr 19 2013 12:55:54 EDT  
Attachments:

---

Ben, thanks for your voicemail last night. John is doing much better, and was in the office for a few hours yesterday. I believe he will get back to you early next week, but if you haven't heard from him by say Tues., let me know.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Longstreth, Ben <blongstreth@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: Energy Efficiency  
Date: Fri Apr 19 2013 13:40:31 EDT  
Attachments:

---

Great news. So glad to hear that he's doing better. Have a good weekend, Ben

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Friday, April 19, 2013 12:56 PM  
To: Longstreth, Ben  
Subject: Energy Efficiency

Ben, thanks for your voicemail last night. John is doing much better, and was in the office for a few hours yesterday. I believe he will get back to you early next week, but if you haven't heard from him by say Tues., let me know.--Mike

Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

michael.myers@ag.ny.gov

---

From: Augenstern, Fred (AGO)  
<fred.augenstern@state.ma.us>  
To: kkennedy672@earthlink.net  
<kkennedy672@earthlink.net>; Kennedy, Kit (kkennedy@nrdc.org)  
<kkennedy@nrdc.org>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Driskell,  
Kristen@Energy <kristen.driskell@energy.ca.gov>  
Cc: blongstreth@nrdc.org  
<blongstreth@nrdc.org>  
Bcc:  
Subject: RE: message from Kit (NRDC NY email system is malfunctioning)  
Date: Thu May 02 2013 08:34:30 EDT  
Attachments:

---

3:30 pm EDT (12:30 PDT) seems to work for all. Please confirm.

Call-in info to follow.

Fred Augenstern  
Assistant Attorney General  
Environmental Protection Division  
Office of the Attorney General  
1 Ashburton Place, 18th Floor  
Boston, Massachusetts 02108  
Ph: 617-963-2427 (direct)  
(or 617-727-2200 x.2427)  
Fax: 617-727-9665  
E-mail: fred.augenstern@state.ma.us

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Kennedy, Kit <kkennedy@nrdc.org>;  
Augenstern, Fred (AGO) <fred.augenstern@state.ma.us>;  
kkennedy672@earthlink.net <kkennedy672@earthlink.net>;  
Driskell, Kristen@Energy <kristen.driskell@energy.ca.gov>  
Cc: Longstreth, Ben <blongstreth@nrdc.org>  
Bcc:  
Subject: RE: 3:30 today works for me for a call  
Date: Thu May 02 2013 09:26:54 EDT  
Attachments:

---

That works for me also

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Kennedy, Kit [mailto:kkennedy@nrdc.org]  
Sent: Thursday, May 02, 2013 9:00 AM  
To: Augenstern, Fred (AGO); kkennedy672@earthlink.net; Michael J. Myers; Driskell, Kristen@Energy  
Cc: Longstreth, Ben  
Subject: RE: 3:30 today works for me for a call

3:30 today works for me. Fred, please hit reply to let me know if you've received this. Thanks, Kit

-----Original Message-----

From: Augenstern, Fred (AGO) [mailto:fred.augenstern@state.ma.us]  
Sent: Thursday, May 02, 2013 8:35 AM  
To: kkennedy672@earthlink.net; Kennedy, Kit; Michael J. Myers; Driskell, Kristen@Energy  
Cc: Longstreth, Ben  
Subject: RE: message from Kit (NRDC NY email system is malfunctioning)

3:30 pm EDT (12:30 PDT) seems to work for all. Please confirm.

Call-in info to follow.

Fred Augenstern  
Assistant Attorney General  
Environmental Protection Division  
Office of the Attorney General  
1 Ashburton Place, 18th Floor  
Boston, Massachusetts 02108  
Ph: 617-963-2427 (direct)  
(or 617-727-2200 x.2427)  
Fax: 617-727-9665  
E-mail: fred.augenstern@state.ma.us



---

From: Driskell, Kristen@Energy  
<kristen.driskell@energy.ca.gov>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Kennedy,  
Kit <kkennedy@nrdc.org>; Augenstern, Fred (AGO)  
<fred.augenstern@state.ma.us>; kkennedy672@earthlink.net  
<kkennedy672@earthlink.net>  
Cc: Longstreth, Ben <blongstreth@nrdc.org>  
Bcc:  
Subject: RE: 3:30 today works for me for a call  
Date: Thu May 02 2013 10:56:59 EDT  
Attachments:

---

3:30 is fine.

Kristen M. Driskell  
Staff Counsel  
Ph: (916) 654-3957

-----Original Message-----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Thursday, May 02, 2013 6:27 AM  
To: 'Kennedy, Kit'; Augenstern, Fred (AGO); kkennedy672@earthlink.net; Driskell, Kristen@Energy  
Cc: Longstreth, Ben  
Subject: RE: 3:30 today works for me for a call

That works for me also

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Kennedy, Kit [mailto:kkennedy@nrdc.org]  
Sent: Thursday, May 02, 2013 9:00 AM  
To: Augenstern, Fred (AGO); kkennedy672@earthlink.net; Michael J. Myers; Driskell, Kristen@Energy  
Cc: Longstreth, Ben  
Subject: RE: 3:30 today works for me for a call

3:30 today works for me. Fred, please hit reply to let me know if you've received this. Thanks, Kit

-----Original Message-----

From: Augenstern, Fred (AGO) [mailto:fred.augenstern@state.ma.us]  
Sent: Thursday, May 02, 2013 8:35 AM  
To: kkennedy672@earthlink.net; Kennedy, Kit; Michael J. Myers; Driskell, Kristen@Energy  
Cc: Longstreth, Ben  
Subject: RE: message from Kit (NRDC NY email system is malfunctioning)

3:30 pm EDT (12:30 PDT) seems to work for all. Please confirm.

Call-in info to follow.

Fred Augenstern  
Assistant Attorney General  
Environmental Protection Division  
Office of the Attorney General  
1 Ashburton Place, 18th Floor  
Boston, Massachusetts 02108  
Ph: 617-963-2427 (direct)  
(or 617-727-2200 x.2427)  
Fax: 617-727-9665  
E-mail: fred.augenstern@state.ma.us

---

From: Augenstern, Fred (AGO)  
<fred.augenstern@state.ma.us>  
To: kkennedy672@earthlink.net  
<kkennedy672@earthlink.net>; Kennedy, Kit (kkennedy@nrdc.org)  
<kkennedy@nrdc.org>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Driskell,  
Kristen@Energy <kristen.driskell@energy.ca.gov>;  
blongstreth@nrdc.org <blongstreth@nrdc.org>  
Cc:  
Bcc:  
Subject: APGA case  
Date: Thu May 02 2013 12:07:14 EDT  
Attachments:

---

Here's the call-in info for today's 3:30 call:

1-877-820-7831

Participant Passcode: 397705 #

Fred Augenstern  
Assistant Attorney General  
Environmental Protection Division  
Office of the Attorney General  
1 Ashburton Place, 18th Floor  
Boston, Massachusetts 02108  
Ph: 617-963-2427 (direct)  
(or 617-727-2200 x.2427)  
Fax: 617-727-9665  
E-mail: fred.augenstern@state.ma.us

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Goffman, Joseph  
<goffman.joseph@epa.gov>  
Cc: Browne, Cynthia  
<browne.cynthia@epa.gov>; Tsirigotis, Peter  
<tsirigotis.peter@epa.gov>; David McCabe (dmccabe@catf.us)  
<dmccabe@catf.us>; Geertsma, Meleah (mgeertsma@nrdc.org)  
<mgeertsma@nrdc.org>  
Bcc:  
Subject: RE: Call on Friday  
Date: Thu May 02 2013 13:17:11 EDT  
Attachments:

---

Thanks Joe. I'm available during those times that you are. Cc'ing David McCabe and Meleah, who will be joining us on the call, to weigh in with their availability tomorrow.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Goffman, Joseph [mailto:Goffman.Joseph@epa.gov]  
Sent: Thursday, May 02, 2013 1:09 PM  
To: Michael J. Myers  
Cc: Browne, Cynthia; Tsirigotis, Peter  
Subject: Call on Friday

Cynthia -- Can you please set up a time for Mike, Peter and Me to talk on Friday. Any time after 10:30, except between 2 and 2:30 would work, since I am flexible with respect to the other three items on my Friday schedule. Thanks.

Joseph Goffman

Senior Counsel to the Assistant Administrator

Office of Air and Radiation

US EPA

202 564 3201



---

From: Bes Admin2 </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=besadmin2> on behalf of Goffman, Joseph <goffman.joseph@epa.gov>  
To: pzalzal@edf.org <pzalzal@edf.org>  
Cc:  
Bcc:  
Subject: Fw: HOLD: Meeting on Methane/Oil and Gas  
Date: Thu May 02 2013 13:33:06 EDT  
Attachments:

---

When: Monday, May 06, 2013 12:00 PM-2:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: DCRoomARN5415PolyPCTB/DC-ARN-OAR

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Message sent from a Blackberry device  
When: Monday, May 06, 2013 12:00 PM-2:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: DCRoomARN5415PolyPCTB/DC-ARN-OAR

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Goffman, Joseph <goffman.joseph@epa.gov>  
To: Tsirigotis, Peter  
<tsirigotis.peter@epa.gov>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; dmccabe@catf.us  
<dmccabe@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>;  
Goffman, Joseph <goffman.joseph@epa.gov>  
Cc: OAR Special Assistants  
<oar\_special\_assistants@epa.gov>; Johnson, Tanya  
<johnson.tanya@epa.gov>; Alston, Lala <alston.lala@epa.gov>  
Bcc:  
Subject: Copy: Prep Call  
Date: Thu May 02 2013 14:04:29 EDT  
Attachments:

---

StartTime: Fri May 03 11:00:00 Eastern Daylight Time 2013

EndTime: Fri May 03 11:45:00 Eastern Daylight Time 2013

Location:

Invitees:

Recurring: No

ShowReminder: No

Accepted: Yes

AcceptedTime: Thu May 02 14:05:33 Eastern Daylight Time 2013

When: Friday, May 03, 2013 11:00 AM-11:45 AM (GMT-05:00) Eastern Time (US & Canada).

Where: DCRoomARN5415PolyPCTB/DC-ARN-OAR; call-in:1-866-299-3188 access:202-564-3201

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Attendees: OAR: Peter Tsirigotis

Others: Michael J. Myers, David McCabe, Meleah Geertsma

---

From: Browne.Cynthia@epa.gov  
<browne.cynthia@epa.gov> on behalf of Goffman, Joseph  
<goffman.joseph@epa.gov>  
To: Goffman, Joseph  
<goffman.joseph@epa.gov>; Tsirigotis, Peter  
<tsirigotis.peter@epa.gov>; Embrey, Patricia  
<embrey.patricia@epa.gov>; Dunham, Sarah  
<dunham.sarah@epa.gov>; Gunning, Paul <gunning.paul@epa.gov>;  
Culligan, Kevin <culligan.kevin@epa.gov>; Henderson, Kelly  
<khenderson@nrdc.org>; Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>;  
Longstreth, Ben <blongstreth@nrdc.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Craig Segall - Sierra  
<craig.segall@sierraclub.org>; Darin Schroeder  
<dschroeder@catf.us>; Ann Weeks <aweeks@catf.us>; Timothy Ballo  
<tballo@earthjustice.org>; Megan Ceronsky <mceronsky@edf.org>;  
Gowrishankar, Vignesh <vgowrishankar@nrdc.org>; Geertsma,  
Meleah <mgeertsma@nrdc.org>; Vickie Patton <vpatton@edf.org>  
Cc: Johnson, Tanya <johnson.tanya@epa.gov>;  
OAR Special Assistants <oar\_special\_assistants@epa.gov>;  
Murphy, Tina <murphy.tina@epa.gov>; Hargrove, Anne  
<hargrove.anne@epa.gov>; Zenick, Elliott  
<zenick.elliott@epa.gov>  
Bcc:  
Subject: Meeting on Methane/Oil and Gas  
Date: Fri May 03 2013 11:43:34 EDT  
Attachments:

---

StartTime: Mon May 06 12:00:00 Eastern Daylight Time 2013

EndTime: Mon May 06 14:00:00 Eastern Daylight Time 2013

Location:

Recurring: No

ShowReminder: No

Accepted: Yes

AcceptedTime: Thu May 02 13:51:00 Eastern Daylight Time 2013

When: Monday, May 06, 2013 12:00 PM-2:00 PM (GMT-05:00) Eastern Time (US & Canada).

Where: DCRoomARN5415PolyPCTB/DC-ARN-OAR; call-in: 1-866-299-3188 access:202-564-3201

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*



---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Lemuel Srolovic </o=lawnet/ou=first  
administrative group/cn=recipients/cn=lsrolovi>; Kennedy, Kit  
<kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: Copy: call re delay case  
Date: Mon May 06 2013 10:35:25 EDT  
Attachments:

---

StartTime: Mon May 06 16:00:00 Eastern Daylight Time 2013  
EndTime: Mon May 06 16:30:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Mon May 06 10:49:00 Eastern Daylight Time 2013

---

From: Geertsma, Meleah <mgeertsma@nrdc.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Longstreth, Ben <blongstreth@nrdc.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Craig Segall - Sierra  
<craig.segall@sierraclub.org>; Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Ann Weeks <aweeks@catf.us>;  
Darin Schroeder <dschroeder@catf.us>; David McCabe  
<dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; Peter Zalzal  
<pzalzal@edf.org>; Tomas Carbonell <tcarbonell@edf.org>;  
Mordick, Briana <bmordick@nrdc.org>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Alan Belenz  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=abelenz>; Geertsma, Meleah  
<mgeertsma@nrdc.org>  
Cc:  
Bcc:  
Subject: Copy: Debrief on O&G meeting  
Date: Mon May 06 2013 18:40:41 EDT  
Attachments:

---

StartTime: Wed May 08 14:00:00 Eastern Daylight Time 2013  
EndTime: Wed May 08 15:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Mon May 06 19:45:07 Eastern Daylight Time 2013

When: Wednesday, May 08, 2013 1:00 PM-2:00 PM (GMT-06:00) Central Time (US & Canada).  
Where: 212-727-4600, 0113634#

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Hope this new time works for folks; if not, let me know when you're available (and please forward if I managed to leave anyone out).

---

From: Geertsma, Meleah <mgeertsma@nrdc.org>  
To: Geertsma, Meleah <mgeertsma@nrdc.org>;  
Doniger, David <ddoniger@nrdc.org>; Longstreth, Ben  
<blongstreth@nrdc.org>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Craig  
Segall - Sierra <craig.segall@sierraclub.org>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Ann Weeks <aweeks@catf.us>;  
Darin Schroeder <dschroeder@catf.us>; David McCabe  
<dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; Peter Zalzal  
<pzalzal@edf.org>; Tomas Carbonell <tcarbonell@edf.org>;  
Mordick, Briana <bmordick@nrdc.org>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Alan Belenz  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=abelenz>  
Cc:  
Bcc:  
Subject: Debrief on O&G meeting  
Date: Mon May 06 2013 18:42:14 EDT  
Attachments:

---

StartTime: Wed May 08 14:00:00 Eastern Daylight Time 2013  
EndTime: Wed May 08 15:00:00 Eastern Daylight Time 2013  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Tue May 07 08:02:00 Eastern Daylight Time 2013

When: Wednesday, May 08, 2013 1:00 PM-2:00 PM (GMT-06:00) Central Time (US & Canada).  
Where: 212-727-4600, 0113634#

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Hope this new time works for folks; if not, let me know when you're available (and please forward if I managed to leave anyone out).

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Geertsma, Meleah <mgeertsma@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Debrief on O&G meeting  
Date: Mon May 06 2013 19:45:07 EDT  
Attachments:

---

Accepted: Debrief on O&G meeting

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: David McCabe <dmccabe@catf.us>;  
Geertsma, Meleah (mgeertsma@nrdc.org) <mgeertsma@nrdc.org>  
Cc: Ann Weeks <aweeks@catf.us>  
Bcc:  
Subject: RE: availability today and tomorrow  
Date: Wed May 08 2013 15:55:19 EDT  
Attachments:

---

Just heard from Joe that he's tied up with Gina's conf. vote today and tomorrow. He asked about Friday. Can you let me know your respective availabilities Fri. so I can get back to him? Thanks.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: David McCabe [mailto:dmccabe@catf.us]  
Sent: Wednesday, May 08, 2013 3:51 PM  
To: Michael J. Myers  
Cc: Ann Weeks  
Subject: availability today and tomorrow

Mike,

Ann and I are available 4:30-5:30 today, or after 2 tomorrow, if that helps. Let us know if you hear from Joe.

David

David McCabe  
dmccabe@catf.us  
+1 626 710 6542



---

From: Geertsma, Meleah <mgeertsma@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; David  
McCabe <dmccabe@catf.us>  
Cc: Ann Weeks <aweeks@catf.us>  
Bcc:  
Subject: RE: availability today and tomorrow  
Date: Wed May 08 2013 15:59:32 EDT  
Attachments:

---

Thanks Mike – I'm flexible this Friday.

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, May 08, 2013 2:55 PM  
To: 'David McCabe'; Geertsma, Meleah  
Cc: Ann Weeks  
Subject: RE: availability today and tomorrow

Just heard from Joe that he's tied up with Gina's conf. vote today and tomorrow. He asked about Friday. Can you let me know your respective availabilities Fri. so I can get back to him? Thanks.

Michael J. Myers  
Chief, Affirmative Litigation Section  
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The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: David McCabe [mailto:dmccabe@catf.us]  
Sent: Wednesday, May 08, 2013 3:51 PM  
To: Michael J. Myers  
Cc: Ann Weeks  
Subject: availability today and tomorrow

Mike,

Ann and I are available 4:30-5:30 today, or after 2 tomorrow, if that helps. Let us know if you hear from Joe.

David

David McCabe

dmccabe@catf.us

+1 626 710 6542

---

From: David McCabe <dmccabe@catf.us>  
To: Geertsma, Meleah <mgeertsma@nrdc.org>  
Cc: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Ann Weeks <aweeks@catf.us>  
Bcc:  
Subject: Re: availability today and tomorrow  
Date: Wed May 08 2013 16:04:36 EDT  
Attachments:

---

Thanks Mike, I am available after 10 am on Friday.

David McCabe  
dmccabe@catf.us  
+1 626 710 6542

On May 8, 2013, at 3:59 PM, Geertsma, Meleah wrote:

Thanks Mike – I'm flexible this Friday.

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, May 08, 2013 2:55 PM  
To: 'David McCabe'; Geertsma, Meleah  
Cc: Ann Weeks  
Subject: RE: availability today and tomorrow

Just heard from Joe that he's tied up with Gina's conf. vote today and tomorrow. He asked about Friday. Can you let me know your respective availabilities Fri. so I can get back to him? Thanks.

Michael J. Myers  
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Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov  
From: David McCabe [mailto:dmccabe@catf.us]  
Sent: Wednesday, May 08, 2013 3:51 PM  
To: Michael J. Myers  
Cc: Ann Weeks  
Subject: availability today and tomorrow

Mike,

Ann and I are available 4:30-5:30 today, or after 2 tomorrow, if that helps. Let us know if you hear from Joe.

David

David McCabe  
dmccabe@catf.us  
+1 626 710 6542

---

From: Ann Weeks <aweeks@catf.us>  
To: David McCabe <dmccabe@catf.us>;  
Geertsma, Meleah <mgeertsma@nrdc.org>  
Cc: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Bcc:  
Subject: RE: availability today and tomorrow  
Date: Wed May 08 2013 16:09:10 EDT  
Attachments:

---

I'm available 10-11:30, then again 1-2 and 3-4

From: David McCabe [mailto:dmccabe@catf.us]  
Sent: Wednesday, May 08, 2013 4:05 PM  
To: Geertsma, Meleah  
Cc: Michael J. Myers; Ann Weeks  
Subject: Re: availability today and tomorrow

Thanks Mike, I am available after 10 am on Friday.

David McCabe  
dmccabe@catf.us  
+1 626 710 6542

On May 8, 2013, at 3:59 PM, Geertsma, Meleah wrote:

Thanks Mike – I'm flexible this Friday.

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, May 08, 2013 2:55 PM  
To: 'David McCabe'; Geertsma, Meleah  
Cc: Ann Weeks  
Subject: RE: availability today and tomorrow

Just heard from Joe that he's tied up with Gina's conf. vote today and tomorrow. He asked about Friday. Can you let me know your respective availabilities Fri. so I can get back to him? Thanks.

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michael.myers@ag.ny.gov

From: David McCabe [mailto:dmccabe@catf.us]  
Sent: Wednesday, May 08, 2013 3:51 PM  
To: Michael J. Myers  
Cc: Ann Weeks  
Subject: availability today and tomorrow

Mike,

Ann and I are available 4:30-5:30 today, or after 2 tomorrow, if that helps. Let us know if you hear from Joe.

David

David McCabe  
dmccabe@catf.us  
+1 626 710 6542

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Ann Weeks <aweeks@catf.us>; David  
McCabe <dmccabe@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>  
Cc:  
Bcc:  
Subject: RE: availability today and tomorrow  
Date: Wed May 08 2013 17:04:05 EDT  
Attachments:

---

Thanks all. I've given these slots to Joe and will let you know when I hear back.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Ann Weeks [mailto:aweeks@catf.us]  
Sent: Wednesday, May 08, 2013 4:09 PM  
To: 'David McCabe'; 'Geertsma, Meleah'  
Cc: Michael J. Myers  
Subject: RE: availability today and tomorrow

I'm available 10-11:30, then again 1-2 and 3-4

From: David McCabe [mailto:dmccabe@catf.us]  
Sent: Wednesday, May 08, 2013 4:05 PM  
To: Geertsma, Meleah  
Cc: Michael J. Myers; Ann Weeks  
Subject: Re: availability today and tomorrow

Thanks Mike, I am available after 10 am on Friday.

David McCabe  
dmccabe@catf.us  
+1 626 710 6542

On May 8, 2013, at 3:59 PM, Geertsma, Meleah wrote:

Thanks Mike – I'm flexible this Friday.

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, May 08, 2013 2:55 PM  
To: 'David McCabe'; Geertsma, Meleah  
Cc: Ann Weeks  
Subject: RE: availability today and tomorrow

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michael.myers@ag.ny.gov

From: David McCabe [mailto:dmccabe@catf.us]  
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To: Michael J. Myers  
Cc: Ann Weeks  
Subject: availability today and tomorrow

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David

David McCabe  
dmccabe@catf.us  
+1 626 710 6542



---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Geertsma, Meleah (mgeertsma@nrdc.org)  
<mgeertsma@nrdc.org>; David McCabe (dmccabe@catf.us)  
<dmccabe@catf.us>; aweeks@catf.us <aweeks@catf.us>  
Cc:  
Bcc:  
Subject: FW: call  
Date: Thu May 09 2013 09:12:24 EDT  
Attachments:

---

FYI. We can expect the call Fri. to be scheduled in the window Joe notes below. I assume Cynthia will send out an invite this morning. If she doesn't, I'll follow up to nail down a time.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Goffman, Joseph [mailto:Goffman.Joseph@epa.gov]  
Sent: Wednesday, May 08, 2013 9:14 PM  
To: Tsirigotis, Peter; Michael J. Myers  
Cc: Browne, Cynthia  
Subject: Re: call

+ Cynthia.

---

From: Tsirigotis, Peter  
Sent: Wednesday, May 08, 2013 9:06:48 PM  
To: Goffman, Joseph; Michael J. Myers  
Subject: Re: call

I'm available all of joe's times.

---

From: Goffman, Joseph  
Sent: Wednesday, May 08, 2013 8:08:51 PM  
To: Michael J. Myers

Cc: Tsirigotis, Peter  
Subject: RE: call

I can do 10:45-12:30 or after 3:30. Thanks.

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, May 08, 2013 4:13 PM  
To: Goffman, Joseph  
Subject: RE: call

That's fine. Do you want to check with Peter and see if you two can talk during one of these windows on Fri.: 10-1130, 1-2, 3-4? I don't think the call will take more than 10-15 min. In addition to me, Meleah, Dave M., and Ann would be on the line.

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New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Goffman, Joseph [mailto:Goffman.Joseph@epa.gov]  
Sent: Wednesday, May 08, 2013 3:50 PM  
To: Michael J. Myers  
Subject: Re: call

Gina's mark-up scheduled for tomorrow, so today not good. Friday?

---

From: Michael J. Myers  
Sent: Wednesday, May 08, 2013 3:38:06 PM  
To: Goffman, Joseph  
Subject: call

Joe, are you available for a call at 430 today to follow up on last week's discussion?

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: David McCabe (dmccabe@catf.us)  
<dmccabe@catf.us>; Geertsma, Meleah (mgeertsma@nrdc.org)  
<mgeertsma@nrdc.org>; aweeks@catf.us <aweeks@catf.us>  
Cc:  
Bcc:  
Subject: FW: call  
Date: Thu May 09 2013 11:17:20 EDT  
Attachments:

---

FYI 10:45 on Fri.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Browne, Cynthia [mailto:Browne.Cynthia@epa.gov]  
Sent: Thursday, May 09, 2013 11:15 AM  
To: Michael J. Myers  
Cc: Tsirigotis, Peter; Johnson, Tanya  
Subject: RE: call

Michael, I will arrange the call on Joe and Peter's calendar for Friday, May 10 at 10:45 am.

Thank you,

Cynthia Browne  
Immediate Office of Air and Radiation  
ARNRoom 5406  
U.S. Environmental Protection Agency  
Email: browne.cynthia@epa.gov  
Office: 202-564-7404

From: Goffman, Joseph  
Sent: Wednesday, May 08, 2013 9:14 PM  
To: Tsirigotis, Peter; Michael J. Myers  
Cc: Browne, Cynthia  
Subject: Re: call

+ Cynthia.

---

From: Tsirigotis, Peter  
Sent: Wednesday, May 08, 2013 9:06:48 PM  
To: Goffman, Joseph; Michael J. Myers  
Subject: Re: call

I'm available all of joe's times.

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Sent: Wednesday, May 08, 2013 8:08:51 PM  
To: Michael J. Myers  
Cc: Tsirigotis, Peter  
Subject: RE: call

I can do 10:45-12:30 or after 3:30. Thanks.

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, May 08, 2013 4:13 PM  
To: Goffman, Joseph  
Subject: RE: call

That's fine. Do you want to check with Peter and see if you two can talk during one of these windows on Fri.: 10-1130, 1-2, 3-4? I don't think the call will take more than 10-15 min. In addition to me, Meleah, Dave M., and Ann would be on the line.

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Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594

michael.myers@ag.ny.gov

From: Goffman, Joseph [mailto:Goffman.Joseph@epa.gov]  
Sent: Wednesday, May 08, 2013 3:50 PM  
To: Michael J. Myers  
Subject: Re: call

Gina's mark-up scheduled for tomorrow, so today not good. Friday?

---

From: Michael J. Myers  
Sent: Wednesday, May 08, 2013 3:38:06 PM  
To: Goffman, Joseph  
Subject: call

Joe, are you available for a call at 430 today to follow up on last week's discussion?

---

From: Goffman, Joseph <goffman.joseph@epa.gov>  
To: Tsirigotis, Peter  
<tsirigotis.peter@epa.gov>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Goffman, Joseph  
<goffman.joseph@epa.gov>; Geertsma, Meleah (mgeertsma@nrdc.org)  
<mgeertsma@nrdc.org>; David McCabe (dmccabe@catf.us)  
<dmccabe@catf.us>; aweeks@catf.us <aweeks@catf.us>  
Cc: Johnson, Tanya <johnson.tanya@epa.gov>  
Bcc:  
Subject: Copy: Call with Michael Myers  
Date: Thu May 09 2013 11:18:08 EDT  
Attachments:

---

StartTime: Fri May 10 10:45:00 Eastern Daylight Time 2013

EndTime: Fri May 10 11:15:00 Eastern Daylight Time 2013

Location:

Invitees:

Recurring: No

ShowReminder: No

Accepted: Yes

AcceptedTime: Thu May 09 11:19:00 Eastern Daylight Time 2013

When: Friday, May 10, 2013 10:45 AM-11:15 AM (GMT-05:00) Eastern Time (US & Canada).

Where: conference:1-866-299-3188 access:202-564-3201

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers> on behalf of Goffman, Joseph <goffman.joseph@epa.gov>  
To: Geertsma, Meleah (mgeertsma@nrdc.org) <mgeertsma@nrdc.org>; David McCabe (dmccabe@catf.us) <dmccabe@catf.us>; aweeks@catf.us <aweeks@catf.us>  
Cc:  
Bcc:  
Subject: FW: Call with Michael Myers  
Date: Thu May 09 2013 11:31:32 EDT  
Attachments:

---

-----Original Appointment-----

From: Goffman, Joseph [mailto:Goffman.Joseph@epa.gov]  
Sent: Thursday, May 09, 2013 11:18 AM  
To: Tsirigotis, Peter; Michael J. Myers; Goffman, Joseph  
Cc: Johnson, Tanya  
Subject: Call with Michael Myers  
When: Friday, May 10, 2013 10:45 AM-11:15 AM (GMT-05:00) Eastern Time (US & Canada).  
Where: conference:1-866-299-3188 access:202-564-3201

When: Friday, May 10, 2013 10:45 AM-11:15 AM (GMT-05:00) Eastern Time (US & Canada).  
Where: conference:1-866-299-3188 access:202-564-3201  
Note: The GMT offset above does not reflect daylight saving time adjustments.

+~+~+~+~+~+~+~+~+~+

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Barbara Baird <bbaird@aqmd.gov>;  
RPetehutch@aol.com <rpetehutch@aol.com>  
Cc:  
Bcc:  
Subject: RE: Chamber of Commerce v EPA and related matters  
Date: Thu May 09 2013 14:55:23 EDT  
Attachments: Amicus Consent Letter (May 8 2013).pdf

---

NY has given blanket consent to filing of amicus briefs in these cases (see attached)

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Barbara Baird [mailto:BBaird@aqmd.gov]  
Sent: Thursday, May 09, 2013 2:18 PM  
To: RPetehutch@aol.com  
Cc: MichaelP.Murphy@texasattorneygeneral.gov; SupremeCtBriefs@USDOJ.gov; Hannon.john@epa.gov; Embrey.Patricia@epa.gov; Orlin.David@epa.gov; Holmes.carol@epa.gov; jon.lipshultz@usdoj.gov; thomas.lorenzen@usdoj.gov; angeline.purdy@usdoj.gov; mark.stern@usdoj.gov; Perry.Rosen@usdoj.gov; egroten@velaw.com; rfrye@fryelaw.com; lmcallester@morganlewis.com; msteinberg@morganlewis.com; rtenpas@morganlewis.com; jjmcmackin@wms-jen.com; margaret.campbell@troutmansanders.com; byron.kirkpatrick@troutmansanders.com; Thompson, Chet; gary.rikard@butlersnow.com; mbehrens@shb.com; tsatterlee@shb.com; lsritts@gmail.com; jlamken@mololamken.com; matt.paulson@kattenlaw.com; twebster@sidley.com; galphonso@mcguirewoods.com; ncabral@mcguirewoods.com; soostdyk@mcguirewoods.com; ehwarner@santeecooper.com; hmacdougald@cwlaw.org; rludwiszewski@gibsondunn.com; Kurt Wiese; jbryson@hollandhart.com; Holtkamp, James; pphillips@hollandhart.com; jelwood@velaw.com; pday@hollandhart.com; pkeisler@sidley.com; qsorenson@sidley.com; rmartella@sidley.com; Kbundy@biologicaldiversity.org; vpardee@biologicaldiversity.org; rgasaway@kirkland.com; jeff.rosen@kirkland.com; jclark@kirkland.com; abamzai@kirkland.com; wburgess@kirkland.com; mbrady@oag.state.va.us; shannon@southeasternlegal.org; donald.trahan@la.gov; rtambling@ago.state.al.us; katie.spohn@nebraska.gov; esmith@scag.gov; bbrownell@hunton.com; nfichthorn@hunton.com; hnickel@hunton.com; awood@hunton.com; steve.mulder@alaska.gov; jhennelly@law.ga.gov; John.west@ky.gov; burschj@michigan.gov; maiolson@nd.gov; Clayton.eubanks@oag.ok.gov; roxanne.giedd@state.sd.us; sandyweisburst@quinnemanuel.com; davidschwartz@quinnemanuel.com; cking@law.nyc.gov; melissa.hoffer@state.ma.us; carol.iancu@state.ma.us; tracy.triplett@state.ma.us; aweeks@catf.us; sganley@catf.us; dmarshall@catf.us; dbaron@earthjustice.org; hfox@earthjustice.org; pzalzal@edf.org; pcampos@edf.org; mceronsky@edf.org; sean@donahuegoldberg.com; mbutler@selcva.org; ddoniger@nrdc.org; blongstreth@nrdc.org; jmurphy@nwf.org; Craig.Segall@sierraclub.org; Joanne.Spalding@sierraclub.org; Nathan.Matthews@sierraclub.org; Gavin.McCabe@doj.ca.gov; Joe.Barbieri@doj.ca.gov; Raissa.Lerner@doj.

ca.gov; Daniel.Lucas@doj.ca.gov; Janill.Richards@doj.ca.gov; Matthew.Levine@po.state.ct.us; Kimberly.Massicotte@po.state.ct.us; Scott.Koschwitz@po.state.ct.us; Valerie.Edge@state.de.us; GKarr@atg.state.il.us; JGignac@atg.state.il.us; MDunn@atg.state.il.us; DSHERID@ag.state.ia.us; TORMIST@ag.state.ia.us; Jerry.Reid@maine.gov; RJames@mde.state.md.us; MRaivel@mde.state.md.us; Karen.Olson@ag.state.mn.us; K.Allen.Brooks@doj.nh.gov; sfarris@nmag.gov; amoore@nmag.gov; tfox@nmag.gov; Michael J. Myers; Morgan Costello; Barbara Underwood; Monica Wagner; Cecelia Chang; mbern@ncdj.gov; Paul.Garrahan@doj.state.or.us; gschultz@riag.ri.gov; tschwartz@atg.state.vt.us; LeslieS@ATG.WA.GOV; JayG@atg.wa.gov; MarySueW@atg.wa.gov; douglas.henderson@troutmansanders.com; jesse.martin@troutmansanders.com; Tom.fisher@atg.in.gov; Diane.dewolf@myfloridalegal.com; terrellm@ag.state.la.us; bromano@utah.gov; H.Thomas.Byron@usdoj.gov; jonathan.mitchell@texasattorneygeneral.gov; james.sullivan@texasattorneygeneral.gov  
Subject: Re: Chamber of Commerce v EPA and related matters

I will take whatever position taken by the StAte of New York

Sent from my iPhone

On May 9, 2013, at 11:16 AM, "RPetehutch@aol.com" <RPetehutch@aol.com> wrote:

Counsel -- Landmark Legal Foundation respectfully requests consent of all parties to file an amicus curiae brief in support of Petitioners. Please reply via return email.

Thank you in advance for your response,

Richard P. Hutchison

Landmark Legal Foundation

---

Owner: Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>  
Filename: Amicus Consent Letter (May 8 2013).pdf  
Last Modified: Thu May 09 14:55:23 EDT 2013

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May 8, 2013

Hon. William K. Suter  
Office of the Clerk  
Supreme Court of the United States  
One First Street, NE  
Washington, D.C. 20543

*Re: American Chemistry Council v. EPA*, No. 12-1248  
*Coalition for Responsible Regulation v. EPA*, 12-1253  
*Energy-Intensive Mfrs. Working Group v. EPA*, No. 12-1154  
*S.E. Legal Foundation v. EPA*, No. 12-1268  
*Texas v. EPA*, No. 12-1269  
*Chamber of Commerce v. EPA*, No. 12-1272  
Consent to the Filing of Amicus Briefs

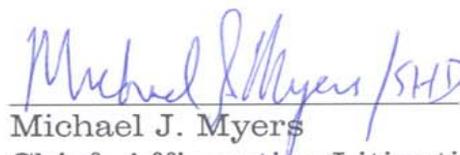
Dear Mr. Suter:

The following respondents consent to the filing of amicus briefs in support of either party or no party in the above petitions: Center for Biological Diversity; Conservation Law Foundation; Environmental Defense Fund; Georgia ForestWatch; Indiana Wildlife Federation; Michigan Environmental Council; National Wildlife Federation; Natural Resources Council of Maine; Natural Resources Defense Council; Ohio Environmental Council; Sierra Club; Wetlands Watch; Wild Virginia; the States of California, Connecticut, Delaware, Illinois, Iowa, Maine, Maryland, Massachusetts; Minnesota; New Hampshire; New Mexico; New York; North Carolina; Oregon; Rhode Island; Vermont; and Washington, and the City of New York.

Sincerely,



Sean H. Donahue  
Counsel for  
Environmental Defense Fund  
Donahue & Goldberg, LLP  
2000 L St., NW Suite 808  
Washington, D.C. 20036  
(202) 277-7085



Michael J. Myers  
Chief, Affirmative Litigation  
Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594

cc: Counsel of Record (by electronic mail)

---

From: Goffman, Joseph <goffman.joseph@epa.gov>  
To: Tsirigotis, Peter  
<tsirigotis.peter@epa.gov>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Ann Weeks  
<aweeks@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>;  
Johnson, Tanya <johnson.tanya@epa.gov>  
Cc:  
Bcc:  
Subject: Call with Michael Myers  
Date: Fri May 10 2013 11:46:36 EDT  
Attachments:

---

Thanks, again. Peter just let me know that he can be in DC on the 23rd, so let's target that day.

---

From: Geertsma, Meleah <mgeertsma@nrdc.org>  
To: Goffman, Joseph  
<goffman.joseph@epa.gov>; Tsirigotis, Peter  
<tsirigotis.peter@epa.gov>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Ann Weeks  
<aweeks@catf.us>; Johnson, Tanya <johnson.tanya@epa.gov>  
Cc: David McCabe <dmccabe@catf.us>  
Bcc:  
Subject: RE: Call with Michael Myers  
Date: Fri May 10 2013 13:53:23 EDT  
Attachments:

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Hi Joe - just noticed that David McCabe wasn't on this or the meeting scheduler, so please make sure to include him on future emails/meeting requests (I forwarded the latter to him).

Thanks,  
Meleah

-----Original Message-----

From: Goffman, Joseph [mailto:Goffman.Joseph@epa.gov]  
Sent: Friday, May 10, 2013 10:47 AM  
To: Tsirigotis, Peter; Michael J. Myers; Ann Weeks; Geertsma, Meleah; Johnson, Tanya  
Subject: Call with Michael Myers

Thanks, again. Peter just let me know that he can be in DC on the 23rd, so let's target that day.

---

From: Isaac Cheng </o=lawnet/ou=first  
administrative group/cn=recipients/cn=isaaccheng>  
To: Robert Schuwerk </o=lawnet/ou=exchange  
administrative group  
(fydibohf23spdlt)/cn=recipients/cn=rschuwerk>  
Cc:  
Bcc:  
Subject: Accepted: Call with EDF re FERC issues  
Date: Mon May 13 2013 14:46:42 EDT  
Attachments:

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Kennedy, Kit (kkennedy@nrdc.org)  
<kkennedy@nrdc.org>; Lehner, Peter (plehner@nrdc.org)  
<plehner@nrdc.org>  
Cc:  
Bcc:  
Subject: Thank you  
Date: Tue May 14 2013 11:45:06 EDT  
Attachments:

---

Peter and Kit--Thanks so much for your letter of support on the ABA award nomination. It was an excellent letter and given how busy you both are with far more important matters, I am very grateful that you did it. Talk to you soon.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton (vpatton@edf.org)  
<vpatton@edf.org>  
Cc:  
Bcc:  
Subject: Thank you  
Date: Tue May 14 2013 11:48:15 EDT  
Attachments:

---

Vickie--Thanks so much for your letter of support on the ABA award nomination. It was an excellent letter and given how busy you both are with far more important matters, I am very grateful that you did it. Talk to you soon.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Lehner, Peter <plehner@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Kennedy,  
Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: Re: Thank you  
Date: Tue May 14 2013 11:50:41 EDT  
Attachments:

---

A pleasure!

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Tuesday, May 14, 2013 11:45 AM  
To: Kennedy, Kit; Lehner, Peter  
Subject: Thank you

Peter and Kit--Thanks so much for your letter of support on the ABA award nomination. It was an excellent letter and given how busy you both are with far more important matters, I am very grateful that you did it. Talk to you soon.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Lehner,  
Peter <plehner@nrdc.org>  
Cc:  
Bcc:  
Subject: RE: Thank you  
Date: Tue May 14 2013 14:23:26 EDT  
Attachments:

---

Mike, it was our pleasure to heap praise on a valued colleague and friend.

I hope you get the award, and whether you do or not – you're the best.

Kit

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Tuesday, May 14, 2013 11:45 AM  
To: Kennedy, Kit; Lehner, Peter  
Subject: Thank you

Peter and Kit--Thanks so much for your letter of support on the ABA award nomination. It was an excellent letter and given how busy you both are with far more important matters, I am very grateful that you did it. Talk to you soon.--Mike

Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

michael.myers@ag.ny.gov



---

From: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>  
To: Isaac Cheng </o=lawnet/ou=first administrative group/cn=recipients/cn=isaaccheng>; Robert Schuwerk </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=rschuwer>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Charlie Donaldson </o=lawnet/ou=first administrative group/cn=recipients/cn=charliedonaldson>; Lisa S. Kwong </o=lawnet/ou=first administrative group/cn=recipients/cn=lisakwong>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Call with EDF re Methane  
Date: Tue May 14 2013 16:01:32 EDT  
Attachments:

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Dial-in Number: (866) 394-2346  
Conference Access code: 1551310317

---

From: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>  
To: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Isaac Cheng </o=lawnet/ou=first administrative group/cn=recipients/cn=isaaccheng>; Robert Schuwerk </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=rschuwer>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Charlie Donaldson </o=lawnet/ou=first administrative group/cn=recipients/cn=charliedonaldson>; Lisa S. Kwong </o=lawnet/ou=first administrative group/cn=recipients/cn=lisakwong>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Copy: Call with EDF re Methane  
Date: Tue May 14 2013 16:01:33 EDT  
Attachments:

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StartTime: Thu May 16 15:30:00 Eastern Daylight Time 2013  
EndTime: Thu May 16 17:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Tue May 14 16:02:00 Eastern Daylight Time 2013

Dial-in Number: (866) 394-2346  
Conference Access code: 1551310317

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From: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>  
To: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Isaac Cheng </o=lawnet/ou=first administrative group/cn=recipients/cn=isaaccheng>; Robert Schuwerk </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=rschuwer>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Charlie Donaldson </o=lawnet/ou=first administrative group/cn=recipients/cn=charliedonaldson>; Lisa S. Kwong </o=lawnet/ou=first administrative group/cn=recipients/cn=lisakwong>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Call with EDF re Methane  
Date: Tue May 14 2013 16:01:33 EDT  
Attachments:

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StartTime: Thu May 16 15:30:00 Eastern Daylight Time 2013  
EndTime: Thu May 16 17:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: No  
  
Dial-in Number: (866) 394-2346  
Conference Access code: 1551310317

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From: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>  
To: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Isaac Cheng </o=lawnet/ou=first administrative group/cn=recipients/cn=isaaccheng>; Robert Schuwerk </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=rschuwer>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Charlie Donaldson </o=lawnet/ou=first administrative group/cn=recipients/cn=charliedonaldson>; Lisa S. Kwong </o=lawnet/ou=first administrative group/cn=recipients/cn=lisakwong>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Call with EDF re Methane  
Date: Tue May 14 2013 16:01:34 EDT  
Attachments:

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StartTime: Thu May 16 15:30:00 Eastern Daylight Time 2013  
EndTime: Thu May 16 17:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Tue May 14 16:01:00 Eastern Daylight Time 2013

Dial-in Number: (866) 394-2346  
Conference Access code: 1551310317

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Jeremy Magliaro </o=lawnet/ou=first  
administrative group/cn=recipients/cn=jeremymagliaro>  
Cc:  
Bcc:  
Subject: Accepted: Call with EDF re Methane  
Date: Tue May 14 2013 16:02:39 EDT  
Attachments:

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Paul Miller <pmiller@nescaum.org>; Lisa  
Rector <lrector@nescaum.org>  
Cc: Arthur Marin <amarin@nescaum.org>  
Bcc:  
Subject: RE: call  
Date: Wed May 15 2013 10:02:19 EDT  
Attachments:

---

Sure, are you referring just to NSPS for OWBs and similar sources (i.e., not the NSPS for power plants, etc.)? I'm available those times as well. Did you want to include other states as well? If so, I can reach out.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Paul Miller [mailto:pmiller@nescaum.org]  
Sent: Wednesday, May 15, 2013 7:33 AM  
To: Lisa Rector  
Cc: Arthur Marin; Michael J. Myers  
Subject: RE: call

I'd be interested in checking in and hearing latest thoughts and status of the NSPS effort. I can do any of those times, so whatever works for others works for me.

From: Lisa Rector  
Sent: Wednesday, May 15, 2013 7:30 AM  
To: Arthur Marin; Paul Miller; Michael.Myers@ag.ny.gov  
Subject: call

Hi Mike, Arthur and Paul, I was wondering if folks are interested in holding a call to discuss NSPS items? Folks at EDF are available this Friday (4/17) from 10:30 - 11:30 AM and 3- 4 PM, and on Monday (4/20) from 3 pm - 5pm.

NESCAUM

Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org

---

From: Lisa Rector <lrector@nescaum.org>  
To: Arthur Marin <amarin@nescaum.org>; Paul Miller <pmiller@nescaum.org>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; tcarbonell@edf.org <tcarbonell@edf.org>; vpatton@edf.org <vpatton@edf.org>; Lisa Rector <lrector@nescaum.org>; Kevin Donovan </o=lawnet/ou=first administrative group/cn=recipients/cn=kevindonovan>; Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>  
Cc: Gail Landry <glandry@nescaum.org>; arthurmarin@vzw.blackberry.net <arthurmarin@vzw.blackberry.net>  
Bcc:  
Subject: Copy: Call on NSPS  
Date: Wed May 15 2013 15:20:53 EDT  
Attachments:

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StartTime: Mon May 20 16:00:00 Eastern Daylight Time 2013  
EndTime: Mon May 20 17:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Wed May 15 15:25:27 Eastern Daylight Time 2013  
  
When: Monday, May 20, 2013 4:00 PM-5:00 PM. Eastern Standard Time  
Where: 877-656-1761 code 127243

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Call on Monday 5/20 at 4 pm to discuss RWH NSPS questions.

gl 0601

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From: Paul Miller <pmiller@nescaum.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Lisa Rector <lrector@nescaum.org>  
Cc:  
Bcc:  
Subject: RE: call  
Date: Thu May 16 2013 08:49:08 EDT  
Attachments: Heinzerling-Insider reflection relationship Obama OMB and EPA\_PaceEnvtlLawRev2013 draft.pdf

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For some additional context on what may happen at OMB/OIRA regardless of EPA's best intentions on a wood appliance NSPS proposal, see attached article (if you haven't seen already). It raises some things to think about even if EPA gets a final proposal out the door to OMB.

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, May 15, 2013 10:02 AM  
To: Paul Miller; Lisa Rector  
Cc: Arthur Marin  
Subject: RE: call

Sure, are you referring just to NSPS for OWBs and similar sources (i.e., not the NSPS for power plants, etc.)? I'm available those times as well. Did you want to include other states as well? If so, I can reach out.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Paul Miller [mailto:pmiller@nescaum.org]  
Sent: Wednesday, May 15, 2013 7:33 AM  
To: Lisa Rector  
Cc: Arthur Marin; Michael J. Myers  
Subject: RE: call

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From: Lisa Rector  
Sent: Wednesday, May 15, 2013 7:30 AM  
To: Arthur Marin; Paul Miller; Michael.Myers@ag.ny.gov  
Subject: call

Hi Mike, Arthur and Paul, I was wondering if folks are interested in holding a call to discuss NSPS items? Folks at EDF are available this Friday (4/17) from 10:30 - 11:30 AM and 3- 4 PM, and on Monday (4/20) from 3 pm - 5pm.

NESCAUM

Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306| 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org

---

Owner: Paul Miller <pmiller@nescaum.org>  
Filename: Heinzerling-Insider reflection relationship Obama OMB and  
EPA\_PaceEnvtlLawRev2013 draft.pdf  
Last Modified: Thu May 16 08:49:08 EDT 2013

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Inside EPA:  
A Former Insider's Reflections on the Relationship Between  
the Obama EPA and the Obama White House\*

Lisa Heinzerling\*\*

I will be discussing the relationship between the Environmental Protection Agency (EPA) and the White House. I will focus specifically on the role that the Office of Information and Regulatory Affairs (OIRA), within the Office of Management and Budget (OMB), plays in reviewing the EPA's regulatory output.

As I will explain, OIRA's actual practice in reviewing agency rules departs considerably from the structure created by the executive order governing OIRA's process of regulatory review.<sup>1</sup> The distribution of decision-making authority is ad hoc and chaotic rather than predictable and ordered; the rules reviewed are mostly not economically significant but rather, in many cases, are merely of special interest to OIRA staffers; rules fail OIRA review for a variety of reasons, some extra-legal and some simply mysterious; there are no longer any meaningful deadlines for OIRA review; and OIRA does not follow – or allow agencies to follow – most of the transparency requirements of the relevant executive order.<sup>2</sup>

Describing the OIRA process as it actually operates today goes a long way toward previewing the substantive problems with it. The process is utterly opaque. It rests on assertions of decision-making authority that are inconsistent with the statutes the agencies administer. The process diffuses power to such an extent – acceding, depending on the situation, to the views of other Cabinet officers, career staff in other agencies, White House economic offices, members of Congress, the White House Chief of Staff, OIRA career staff, and many more – that at the end of the day no one is accountable for the results it demands (or blocks, in the case of the many rules stalled during the OIRA process). And, through it all, environmental

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\* This essay is an expanded version of remarks delivered on March 12, 2013, as the Lloyd K. Garrison Lecture on Environmental Law at Pace Law School.

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<sup>1</sup> EO 12866, issued by President Clinton in 1993, continues – in principle – to govern the mechanics of OIRA review. President Obama issued his own executive order, EO 13563, on OIRA review in 2011, but that order reaffirmed EO 12866 and did not by its terms change the *process* of OIRA review (such as deadlines and disclosure requirements) in any respect.

<sup>2</sup> See Part II, *infra*.

rules take a particular beating, from the number of such rules reviewed to the scrutiny they receive to the changes they suffer in the course of the process.<sup>3</sup>

These problems are significant, and they deserve serious attention. Although I discuss these problems at the end of this paper, my main project in this paper is descriptive. Misunderstandings of the OIRA process abound. Too often these misunderstandings are perpetuated by, or not contradicted by, the very personnel who have been involved in the process. Indeed, after I finished a stint as the head of the EPA office responsible for acting as the primary EPA liaison to OIRA, I did not write at any length about my experiences with OIRA review. Partly out of continuing loyalty to the administration that had made my time in government possible, partly out of respect for the sensitivity of interactions between high-level government officers, and partly out of a sense of sheer futility,<sup>4</sup> I had resolved to move on to other topics. But when accounts of OIRA's role in the Obama administration began to emerge from other quarters,<sup>5</sup> and when these accounts, in many respects, did not jibe with my own experience, I decided to resurface and to describe the OIRA process from my perspective. Hence the account that follows.

## I. The History of White House Review

It will be useful first to give a brief history of White House review of agencies' regulatory actions. Some form of centralized review of agency action has been with us for decades. Such review took place episodically in the Nixon, Ford, and Carter administrations.<sup>6</sup> But it was in the presidency of Ronald Reagan that the practice of regulatory review began to take on the shape it has today.

### A. 12,291

In one of his earliest acts as President, Ronald Reagan issued an executive order – Executive Order 12,291 – that gave centralized review more systematized form in two respects.<sup>7</sup> First, EO 12,291 put a specific office – OMB<sup>8</sup> – in charge of

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<sup>3</sup> See Part III, *infra*.

<sup>4</sup> Lisa Heinzerling, *Towards Engaged Scholarship*, at 19-20, [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2225283](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2225283).

<sup>5</sup> See Cass R. Sunstein, *Simpler: The Future of Government* (2013); Cass R. Sunstein, Cass R. Sunstein, *The Office of Information and Regulatory Affairs: Myths and Realities*, *Harv. L. Rev.* (forthcoming), available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2192639](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2192639).

<sup>6</sup> See, e.g., Oliver A. Houck, *President X and the New (Approved) Decisionmaking*, 36 *Am. U. L. Rev.* 535, 536-37 (1986) (describing “rather modest and unintrusive” efforts by the White House to control agencies during the 1970s). For a detailed discussion, see Rena Steinzor, *The Case for Abolishing Centralized White House Regulatory Review*, 1 *Mich. J. Env'tl. & Admin. L.* 209, 239-42 (2012).

<sup>7</sup> E.O. 12291, 46 *Fed. Reg.* 13193 (Feb. 17, 1981).

reviewing agency actions.<sup>9</sup> Second, it adopted cost-benefit analysis as the governing framework for this review.<sup>10</sup>

Before President Reagan issued EO 12,291, the Office of Legal Counsel (OLC) reviewed the order for legal soundness.<sup>11</sup> Notably, OLC's opinion confirming the order's legality rested on the premise that the centralized reviewers (OMB and a newly created Task Force on Regulatory Relief) would only supervise, and not displace, the exercise of discretion given to the agencies by statute. OLC wrote: "[T]he fact that the President has both constitutional and implied statutory authority to supervise decisionmaking by executive agencies ... suggest[s] ... that supervision is more readily justified when it *does not purport wholly to displace, but only to guide and limit*, discretion which Congress has allocated to a particular subordinate official. A wholesale displacement might be held inconsistent with the statute vesting authority in the relevant official.... The order *does not empower* the [OMB] Director or the Task Force to *displace* the relevant agencies in discharging their statutory functions or in assessing and weighing the costs and benefits of proposed actions."<sup>12</sup>

OLC's opinion does not state that an order displacing the agencies' discretion would certainly be illegal. But it does interpret EO 12,291 not to permit such displacement and it does suggest a potential legal problem with such displacement. Reading only EO 12,291 and the OLC's opinion on it, one would conclude that agencies retained the decision-making discretion they were given by the statutes they are charged with administering.

In practice, though, it was not that simple. During the Reagan years, critics charged that OIRA did indeed displace – and not merely supervise – agencies' decision-making discretion.<sup>13</sup> In addition, OIRA's process of review frequently

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<sup>8</sup> Within OMB, OIRA was the office responsible for regulatory review. OMB, Report to Congress on the Costs and Benefits of Federal Regulations, Chapter I.2.c (1997), available at [http://www.whitehouse.gov/omb/infoleg\\_chap1](http://www.whitehouse.gov/omb/infoleg_chap1). From here on out in this article, I will refer to "OMB" only where I mean to distinguish OMB from OIRA or where (as in the Office of Legal Counsel opinion I am about to discuss) another party has referred to OMB rather than to OIRA.

<sup>9</sup> EO 12291, § 3.

<sup>10</sup> EO 12291, § 2(b)-(c).

<sup>11</sup> Proposed Executive Order Entitled "Federal Regulation," 5 Op. OLC 59 (Feb. 13, 1981).

<sup>12</sup> 5 Op. OLC at 62-63 (emphasis added).

<sup>13</sup> See, e.g., Robert V. Percival, *Who's in Charge? Does the President Have Directive Authority Over Agency Regulatory Decisions?*, 79 Ford. L. Rev. 2487, 2502-05 (2011). Percival cites a wealth of sources on this point. *Id.* at 2504, n. 127. Beyond OIRA, Reagan's appointees to the environmental agencies also were quite willing to take deregulatory actions on their own initiative. See Philip Weinberg, *Masquerade*

delayed agency rules for extended periods.<sup>14</sup> The process also at times degenerated into one in which OIRA served as a conduit for the views of industry on particular regulatory actions.<sup>15</sup> This feature of the process was especially troubling insofar as the process was opaque. Only in 1986 did OIRA begin to make public the documents shared by outside parties with OIRA during its review.<sup>16</sup> Even so, the bulk of the process – which agency actions went to OIRA, what happened to them while they were there, who made the decisions – was closed off to the public.<sup>17</sup> Moreover, the cost-benefit lens through which OIRA viewed agency rules proved to skew against some kinds of rules, in particular environmental rules, since so many of the benefits of environmental rules are difficult or impossible to quantify and monetize, and since so many of these benefits occur in the future and yet the settled practice of cost-benefit analysis is to steeply discount future consequences.<sup>18</sup>

Such critiques dogged the OIRA review process under EO 12,291 through the Reagan years and into the presidency of George H.W. Bush.<sup>19</sup> By the time Bill Clinton came into office in 1993, many were hoping for change.<sup>20</sup> Within months of taking office, President Clinton responded with a new executive order on regulatory review, EO 12,866.<sup>21</sup>

## B. 12,866

Although EO 12,866 preserved the status quo in that it continued to require centralized White House review of agency actions under a cost-benefit framework, it also reformed several specific features of this review that had proved troublesome. Taking on the issue of displacement, an early passage in EO 12,866 “reaffirm[ed] the

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for Privilege: Deregulation Undermining Environmental Protection, 45 Wash. & Lee L. Rev. 1321 (1988).

<sup>14</sup> See, e.g., Harold H. Bruff, Presidential Management of Agency Rulemaking, 57 Geo. Wash. L. Rev. 533, 565-68 (1989).

<sup>15</sup> See, e.g., Claudia O’Brien, White House Review of Regulations under the Clean Air Act Amendments of 1990, 8 J. Env’tl. L. & Lit. 51, 58-80 (1993).

<sup>16</sup> Bruff, 57 Geo. Wash. L. Rev. at 583 (citing OMB, Memorandum for the Heads of Departments and Agencies Subject to Executive Order Nos. 12,291 and 12,498, Subject: Additional Procedures Concerning OIRA Reviews Under Executive Order Nos. 12,291 and 12,498 (June 13, 1986)).

<sup>17</sup> See, e.g., Alan B. Morrison, OMB Interference with Agency Rulemaking: The Wrong Way to Write a Regulation, 99 Harv. L. Rev. 1059, 1067-68 (1986).

<sup>18</sup> See, e.g., Thomas O. McGarity, Regulatory Analysis and Regulatory Reform, 65 Tex. L. Rev. 1243, 1293-97 (1987).

<sup>19</sup> See, e.g., Richard L. Revesz & Michael A. Livermore, Retaking Rationality: How Cost-Benefit Analysis Can Better Protect the Environment and Our Health 189 (2008).

<sup>20</sup> Richard H. Pildes & Cass R. Sunstein, Reinventing the Regulatory State, 62 U. Chi. L. Rev. 1, 6 (1995).

<sup>21</sup> EO 12866, Regulatory Planning and Review, 58 Fed. Reg. 51735 (Oct. 4, 1993).

primacy of Federal agencies in the regulatory decision-making process.”<sup>22</sup> At the same time, however, the order for the first time explicitly stated that if a conflict arose between OIRA and an agency over a particular matter, one that could not be resolved by the OMB Director and the agency head, it would be the President (or the Vice-President acting on the President’s behalf) who would settle the dispute – and make the “decision with respect to the matter.”<sup>23</sup> EO 12,866 also provided a specific framework for elevating decisions beyond OMB and the agency head: the Vice-President (then Al Gore) was to make recommendations to the President on how to resolve the conflict.<sup>24</sup> EO 12,866 thus gestured toward the primacy of the agencies while simultaneously – for the first time in such an order – explicitly providing that the President would decide the hardest cases and laying out the process to follow when conflicts arose.<sup>25</sup>

Addressing the problem of delay, EO 12,866 set out specific time limits on OIRA review. Advance notices of proposed rulemaking, notices of inquiry, and “other preliminary regulatory actions prior to a Notice of Proposed Rulemaking” were to be reviewed within 10 days.<sup>26</sup> Regulatory actions previously reviewed by OIRA were to be reviewed within 45 days if “there has been no material change in the facts and circumstances upon which the regulatory action is based.”<sup>27</sup> “[A]ll other regulatory actions” were to be reviewed within 90 days.<sup>28</sup> EO 12,866 also provided that the review process could be extended “(1) once by no more than 30 calendar days upon the written approval of the Director and (2) at the request of the agency head.”<sup>29</sup> This provision allowing extensions seems, with its use of the word “and” rather than “or,” to contemplate a process whereby both the OMB Director and the agency head would need to agree on the extension. Together, the new deadlines, precisely defined and tailored to specific circumstances, clearly were designed to end OIRA review that dragged on intolerably long or even indefinitely.

In addition, EO 12,866 limited the range of rules OIRA could review. Only “significant” regulatory actions were to be reviewed.<sup>30</sup> Economically significant actions – those having annual costs of \$100 million or more<sup>31</sup> – were to be accompanied by extensive cost-benefit analysis.<sup>32</sup> Beyond annual costs, other features that might make a regulatory action significant (and thus subject to OIRA

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<sup>22</sup> EO 12866, preamble.

<sup>23</sup> EO 12866, § 7.

<sup>24</sup> EO 12866, § 7.

<sup>25</sup> Elena Kagan, *Presidential Administration*, 114 *Harv. L. Rev.* 2245, 2288-90 (2001).

<sup>26</sup> EO 12866, § 6(b)(2)(A).

<sup>27</sup> EO 12866, § 6(b)(2)(B).

<sup>28</sup> EO 12866, § 6(b)(2)(B).

<sup>29</sup> EO 12866, § 6(b)(2)(C).

<sup>30</sup> EO 12866, § 6(a)(3)(B).

<sup>31</sup> EO 12866, § 3(f)(1).

<sup>32</sup> EO 12866, § 6(a)(3)(C).

review) were serious inconsistencies with another agency's plans,<sup>33</sup> material effects on budgetary impacts of various programs,<sup>34</sup> and the presence of "novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive order."<sup>35</sup> The OIRA Administrator was given the final say as to which regulatory actions qualify as significant and thus must be reviewed by OIRA.<sup>36</sup>

EO 12,866 also took on the problem of OIRA acting as a conduit for industry views. The order required disclosure of all contacts with outside parties during the period of OIRA review.<sup>37</sup> The order limited the conditions under which outside views could be relayed to OIRA by requiring that only the Administrator of OIRA or "a particular designee" could receive oral communications by persons outside the executive branch regarding the substance of a regulatory action under review.<sup>38</sup> The order also provided that in the case of elevation to the President or Vice-President, any communications by outside parties, directed at the President's advisors or their staffs or the staff of the Vice-President, would be in writing and would become part of the public docket.<sup>39</sup> If the communication was not in writing, the advisors or staff members were to "inform the outside party that the matter is under review and that any comments should be submitted in writing."<sup>40</sup>

In other ways as well, EO 12,866 aimed to make OIRA review far more transparent than it had been. In fact, the order requires transparency throughout the OIRA process. If an agency plans a regulatory action that OIRA thinks is inconsistent with the President's policies or priorities, OIRA must tell the agency so, in writing.<sup>41</sup> If a regulatory action is under review, OIRA must provide information – in a "publicly available log" – about the status of that action.<sup>42</sup> If a dispute arises between OIRA and an agency over whether a particular rule should issue, and one of these parties requests resolution of the dispute by the President or Vice-President, OIRA must note – in a "publicly available log" – who requested elevation and when.<sup>43</sup> If OIRA returns a rule to an agency "for further consideration of some or all of its provisions," the Administrator of OIRA must provide a "written explanation" for this return.<sup>44</sup> If a regulatory proposal changes between the time it goes to OIRA and the time it emerges from OIRA, the agency must identify those changes ("in a

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<sup>33</sup> EO 12866, § 3(f)(2).

<sup>34</sup> EO 12866, § 3(f)(3).

<sup>35</sup> EO 12866, § 3(f)(4).

<sup>36</sup> EO 12866, § 6(b)(3)(B).

<sup>37</sup> EO 12866, § 6(b)(4)(B)(iii), (C)(ii)-(iii).

<sup>38</sup> EO 12866, § 6(b)(4)(A).

<sup>39</sup> EO 12866, § 7.

<sup>40</sup> EO 12866, § 7.

<sup>41</sup> EO 12866, § 4(c)(5).

<sup>42</sup> EO 12866, § 6(b)(4)(C)(i).

<sup>43</sup> EO 12866, § 6(b)(4)(C)(i).

<sup>44</sup> EO 12866, § 6(b)(3).

complete, clear, and simple manner”).<sup>45</sup> If OIRA insists on changes to the regulatory proposal during its review, the agency must identify those changes for the public (“in plain, understandable language”).<sup>46</sup>

If followed (an important qualification, as we will see), these disclosure requirements would allow the public to know, often in real time, what actions are under review at OIRA, what the status of those actions is, and what the consequences of the review have been for any particular agency action.

A final refinement of EO 12,866 was the explicit inclusion, in the prescribed cost-benefit framework, of “qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider” and of benefits such as “distributive impacts ... and equity” and “the enhancement of health and safety, the protection of the natural environment, and the elimination or reduction of discrimination or bias.”<sup>47</sup>

Even with these changes, not everyone was thrilled with EO 12,866. Some were disappointed that OIRA and cost-benefit analysis would continue to play a large role in determining regulatory policy.<sup>48</sup> Others had long fretted that little would change if the culture – and personnel – at OIRA did not change.<sup>49</sup> Still others continued to worry about displacement of agency discretion; they thought that statutes giving authority and discretion to agencies did not allow the White House to direct the agencies to make particular decisions on particular matters.<sup>50</sup>

Nevertheless, it seems fair to say – certainly in retrospect – that the Clinton years were relatively quiet ones for OIRA review. The process did not seem to involve the kinds of delays and secrecy prevalent in the Reagan-Bush years.<sup>51</sup> The one known case of a high-level elevation of an issue to the President – involving EPA’s National Ambient Air Quality Standards for particulate matter and ozone –

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<sup>45</sup> EO 12866, § 6(a)(3)(E)(ii).

<sup>46</sup> EO 12866, § 6(a)(3)(E)(iii).

<sup>47</sup> EO 12866, §§ 1(a), 6(a)(e)(C)(i).

<sup>48</sup> Including this author: Lisa Heinzerling, *Environmental Law and the Present Future*, 87 *Geo. L.J.* 2025, 2027-28 (1999).

<sup>49</sup> Alan B. Morrison, *OMB Interference with Agency Rulemaking: The Wrong Way to Write a Regulation*, 99 *Harv. L. Rev.* 1059, 1067-68 (1986); Erik D. Olson, *The Quiet Shift of Power: Office of Management & Budget Supervision of Environmental Protection Agency Rulemaking Under Executive Order 12,291*, 4 *Va. J. Nat. Resources L.* 1, 55-73 (1984).

<sup>50</sup> Cynthia R. Farina, *The Consent of the Governed: Against Simple Rules for a Complex World*, 72 *Chi.-Kent L. Rev.* 987 (1997); Peter L. Strauss, *Presidential Rulemaking*, 72 *Chi.-Kent L. Rev.* 965 (1997).

<sup>51</sup> Robert V. Percival, *Presidential Management of the Administrative State: The Not-So-Unitary Executive*, 51 *Duke L.J.* 963, 996-98 (2001).

resulted in a decision allowing the agency to proceed with the rules.<sup>52</sup> While the OIRA process has never been free from controversy, the Clinton years were probably the least contentious.<sup>53</sup>

The period of relative quiet did not last. Upon assuming office in 2001, President George W. Bush, like his predecessors, sought to put his own stamp on regulatory policy through the OIRA process. Interestingly, however, he did not do this by issuing a significant new executive order. He did issue two executive orders on regulatory review, but they were (as these things go) relatively minor. One, EO 13,258, replaced the Vice-President-driven elevation process with a process staffed with the President's "advisors."<sup>54</sup> Another, EO 13,422, strengthened language requiring agencies to find a market failure before regulating and also directed OIRA to review significant agency guidance (that is, agency statements of policy or interpretation that do not have the legal effect of rules).<sup>55</sup> EO 13,422 generated criticism within the health, safety, and environmental community because of its tilt toward the superiority of private markets and its assertion of authority to review agency guidance.<sup>56</sup> But EO 12,866 also remained in place.

Rather than prescribing a whole new framework for regulatory review, President Bush chose an intellectually forceful and politically shrewd academic, John Graham, to head OIRA.<sup>57</sup> One of Graham's first acts as OIRA Administrator was to issue a memorandum on OIRA disclosure to OIRA staff. Acknowledging that transparency was essential to the legitimacy of the process,<sup>58</sup> Graham moved to

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<sup>52</sup> John H. Cushman Jr., Clinton Sharply Tightens Air Pollution Regulations Despite Concern Over Costs, *NY Times* (June 26, 1997).

<sup>53</sup> For details, see Steinzor, *Abolishing Centralized Regulatory review*, at 245-47. Note, however, that in their important article reporting on the views of the OIRA process from those inside the EPA during the Bush I and Clinton years, Lisa Schulz Bressman and Michael Vandenberg did not find substantial differences in the responses of EPA personnel to questions about White House involvement in rulemaking during these different administrations. Lisa Schultz Bressman & Michael P. Vandenberg, *Inside the Administrative State: A Critical Look at the Practice of Presidential Control*, 105 *Mich. L. Rev.* 47, 49 (2006).

<sup>54</sup> EO 13258, Amending Executive Order 12866 on Regulatory Planning and Review, 67 *Fed. Reg.* 9385 (Feb. 28, 2002).

<sup>55</sup> EO 13422, Further Amendment to Executive Order 12866 on Regulatory Planning and Review, 72 *Fed. Reg.* 2763 (Jan. 23, 2007).

<sup>56</sup> See, e.g., OMB Watch, *A Failure to Govern: Bush's Attack on the Regulatory Process* (2007), available at [dev.ombwatch.org/files/regs/PDFs/FailuretoGovern.pdf](http://dev.ombwatch.org/files/regs/PDFs/FailuretoGovern.pdf).

<sup>57</sup> A sense of the reaction Dr. Graham's appointment inspired in environmental circles can be found in Steve Weinberg, Mr. Bottom Line, *OnEarth* (Spring 2003), available at <http://www.nrdc.org/onearth/03spr/graham1.asp>.

<sup>58</sup> John D. Graham, OIRA Disclosure Memo-B (Oct. 18, 2001) ("I believe that the transparency of OIRA's regulatory review process is critical to our ability to improve

increase transparency in several ways. He directed that documents related to OIRA review be made available online.<sup>59</sup> He required that notices of meetings and other communications with outside parties be made available online.<sup>60</sup> He returned rules to agencies with a written and public explanation of why they were being returned.<sup>61</sup> Each of these actions increased the public's access to information about what happened when rules went to OIRA.

Another of Graham's innovations, however, turned in the opposite direction. Graham began to insist that agencies involve OIRA early on in their deliberative processes.<sup>62</sup> This early intervention ensured both that rules would not arrive at OIRA fully baked, with little for OIRA to do but accept or reject them. It also meant that many of OIRA's early efforts would leave no public trail. The latter point requires a note of explanation. OIRA has always, so far as I know, taken the position that only when a regulatory action is sent to OIRA through official channels – which include a computer system used for the purpose of facilitating the transfer of rules between the agencies and OIRA – do the transparency requirements of EO 12,866 kick in. If an agency briefs OIRA on a rule prior to formally sending it to OIRA, or consults with OIRA before doing so, or even sends a full-fledged rule package to OIRA outside formal channels, none of this, or any of its consequences, will appear in the public record assembled for formal OIRA review. Thus Graham's emphasis on early, informal intervention had the potential to significantly undermine the transparency achieved by his initiatives on disclosure.

One episode from the Bush years, which occurred after Graham left office, well illustrates OIRA's power to secretly alter an agency's course. Shortly after the Supreme Court held, in *Massachusetts v. EPA*,<sup>63</sup> that the Clean Air Act empowers EPA to regulate greenhouse gases, President Bush held a press conference in the Rose Garden and directed EPA and the Department of Transportation to develop rules for cars that would comply with the Court's decision.<sup>64</sup> EPA would, at the same time, prepare a finding as to whether greenhouse gases endangered public health or welfare and thus triggered regulatory obligations under the Clean Air Act.<sup>65</sup> The agencies went quickly to work, and within seven months EPA had prepared a draft

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the nation's regulatory system. Only if it is clear how the OMB review process works and what it does will Congress and the public understand our role and the reasons behind our decisions.”), available at [http://www.whitehouse.gov/omb/inforeg\\_oira\\_disclosure\\_memo-b](http://www.whitehouse.gov/omb/inforeg_oira_disclosure_memo-b).

<sup>59</sup> Id.

<sup>60</sup> Id.

<sup>61</sup> These return letters are available at <http://www.reginfo.gov/public/do/eoReturnLetters>.

<sup>62</sup> John D. Graham et al., *Managing the Regulatory State: The Experience of the Bush Administration*, 33 *Ford. Urb. L.J.* 101, 119-21 (2005).

<sup>63</sup> 549 U.S. 497 (2007).

<sup>64</sup> Lisa Heinzerling, *Climate Change at EPA*, 64 *Fla. L. Rev.* 1, 2 (2012).

<sup>65</sup> Heinzerling, 64 *Fla. L. Rev.* at 2.

endangerment finding and the agencies together had prepared rules to regulate greenhouse gases from cars. The agencies sent the rules to OIRA for review.<sup>66</sup> Then things went off the rails.

As I have mentioned, OIRA uses a computer system – known as “ROCIS” – to manage regulatory submissions from agencies. (Even for Washington, the name of the system is exceptionally acronymic: the acronym “ROCIS” contains within it two additional acronyms.<sup>67</sup>) When an agency sends an action to OIRA for review, it submits the package to ROCIS.<sup>68</sup> From its end, OIRA then – in theory – uploads the package from ROCIS. When OIRA uploads the package, it is accepted for review. At that moment, the clock starts to tick on OIRA’s review and the public disclosure requirements kick in. If OIRA does not upload the package, however, it is as if it was never sent to OIRA; no clock begins ticking, and the package does not appear on OIRA’s website listing rules under review. This is what happened to the draft endangerment finding and the proposed rules on cars: OIRA simply declined to upload them into ROCIS. A presidential promise, months of work, compliance with a Supreme Court ruling – all went out the window with OIRA’s simple refusal to be in receiving mode when the agencies sent the package over to OIRA.<sup>69</sup> The endangerment finding and the rules on cars languished at the agencies until the Obama administration came into office.

The effect on EPA of OIRA’s declination of this regulatory package is hard to overstate. EPA had become accustomed, through sheer necessity, to OIRA’s interventions in the rulemaking process. But, so far as I know, OIRA had never before simply declined to accept a fully formed regulatory package. Over a year later, by the time I arrived at EPA as the Administrator’s climate advisor, agency personnel were still reeling from OIRA’s action. During my time at EPA, when OIRA would delay uploading a package to ROCIS for any reason, worry would spread through the offices involved with the package that perhaps OIRA would – as it had with the endangerment finding and the cars rules – just not upload the documents, and it would be as if they had never been sent, or indeed as if they had never been written.

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<sup>66</sup> Heinzerling, 64 Fla. L. Rev. at 2-3.

<sup>67</sup> “ROCIS” stands for “RISC (Regulatory Information Service Center) and OIRA Consolidated Information System.”

<sup>68</sup> OIRA Regulatory System, Records Management System and Records Management Center, [whitehouse.gov/omb/gils\\_oira-gils](http://whitehouse.gov/omb/gils_oira-gils).

<sup>69</sup> Felicity Berringer, *White House Refused to Open Pollutants E-Mail*, N.Y. Times (June 25, 2008); Juliet Eilperin & R. Jeffrey Smith, *EPA Won’t Act on Emissions This Year; Instead of New Rules, More Comment Sought*, Wash. Post (July 22, 2008). As Eilperin and Smith report, it was not clear exactly who within the White House ordered that the regulatory package be declined.

The refusal to open the documents on endangerment and cars caused a furor in the environmental community once it became known.<sup>70</sup> It emerged as a primary example of how OIRA should not operate.<sup>71</sup> To critics, the incident bespoke disrespect for agency process and even for the rule of law. Many hoped such a thing would not happen again.

The assertiveness and opacity of OIRA during the George W. Bush administration led many to hope that when Barack Obama came into office, things would change for the better. And indeed, one of President Obama's first acts was to issue an executive order revoking the Bush-era executive orders on regulatory review.<sup>72</sup> As noted, the major substantive innovation of these orders was the assertion of OIRA authority to review agency guidance; thus, one of the major effects of the revocation of the Bush-era orders should have been to keep OIRA from reviewing agency guidance.

But this was not to be. In a little-noticed memorandum issued less than two months later, OIRA Director Peter Orszag essentially revoked President Obama's revocation of the executive order on guidance.<sup>73</sup> Orszag announced that OIRA would, despite Obama's order, continue to review agency guidance, since it had done so for many years.<sup>74</sup> The President's revocation of the Bush-era executive orders had received enthusiastic attention from progressive groups.<sup>75</sup> Perhaps not surprisingly, the OMB Director's memorandum revoking the major substantive part of the President's executive order – issued quietly, without a press release –

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<sup>70</sup> Here is Jon Stewart's hilarious take on the episode: <http://www.thedailyshow.com/watch/wed-june-25-2008/be-patient-this-gets-amazing---epa-e-mail>.

<sup>71</sup> White House disses Supreme Court, kills \$2 trillion savings, <http://thinkprogress.org/climate/2008/07/01/202838/white-house-mocks-supreme-court-kills-2-trillion-savings/> (also discussing OMB intervention in EPA's later-issued Advance Notice of Proposed Rulemaking regarding greenhouse gases).

<sup>72</sup> EO 13497, Revoking Executive Orders 13258 and 13422 Concerning Regulatory Planning and Review (Jan. 30, 2009), available at <http://www.whitehouse.gov/the-press-office/revocation-certain-executive-orders-concerning-regulatory-planning-and-review>.

<sup>73</sup> Peter R. Orszag, Memorandum for the Heads and Acting Heads of Executive Departments and Agencies (Mar. 4, 2009), available at [aolt/files/omb/assets/memoranda\\_fy2009/m09-13.pdf](http://aolt.files/omb/assets/memoranda_fy2009/m09-13.pdf).

<sup>74</sup> Id.

<sup>75</sup> See, e.g., Obama Begins Regulatory Reform, <http://www.foreffectivegov.org/node/9689>; Revoking EO 13422: An Important First Step Toward Fixing the Regulatory System, <http://www.progressivereform.org/printPage.cfm?idBlog=417B6671-1E0B-E803-CA4ED11FA8E0030C>.

received almost no attention.<sup>76</sup> In fact, so stealthy was the replacement of Obama's order with Orszag's memorandum that, even months later, I found myself having to explain to EPA personnel why they still needed to send agency guidance to OIRA for review. Quite understandably, they had read Barack Obama's executive order rather than Peter Orszag's memo.

In another gesture of potential change, in January 2009 President Obama also issued a presidential memorandum directing the Director of OMB to consult with representatives of regulatory agencies and to make recommendations to the President for a new executive order on regulatory review.<sup>77</sup> The memorandum noted that much had been learned since 1993, when EO 12,866 was issued, about both the substance of regulation ("what works and what does not") and about "how to improve the process of regulatory review."<sup>78</sup> "In this time of fundamental transformation," President Obama declared, "that process – and the principles governing regulation in general – should be revisited."<sup>79</sup> The President also laid out specific topics he wanted covered in OMB's recommendations:

[T]he recommendations should offer suggestions for the relationship between OIRA and the agencies; provide guidance on disclosure and transparency; encourage public participation in agency regulatory processes; offer suggestions on the role of cost-benefit analysis; address the role of distributional considerations, fairness, and concern for the interests of future generations; identify methods of ensuring that regulatory review does not produce undue delay; clarify the role of the behavioral sciences in formulating regulatory policy; and identify the best tools for achieving public goals through the regulatory process.<sup>80</sup>

President Obama directed OMB to produce the recommendations within 100 days.<sup>81</sup> The President also directed OMB to consult with the representatives of regulatory agencies, "as appropriate," in formulating recommendations for a new executive order.<sup>82</sup> From my time at EPA, I know that agencies did indeed submit comments to OMB. Notably, OMB never made the agencies' comments public; thus we do not know what the agencies said to OMB about regulatory review and how to improve the process. OMB also asked the public for comments on regulatory review and how

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<sup>76</sup> No press statement appears on the White House website devoted to such items: <http://www.whitehouse.gov/briefing-room/Statements-and-Releases/2009/03>.

<sup>77</sup> Presidential Memorandum of January 30, 2009 – Regulatory Review, 74 Fed. Reg. 5977, available at [http://www.reginfo.gov/public/jsp/EO/fedRegReview/POTUS\\_Memo\\_on\\_Regulatory\\_Review.pdf](http://www.reginfo.gov/public/jsp/EO/fedRegReview/POTUS_Memo_on_Regulatory_Review.pdf).

<sup>78</sup> Id. at 5977.

<sup>79</sup> Id. at 5977.

<sup>80</sup> Id. at 5977.

<sup>81</sup> Id. at 5977.

<sup>82</sup> 74 Fed. Reg. at 5977.

to reform it.<sup>83</sup> Public comments (183 of them)<sup>84</sup> came in by the end of March, 2009.<sup>85</sup>

And there the matter sat. Agency personnel, buoyed by the possibility of reform of a secretive, intrusive, and time-consuming process, eagerly anticipated the new executive order. Outside groups interested in health, safety, and environmental protection cheered the prospect of changes to a system that had worked disproportionately against rules in their domain. But nothing happened for almost two years, and in that time OIRA continued to assert its customary control over agency regulatory decisions.

### C. 13,563

In January 2011, a new executive order on regulatory review finally emerged.<sup>86</sup> The single most notable fact about the new order, EO 13,563, is how not-new it was; much of the order simply repeats, verbatim, the language of EO 12,866.

Another striking fact about the order is how weakly responsive it is to President Obama's own directives in his presidential memorandum of January 2009: EO 13,563 does not say a word about "the relationship between OIRA and the agencies" or "methods of ensuring that regulatory review does not produce undue delay." On "disclosure and transparency," the order says nothing about disclosure and transparency related to OIRA, but focuses only on the agencies and here simply advises them to place materials online and in an open format wherever possible.<sup>87</sup> On "public participation in agency regulatory processes," the order advises the agencies to seek out the public's views prior to proposing rules (something agencies already routinely did).<sup>88</sup> On "the role of cost-benefit analysis," the order adds nothing to EO 12,866 except for a new allowance for "human dignity" in the calculations of regulatory benefits.<sup>89</sup> As for "the role of distributional considerations, fairness, and concern for the interests of future generations," the order adds only the word "fairness" to EO 12,866's already-existing references to

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<sup>83</sup> OMB, Federal Regulatory Review, 74 Fed. Reg. 8819 (Feb. 26, 2009) (inviting public comment on how to improve the process of regulatory review and principles governing regulation).

<sup>84</sup> Steinzor, Abolishing Centralized Regulatory review, at256.

<sup>85</sup> OMB, Federal Regulatory Review, Extension of request for comments, 74 Fed. Reg. 11383 (Mar. 17, 2009) (extending public comment period to March 31, 2009). A summary of the comments from 170 different individuals and organizations can be found at <http://www.foreffectivegov.org/node/9913>.

<sup>86</sup> EO 13563, Improving Regulation and Regulatory Review, 76 Fed. Reg. 3821 (Jan. 18, 2011).

<sup>87</sup> EO 13563, § 2(b).

<sup>88</sup> EO 13563, § 2(c).

<sup>89</sup> EO 13563, § 1(c).

distributive impacts and equity.<sup>90</sup> And as for clarifying “the role of the behavioral sciences in formulating regulatory policy” and identifying “the best tools for achieving public goals through the regulatory process,” the only new item in the new executive order was a reference to “appropriate default rules.”<sup>91</sup>

President Obama’s new executive order on regulatory review, in short, was neither very new nor very specific. Any hope that President Obama would use the new executive order as an occasion to fundamentally reshape the relationship between the White House and the agencies, or to loosen the grip of cost-benefit analysis on regulatory policy, was dashed. Yet the very vagueness of the executive order also created a large space within which OIRA could fashion a kind of common law of regulatory review. OIRA eagerly inhabited that space.

## II. The Common Law of 13,563

The common law of EO 13,563 determines the most important features of the current process of regulatory review: who is the decision maker, what is reviewed, why particular actions fail regulatory review, when actions emerge from review, and what is disclosed about the process. If one has read EOs 12,866 and 13,563, which in theory govern this process, surprises are in store once we look at the way the process actually operates.

### A. Who Decides?

Recall that EO 12,866 puts OIRA initially in charge of the process of regulatory review. But if, according to EO 12,866, a dispute arises between OIRA and the action agency, the dispute is to be resolved through a highly specified process that involves recommendations from the Vice-President and an ultimate decision by the President or by the Vice-President acting on his behalf.<sup>92</sup> (Recall that the Bush-era executive order replacing the role of the Vice-President with that of presidential “advisors” was revoked by President Obama during his first days in office.<sup>93</sup>)

This is not how regulatory review works today. In my two years at EPA, I do not recall ever hearing of Vice-Presidential involvement in a regulatory matter. Moreover, the OIRA process in the Obama administration was not structured to funnel disputes between OIRA and the agencies to Vice-President Biden for his recommendations. It was far messier and more ill-defined than that. From my perspective, it was often hard to tell who exactly was in charge of making the ultimate decision on an important regulatory matter.

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<sup>90</sup> EO 13563, § 1(c).

<sup>91</sup> EO 13563, § 4.

<sup>92</sup> EO 12866, § 7.

<sup>93</sup> EO 13497.

A recent account of the OIRA process by former OIRA Administrator Cass Sunstein helps to explain this confusion as to some regulatory matters, but leaves a puzzle as to others.<sup>94</sup> Sunstein states that OIRA's primary role in the regulatory process is as an "information-aggregator" – compiling information from many actors in the executive branch and using that information to help get at the right regulatory result.<sup>95</sup> Observing that the White House is a "they," not an "it,"<sup>96</sup> Sunstein emphasizes the role of other White House offices and officials, beyond OIRA, in shaping regulatory policy.<sup>97</sup> Sunstein lists almost a dozen White House offices that, he says, play a significant role.<sup>98</sup> Beyond the White House, Sunstein asserts that agencies other than the agency proposing a particular regulatory action also have a large influence on regulatory policy.<sup>99</sup> Sometimes it is another Cabinet secretary who might have such influence;<sup>100</sup> often, Sunstein says, it is career staff at another agency.<sup>101</sup> Sometimes it is the Chief of Staff of the White House who plays the major role;<sup>102</sup> sometimes it is a member of Congress.<sup>103</sup> Sunstein extols the virtues of this system, arguing that the aggregation of input from all of these different sources produces better regulatory results.<sup>104</sup> Of course, Sunstein's description also explains why it was often hard, from EPA's perspective, to know who was calling the shots; perhaps it was Rahm Emanuel, the White House Chief of Staff from 2009 to 2010, or perhaps it was Tom Vilsack, the Secretary of Agriculture, or perhaps it was a career staffer at the Department of Energy. The confusion was deepened by OIRA's insistence that, once a matter was under review, all communications run through OIRA;<sup>105</sup> at one point in my tenure at EPA, it was even suggested that a conversation between members of the President's cabinet on a matter under review would be inappropriate if OIRA were not included.

Sunstein's account of the OIRA process at least helps me to understand why we were all so confused about exactly what the process was.

In another respect, though, Sunstein's account in the *Harvard Law Review* is puzzling rather than clarifying. From my vantage point at EPA, it certainly often

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<sup>94</sup> Sunstein, *Myths and Realities*, Harv. L. Rev. (forthcoming), available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2192639](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2192639). Page number references in subsequent cites to this article (hereinafter "Myths and Realities") are from the SSRN posting.

<sup>95</sup> *Id.* at 1, 3, 35.

<sup>96</sup> *Id.* at 3, 16, 20.

<sup>97</sup> *Id.* at 8, 12, 17, 19, 20, 28, 33-34.

<sup>98</sup> *Id.* at 17.

<sup>99</sup> *Id.* at 3-4, 5-6, 10, 17, 32.

<sup>100</sup> *Id.* at 14-15, 21.

<sup>101</sup> *Id.* at 4, 5-6.

<sup>102</sup> *Id.* at 19, 34.

<sup>103</sup> *Id.* at 15, 21.

<sup>104</sup> *Id.* at 3-4, 6, 32-34.

<sup>105</sup> *Id.* at 22.

appeared that OIRA – not other White House offices, not other agencies – was calling the shots. OIRA decided what to review, offered line-by-line edits of regulatory proposals, convened meetings with outside parties, mediated disputes among the agencies, decided whether an agency’s cost-benefit analysis was up to snuff, and more. It often appeared, from the agency’s perspective, that other White House offices were brought in to bolster, not to question, OIRA’s position on regulatory matters.<sup>106</sup> I was not in the White House, and so I cannot confirm that the latter impression was correct. But I can say that Sunstein’s account does not jibe with my own perceptions of OIRA’s power relative to EPA or to other executive branch actors.

In his new book on his time in the government, however, Sunstein paints a somewhat different picture of the role of OIRA during his tenure. Sunstein’s book, “Simpler: The Future of Government,” makes clear just how much power he wielded as the Administrator of OIRA. Referring to OIRA as “the cockpit of the regulatory state,”<sup>107</sup> Sunstein informs us that, as OIRA Administrator, he had the power to “say no to members of the president’s Cabinet”;<sup>108</sup> to deposit “highly touted rules, beloved by regulators, onto the shit list”;<sup>109</sup> to make sure that some rules “never saw the light of day”;<sup>110</sup> to impose cost-benefit analysis “wherever the law allowed”;<sup>111</sup> and to transform cost-benefit analysis from an analytical tool into a “rule of decision,” meaning that “[a]gencies could not go forward” if their rules flunked OIRA’s cost-benefit test.<sup>112</sup> This account – in which OIRA plays a central and often decisive role in determining which rules move and which don’t – is much more consistent with my own experience at EPA than is Sunstein’s account of OIRA as a kind of neutral “information-aggregator.”

Beyond Sunstein’s account, the relative power of EPA within the OIRA process is also well illustrated by considering the increase in influence that EPA personnel enjoy when they go on detail to offices within the White House. Many White House offices depend on agency detailees to help do their work. The Council of Economic Advisors and the Council on Environmental Quality nearly always have one or more detailees from EPA. These detailees, in my experience, participate actively in the OIRA process – and, often, not by pressing for EPA’s rules but instead by offering critiques of EPA’s work. The detailees appear to have far more power when they are housed in a White House office than they do at EPA, often because their expertise – frequently it is economics – is more central to the White House

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<sup>106</sup> This impression is consistent with EPA officials’ accounts of White House involvement in rulemaking during the Bush I and Clinton years. Bressman & Vandenberg, *Inside the Administrative State*, 105 Mich. L. Rev. at 68-69.

<sup>107</sup> Sunstein, *Simpler*, at 3.

<sup>108</sup> *Id.* at 3.

<sup>109</sup> *Id.* at 6.

<sup>110</sup> *Id.* at 7.

<sup>111</sup> *Id.* at 8.

<sup>112</sup> *Id.* at 161.

process than it is to EPA's regulatory frameworks. Going on detail to the White House increases the power of EPA personnel not because they somehow become more expert when they go to the White House, but because the White House privileges their particular expertise over other kinds of expertise. Going on detail to the White House also increases the power of agency personnel for another, very simple reason: the White House has the final say on agency rules.

The role of agency detailees in the OIRA process makes it hard to make sense of Sunstein's portrait of OIRA as an "information-aggregator." If, as I have said, an appreciable number of the people doing the work in the White House are actually employees on detail from the agencies whose work is being reviewed, what sense does it make to say that the OIRA review process increases the total amount of information gathered during a rulemaking process or that it increases the likelihood that a rule will get it right? The same agency personnel participating in the White House process have virtually identical counterparts, making the same kinds of observations, in their home agencies; yet these personnel have a power in the White House that they do not enjoy in their home agencies. More than an information-aggregator, then, OIRA is an information-sorter; economic information rises to the top, other information shakes out below.

Also relevant to the question of who is calling the shots in the OIRA process is the kind of rules OIRA reviews. Most of the rules OIRA reviews are not economically significant,<sup>113</sup> that is, they do not pass EO 12,866's economic-significance threshold of \$100 million in annual costs.<sup>114</sup> Many of the rules do not have obvious interagency dimensions. Many are continuing iterations of longstanding regulatory programs. In these cases, when the rules got into trouble in the OIRA process, it often did not appear that there was any appreciable interagency pushback on the rules or any White House resistance outside OIRA. Often, indeed, it appeared that OIRA career staff simply trumped EPA career staff when it came to rules that were neither insignificant enough, from OIRA's perspective, to pass up the opportunity for review, nor significant enough, from EPA's perspective, to elevate the issue beyond OIRA.<sup>115</sup>

In these ways, the "common law" of regulatory review under President Obama manages to muddy the seemingly simple question: who runs EPA? Long gone, it appears, is the carefully articulated power structure of EO 12,866, with its process for elevating issues and for deciding them once elevated. In its place, a free-for-all of regulatory power has emerged, with no one clearly in charge. The lack of a

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<sup>113</sup> From January 20, 2009, to April 8, 2013, OIRA reviewed a total of 2514 regulatory actions, of which only 477 were economically significant. <http://www.reginfo.gov/public/do/eoCountsSearch>. For EPA, the numbers were 340 total rules, 66 of which were economically significant.

<sup>114</sup> EO 12866, § 3(f)(1).

<sup>115</sup> For a similar account of the Bush I and Clinton years, see Bressman & Vandenberg, *Inside the Administrative State*, 105 Mich. L. Rev. at 68.

clear power structure is, perhaps unintentionally, best captured by Sunstein's incongruent accounts of his own role in the process: was he the regulatory czar, or an information-aggregator? It depends on which account you read.

## B. What Is Reviewed?

One domain in which OIRA's powerful role is quite clear, however, is in the decisions about which regulatory actions OIRA will review. EO 12,866 states that OIRA may review not only economically significant actions, but also actions with a significant potential for interagency conflict or inconsistency and actions that raise "novel legal or policy issues."<sup>116</sup> In fact, most of the rules OIRA reviews are not economically significant. In the Obama administration so far, some 80 percent of the EPA rules that have been reviewed were not economically significant.<sup>117</sup> Moreover, many of the rules under review lack any obvious interagency dimension. So how does OIRA come to review them?

While I was at EPA, we had a routinized process for determining what went to OIRA. Every three months or so, the Assistant Administrators of the program offices (air, water, solid waste and emergency response, chemical safety and pollution prevention) and I met with representatives from OIRA to go over the regulatory actions EPA planned to announce in the coming months. We offered our own opinion as to whether any given item warranted OIRA review. But the bottom line was that it was not our decision to make. If OIRA wanted to review something, OIRA reviewed it.<sup>118</sup> Sometimes, the reason for review was a little baffling, along the lines of: we've always reviewed this kind of action, so we'd like to review this one, too. The explanation was baffling because the longstanding practice of review sometimes came straight from a prior administration with seemingly different perspectives on the role of regulation and government; the same OIRA career personnel who had "always" reviewed those kinds of actions were insisting that they should still review them, even after a change in personnel at the very top – and even though, strangely, they were often asserting such power of review under the EO provision that covered "*novel*" legal or policy issues. On occasion, EPA was able to persuade OIRA not to review a regulatory action that OIRA was inclined to review; but this was the exception, not the rule.

It is thus quite perplexing to read recent accounts of the OIRA process that argue that agencies can avoid OIRA review altogether through quite obvious and simple stratagems.<sup>119</sup> Agencies can, it is argued, separate regulatory actions into

<sup>116</sup> EO 12866, § 3(f)(4).

<sup>117</sup> Numbers are available at <http://www.reginfo.gov/public/do/eoCountsSearch>.

<sup>118</sup> This is OIRA's prerogative. See EO 12866, § 6(b)(3)(B).

<sup>119</sup> Jennifer Nou, Agency Self-Insulation under Presidential Review, Harv. L. Rev. (2013), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2208058##](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2208058##) (page numbers in

different packages so that no one action is economically significant;<sup>120</sup> they can low-ball their estimates of regulatory costs to come in under the threshold for economic significance;<sup>121</sup> they can slip a policy out as guidance rather than as a rule;<sup>122</sup> they can do low-quality cost-benefit analysis to make OIRA review more difficult;<sup>123</sup> they can even, we are told, spring a rule on the world without warning to OIRA.<sup>124</sup>

From the perspective of EPA at least, this is not a plausible account. Most of the EPA rules OIRA reviews are not economically significant, so fussing around to make a rule or package of rules not economically significant won't help to avoid OIRA review. OIRA, in any event, lavishes skeptical attention on EPA's estimates of regulatory costs. Moreover, as discussed above, OIRA continues to review agency guidance,<sup>125</sup> so denominating an action as guidance will not avoid OIRA review. And in my experience, OIRA personnel keep an eagle eye on EPA – on its public announcements, website, etc. – to make sure EPA does not sneak something past it. From OIRA's perspective, the system appears to work: EPA receives more sustained attention from OIRA than any other federal agency. Most often, EPA is the agency with the largest number of rules under review at OIRA.<sup>126</sup>

On the issue of which regulatory actions go to OIRA, therefore, the express terms of EO 12,866 again recede and a common law emerges. OIRA reviews pretty much anything it wants to review, and fits anything it must into the catch-all category, “novel legal or policy issues.”

### C. Why Do Rules Fail?

One of the most vexing questions concerning regulatory review has to do with the basis on which regulatory actions fail this review. When a regulatory action goes to OIRA for review, it goes fully formed, reflecting the agency's best judgment about the proper path in the relevant circumstances. EPA rules go to OIRA after an extensive period of internal development and review.<sup>127</sup> In many

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subsequent references to this article are from SSRN posting); Note, OIRA Avoidance, 124 Harv. L. Rev. 994 (2011).

<sup>120</sup> Nou, at 36.

<sup>121</sup> Nou, at 36.

<sup>122</sup> Nou, at 28-32.

<sup>123</sup> Nou, at 37-40.

<sup>124</sup> Note, OIRA Avoidance, at 1005.

<sup>125</sup> Peter R. Orszag, Memorandum for the Heads and Acting Heads of Executive Departments and Agencies (Mar. 4, 2009), available at [aolt/files/omb/assets/memoranda\\_fy2009/m09-13.pdf](http://aolt.files/omb/assets/memoranda_fy2009/m09-13.pdf).

<sup>126</sup> Lists of rules under formal review at OIRA can be found at [www.reginfo.gov](http://www.reginfo.gov).

<sup>127</sup> EPA has a robust internal process for developing rules, described in Office of Policy, EPA's Action Development Process: Guidance for EPA Staff on Developing Quality Actions (March 2011),

cases, the rules have been under development for years, with dozens or more agency personnel working on them. In the case of the most significant rules, they have gone to the Administrator herself for initial selection of options and later for final review.<sup>128</sup> It is a matter of some consequence, then, when OIRA does not allow such rules to issue, or requires substantial changes before they may issue.

One reason why OIRA might disapprove of an agency's planned action is that it disagrees with the agency's interpretation of the statute the agency is charged with administering. Notably, neither EO 12,866 nor EO 13,563 gives OIRA the authority to second-guess agencies' interpretations of the statutes they administer. Indeed, both executive orders explicitly state that nothing in them permits a departure from existing law.<sup>129</sup> Yet, in a post-*Chevron* world, that disclaimer means less than it seems. If a statute is ambiguous – or if OIRA believes that a statute is ambiguous – then perhaps OIRA has room to press an agency to change its interpretation of a statute it administers, without running afoul of the EOs' injunction to follow existing law. After *Chevron*, “existing law” is up for grabs so long as existing law is ambiguous.<sup>130</sup>

President Obama's OIRA has aggressively moved into the space created by *Chevron*. As a law professor, Cass Sunstein had promoted “cost-benefit default principles,” according to which statutes are interpreted to allow cost-benefit analysis so long as they do not clearly forbid it;<sup>131</sup> as OIRA Administrator, Sunstein moved to lock these default principles into place.<sup>132</sup> With respect to EPA rules, OIRA actively pressed EPA to interpret its governing statutes to allow cost-benefit analysis, even where EPA had a long history of interpreting them not to allow it. Pressure like this appears to have borne public fruit when EPA announced its long-awaited proposal for addressing the ecological impacts of cooling water intake structures under the Clean Water Act. In its preamble discussing the rule, EPA noted that it was adopting an interpretation of the relevant provision of the Clean

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[http://yosemite.epa.gov/sab/sabproduct.nsf/5088B3878A90053E8525788E005EC8D8/\\$File/adp03-00-11.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/5088B3878A90053E8525788E005EC8D8/$File/adp03-00-11.pdf).

<sup>128</sup> EPA's Action Development Process specifies the criteria for determining which regulatory actions are “Tier 1” rules and thus must receive substantial input from the Administrator at important stages in the rulemaking process. EPA's Action Development Process, at 22-27, available at [http://yosemite.epa.gov/sab/sabproduct.nsf/5088B3878A90053E8525788E005EC8D8/\\$File/adp03-00-11.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/5088B3878A90053E8525788E005EC8D8/$File/adp03-00-11.pdf).

<sup>129</sup> EO 12866, § 9; EO 13563, § 7(b)(i), (c).

<sup>130</sup> *Chevron U.S.A. v. Natural Resources Defense Council*, 467 U.S. 837 (1984).

<sup>131</sup> Cass R. Sunstein, *Cost-Benefit Default Principles*, 99 Mich. L. Rev. 1651 (2001).

<sup>132</sup> Sunstein, *Simpler*, at 8.

Water Act that would allow cost-benefit analysis, citing EO 13,563 as authority for this interpretation.<sup>133</sup>

I have argued elsewhere that agencies should not get deference under *Chevron* when an interpretation is foisted upon them by OIRA; OIRA is not charged by Congress with interpreting the statutes the agencies administer, and OIRA does not have the expertise of the relevant agencies.<sup>134</sup> But whatever one thinks about the legal consequences of an OIRA-driven agency interpretation, one must take note of the large degree of influence wielded by OIRA when one of the powers it asserts is to embed cost-benefit default principles into the regulatory process.

To understand the boldness of OIRA's power grab, it helps to consider a bit of history. In 1994, eyeing the first Republican takeover of the House of Representatives in forty years, Newt Gingrich proposed an aggressive series of legislative reforms, bundled together as the "Contract With America."<sup>135</sup> Among the most contentious of the proposals was the "supermandate": a requirement that all rules protecting human health, safety, or the environment pass a cost-benefit test.<sup>136</sup> Critics of what President Bill Clinton dubbed the "Contract On America"<sup>137</sup> feared that applying a cost-benefit test to health, safety, and environmental rules would often spell their doom, as these rules produce benefits — in human health, in longer life, in cleaner air and water and land — that are hard to quantify and even harder to monetize.<sup>138</sup> President Clinton vetoed bills to fund the government in part because they contained the supermandate,<sup>139</sup> leading to the government shutdowns of 1995 and likely contributing to Clinton's political renewal.

Thanks to Sunstein, though, the supermandate is back. By pressing agencies to adopt cost-benefit analysis as a decision-making framework wherever the law allows it, Sunstein's OIRA has, by executive fiat rather than legislative enactment, imposed a cost-benefit supermandate wherever the law is ambiguous (which, of

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<sup>133</sup> National Permit Discharge Elimination System – Cooling Water Intake Structures at Existing Facilities and Phase I Facilities, Proposed Rule, 76 Fed. Reg. 22173, 22185, 22196, 22207, 22212 (Apr. 20, 2011).

<sup>134</sup> Lisa Heinzerling, Statutory Interpretation in the Era of OIRA, 33 Ford. Urb. L.J. 1097 (2006).

<sup>135</sup> See, e.g., Katherine Q. Seelye, The 1994 Campaign: The Republicans; With Fiery Words, Gingrich Builds His Kingdom, N.Y. Times, at A1 (Oct. 27, 1994).

<sup>136</sup> See, e.g., Thomas O. McGarity, The APA at Fifty: The Expanded Debate Over the Future of the Regulatory State, 63 U. Chi. L. Rev. 1463, 1494 (1996).

<sup>137</sup> See, e.g., Adam Clymer, The Clinton Record: Congress; The President and Congress: A Partnership of Self-Interest, N.Y. Times, at A1 (Oct. 2, 1996).

<sup>138</sup> See, e.g., Todd S. Purdum, Clinton Says G.O.P. Rule Cutting Would Cost Lives, at A14 (Feb. 22, 1995).

<sup>139</sup> See, e.g., R.W. Apple Jr., In This Fight, Polls Guide All the Moves, N.Y. Times, at A1 (Nov. 15, 1995).

course, it often is). Presumably, then, one way that rules can fail the OIRA process is if they do not hew to OIRA's new supermandate.

Another way rules can fail the OIRA review process is to fail cost-benefit analysis. One way to fail is never to try. An important but little-remarked aspect of the relationship between EPA and OIRA is that OIRA's cost-benefit sieve leads EPA personnel to be deeply wary of developing rules that have very high costs in relation to their quantified and monetized benefits. Indeed, Sunstein himself suggests this may be one consequence of OIRA's cost-benefit test.<sup>140</sup> From the moment EPA begins even to think about proposing a rule that OIRA will likely want to see, EPA personnel wonder whether OIRA will accept it; this mindset narrows the range of rules EPA might otherwise consider.

If EPA does decide to propose a rule that has much higher costs than benefits, that rule may not make it past OIRA. Among environmental rules, non-air rules fare the worst in a cost-benefit framework. Rules governing air pollution often produce relatively (or even very) high benefits in relation to costs on account of reductions in particulate matter. Indeed, according to OMB, in the last decade clean air rules have produced a majority of the total monetized benefits conferred by all of the major regulations in the federal government.<sup>141</sup> Rules on water pollution, toxics, and hazardous waste contamination do not have a single category of benefits – like reductions in human mortality due to reductions in particulate matter – that makes it possible for them to clear the cost-benefit hurdle. These programs fare poorly in OIRA's process of review. EPA's proposal to regulate coal ash changed markedly while at OIRA, and has not seen the light of day since it was proposed.<sup>142</sup> EPA initiatives on toxics have stalled at OIRA for years.<sup>143</sup> Likewise, rules on water pollution appear permanently stuck.<sup>144</sup> While Sunstein reports that cost-benefit analysis is not a major reason why rules get stuck at OIRA,<sup>145</sup> it is hard to escape speculating that cost-benefit analysis must be one factor in the trouble these categories of rules have run into at OIRA. Indeed, Sunstein also says that rules that fail cost-benefit will in fact likely fail OIRA review.<sup>146</sup>

<sup>140</sup> Sunstein, *Myths and Realities*, at 26.

<sup>141</sup> OMB, *Draft 2012 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities*, at 15, available at [http://www.whitehouse.gov/sites/default/files/omb/oir/draft\\_2012\\_cost\\_benefit\\_report.pdf](http://www.whitehouse.gov/sites/default/files/omb/oir/draft_2012_cost_benefit_report.pdf).

<sup>142</sup> Center for Effective Government, *White House Misadventures in Coal Ash Rule* (May 18, 2010), <http://www.foreffectivegov.org/node/11001>.

<sup>143</sup> [www.reginfo.gov](http://www.reginfo.gov), "Regulations Under EO 12866 Review" (showing chemicals rules that have been at OIRA for one to three years).

<sup>144</sup> [www.reginfo.gov](http://www.reginfo.gov), "Regulations Under EO 12866 Review" (showing water rules that have been at OIRA for over a year).

<sup>145</sup> Sunstein, *Myths and Realities*, at 29-30.

<sup>146</sup> Sunstein, *Simpler*, at 161.

Sunstein asserts that EO 13,563 adds qualitative texture to the generally quantitative thrust of cost-benefit analysis.<sup>147</sup> In particular, he notes, EO 13,563 introduced “dignity” into the cost-benefit equation.<sup>148</sup> Sunstein cites the Department of Justice’s rule on prison rape as an instance in which “dignity” made a difference in the regulatory process.<sup>149</sup> In its cost-benefit analysis of its rule aiming to reduce the incidence of prison rape, DOJ noted that it was very hard to quantify and monetize the benefits of reducing rape.<sup>150</sup> Nevertheless, DOJ said, reducing rape would promote human dignity, and this was a positive feature of its rule on prison rape.<sup>151</sup>

But I would venture to guess that the only reason DOJ was doing a cost-benefit analysis of rape prevention was that OIRA insisted on it. The only reason DOJ needed to reach to justify preventing rape was that OIRA’s cost-benefit vision did not easily digest, in economic terms, a human indignity like rape.<sup>152</sup> To argue, as Sunstein does, that the inclusion of “dignity” in EO 13,563 somehow made it possible to issue DOJ’s rule on prison rape is to get things very backwards.

One of the most problematic features of cost-benefit analysis, especially for future-oriented regulatory programs like those involving the environment, is its treatment of future consequences. In calling for recommendations on a new executive order, President Obama explicitly asked the OMB Director to address “concern for the interests of future generations.”<sup>153</sup> This concern did not make it into the actual executive order, and indeed, the record of the Obama administration has been disappointing in this domain. The Obama administration’s signature effort in this area – the estimation of the “social cost of carbon”<sup>154</sup> – used higher discount rates than OIRA’s own cost-benefit guidance to agencies allows when a regulatory policy has significant intergenerational effects. The Obama administration approved a “central” value for the discount rate to be used in calculating the social cost of carbon of 3 percent and an upper value of 5 percent<sup>155</sup> – yet OIRA’s own guidance allows agencies to use discount rates of 1 to 3 percent where

<sup>147</sup> Sunstein, *Myths and Realities*, at 27.

<sup>148</sup> Sunstein, *Myths and Realities*, at 27.

<sup>149</sup> Sunstein, *Myths and Realities*, at 27.

<sup>150</sup> Prison Rape Elimination Act, Regulatory Impact Assessment, Department of Justice Final Rule, at 3 (May 17, 2012), available at [http://www.ojp.usdoj.gov/programs/pdfs/prea\\_ria.pdf](http://www.ojp.usdoj.gov/programs/pdfs/prea_ria.pdf).

<sup>151</sup> PREA RIA at 5.

<sup>152</sup> Lisa Heinzerling, *Cost-Benefit Jumps the Shark*, [http://gulcfac.typepad.com/georgetown\\_university\\_law/2012/06/cost-benefit-jumps-the-shark.html](http://gulcfac.typepad.com/georgetown_university_law/2012/06/cost-benefit-jumps-the-shark.html) (June 2012).

<sup>153</sup> Presidential Memorandum of January 30, 2009, Regulatory Review.

<sup>154</sup> Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, available at <http://www.epa.gov/oms/climate/regulations/scc-tsd.pdf>.

<sup>155</sup> *Id.* at 3.

intergenerational effects are significant.<sup>156</sup> Increasing the discount rate means decreasing the worth of future generations.<sup>157</sup> In approving a high range of discount rates for climate consequences, the Obama administration took a step backward, not forward, in the incorporation of future generations' interests in cost-benefit analysis.

We have seen that rules might fail OIRA review because they do not have a positive enough cost-benefit profile, and that President Obama's executive order on regulatory review has not appreciably helped rules get over this hurdle. Another reason why rules might fail OIRA review is that they simply fail "on the merits." This is, in fact, Sunstein's explanation of why EPA's final rule revising the ozone standard failed: the decision to return the rule to EPA was, Sunstein asserts, "unquestionably correct"<sup>158</sup> and "made on the merits."<sup>159</sup> He does not explain what this means – on the merits, considering cost-benefit analysis? on the merits, considering the scientific evidence? on the merits, considering EPA's other priorities and activities? – but he does insist that the rejection of EPA's rule on ozone was "not motivated by politics."<sup>160</sup>

Whatever view Sunstein takes of the "merits" of the ozone rule, it is hard to understand why the President rejected it and why Sunstein thinks that decision was "unquestionably correct." If, by the "merits," Sunstein means that the rule failed a cost-benefit test, that claim would be legally irrelevant. Neither EPA nor the White House was allowed to use cost-benefit analysis to pass judgment on the rule: the Supreme Court has held (unanimously) that EPA may not consider costs in setting the National Ambient Air Quality Standards.<sup>161</sup> The President's letter to Administrator Jackson emphasized "regulatory burdens," "regulatory uncertainty," and the economic downturn in explaining the return of the rule to EPA;<sup>162</sup> if these considerations were indeed the basis for the President's decision, the decision was unlawful.

Perhaps Sunstein means that the ozone rule failed on the scientific merits. Certainly, OIRA has played an active role in adjusting EPA's discussions of technical matters in its NAAQS decisions. In a report prepared for the Administrative Conference of the United States, Professor Wendy Wagner has carefully documented

<sup>156</sup> [http://www.whitehouse.gov/omb/circulars\\_a004\\_a-4/](http://www.whitehouse.gov/omb/circulars_a004_a-4/).

<sup>157</sup> Lisa Heinzerling, *Discounting Our Future*, 34 *Land & Water L. Rev.* 39 (1999).

<sup>158</sup> Sunstein, *Simpler*, at 7.

<sup>159</sup> Sunstein, *Simpler*, at 27.

<sup>160</sup> Sunstein, *Simpler*, at 27. For a very different take on this episode, see John M. Broder, *Re-election Strategy Is Tied to a Shift on Smog*, *N.Y. Times* (Nov. 16, 2011).

<sup>161</sup> *Whitman v. American Trucking Associations*, 531 U.S. 457 (2001).

<sup>162</sup> Statement by the President on the Ozone National Ambient Air Quality Standards (September 2, 2011), available at <http://www.whitehouse.gov/the-press-office/2011/09/02/statement-president-ozone-national-ambient-air-quality-standards>.

just how often OIRA intrudes upon EPA's technical analysis in the domain of the NAAQS.<sup>163</sup> But OIRA does not have the scientific expertise necessary to make judgments about where the NAAQS should be set. Nor, it should be added, does the President. Moreover, the scientific shakiness of the decision to direct EPA to withdraw the ozone standard emerged clearly at oral argument on the EPA standard left in place by President Obama's decision. At argument, the panel of D.C. Circuit judges sharply questioned the government's lawyers as to the scientific merits of the Bush-era ozone standard, left standing after EPA withdrew its revised standard.<sup>164</sup> They seemed very skeptical that the Bush-era standard was stringent enough.<sup>165</sup> Given the lack of relevant expertise on the part of OIRA and the President, and given the hard time EPA had defending the Bush-era standard in court, it is hard to imagine that when Sunstein says Obama's decision to reject EPA's revised standard was correct "on the merits," Sunstein means that the directive to withdraw the revised standard was scientifically correct.

A final possibility is that Sunstein believes that the ozone decision was correct on the merits because it reflected good governance. The President's letter to Administrator Jackson emphasized the importance of regulatory certainty and observed that EPA was already in the process of reviewing the ozone standard in light of the very latest scientific evidence.<sup>166</sup> So perhaps Sunstein means that the decision to reject the standard was correct because EPA should just have waited for the new five-year review of the ozone standard, rather than reconsidering the Bush-era standard and replacing it with a revised standard based on the same evidence EPA had considered in the Bush administration.

The trouble with this potential explanation is that, by the time President Obama ordered the standard pulled, EPA had been working on the reconsidered ozone standard for 2-1/2 years, with the full knowledge and acquiescence of the White House. Work on the reconsidered standard was consistent with Rahm Emanuel's memorandum to agencies, written within a week of President Obama's inauguration, directing them to review new and pending regulatory actions begun in the Bush administration,<sup>167</sup> and with the President's own March 2009

<sup>163</sup> "Science in Regulation: A Study of Agency Decisionmaking Approaches" (Feb. 18, 2013), available at [http://www.acus.gov/sites/default/files/documents/Science%20in%20Regulation\\_Final%20Report\\_2\\_18\\_13\\_0.pdf](http://www.acus.gov/sites/default/files/documents/Science%20in%20Regulation_Final%20Report_2_18_13_0.pdf).

<sup>164</sup> Robin Bravender, Obama ozone decision blindsides enviros – and his own EPA, available at <http://www.politico.com/news/stories/0911/62586.html>.

<sup>165</sup> Lawrence Hurley, Court sympathetic to enviros' challenge to Bush-era ozone standards, Greenwire (Nov. 16, 2012), available at <http://eenews.net/public/Greenwire/2012/11/16/2>.

<sup>166</sup> Statement by the President on Ozone, *supra* note 162.

<sup>167</sup> EPA, National Ambient Air Quality Standards for Ozone, Proposed rule, 75 Fed. Reg. 2938, 2943 (Jan. 19, 2010); Memorandum for the Heads of Executive Departments and Agencies, 74 Fed. Reg. 4435 (Jan. 26, 2009).

memorandum on scientific integrity.<sup>168</sup> The Bush-era ozone standard was widely regarded as one of the biggest environmental defaults of the Bush administration relating to the environment; many thought the standard of 0.075 parts per million was scientifically unsound. Thus, in September 2009, EPA announced that it would reconsider the Bush-era ozone standard.<sup>169</sup> In January 2010, EPA proposed revising that standard.<sup>170</sup> EPA held three public hearings and took public comment on the proposed standard in 2010.<sup>171</sup> The proposal went through OIRA.<sup>172</sup> The *upper end* of the range the agency proposed to consider was 0.070 parts per million of ozone.<sup>173</sup> In other words, no part of the range EPA proposed for the revision encompassed the Bush-era standard.

It would be bizarre to say that stopping a decision that everyone knew about, 2-1/2 years into the process, was justified on the ground that stopping it was a good way to govern. It was the opposite: it was a bad way to govern. It wasted tremendous agency resources and valuable time; it put the agency back at square one in figuring out how to manage the ozone problem under the Bush-era standard; it sent a wave of distrust and disbelief through agency ranks and outside supporters of the agency; and it put the government in the untenable position of defending the Bush-era standard left in place. Unleashing chaos cannot be what Sunstein means when he says that the ozone decision was correct “on the merits”; but that was the decision’s effect.

Under the common law of 13,563, then, rules can fail for a variety of reasons: they can reflect an OIRA-disapproved understanding of the role of cost-benefit analysis under the relevant laws; they can fail a cost-benefit test; or they can be bad ideas on some unspecified theory of the “merits.” Perhaps these are some of the reasons so many EPA rules seem permanently stuck at OIRA, as I next discuss.

#### D. When Does Review End (and Begin)?

The common law of 13,563 also determines the timelines under which OIRA operates. As discussed above, EO 13,563 explicitly reaffirms EO 12,866, which is the

<sup>168</sup> EPA, National Ambient Air Quality Standards for Ozone, Proposed rule, 75 Fed. Reg. 2938, 2943 (Jan. 19, 2010); Memorandum for the Heads of Executive Departments and Agencies (Mar. 9, 2009), available at <http://www.whitehouse.gov/the-press-office/memorandum-heads-executive-departments-and-agencies-3-9-09>.

<sup>169</sup> [http://www.epa.gov/glo/pdfs/O3\\_Reconsideration\\_FACT%20SHEET\\_091609.pdf](http://www.epa.gov/glo/pdfs/O3_Reconsideration_FACT%20SHEET_091609.pdf).

<sup>170</sup> EPA, National Ambient Air Quality Standards for Ozone, Proposed rule, 75 Fed. Reg. 2938 (Jan. 19, 2010).

<sup>171</sup> <http://www.epa.gov/glo/actions.html>.

<sup>172</sup> <http://www.reginfo.gov/public/do/eoHistReviewSearch> (proposed rule went to OIRA on Oct. 21, 2009, and review was completed on Jan. 6, 2010).

<sup>173</sup> *Id.* at 2997.

executive order that sets forth timelines for OIRA review: 10 days for pre-rule actions, 45 days for final rules on subjects already reviewed and little changed, 90 days for everything else.<sup>174</sup> EO 12,866 also, as I have said, seems clearly to contemplate one 30-day extension if the OMB Director and the agency head agree to it.<sup>175</sup>

This is not the way the OIRA process now works. Many, many rules linger at OIRA long past the 90- or 120-day deadline.<sup>176</sup> Many pre-rule actions stay long past 10 days.<sup>177</sup> Some rules have been at OIRA for *years*.<sup>178</sup>

Sunstein explains that, in fact, the prevailing understanding of EO 12,866 holds that an agency head may, on her own, request an indefinite extension of OIRA review.<sup>179</sup> This would mean that neither the requirement that the OMB Director agree “in writing” to the extension nor the requirement that the extension be once, for 30 days only, holds under the present understanding of EO 12,866. This would, in turn, mean that if an agency head asks for an extension, there actually is no deadline for completing OIRA review.

This remodeling of EO 12,866’s structure on the timelines for review is news in and of itself. Many outside observers believe that there is in fact a deadline for OIRA review.<sup>180</sup> OIRA itself encourages this (mis)understanding by displaying 90 days as a timing benchmark on its regulatory dashboard.<sup>181</sup>

But it is worse than that. It is worse because the way that agency heads come to request extended review, in my experience, is that OIRA calls an official at the agency and *asks the agency to ask for an extension*. It is clear, in such a phone call, that the agency is not to decline to ask for such an extension. Thus, not only is there no deadline for OIRA review, but OIRA itself controls the agency’s “requests” for extensions. In this way, it comes to pass that rules can remain at OIRA for years.

Quite apart from not knowing when OIRA review ends, it is also sometimes hard for the public to know when OIRA review begins. It has been widely reported that OIRA has lately been in the habit of not allowing agencies to send rules for

<sup>174</sup> EO 12866, § 6(b)(2)(A), (B).

<sup>175</sup> EO 12866, § 6(b)(2)(C).

<sup>176</sup> [www.reginfo.gov](http://www.reginfo.gov).

<sup>177</sup> [www.reginfo.gov](http://www.reginfo.gov).

<sup>178</sup> [www.reginfo.gov](http://www.reginfo.gov).

<sup>179</sup> Sunstein, *Myths and Realities*, at 10 n. 37.

<sup>180</sup> See, e.g., *Printers to Obama: please regulate our cleaning rags*, <http://thehill.com/blogs/regwatch/pending-regs/296827-printers-to-obama-please-regulate-our-cleaning-rags> (“Laws stipulate that the agency then has 90 days to review the drafts before returning them to agencies for correction or publication...”).

<sup>181</sup> <http://www.reginfo.gov/public/>.

review until OIRA has cleared them for review – a kind of pre-clearance procedure uncomfortably reminiscent of the Bush-era failure of OIRA to be in receiving mode when the endangerment finding and rules on cars went over for review.<sup>182</sup>

Some documents on publicly available websites corroborate these reports. EPA maintains a website, the Regulatory Development and Retrospective Review Tracker (“Reg DaRRT”), that is supposed to track important moments in the development of EPA rules.<sup>183</sup> Inspired by the Bush-era fiasco of the un-uploaded package on endangerment and cars, EPA designed a timeline with two dates relevant to OIRA review: one noting the date when EPA sends a regulatory package to OIRA, and one noting the date when OIRA “receives” the package.<sup>184</sup> A space of a day or two between these two dates might mean nothing; it might mean that the package went over late in the day, for example, and no one was around to upload it at OIRA. But a space of anything more than that may signal that OIRA has lapsed into non-receiving mode. Thus, for example, looking at the Reg DaRRT entry on EPA’s rule requiring electronic reporting by Clean Water Act permittees, one can see that the rule went to OIRA on December 22, 2011, but was not received by OIRA until January 20, 2012.<sup>185</sup> It would be unusual to have this long a space between sending and receipt unless OIRA had identified some problem with the package.

Comparing EO 12,866 documents on regulations.gov to OIRA’s own posted review dates can also be illuminating. On regulations.gov, one can see that EPA sent a rule relating to renewable fuels to OIRA on November 20, 2012<sup>186</sup> – but OIRA itself reports that it received this rule on January 30, 2013.<sup>187</sup> Some regulatory actions seem caught forever in email limbo between EPA and OIRA. A Notice of Data Availability on coal ash, for example, appears to have been sent to OIRA on March 12, 2012<sup>188</sup> – but the notice did not appear on OIRA’s log of items under review until April 13, 2013.<sup>189</sup> Needless to say, even if OIRA did indeed respect the EO 12,866 deadlines once items are accepted by it for review, these deadlines would mean little if OIRA simply does not accept certain regulatory actions for review or only accepts them long after they have been sent.

<sup>182</sup> See text at note 69, supra.

<sup>183</sup> Found here: <http://www.gao.gov/assets/120/110801.pdf>.

<sup>184</sup> See, among many others, entry for Formaldehyde Standards for Composite Wood Products, <http://yosemite.epa.gov/opei/rulegate.nsf/byRIN/2070-AJ92?opendocument> (showing date sent to OMB for review and date received by OMB).

<sup>185</sup> <http://yosemite.epa.gov/opei/rulegate.nsf/byRIN/2020-AA47?opendocument>.

<sup>186</sup> <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2012-0621-0003>.

<sup>187</sup> Entry on RFS Renewable Identification Number (RIN) Quality Assurance Program, <http://www.reginfo.gov/public/do/eoHistReviewSearch>.

<sup>188</sup> <http://yosemite.epa.gov/opei/rulegate.nsf/byRIN/2050-AE81?opendocument>.

<sup>189</sup> [www.reginfo.gov](http://www.reginfo.gov).

To sum up, on the matter of deadlines, OIRA has broken entirely free from the constraints of EO 12,866. The 10-day, 45-day, and 90-day time limits on OIRA review perhaps survive as benchmarks, but nothing more. To maintain the fiction that deadlines still exist, OIRA extends review indefinitely at the “request” of agency heads – but these requests, in my experience, often are instigated by OIRA itself. To make matters worse, OIRA has fudged its own failure to meet the deadlines imposed by EO 12,866 by simply not “receiving” some regulatory packages until long after they are sent.

#### E. What Are We Told?

The last facet of the common law of EO 13,563 compounds the problems created by OIRA’s other innovations to the regulatory review process prescribed in EO 12,866: OIRA follows, and allows the agencies to follow, almost none of the disclosure requirements of EO 12,866. OIRA also nowhere has written down the elements of its common law of regulatory review. This is why we are left to speculate about who is in charge of regulatory review. This is why so many people think OIRA reviews only really big and important rules, and perhaps why some believe that agencies can easily evade OIRA review altogether. This is why outsiders think there actually are deadlines for OIRA review and also think OIRA’s website contains a full listing of items under OIRA scrutiny. The misconceptions about OIRA review would not be possible if OIRA either actually met the disclosure requirements of EO 12,866 or were more forthcoming about the many alterations it has made to the process described in the executive order.

OIRA does not explain in writing to agencies that items on their regulatory agenda do not fit with the President’s agenda.<sup>190</sup> OIRA does not keep a publicly available log explaining when and by whom disputes between OIRA and the agencies were elevated. Indeed, when the first elevation of an EPA rule occurred in President Obama’s first term, I drafted a brief memo for the EPA’s docket explaining that elevation had occurred and noting the outcome. OIRA told me in no uncertain terms that the memo must not be made public. Moreover, except in one instance – President Obama’s direction to then-EPA Administrator Lisa Jackson to withdraw the final rule setting a new air quality standard for ozone – OIRA has not returned rules to agencies with a written explanation about why they have not passed OIRA review.<sup>191</sup> Instead, as discussed above, OIRA simply hangs onto the rules indefinitely, and they wither quietly on the vine. This is how it comes to pass that a

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<sup>190</sup> The next several paragraphs are drawn from Lisa Heinzerling, *Who Will Run the EPA?*, Yale J. Reg. (April 2013), <http://jreg.common.yale.edu/who-will-run-the-epa/>.

<sup>191</sup> The website on regulatory review shows only one return letter (on ozone) issued during the Obama administration. OIRA Return Letters, Office of Info. And Regulatory Affairs, <http://www.reginfo.gov/public/do/eoReturnLetters> (last visited Mar. 25, 2013).

list of chemicals of concern or a workplace rule on crystalline silica lingers at OIRA for years.

Some agencies do post “before” and “after” versions of rules that have gone to OIRA. These redlined documents often feature hundreds of changes. There is nothing here like the “complete, clear, and simple manner” of disclosure contemplated by the Executive Order. There is also often no document that explains which changes were made at OIRA’s behest. Where, as Sunstein explains, changes might come from OIRA, from another White House office, from another Cabinet head, or from a career staffer in a separate agency, the failure to follow the Executive Order’s rules on transparency means that no one is ultimately accountable for the changes that occur. Who is responsible, for example, for the hundreds of technical changes made to the EPA’s scientific analyses of air quality rules?<sup>192</sup> We simply do not know.

Here, too, OIRA is the stumbling block when it comes to transparency. Agencies know full well that they are not to be too transparent. OIRA reprimanded the EPA when the EPA accidentally posted interagency comments on its proposal to regulate coal ash impoundments.<sup>193</sup> But why shouldn’t the public know who is responsible for changing the rules? In fact, without knowing the expertise and affiliation of the kibitzers, it is hard to evaluate their comments.

The problems go deeper still. OIRA maintains a “Regulatory Review Dashboard” that contains a good deal of information about rules under review, how long they have been under review, and so on.<sup>194</sup> It is spiffy and informative, but woefully incomplete. Some rules go to OIRA “informally” and do not appear on the Dashboard at that time. Some rules go to OIRA and appear on the Dashboard only weeks after the agency has sent them.<sup>195</sup> Some rules are done, from the agency’s

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<sup>192</sup> Wendy Wagner has painstakingly documented such changes in a study prepared for the Administrative Conference of the United States. Wendy Wagner, *Science in Regulation: A Study of Agency Decisionmaking Approaches* (2013), available at [http://www.acus.gov/sites/default/files/documents/Science%20in%20Regulation\\_Final%20Report\\_2\\_18\\_13\\_0.pdf](http://www.acus.gov/sites/default/files/documents/Science%20in%20Regulation_Final%20Report_2_18_13_0.pdf).

<sup>193</sup> See Cent. For Effective Gov’t, *Changes to Coal Ash Proposal Place Utility’s Concerns Above Public Health* (2010) (recounting the same episode), available at <http://www.foreffectivegov.org/node/11041>.

<sup>194</sup> Regulatory Review Dashboard, <http://www.reginfo.gov>.

<sup>195</sup> For example, compare the EPA’s report of when it sent its rule on electronic reporting regarding water pollution permits to OIRA, Dec. 22, 2011, to its report on when OIRA “received” the rule, Jan. 20, 2012. See NPDES Electronic Reporting Rule, U.S. Env’tl. Prot. Agency, <http://yosemite.epa.gov/opei/rulegate.nsf/byRIN/2020-AA47?opendocument> (listing dates for “NPRM: Sent to OMB for Regulatory Review” and “NPRM: Received by OMB”). See also Search Results for NPRM Review Status, Regulatory Review Dashboard, <http://www.reginfo.gov/> (search “RIN” for “2020-

perspective, but the White House prevents their transmittal to OIRA.<sup>196</sup> The truth is, the Dashboard purports to be, but is not, a full picture of the items under review at any given time. Thus it misleads at the same time it informs.

So far I have explained the ways in which OIRA review, as practiced today, departs from the executive order it purports to be following, EO 12,866. I have suggested, along the way, reasons to think OIRA's practice may not be ideal. Now, I turn to the normative perspective in earnest, and explain why I believe OIRA's process of regulatory review is deeply problematic along several different dimensions.<sup>197</sup>

### III. The Problems With OIRA

In this paper, I have focused mainly on a descriptive account of the OIRA review process as it exists today. I believe this descriptive account is essential because there is so much misunderstanding about how OIRA actually operates. But this paper would be incomplete without a discussion of the normative problems created by OIRA's current practices. Other scholars have covered these problems well;<sup>198</sup> for this article, I rest with a relatively brief discussion.

I lead off with the last topic I covered in discussing the common law of EO 13,563: transparency. The opacity of the OIRA process has two large problems. The first is that opacity in government in general is a problem. It prevents people from understanding the way their government operates, how they can intervene and at what points, what the government is up to, who is making important decisions, why the government has made those decisions. The problems with opacity are, in fact, what led President Clinton to include disclosure requirements in EO 12,866 in the first place.<sup>199</sup>

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AA47" and search "Agency for Environmental Protection Agency) (showing OMB's received date to be Jan. 20, 2012).

<sup>196</sup> Juliet Eilperin, *Obama Administration Slows Environmental Rules as it Weighs Political Cost*, Wash. Post, Feb. 12, 2012, (stating that the White House had not given EPA permission to send a rule on cars and trucks to OMB).

<sup>197</sup> For a compelling argument that OIRA review is so problematic that it should be scrapped altogether, see Steinzor, *Abolishing Centralized Regulatory Review*.

<sup>198</sup> Indispensable articles in this literature, spanning a long period, include Steinzor, *Abolishing Centralized Regulatory Review*; Bressman & Vandenberg, *Inside the Administrative State*, 105 Mich. L. Rev. 47; Thomas O. McGarity, *Presidential Control of Regulatory Agency Decisionmaking*, 36 Am. U. L. Rev. 443 (1987); Percival, *Presidential Management of the Administrative State*, 51 Duke L.J. 963; Morrison, *OMB Interference with Agency Rulemaking*, 99 Harv. L. Rev. 1059; Olson, *The Quiet Shift of Power*, 4 Va. J. Nat. Resources L. 1.

<sup>199</sup> See, e.g., Steven Croley, *White House Review of Agency Rulemaking: An Empirical Investigation*, 70 U. Chi. L. Rev. 821, 878 (2003).

Another problem with opacity in the OIRA process is that transparency is promised but not delivered. Opacity about transparency is the worst kind of opacity; people think a lack of information on a subject means there is nothing relevant to report, when in fact it might mean they are just not being told. Thus it is especially troubling, given the gaps in transparency I have described, that Sunstein continues to tout the transparency of the OIRA process.<sup>200</sup> If believed, this claim would lull people into thinking they have all the information they might need or want about this process. But they do not. Moreover, to claim transparency but offer mostly opacity is especially bad in an administration that has made openness in government one of its signature initiatives.

A second problem with OIRA review as it is now conducted is the one flagged by OLC in 1981 when it reviewed EO 12,291. OLC cautioned, as I have said, that displacement of discretion by White House personnel might run afoul of the laws lodging discretion within a particular agency or with a particular official at a particular agency.<sup>201</sup> Since that time, the academic literature on this issue has burgeoned, with many scholars on both sides of the political divide arguing that certainly the President has the authority to order political appointees within the agencies to make particular decisions. Perhaps most famously, then-professor Elena Kagan argued that statutes that give discretion to particular agencies or to particular officials within particular agencies are best read as implicit delegations of authority to the President to dictate specific regulatory outcomes.<sup>202</sup> Other scholars have followed Kagan's lead and argued that it is nonsensical to read much of anything into Congress's particular choices about who is to make particular regulatory decisions.<sup>203</sup> What sense would it make, they ask, for Congress to give the President the authority to designate Superfund sites but not to give him directive authority over the setting of the NAAQS?<sup>204</sup> Some statutes give authority to the President, many others to agencies, and there appears to be no rhyme or reason in these choices.<sup>205</sup>

But if having rhyme or reason is a prerequisite for respecting Congress's choices, we have a lot of work to do unraveling its handiwork. Congress also has given USDA authority over meat but not cheese,<sup>206</sup> it has given FDA authority over

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<sup>200</sup> Sunstein, *Myths and Realities*, at 16.

<sup>201</sup> Proposed Executive Order Entitled "Federal Regulation," 5 Op. OLC 59, 62-63 (Feb. 13, 1981).

<sup>202</sup> Kagan, *Presidential Administration*, 114 Harv. L. Rev. at 2288-90.

<sup>203</sup> Nina A. Mendelson, *Another Word on the President's Statutory Authority Over Agency Action*, 79 Ford. L. Rev. 2455 (2011).

<sup>204</sup> Mendelson, 79 Ford. at 2466.

<sup>205</sup> Mendelson, 79 Ford. at 2466-68.

<sup>206</sup> GAO, *Testimony Before the Subcommittee on Civil Service and Agency Organization, Committee on Government Reform, House of Representatives, Federal Food Safety and Security System: Fundamental Restructuring Is Needed to Address*

eggs but not egg products,<sup>207</sup> it has given EPA authority over open waters but it requires EPA to share its authority over wetlands with the Army Corps of Engineers,<sup>208</sup> it has given DOT authority over fuel economy standards but not tailpipe standards for greenhouse gases.<sup>209</sup> The law is filled with delegations of authority that do not make obvious sense. But no one argues that FDA could just take over USDA's meat inspections, or that EPA could take over the Army Corps' functions with respect to wetlands. Even more tellingly, few other than those who believe in a strongly unitary executive believe that the President can simply ignore Congress's choices about whether the head of an agency can be removed for any reason or must only be removed for cause.<sup>210</sup> Yet it makes little sense, as far as I can tell, to have an independent SEC but a dependent EPA, or to have an independent FTC but a dependent CPSC. Why should we think nothing of ignoring Congress's instructions as to who within the executive branch should make particular decisions, but then cling tightly to its instructions about how to remove particular officials?

To delve fully into these issues would take me beyond the scope of this paper. My basic point is that it is not at all obvious that a delegation to a specific agency to make a specific decision delegates authority to the President to make that decision himself. It is even less obvious that such a delegation gives decision-making authority to OIRA career staff, other agencies' career staff, Cabinet members outside the relevant agency, the White House Chief of Staff, and others, apart from the President. Even if one believed that the President himself has decision-making power, Sunstein's account of the way the OIRA process actually works shows that it is almost never the President himself who is making the relevant calls. It is OIRA career staff and other agencies' career staff and other Cabinet officials and the Council of Economic Advisors and the White House Chief of Staff and a cast of many others.<sup>211</sup> To suggest that all of these players somehow can appropriately partake of the President's own power is ludicrous. It would be to suggest that the entire executive branch is "the President."

Thus, as in 1981, there remains a significant legal issue whether OIRA may exercise decision-making authority – not just oversight – with respect to regulatory decisions lodged by statute in particular agencies.

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Fragmentation and Overlap, 3, 21 (March 30, 2004), available at <http://www.gao.gov/assets/120/110801.pdf>.

<sup>207</sup> 21 U.S.C. 331 § 331; 21 U.S.C. § 1031. For a critique of the resulting regulatory patchwork, see Note, Reforming the Food Safety System: What If Consolidation Isn't Enough?, 120 Harv. L. Rev. 1345, 1357-59 (2007).

<sup>208</sup> 33 U.S.C. § 1344.

<sup>209</sup> *Massachusetts v. EPA*, 549 U.S. 497, 532 (2007).

<sup>210</sup> See, e.g., Kagan, at 2326-27.

<sup>211</sup> Sunstein, *Myths and Realities*, at 18-21; see also Bressman & Vandenberg, *Inside the Administrative State*, at 68 (counting 19 different White House offices involved in OIRA review).

A third large problem with OIRA review as it is now conducted is that it lacks accountability. No one knows who is really in charge. Sunstein's account of the process has only deepened the impression that the process is chaotic and unpredictable, lacking clear lines of authority and producing outcomes that have no clear author. The precise process set out in EO 12,866 for resolving disputes between the action agency and OIRA has given way to a blurry struggle for power in a process that remains opaque and mysterious even to the closest participants in it. Chaos, opacity, mystery: these are not the hallmarks of accountability. Since OIRA review is founded in part on a perceived need for greater accountability in the regulatory domain, the absence of accountability in this process undercuts the very reason for that review.

The accountability deficit is worsened by officials' insistence that, despite all that I have shown here, it really is the agencies who are in charge of regulatory policy. Sunstein reports that "[a]gencies decline to accept changes with which they disagree" and that "[w]hen changes are made, the agency assents to them."<sup>212</sup> "It is true, of course," Sunstein allows, "that OIRA has a good deal of formal authority under Executive Orders 12866 and 13563. That authority matters. But in important cases, the agency convinces OIRA and others, on the merits, that its position is indisputably correct, or that it is reasonable enough even if not indisputably correct."<sup>213</sup> I do not know why Sunstein believes that agencies come to understand that OIRA's positions are "indisputably correct"; I believe, instead, that they often come to understand simply that OIRA is indisputably in charge. But the continuing assertion that agencies accept OIRA's views, even welcome them, further dilutes accountability for the regulatory decisions in question.

Last but not least, the current process of OIRA review hits environmental protection especially hard. EPA most often leads the federal pack in terms of the number of its rules under review at any given time. Most of the EPA rules OIRA reviews are not economically significant. As of May 7, 2013, 15 of the 22 EPA rules under review had been there for over a year. As shown in redlined versions of EPA rules showing changes during OIRA review, OIRA devotes extreme attention – and sometimes little deference – to EPA's technical judgments.<sup>214</sup> Whole categories of rules protecting the environment fare poorly in the cost-benefit analysis OIRA demands.<sup>215</sup> Perhaps it is not surprising that a centralized structure first developed in the Nixon years to undercut protections under the new federal environmental laws would still, in 2013, save its strongest fire for these same protections. But it is a shame that so little has changed.

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<sup>212</sup> Sunstein, *Myths and Realities*, at 10.

<sup>213</sup> Sunstein, *Myths and Realities*, at 33 (footnote omitted).

<sup>214</sup> See text at note 163 & n. 192, *supra*.

<sup>215</sup> See text at notes 142-44, *supra*.

Solving at least some of these problems with OIRA review would be simple: OIRA could just follow the rules laid down in EO 12,866. If OIRA followed EO 12,866's requirements for transparency, a good number of the issues surrounding OIRA's opacity would disappear. If OIRA followed the spirit of 12,866 and 13,563 insofar as they do not envision OIRA changing the laws under which agencies operate, the problem of OIRA interfering with the agencies' best judgments about the appropriate interpretations of the statutes they administer would go away. If OIRA followed the process EO 12,866 requires for elevation and dispute resolution at the highest levels, and if OIRA followed the disclosure requirements pertaining to such matters, some of the concerns about accountability would be mitigated. If OIRA kept to EO 12,866's deadlines, at least indefinite delay would not be one of the intrusions it visits upon the agencies. If OIRA sent return letters to agencies when it rejected rules, explaining in writing why it rejected them, there would exist a focal point for substantive discussion and accountability would be enhanced. Much can be done to improve things, in other words, simply by following the executive order President Obama himself has reaffirmed.

Other problems would be trickier to resolve. There would remain the overarching legal issue of whether it is fair to assume that statutes giving decision-making authority to executive agencies also give decision-making authority to the President (or his aides in OIRA and the larger White House). If the cast of thousands Sunstein describes still played a role in regulatory review, there would remain a serious accountability deficit. And, so long as the culture at OIRA does not change and so long as cost-benefit is the decision tool of choice, environmental protection will suffer.

I hope that the descriptive account I have provided here, aimed at correcting the misimpressions that have grown up around OIRA review, will help to renew the debate over the role of OIRA and the larger White House in agency rulemaking.

---

From: Goffman, Joseph <goffman.joseph@epa.gov>  
To: Embrey, Patricia  
<embrey.patricia@epa.gov>; Dunham, Sarah  
<dunham.sarah@epa.gov>; Gunning, Paul <gunning.paul@epa.gov>;  
Longstreth, Ben <blongstreth@nrdc.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Craig Segall - Sierra  
<craig.segall@sierraclub.org>; Darin Schroeder  
<dschroeder@catf.us>; Ann Weeks <aweeks@catf.us>; Gowrishankar,  
Vignesh <vgowrishankar@nrdc.org>; Geertsma, Meleah  
<mgeertsma@nrdc.org>; Vickie Patton <vpatton@edf.org>; Murphy,  
Tina <murphy.tina@epa.gov>; Zenick, Elliott  
<zenick.elliott@epa.gov>; Mary Raivel  
<mraivel@mde.state.md.us>; Tomas Carbonell  
<tcarbonell@edf.org>; dlyon@edf.org <dlyon@edf.org>;  
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<carol.iancu@state.ma.us>; DCRoomARN5415PolyPCTB/DC-ARN-OAR  
<dcroomarn5415polypctb@epa.gov>; Culligan, Kevin  
<culligan.kevin@epa.gov>; Henderson, Kelly  
<khenderson@nrdc.org>; Morgan Costello </o=lawnet/ou=first  
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Ballo <tballo@earthjustice.org>; Megan Ceronsky  
<mceronsky@edf.org>; Johnson, Tanya <johnson.tanya@epa.gov>;  
OAR Special Assistants <oar\_special\_assistants@epa.gov>;  
Hargrove, Anne <hargrove.anne@epa.gov>; Peter Zalzal  
<pzalzal@edf.org>

Cc:  
Bcc:  
Subject: Meeting on Methane/Oil and Gas  
Date: Thu May 16 2013 12:12:55 EDT  
Attachments:

---

Please look out for a new schedule on this - for either 9:30-11:30 or 3-5 on May 22 - and a cancellation of the May 23 meeting. Many thanks.

---

From: Goffman, Joseph <goffman.joseph@epa.gov>  
To: Embrey, Patricia  
<embrey.patricia@epa.gov>; Dunham, Sarah  
<dunham.sarah@epa.gov>; Gunning, Paul <gunning.paul@epa.gov>;  
Longstreth, Ben <blongstreth@nrdc.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Craig Segall - Sierra  
<craig.segall@sierraclub.org>; Darin Schroeder  
<dschroeder@catf.us>; Ann Weeks <aweeks@catf.us>; Gowrishankar,  
Vignesh <vgowrishankar@nrdc.org>; Geertsma, Meleah  
<mgeertsma@nrdc.org>; Vickie Patton <vpatton@edf.org>; Murphy,  
Tina <murphy.tina@epa.gov>; Zenick, Elliott  
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<mraivel@mde.state.md.us>; Tomas Carbonell  
<tcarbonell@edf.org>; dlyon@edf.org <dlyon@edf.org>;  
Tsirigotis, Peter <tsirigotis.peter@epa.gov>; Hoffer, Melissa  
(AGO) <melissa.hoffer@state.ma.us>; Iancu, Carol (AGO)  
<carol.iancu@state.ma.us>; DCRoomARN5415PolyPCTB/DC-ARN-OAR  
<dcroomarn5415polypctb@epa.gov>; Culligan, Kevin  
<culligan.kevin@epa.gov>; Henderson, Kelly  
<khenderson@nrdc.org>; Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>; Timothy  
Ballo <tballo@earthjustice.org>; Megan Ceronsky  
<mceronsky@edf.org>; Johnson, Tanya <johnson.tanya@epa.gov>;  
OAR Special Assistants <oar\_special\_assistants@epa.gov>;  
Hargrove, Anne <hargrove.anne@epa.gov>; Peter Zalzal  
<pzalzal@edf.org>  
Cc: Browne, Cynthia  
<browne.cynthia@epa.gov>  
Bcc:  
Subject: Re: Meeting on Methane/Oil and Gas  
Date: Thu May 16 2013 12:30:50 EDT  
Attachments:

---

Sorry about this, but we are already seeing a critical mass of participants with conflicts on Wednesday, May 22. We have furlough issues on May 23 and 24, so we will have to reschedule for the following week. Could I ask that the states and groups please get back to Cynthia Browne with proposed times for the week of May 27 (or if need be the week after)? Thanks.

---

From: Goffman, Joseph  
Sent: Thursday, May 16, 2013 12:12:55 PM  
To: Embrey, Patricia; Dunham, Sarah; Gunning, Paul; Longstreth, Ben; Michael J. Myers; Craig Segall - Sierra; Darin Schroeder; Ann Weeks; Gowrishankar, Vignesh; Geertsma, Meleah; Vickie Patton; Murphy, Tina; Zenick, Elliott; Mary Raivel; Tomas Carbonell; 'dlyon@edf.org'; Tsirigotis, Peter; Hoffer, Melissa (AGO); Iancu, Carol (AGO); DCRoomARN5415PolyPCTB/DC-ARN-OAR; Culligan, Kevin; 'Henderson, Kelly'; Morgan Costello; Timothy Ballo; Megan Ceronsky; Johnson, Tanya; OAR Special Assistants; Hargrove, Anne; 'Peter Zalzal'  
Subject: Meeting on Methane/Oil and Gas

Please look out for a new schedule on this - for either 9:30-11:30 or 3-5 on May 22 - and a cancellation of the May 23 meeting. Many thanks.



---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: joanne.spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>  
Cc:  
Bcc:  
Subject: vm  
Date: Fri May 17 2013 12:49:22 EDT  
Attachments:

---

Joanne, got your message. Are you around this afternoon to talk, say 330 or 4 eastern?

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Joanne Spalding  
<joanne.spalding@sierraclub.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: Re: vm  
Date: Fri May 17 2013 12:53:45 EDT  
Attachments:

---

3:30 would be great. Why don't you call me on my office line.

Joanne Spalding  
415-977-5725 (o)  
510-612-4062 (c)

Sent from my iPhone

On May 17, 2013, at 9:49 AM, "Michael J. Myers" <Michael.Myers@ag.ny.gov> wrote:

Joanne, got your message. Are you around this afternoon to talk, say 330 or 4 eastern?

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Lisa Rector <lrector@nescaum.org>  
Cc:  
Bcc:  
Subject: RE: Call on NSPS  
Date: Tue May 21 2013 11:49:11 EDT  
Attachments:

---

Lisa, I didn't see a link to the poll. Thanks.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Monday, May 20, 2013 5:03 PM  
To: Lisa Rector; Arthur Marin; Paul Miller; Michael J. Myers; tcarbonell@edf.org; vpatton@edf.org;  
Janice Nolen  
Cc: arthurmarin@vzw.blackberry.net  
Subject: RE: Call on NSPS

I have set up a doodle poll to identify a time for a follow up call. I would appreciate it, if could complete this by COB tomorrow. Thanks!

Lisa  
[<http://www.nescaum.org/NESCAUM-logo.gif>]<http://www.nescaum.org>  
Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | [lrector@nescaum.org](mailto:lrector@nescaum.org)<mailto:lrector@nescaum.org>

---

From: Lisa Rector  
Sent: Wednesday, May 15, 2013 3:15 PM  
Required: Arthur Marin; Paul Miller; Michael.Myers@ag.ny.gov; tcarbonell@edf.org; vpatton@edf.org;  
Janice Nolen  
Optional: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: Call on NSPS  
When: Monday, May 20, 2013 4:00 PM-5:00 PM.  
Where: 877-656-1761 code 127243

Call on Monday 5/20 at 4 pm to discuss RWH NSPS questions.

gl 0601

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Henderson, Kelly <khenderson@nrdc.org>  
Cc:  
Bcc:  
Subject: RE: Call on power plant lawsuit  
Date: Wed May 22 2013 09:42:32 EDT  
Attachments:

---

Kelly, on Tues. I'm available those times other than the 10-11 slot, on Wed. I'm available all day.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Henderson, Kelly [mailto:khenderson@nrdc.org]  
Sent: Wednesday, May 22, 2013 9:33 AM  
To: Longstreth, Ben; 'Megan Ceronsky (mceronsky@edf.org)'; Vickie Patton; 'Joanne.  
Spalding@sierraclub.org'; 'aweeks@catf.us'; Michael J. Myers; Morgan Costello; Hawkins, Dave  
Cc: Doniger, David; Beckerman, Samantha  
Subject: Call on power plant lawsuit

Dear all,

I would like to set up a call early next week to discuss the draft complaint (to be circulated on Thursday) and planning for the suit. Since Monday is a holiday, I am listing some times on Tuesday and Wednesday. Please let me know when you are available:

Tuesday 5/28

10-11am EST

12-1pm EST

2-3pm EST

5-6pm EST

Wednesday 5/29

12-1pm EST

3-4pm EST

4-5pm EST

5-6pm EST

Best,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | [khenderson@nrdc.org](mailto:khenderson@nrdc.org) | [www.nrdc.org](http://www.nrdc.org)

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>



---

From: Browne.Cynthia@epa.gov  
<browne.cynthia@epa.gov> on behalf of Goffman, Joseph  
<goffman.joseph@epa.gov>  
To: Goffman, Joseph  
<goffman.joseph@epa.gov>; Tsirigotis, Peter  
<tsirigotis.peter@epa.gov>; Embrey, Patricia  
<embrey.patricia@epa.gov>; Dunham, Sarah  
<dunham.sarah@epa.gov>; Gunning, Paul <gunning.paul@epa.gov>;  
Culligan, Kevin <culligan.kevin@epa.gov>; Henderson, Kelly  
<khenderson@nrdc.org>; Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>;  
Longstreth, Ben <blongstreth@nrdc.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Craig Segall - Sierra  
<craig.segall@sierraclub.org>; Darin Schroeder  
<dschroeder@catf.us>; Timothy Ballo <tballo@earthjustice.org>;  
Megan Ceronsky <mceronsky@edf.org>; Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>; Geertsma, Meleah  
<mgeertsma@nrdc.org>; Vickie Patton <vpatton@edf.org>; Hoffer,  
Melissa (AGO) <melissa.hoffer@state.ma.us>; Mary Raivel  
<mraivel@mde.state.md.us>; Peter Zalzal <pzalzal@edf.org>;  
Tomas Carbonell <tcarbonell@edf.org>; dlyon@edf.org  
<dlyon@edf.org>; Iancu, Carol (AGO) <carol.iancu@state.ma.us>;  
Browne, Cynthia (Browne.Cynthia@epa.gov)  
<browne.cynthia@epa.gov>  
Cc: OAR Special Assistants  
<oar\_special\_assistants@epa.gov>; Johnson, Tanya  
<johnson.tanya@epa.gov>; Murphy, Tina <murphy.tina@epa.gov>;  
Hargrove, Anne <hargrove.anne@epa.gov>; Zenick, Elliott  
<zenick.elliott@epa.gov>  
Bcc:  
Subject: Copy: Meeting on Methane/Oil and Gas  
Date: Thu May 23 2013 09:49:04 EDT  
Attachments:

---

StartTime: Tue May 28 15:00:00 Eastern Daylight Time 2013

EndTime: Tue May 28 17:00:00 Eastern Daylight Time 2013

Location:

Invitees:

Recurring: No

ShowReminder: No

Accepted: Yes

AcceptedTime: Thu May 23 09:51:00 Eastern Daylight Time 2013

When: Tuesday, May 28, 2013 3:00 PM-5:00 PM (GMT-05:00) Eastern Time (US & Canada).

Where: DCRoomARN5415PolyPCTB/DC-ARN-OAR; 1-866-299-3188 access:202-564-3201

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*



---

From: Browne.Cynthia@epa.gov  
<browne.cynthia@epa.gov> on behalf of Goffman, Joseph  
<goffman.joseph@epa.gov>  
To: Tsirigotis, Peter  
<tsirigotis.peter@epa.gov>; Embrey, Patricia  
<embrey.patricia@epa.gov>; Dunham, Sarah  
<dunham.sarah@epa.gov>; Gunning, Paul <gunning.paul@epa.gov>;  
Culligan, Kevin <culligan.kevin@epa.gov>; Henderson, Kelly  
<khenderson@nrdc.org>; Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>;  
Longstreth, Ben <blongstreth@nrdc.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Craig Segall - Sierra  
<craig.segall@sierraclub.org>; Darin Schroeder  
<dschroeder@catf.us>; Timothy Ballo <tballo@earthjustice.org>;  
Megan Ceronsky <mceronsky@edf.org>; Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>; Geertsma, Meleah  
<mgeertsma@nrdc.org>; Vickie Patton <vpatton@edf.org>; Hoffer,  
Melissa (AGO) <melissa.hoffer@state.ma.us>; Mary Raivel  
<mraivel@mde.state.md.us>; Peter Zalzal <pzalzal@edf.org>;  
Tomas Carbonell <tcarbonell@edf.org>; dlyon@edf.org  
<dlyon@edf.org>; Iancu, Carol (AGO) <carol.iancu@state.ma.us>  
Cc: OAR Special Assistants  
<oar\_special\_assistants@epa.gov>; Johnson, Tanya  
<johnson.tanya@epa.gov>; Murphy, Tina <murphy.tina@epa.gov>;  
Hargrove, Anne <hargrove.anne@epa.gov>; Zenick, Elliott  
<zenick.elliott@epa.gov>  
Bcc:  
Subject: Meeting on Methane/Oil and Gas  
Date: Thu May 23 2013 09:49:04 EDT  
Attachments:

---

When: Tuesday, May 28, 2013 3:00 PM-5:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: DCRoomARN5415PolyPCTB/DC-ARN-OAR; 1-866-299-3188 access:202-564-3201

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Browne.Cynthia@epa.gov  
<browne.cynthia@epa.gov> on behalf of Goffman, Joseph  
<goffman.joseph@epa.gov>  
To: Goffman, Joseph  
<goffman.joseph@epa.gov>; Tsirigotis, Peter  
<tsirigotis.peter@epa.gov>; Embrey, Patricia  
<embrey.patricia@epa.gov>; Dunham, Sarah  
<dunham.sarah@epa.gov>; Gunning, Paul <gunning.paul@epa.gov>;  
Culligan, Kevin <culligan.kevin@epa.gov>; Henderson, Kelly  
<khenderson@nrdc.org>; Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>;  
Longstreth, Ben <blongstreth@nrdc.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Craig Segall - Sierra  
<craig.segall@sierraclub.org>; Darin Schroeder  
<dschroeder@catf.us>; Timothy Ballo <tballo@earthjustice.org>;  
Megan Ceronsky <mceronsky@edf.org>; Gowrishankar, Vignesh  
<vgowrishankar@nrdc.org>; Geertsma, Meleah  
<mgeertsma@nrdc.org>; Vickie Patton <vpatton@edf.org>; Hoffer,  
Melissa (AGO) <melissa.hoffer@state.ma.us>; Mary Raivel  
<mraivel@mde.state.md.us>; Peter Zalzal <pzalzal@edf.org>;  
Tomas Carbonell <tcarbonell@edf.org>; dlyon@edf.org  
<dlyon@edf.org>; Iancu, Carol (AGO) <carol.iancu@state.ma.us>  
Cc: OAR Special Assistants  
<oar\_special\_assistants@epa.gov>; Johnson, Tanya  
<johnson.tanya@epa.gov>; Murphy, Tina <murphy.tina@epa.gov>;  
Hargrove, Anne <hargrove.anne@epa.gov>; Zenick, Elliott  
<zenick.elliott@epa.gov>  
Bcc:  
Subject: Meeting on Methane/Oil and Gas  
Date: Thu May 23 2013 09:49:04 EDT  
Attachments:

---

StartTime: Tue May 28 15:00:00 Eastern Daylight Time 2013

EndTime: Tue May 28 17:00:00 Eastern Daylight Time 2013

Location:

Recurring: No

ShowReminder: No

Accepted: No

When: Tuesday, May 28, 2013 3:00 PM-5:00 PM (GMT-05:00) Eastern Time (US & Canada).

Where: DCRoomARN5415PolyPCTB/DC-ARN-OAR; 1-866-299-3188 access:202-564-3201

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Geertsma, Meleah <mgeertsma@nrdc.org>  
To: Geertsma, Meleah <mgeertsma@nrdc.org>;  
Doniger, David <ddoniger@nrdc.org>; Longstreth, Ben  
<blongstreth@nrdc.org>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Ann Weeks <aweeks@catf.us>;  
dschroeder@catf.us <dschroeder@catf.us>; David McCabe  
<dmccabe@catf.us>; David Lyon <dlyon@edf.org>; Peter Zalzal  
<pzalzal@edf.org>; Tomas Carbonell <tcarbonell@edf.org>; Craig  
Segall - Sierra <craig.segall@sierraclub.org>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Mordick, Briana  
<bmordick@nrdc.org>

Cc:  
Bcc:  
Subject: Call for O&G meeting with EPA  
Date: Thu May 23 2013 11:27:57 EDT  
Attachments:

---

StartTime: Fri May 24 12:00:00 Eastern Daylight Time 2013  
EndTime: Fri May 24 13:00:00 Eastern Daylight Time 2013  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: No

When: Friday, May 24, 2013 11:00 AM-12:00 PM (GMT-06:00) Central Time (US & Canada).  
Where: 212-727-4600, 0113634

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Geertsma, Meleah <mgeertsma@nrdc.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Longstreth, Ben <blongstreth@nrdc.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Ann Weeks <aweeks@catf.us>;  
dschroeder@catf.us <dschroeder@catf.us>; David McCabe  
<dmccabe@catf.us>; David Lyon <dlyon@edf.org>; Peter Zalzal  
<pzalzal@edf.org>; Tomas Carbonell <tcarbonell@edf.org>; Craig  
Segall - Sierra <craig.segall@sierraclub.org>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Mordick, Briana  
<bmordick@nrdc.org>; Geertsma, Meleah <mgeertsma@nrdc.org>  
Cc:  
Bcc:  
Subject: Copy: Call for O&G meeting with EPA  
Date: Thu May 23 2013 11:28:23 EDT  
Attachments:

---

StartTime: Fri May 24 12:00:00 Eastern Daylight Time 2013  
EndTime: Fri May 24 13:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Thu May 23 11:31:00 Eastern Daylight Time 2013

When: Friday, May 24, 2013 11:00 AM-12:00 PM (GMT-06:00) Central Time (US & Canada).  
Where: 212-727-4600, 0113634

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Geertsma, Meleah <mgeertsma@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Call for O&G meeting with EPA  
Date: Thu May 23 2013 11:31:34 EDT  
Attachments:

---

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Call on power plant lawsuit  
Date: Thu May 23 2013 11:56:48 EDT  
Attachments:

---

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Browne, Cynthia  
(Browne.Cynthia@epa.gov) <browne.cynthia@epa.gov>  
Cc: Geertsma, Meleah (mgeertsma@nrdc.org)  
<mgeertsma@nrdc.org>  
Bcc:  
Subject: Pre-meeting room  
Date: Fri May 24 2013 13:42:21 EDT  
Attachments:

---

Cynthia, before Tuesday's 3 pm meeting with Joe, et al., would it be possible to reserve a room at EPA for the NGO and States to do a pre-meeting from 2 pm - 3 pm? If so, can you let Meleah and I know the logistics? (She will be there in person, I'll be on the phone). Thanks.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Geertsma, Meleah (mgeertsma@nrdc.org)  
<mgeertsma@nrdc.org>  
Cc: Jeremy Magliaro </o=lawnet/ou=first  
administrative group/cn=recipients/cn=jeremymagliaro>  
Bcc:  
Subject: contact  
Date: Fri May 24 2013 14:09:15 EDT  
Attachments:

---

Meleah, cc'ing Jeremy here if you can send him John Moore's contact info. Thanks.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Geertsma, Meleah <mgeertsma@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>  
Bcc:  
Subject: RE: contact  
Date: Fri May 24 2013 15:27:13 EDT  
Attachments:

---

Thanks Mike – I'm checking with Becky Stanfield (rstanfield@nrdc.org) and John (jmoore@nrdc.org) about who would be the best person to discuss. Can you clarify whether you are looking at a particular aspect of the transmission and/or distribution system, or have specific questions that you'd like to explore? Becky is part of our Energy Team and has been involved in the distribution rate recovery issue, while John does more general FERC work.

Best,

Meleah

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Friday, May 24, 2013 1:09 PM  
To: Geertsma, Meleah  
Cc: Jeremy Magliaro  
Subject: contact

Meleah, cc'ing Jeremy here if you can send him John Moore's contact info. Thanks.--Mike

Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

michael.myers@ag.ny.gov



---

From: Browne, Cynthia <browne.cynthia@epa.gov>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Geertsma,  
Meleah <mgeertsma@nrdc.org>; Browne, Cynthia  
<browne.cynthia@epa.gov>  
Cc:  
Bcc:  
Subject: Copy: Pre-meeting for NGO sand States  
Date: Tue May 28 2013 10:05:58 EDT  
Attachments:

---

StartTime: Tue May 28 14:00:00 Eastern Daylight Time 2013  
EndTime: Tue May 28 15:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Tue May 28 10:06:34 Eastern Daylight Time 2013

When: Tuesday, May 28, 2013 2:00 PM-3:00 PM (GMT-05:00) Eastern Time (US & Canada).  
Where: DCRoomARN5415PolyPCTB/DC-ARN-OAR

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Directions and procedures: If you come by Metro the Federal Triangle metro stop is directly below the building entrances. You would leave the metro station and go up all three sets of escalators and turn right. You will see a set of stairs and glass Doors with EPA Signified on Glass. That is Ariel Rios North.

If you are coming by taxi, you would want to be dropped off on 12th NW, between Constitution Ave and Pennsylvania Ave. It is almost exactly half way between the two avenues on 12th. From 12th Street, facing the building with the EPA and American flags, walk toward the building and take the glass door on your right hand side with the escalators going down to the metro on your left. This again will be the North Lobby of the Ariel Rios bldg.

Upon entering the lobby, the meeting attendees will be asked to pass through security and provide a photo ID for entrance. Let the guards know that you were instructed to call 202-564-7400. If you are travelling in a large group, you may want to arrive 10-15 minutes early in order to be on time for the meeting.

---

From: Browne, Cynthia <browne.cynthia@epa.gov>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc: Geertsma, Meleah (mgeertsma@nrdc.org)  
<mgeertsma@nrdc.org>  
Bcc:  
Subject: RE: Pre-meeting room  
Date: Tue May 28 2013 10:08:27 EDT  
Attachments:

---

Michael,

I have reserved a conference room for the pre meeting at 2:00 pm. When Meleah shows up let her have the guards call Ext. 564-7400 to be escorted up.

Thank you, Cynthia Browne

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Friday, May 24, 2013 1:42 PM  
To: Browne, Cynthia  
Cc: Geertsma, Meleah (mgeertsma@nrdc.org)  
Subject: Pre-meeting room

Cynthia, before Tuesday's 3 pm meeting with Joe, et al., would it be possible to reserve a room at EPA for the NGO and States to do a pre-meeting from 2 pm - 3 pm? If so, can you let Meleah and I know the logistics? (She will be there in person, I'll be on the phone). Thanks.--Mike

Michael J. Myers

Chief, Affirmative Litigation Section

Environmental Protection Bureau

New York State Attorney General

The Capitol

Albany, NY 12224

(518) 402-2594

michael.myers@ag.ny.gov



---

From: Doniger, David <ddoniger@nrdc.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Longstreth, Ben <blongstreth@nrdc.org>; Hawkins, Dave  
<dhawkins@nrdc.org>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Morgan  
Costello </o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; aweeks@catf.us  
<aweeks@catf.us>; Vickie Patton <vpatton@edf.org>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Megan Ceronsky  
(mceronsky@edf.org) <mceronsky@edf.org>

Cc:  
Bcc:  
Subject: Call on power plant lawsuit  
Date: Wed May 29 2013 17:03:59 EDT  
Attachments:

---

StartTime: Wed May 29 17:00:00 Eastern Daylight Time 2013  
EndTime: Wed May 29 18:00:00 Eastern Daylight Time 2013  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: No

When: Wednesday, May 29, 2013 5:00 PM-6:00 PM (UTC-05:00) Eastern Time (US & Canada).  
Where: 212-727-4600, code: 193688#

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Put a "0" in front of the passcode #.

---

From: Longstreth, Ben <blongstreth@nrdc.org>  
To: Longstreth, Ben <blongstreth@nrdc.org>;  
Doniger, David <ddoniger@nrdc.org>; Vickie Patton  
<vpatton@edf.org>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Morgan  
Costello </o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Hawkins, Dave  
<dhawkins@nrdc.org>; Joanne Spalding  
<joanne.spalding@sierraclub.org>; Ann Weeks <aweeks@catf.us>;  
Darin Schroeder <dschroeder@catf.us>; Megan Ceronsky  
<mceronsky@edf.org>

Cc:  
Bcc:  
Subject: Call on 111(b) suit  
Date: Wed May 29 2013 18:16:13 EDT  
Attachments:

---

StartTime: Tue Jun 04 11:30:00 Eastern Daylight Time 2013  
EndTime: Tue Jun 04 12:00:00 Eastern Daylight Time 2013  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Thu May 30 08:16:00 Eastern Daylight Time 2013

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Longstreth, Ben <blongstreth@nrdc.org>  
Cc:  
Bcc:  
Subject: Declined: Call on 111(b) suit  
Date: Thu May 30 2013 11:32:55 EDT  
Attachments:

---

Thanks Ben. Morgan will be on for NY.

---

From: Longstreth, Ben <blongstreth@nrdc.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Vickie Patton <vpatton@edf.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Hawkins, Dave  
<dhawkins@nrdc.org>; Joanne Spalding  
<joanne.spalding@sierraclub.org>; Ann Weeks <aweeks@catf.us>;  
Darin Schroeder <dschroeder@catf.us>; Megan Ceronsky  
<mceronsky@edf.org>  
Cc:  
Bcc:  
Subject: RE: Call on 111(b) suit  
Date: Tue Jun 04 2013 12:33:26 EDT  
Attachments:

---

Hi all, here's the link to EPA's list of notice of intent letters. <http://www.epa.gov/ogc/noi.html> As you'll see, the site now has the state's letter and also the March NOI letter. – Ben

-----Original Appointment-----

From: Longstreth, Ben  
Sent: Wednesday, May 29, 2013 6:16 PM  
To: Longstreth, Ben; Doniger, David; 'Vickie Patton'; 'Michael J. Myers'; 'Morgan Costello'; Hawkins, Dave; 'Joanne Spalding'; 'Ann Weeks'; 'Darin Schroeder'; 'Megan Ceronsky'  
Subject: Call on 111(b) suit  
When: Tuesday, June 04, 2013 11:30 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).  
Where: Dial-in: 212-727-4600 Conf code: 0193688#

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>;  
Henderson, Kelly (khenderson@nrdc.org) <khenderson@nrdc.org>  
Cc:  
Bcc:  
Subject: Declined: 111 lawsuit call  
Date: Thu Jun 06 2013 10:45:52 EDT  
Attachments:

---

I could talk at 1:30

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: 111 lawsuit call  
Date: Thu Jun 06 2013 10:48:22 EDT  
Attachments:

---

---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; Megan Ceronsky (mceronsky@edf.org) <mceronsky@edf.org>; Vickie Patton <vpatton@edf.org>; Longstreth, Ben <blongstreth@nrdc.org>  
Cc: Doniger, David <ddoniger@nrdc.org>  
Bcc:  
Subject: 111d Lawsuit Call Tomorrow at 1:30pm EST  
Date: Thu Jun 06 2013 10:49:41 EDT  
Attachments:

---

Good Morning All,

I just sent around an invite for a 111d lawsuit call tomorrow (Friday) at 1:30pm EST. The call in is: 212-727-4600, code: 0193688#.

Best,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | khenderson@nrdc.org | www.nrdc.org

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>

---

From: Megan Ceronsky <mceronsky@edf.org>  
To: Henderson, Kelly <khenderson@nrdc.org>;  
Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Vickie Patton  
<vpatton@edf.org>; Longstreth, Ben <blongstreth@nrdc.org>  
Cc: Doniger, David <ddoniger@nrdc.org>  
Bcc:  
Subject: RE: 111d Lawsuit Call Tomorrow at 1:30pm EST  
Date: Thu Jun 06 2013 14:53:54 EDT  
Attachments:

---

Hi all—

I thought we had set this call up for 1 p.m. tomorrow—does that still work? 1:30 is okay but I will be awaiting a high school graduation in an auditorium. So—background noise is at least a possibility.

Megan

Megan Ceronsky

Attorney

Environmental Defense Fund

(303) 447-7224 (P)

(303) 440-8052 (F)

1875 Connecticut Avenue NW

Suite 600

Washington, D.C. 20009

From: Henderson, Kelly [mailto:khenderson@nrdc.org]  
Sent: Thursday, June 06, 2013 10:50 AM  
To: 'Michael J. Myers (Michael.Myers@ag.ny.gov)'; 'Morgan.Costello@ag.ny.gov'; 'Joanne.Spalding@sierraclub.org'; Megan Ceronsky; Vickie Patton; Longstreth, Ben  
Cc: Doniger, David

Subject: 111d Lawsuit Call Tomorrow at 1:30pm EST

Good Morning All,

I just sent around an invite for a 111d lawsuit call tomorrow (Friday) at 1:30pm EST. The call in is: 212-727-4600, code: 0193688#.

Best,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | [khenderson@nrdc.org](mailto:khenderson@nrdc.org) | [www.nrdc.org](http://www.nrdc.org)

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>

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---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Megan Ceronsky <mceronsky@edf.org>;  
Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Vickie Patton  
<vpatton@edf.org>; Longstreth, Ben <blongstreth@nrdc.org>  
Cc: Doniger, David <ddoniger@nrdc.org>  
Bcc:  
Subject: RE: 111d Lawsuit Call Tomorrow at 1:30pm EST  
Date: Thu Jun 06 2013 14:56:36 EDT  
Attachments:

---

Mike Myers had mentioned that he is unable to make 1pm tomorrow but could do 1:30pm.

All- please let me know which time is better.

Thanks,

Kelly

From: Megan Ceronsky [mailto:mceronsky@edf.org]  
Sent: Thursday, June 06, 2013 2:54 PM  
To: Henderson, Kelly; 'Michael J. Myers (Michael.Myers@ag.ny.gov)'; 'Morgan.Costello@ag.ny.gov';  
'Joanne.Spalding@sierraclub.org'; Vickie Patton; Longstreth, Ben  
Cc: Doniger, David  
Subject: RE: 111d Lawsuit Call Tomorrow at 1:30pm EST

Hi all—

I thought we had set this call up for 1 p.m. tomorrow—does that still work? 1:30 is okay but I will be awaiting a high school graduation in an auditorium. So—background noise is at least a possibility.

Megan

Megan Ceronsky

Attorney

Environmental Defense Fund

(303) 447-7224 (P)

(303) 440-8052 (F)

1875 Connecticut Avenue NW

Suite 600

Washington, D.C. 20009

From: Henderson, Kelly [mailto:khenderson@nrdc.org]

Sent: Thursday, June 06, 2013 10:50 AM

To: 'Michael J. Myers (Michael.Myers@ag.ny.gov)'; 'Morgan.Costello@ag.ny.gov'; 'Joanne. Spalding@sierraclub.org'; Megan Ceronsky; Vickie Patton; Longstreth, Ben

Cc: Doniger, David

Subject: 111d Lawsuit Call Tomorrow at 1:30pm EST

Good Morning All,

I just sent around an invite for a 111d lawsuit call tomorrow (Friday) at 1:30pm EST. The call in is: 212-727-4600, code: 0193688#.

Best,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

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202. 289. 2401 | khenderson@nrdc.org | www.nrdc.org

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>

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---

From: khenderson@nrdc.org <khenderson@nrdc.org>  
on behalf of Doniger, David <ddoniger@nrdc.org>  
To: Longstreth, Ben <blongstreth@nrdc.org>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Megan Ceronsky  
(mceronsky@edf.org) <mceronsky@edf.org>; Vickie Patton  
<vpatton@edf.org>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Morgan  
Costello </o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: 111 lawsuit call  
Date: Fri Jun 07 2013 09:13:16 EDT  
Attachments:

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From: khenderson@nrdc.org <khenderson@nrdc.org>  
on behalf of Doniger, David <ddoniger@nrdc.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Longstreth, Ben <blongstreth@nrdc.org>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Megan Ceronsky  
(mceronsky@edf.org) <mceronsky@edf.org>; Vickie Patton  
<vpatton@edf.org>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Morgan  
Costello </o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Copy: 111 lawsuit call  
Date: Fri Jun 07 2013 09:13:16 EDT  
Attachments:

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StartTime: Fri Jun 07 13:00:00 Eastern Daylight Time 2013  
EndTime: Fri Jun 07 14:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Fri Jun 07 09:13:00 Eastern Daylight Time 2013

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From: khenderson@nrdc.org <khenderson@nrdc.org>  
on behalf of Doniger, David <ddoniger@nrdc.org>  
To: Doniger, David <ddoniger@nrdc.org>;  
Longstreth, Ben <blongstreth@nrdc.org>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Megan Ceronsky  
(mceronsky@edf.org) <mceronsky@edf.org>; Vickie Patton  
<vpatton@edf.org>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Morgan  
Costello </o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>  
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Recurring: No  
ShowReminder: No  
Accepted: No

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: 111 lawsuit call  
Date: Fri Jun 07 2013 09:13:45 EDT  
Attachments:

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From: Alison Crocker  
<ahcrocke@gw.dec.state.ny.us>  
To: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Cc: Patricia Desnoyers  
<pjdesnoy@gw.dec.state.ny.us>; William Little  
<>wglittle@gw.dec.state.ny.us>  
Bcc:  
Subject: Fwd: RGGI /6 NYCRR Part 242 Rulemaking Package  
Date: Tue Jun 11 2013 09:17:10 EDT  
Attachments: Express Terms Summary642013.docx  
JIS SummaryPD642013.docx  
JIS642013.docx  
Part 242642013.docx  
RAFA642013.docx  
RAFASUM642013.docx  
RFASBLG642013.docx  
RIS642013.docx  
RISSUM642013.docx

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Good morning - as you and I just discussed, I would like for you to review the support documents, particularly the RIS. I believe we need to strengthen the legal authority section of the RIS, to better explain why the statutory citations support the regulatory provisions of the program, and as you know, we are only making changes to certain aspects of the program (reduced cap, creation of Cost Containment Reserve, annual adjusted budget). The legal authority could also weave in more of the scientific studies that support using the authority to require reductions of CO2. I also would like to better explain that the NYSEDA auction provisions are not significantly affected by these regulatory revisions, thus clearly indicating that no new opportunity to challenge these provisions is opened up by this rulemaking.

Given all the analysis you have done in your brief writing to defend the RGGI program, I would really appreciate your input on the SAPA documents. Thank you. I'm sure Patty and Bill will work with you on any questions you may have.

>>> Patricia Desnoyers 6/5/2013 10:44 AM >>>

Ed and Alison, The RGGI Part 242 rulemaking package will begin routing for approval today. In order to give you a little time to review the documents before the package arrives in your in-box, I'm attaching the following: 1) Express Terms; 2) Express Terms Summary; 3) Regulatory Impact Statement (RIS); 4) RIS Summary; 5) Job Impact Statement (JIS); 6) JIS Summary; 7) Rural Area Flexibility Analysis (RAFA); 8) RAFA Summary; and 9) Regulatory Flexibility Analysis for Small Businesses and Local Governments. We're continuing to review for typos and non-material changes. Please let me know if you have any questions or comments. Thanks, Patty

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Owner: Alison Crocker <ahcrocke@gw.dec.state.ny.us>  
Filename: Express Terms Summary642013.docx  
Last Modified: Tue Jun 11 09:17:10 EDT 2013

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6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

## 6 NYCRR Part 200, General Provisions

## Express Terms Summary

The New York State CO<sub>2</sub> Budget Trading Program, 6 NYCRR Part 242 ( CO<sub>2</sub> Budget Trading Program or Part 242), is designed to stabilize and then reduce anthropogenic emissions of carbon dioxide ( CO<sub>2</sub>), a greenhouse gas (GHG), from CO<sub>2</sub> budget sources in an economically efficient manner. The proposed revisions to Part 242, including most notably the proposed reduction in the annual CO<sub>2</sub> emission budgets, are designed to further these objectives.

While the proposed revisions to Part 242 maintain annual base budgets for CO<sub>2</sub>, the most significant proposed revision to Part 242 is the approximately 45 percent reduction in the amount of such annual base budgets. In particular, the proposed revisions to Section 242-5.1 establish that , for allocation year 2014, the Statewide CO<sub>2</sub> Budget Trading Program base budget will be reduced from 64,310,805 tons to 35,228,822 tons<sup>1</sup>. The annual base budgets under Part 242 then decrease thereafter, as follows: to 34,348,101 tons in 2015, to 33,489,399 tons in 2016, to 32,837,536 tons in 2017, to 32,016,597 tons in 2018, to 31,216,182 tons in 2019 , and to 30,435,778 tons for 2020 . Each year thereafter, the annual CO<sub>2</sub> Budget Trading Program base budget will remain at 30,435,778 tons.

In addition to the proposed reduction in the annual CO<sub>2</sub> Budget Trading Program base budgets, the proposed revisions to Part 242 also include a new Section 242-5.2 for annual CO<sub>2</sub> Budget Trading Program adjusted budgets. The CO<sub>2</sub> Budget Trading Program adjusted budget is defined as the annual amount of CO<sub>2</sub> allowances allocated each year. In order to account for the existing private bank of CO<sub>2</sub> emissions allowances

<sup>1</sup> This amount reflects New York State's portion of the regional cap of 91,000,000 tons for 2014, proposed by the states participating in the Regional Greenhouse Gas Initiative (RGGI).

already acquired, and in order to help create a binding cap, the proposed revisions to Part 242 provides for two distinct budget adjustments. The First Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the first control period private bank of allowances (vintages 2009, 2010, and 2011) held by market participants after the first control period. The first adjustment will reduce New York's budget (the annual cap) by this amount, multiplied by New York's portion of the RGGI regional cap (approximately 38.93 percent), in each allocation year over the seven year period 2014-2020. The Second Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the surplus 2012 and 2013 vintage allowances held by market participants as of the end of 2013. The second adjustment will reduce New York's budget (the annual cap) by this amount, multiplied by New York's portion of the RGGI regional cap (approximately 38.93 percent) in each allocation year over the six year period 2015-2020. These are referred to as the CO<sub>2</sub> Budget Trading Program adjusted budget(s).

The proposed revisions to Part 242 also include the creation of the Cost Containment Reserve (CCR), which will help provide additional flexibility and cost containment for the Program. The CCR allocation and the rules for the sale of CO<sub>2</sub> CCR allowances are set forth in subdivision 242-5.3(b) of the proposed revisions to Part 242. CO<sub>2</sub> CCR allowances are separate from and additional to CO<sub>2</sub> allowances allocated from the CO<sub>2</sub> Budget Trading Program base and adjusted budgets. The CCR allowances will be triggered and released at auctions at \$4/ton in 2014, \$6/ton in 2015, \$8/ton in 2016, and \$10/ton in 2017. Each year after 2017 the CCR trigger price will increase by 2.5 percent.

If the CCR trigger price is reached, up to 10 million additional CCR allowances will be available for purchase at auction regionally under the RGGI program, except in 2014, when the reserve will be limited to five million allowances in the RGGI region. New York's portion of the regional CCR is approximately 38.93 percent, such that the State's portion of the CCR in Part 242 is limited in 2014 to 1,946,639 CO<sub>2</sub> CCR allowances in 2014 and 3,893,277 CO<sub>2</sub> CCR

allowances in 2015 and each calendar year thereafter.

The proposed revisions to Part 242 create a new interim compliance obligation, set forth in proposed paragraph 242-1.5(c)(2). An interim control period is defined as a one-year period, consisting of each of the first and second calendar years of each three year control period. In addition to demonstrating full compliance at the end of each three-year control period, at the end of each interim control period, regulated entities must now demonstrate that they are holding CO<sub>2</sub> allowances equal to at least 50 percent of their CO<sub>2</sub> emissions during the previous year.

Under the proposed revisions to Part 242, the second control period, which commenced on January 1, 2012, still concludes on December 31, 2014. Likewise, under the proposed revisions to Part 242, the CO<sub>2</sub> allowance transfer deadline for the second control period will remain March 1, 2015. Subsequent control periods begin on January 1<sup>st</sup> and conclude on the December 31<sup>st</sup> three years later. In each of the first two calendar years of each three year control period the owners and operators of each source subject to the revised Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, as of the CO<sub>2</sub> allowance transfer deadline (midnight of March 1<sup>st</sup> or, if March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter), in the source's compliance account that is not less than 50 percent of the total tons of CO<sub>2</sub> emissions for that interim control period. For example, the first interim control period will be the year 2015 and the second interim control period will be the year 2016 under the proposed revisions to Part 242, with associated CO<sub>2</sub> allowance transfer deadlines of March 1, 2016 and March 2016 respectively. At the end of the control period in 2017, all sources must demonstrate full compliance and account for 100 percent of their control period emissions with an allowance transfer deadline of March 1, 2018. Under the proposed revisions to Part 242, a compliance certification report is still required at the end of each control period, however, a report is not required at the end of each interim control period. Moreover, pursuant to the proposed revisions, the so-called treble damages provision in paragraph 242-

6.5(d)(1), which applies to excess emissions, will not apply to excess interim emissions.

The proposed revisions to Part 242 do not change the applicability provisions of the regulation, and maintain the limited exemption for units with electrical output to the electric grid restricted by permit conditions pursuant to subdivision 242-1.4(b). The proposed revisions do, however, eliminate the provision in paragraph 242-1.4(b)(4) to reduce the CO<sub>2</sub> Budget Trading Program base budget and remove the tons equal to the exempt unit's average annual emissions from the previous three calendar years. These allowances will now be available to the market.

The Department will continue to allocate most of the CO<sub>2</sub> Budget Trading Program adjusted budget to the energy efficiency and clean energy technology account. Although New York State Energy Research and Development Authority's (NYSERDA) CO<sub>2</sub> Allowance Auction Program (21 NYCRR Part 507) will not be revised as part of this rulemaking, NYSEDA will continue to administer the energy efficiency and clean technology account so that allowances will be sold in an open and transparent allowance auctions. The proceeds of the auctions will be used to promote the purposes of the energy efficiency and clean technology account and for administrative costs associated with the CO<sub>2</sub> Budget Trading Program.

The Reserve Price is the minimum acceptable price for each CO<sub>2</sub> allowance in a specific auction. Under the proposed revisions to Part 242, the reserve price at an auction is either the Minimum Reserve Price (MRP) or the CCR trigger price, depending on the level of demand for allowances at the auction. The proposed revisions to Part 242 provide that the MRP will be set at \$2.00 in 2014 and increase by 2.5 percent each year thereafter. The provisions for a current market reserve price are eliminated under the proposed revisions.

Under the proposed revisions to Part 242, the Department has maintained the inclusion of two set-asides in subdivisions 242-5.3(c) and (d). In particular,

the department shall continue to allocate 700,000 and 1,500,000 tons each year, respectively, from the CO<sub>2</sub> Budget Trading Program adjusted budgets to these two set-asides.

While the amount of allowances set-aside remains the same, the revisions to Pat 242 include a proposal to modify the existing “voluntary renewable energy market set-aside” in subdivision 242-5.3(c) to include eligible biomass. This revision expands eligibility for retiring CO<sub>2</sub> allowances from the set-aside to include CO<sub>2</sub> budget sources that co-fire eligible biomass as a compliance mechanism. Therefore, when a CO<sub>2</sub> budget source deducts CO<sub>2</sub> emissions from its compliance obligation as a result of co-firing eligible biomass, the Department proposes to also allow for the retirement of the corresponding number of CO<sub>2</sub> allowances from the set-aside. The proposed revisions to the Program maintain the existing provisions for voluntary renewable energy purchases. The Department will continue to retire allowances under the voluntary renewable energy market and eligible biomass set-aside for voluntary renewable energy purchases.

Similarly, while the amount of allowances set-aside remains the same, under the proposed revisions to Part 242, the long-term contract set-aside in subdivision 242-5.3(d) will continue to be available to CO<sub>2</sub> budget sources that can make the necessary demonstration to the Department’s satisfaction. The changes proposed in this subdivision are merely intended to clarify the operation and administration of the set-aside, consistent with the Department’s interpretation of subdivision 242-5.3(d) pursuant to Declaratory Ruling 19-18, which the Department issued on November 5, 2009.

The proposed revisions to Part 242 delete the existing stage one and stage two triggers and associated provisions. These price triggers raised the allowable percentage of offsets to be used for compliance, allowed for the use of international CO<sub>2</sub> emission credit retirements, and created the potential extension of the control period to four years. The offset price triggers and the potential extension of the control period to four years are replaced by the CCR mechanism, to provide

measurable cost control in an efficient, transparent and predictable manner. For CO<sub>2</sub> offset allowances, the proposed revisions retain the number of CO<sub>2</sub> offset allowances that are available to be deducted for compliance with a CO<sub>2</sub> budget source's CO<sub>2</sub> budget emissions limitation for a control period at 3.3 percent of the CO<sub>2</sub> budget source's CO<sub>2</sub> emissions for that control period.

The proposed revisions to Part 242 eliminate the provision to award early reduction allowances, in existing subdivision 242-5.2(b), as those provisions are no longer applicable. Finally, the proposed revisions to Part 200 include updated cites for the portions of Federal statute and regulations, as well as other documents, that are incorporated by reference into the proposed revisions to Part 242.

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Filename: JIS SummaryPD642013.docx  
Last Modified: Tue Jun 11 09:17:10 EDT 2013

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6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

## 6 NYCRR Part 200, General Provisions

## Job Impact Statement Summary

1. Nature of Impact: The Regional Greenhouse Gas Initiative (RGGI) is a cooperative, historic effort among New York and eight Participating States<sup>1</sup> and is the first mandatory, market-based carbon dioxide (CO<sub>2</sub>) emissions reduction program in the United States. Since its inception in 2008, RGGI has utilized an innovative market-based mechanism to cap and cost-effectively reduce emissions that cause climate change. Recently, New York along with the Participating States, announced a proposal to lower the regional emissions cap established under RGGI to 91 million tons in 2014, declining 2.5 percent a year through 2020.<sup>2</sup> In order to implement the updated RGGI program in New York State, the Department of Environmental Conservation (Department) proposes to revise 6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program (the Program), and 6 NYCRR Part 200, General Provisions.

A macroeconomic impact study to estimate the impact of the reduced CO<sub>2</sub> emissions cap, budget adjustments and the remainder of the proposed Program revisions<sup>3</sup> on jobs in the RGGI region was conducted at the direction of the New York and the Participating States by the Northeast States Coordinated Air Use Management (NESCAUM). Utilizing the Regional Economic Models, Inc. Policy Insight™ (REMI) model, the study estimates that the cumulative change in employment in New York associated with the proposed Program revisions will be approximately 80,500 additional job-years over the period 2012 to 2040. (A job-year is equivalent to one person employed for one year.) Further, the study estimates that the cumulative changes in

<sup>1</sup> In addition to New York, the RGGI Participating States include: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, Rhode Island, and Vermont.

<sup>2</sup> The Participating States released the Updated Model Rule on February 7, 2013.

<sup>3</sup> The estimated impact of the RGGI Program is the increment calculated as the difference between the Reference Case and the “91 Cap Bank MR IPM Scenario.”

New York 's Gross State Product and Personal Income associated with the proposed Part 242 revisions will increase approximately \$5.8 billion and \$4.7 billion, respectively (2010 dollars, calculated as the present value of estimated annual changes over the period 2012 to 2040, discounted at three percent per year to account for the time-value of money). Although these cumulative changes are minimal, they represent positive impacts for total State employment, total Gross State Product and total Personal Income.

The proposed Program revisions will cap regional CO<sub>2</sub> emissions at 91 million tons annually beginning in 2014. After 2020, the cap will remain at 78 million tons annually. Further, in order to account for the existing private bank of CO<sub>2</sub> emissions allowances already acquired at auction, and in order to help create a binding cap, the proposed Program revisions provide two distinct budget adjustments. The proposed Program revisions also create the Cost Containment Reserve (CCR) which will help provide additional flexibility and cost containment for the Program. The CCR allowances will be triggered and released at auctions at \$4/ton in 2014, \$6/ton in 2015, \$8/ton in 2016, and \$10/ton in 2017. Each year after 2017 the CCR trigger price will increase by 2.5 percent. If the trigger price is reached, up to 10 million additional CCR allowances will be available for purchase at auction, except in 2014, when the reserve will be limited to 5 million allowances. Finally, the proposed Program revisions create an interim compliance obligation. In addition to demonstrating full compliance at the end of each three-year compliance period, regulated entities must now demonstrate that they are holding allowances equal to at least 50 percent of their emissions at end of each of the first two years in each three year compliance period.

2. Categories and Numbers Affected: The Department, New York State Energy Research Development Authority (NYSERDA) and the New York State Department of Public Service (DPS) analyzed costs, including impacts to jobs, total Gross State Product and total Personal Income, associated with compliance with the proposed Part 242 revisions. This section explains NYSERDA 's analysis and includes a summary of the

Integrated Planning Model (IPM®) modeling conducted by ICF International (ICF). IPM® is a nationally recognized modeling tool used by the U.S. Environmental Protection Agency (EPA), state energy and environmental agencies, and private sector firms such as utilities and generation companies. This section also discusses the Department's analysis of the costs associated with State and local government compliance and impacts from the proposed revisions to the Program on the New York economy and customer bills.<sup>4,5</sup>

Modeling analysis and review was coordinated by RGGI Inc. and New York staff, and included input from energy and environmental representatives from the Participating States and each regional ISO. In order to evaluate the potential cost impacts of the reduced CO<sub>2</sub> emissions cap and budget adjustments, including the impact on jobs, total Gross State Product and total personal income, IPM® compared a future with the revisions to the Program (Program Case) to a Reference Case (business as usual scenario) that projects how the electricity system would look if the Program remained unchanged and proposed revisions were not implemented.

Assumptions and sources of input data are specified in detail in the "RGGI DRAFT 2012 Reference Case and Sensitivity Analyses Assumptions."<sup>6</sup> Key assumptions and data include regional electricity demand, load shapes, transmission system capacities and limits, generation unit level operation and maintenance costs and performance characteristics, fuel prices, new capacity and emission control technology costs and performance characteristics, reserve margins and local reserve requirements, RPS requirements, national and state environmental regulations, and financial market assumptions. All estimates are based on 2010 dollars. Regional electricity demand growth projections, transmission capacities and limits, and near-term expected infrastructure additions/retirements were obtained from regional ISO sources. Long range Henry Hub natural

<sup>4</sup> "REMI Economic Impacts Analysis," by the Northeast States for Coordinated Air Use Management (NESCAUM), dated May 29, 2013. [http://www.dec.ny.gov/docs/administration\\_pdf/remi91cap2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/remi91cap2013.pdf)

<sup>5</sup> "IPM Potential Scenario Customer Bill Analysis," by the Analysis Group, dated May 24, 2013. [http://www.dec.ny.gov/docs/administration\\_pdf/remi91cap2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/remi91cap2013.pdf)

<sup>6</sup> The modeling assumptions document and the tabular results for each modeling run are located at [http://www.rggi.org/design/program\\_review](http://www.rggi.org/design/program_review)

gas prices (2020), based on forecast data from U.S. Energy Information Administration (EIA) were projected to be approximately \$4.6/MMBtu (constant 2010 dollars).

A number of assumptions were used to develop the model, including: 1) the construction of new coal-fired plants was precluded to meet projected capacity shortfalls in the United States unless they include carbon capture; 2) new nuclear plant construction was limited to build outs at existing plant sites; 3) a national 3-pollutant policy (SO<sub>2</sub>, NO<sub>x</sub> and mercury) that approximates the Cross-state Air Pollution Rule (CSAPR) and the Mercury and Air Toxics Rule (MATS) is assumed; 4) RPS targets are assumed to be met in all states except New York; and 5) partial fulfillment of the RPS target is assumed in New York based upon New York ISO certainty criteria, capacity under RPS contract, and RPS funds currently approved for future solicitations (approximately \$3 billion).

Under the Reference Case, generation from new gas-fired combined cycle units is projected to supply most of the growing electricity demand. Electric generation from gas-fired plants in New York is projected to increase by approximately 37 percent from 48,109 Gigawatt hours ( GWh) in 2013 to 65,983 GWh in 2020. Generation from new renewable resources (primarily wind units) is projected to increase significantly, largely in response to RPS requirements. While nuclear generation is projected to decrease by about 35 percent between 2013 and 2020 due to the assumed retirement of the Indian Point units upon their respective license expiration, generation from coal-fired plants is projected to increase by about eight percent between 2013 and 2020. Finally, generation from existing oil/gas steam units is projected to decrease over time, as a result of displacement by lower-cost electricity from new gas-fired units. Additionally, net imports of electricity into New York are projected to rise from approximately 24,000 GWh in 2013 to approximately 26,800 GWh in 2016 before decreasing to about 23,000 in 2020. CO<sub>2</sub> emissions in the Reference Case, from sources in New York State subject to the Program, are projected to increase from approximately 34.6 million tons in 2013 to about

41.7 million tons in 2020.

Likewise, several assumptions were used to project impacts in the Program Case. For modeling purposes, the proposed CO<sub>2</sub> cap of 91 million tons, based on the approximate amount of current emissions in the RGGI region, was applied to sources subject to the Program in the Participating States. In order to account for the existing private bank of allowances and in order to help create a binding cap, the proposed revisions to the Program create provisions for two distinct budget adjustments. In order to model the budget adjustments, the annual caps were adjusted in accordance with the model rule language and the assumption that the adjustment would account for the existing bank as well as 100 percent of the surplus (current cap and emissions) for 2013. While the Program Case allows a limited number of emissions offsets to be purchased by affected generators and used for compliance by affected generators, the model assumes that it is not economically attractive for offset suppliers to sell their products in the RGGI market until prices reached \$10 per allowance.

In order to obtain New York specific results, several components between the Program Case and the Reference Case are compared including generation mix, net electricity imports, changes in generation capacity, CO<sub>2</sub> emissions, CO<sub>2</sub> allowance prices, and wholesale and retail electricity price impacts. Electricity generation from gas-fired units in 2020 is about 1,576 GWh, or 2.4 percent lower in the Program Case than in the Reference Case. Generation from coal-fired units in 2020 is about 2,376 GWh, or 37 percent lower in the Program Case than in the Reference Case. Net imports into New York in 2020 are projected to be about 3,900 GWh, or 17 percent higher in the Program Case than in the Reference Case. Relative to the Reference Case, total capacity additions through 2020 in the Program Case are the same (5,909 MW) as in the Reference Case. Coal capacity retirements through 2020 in the Reference Case are 408 MW while the estimated value for the Program Case is 466 MW.

CO<sub>2</sub> emissions from New York generators in the Program Case are projected to be 3.2 million tons (eight

percent) lower in 2020 than in the Reference Case. Over the 2014-2020 time period, cumulative CO<sub>2</sub> emission reductions from New York generators subject to the Program are projected to be 13 million tons in the Program Case as compared to the Reference Case. Although emissions from affected sources across the RGGI region are estimated to be 15 million tons (14.6 percent ) lower under the Program Case than under the Reference Case in 2020, CO<sub>2</sub> emissions from the electricity sector in New York are projected to increase 4.9 million tons , or 14.7 percent between 2014 and 2020. Principally, emissions in New York are projected to rise because the Indian Point nuclear units are assumed to retire when their current licenses expire in 2013 and 2015. The IPM model projects that the generation from these non-CO<sub>2</sub> emitting generators is likely to be replaced with fossil fuel-fired generation, at least in part. Nevertheless, CO<sub>2</sub> emission reductions over the 2014-2020 period from affected sources across the RGGI region are estimated to be 86 million tons in the Program Case compared to the Reference Case.

Under the Reference Case, without making any proposed Program revisions, CO<sub>2</sub> allowance prices are projected to remain at the minimum reserve price through 2020. Under the Program Case, CO<sub>2</sub> allowance prices (the cost of complying with RGGI) are projected to increase from approximately \$6.02/ton (2010 dollars) in 2014 to about \$6.73/ton in 2016, and to about \$8.41/ton in 2020. Approximately 17.6 million allowances would be obtained by the marketplace between 2014 and 2020 from the Cost Containment Reserve (CCR), which would be triggered at \$4/ton in 2014 and at \$6/ton in 2015.

Under the Program Case, New York 's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.64/MWh higher in 2016 and \$2.12/MWh higher in 2020, than the Reference Case. RGGI is projected to increase wholesale electricity prices in New York State by about 3.0 percent in 2016 and 3.9 percent in 2020. For a typical New York residential customer (using 750 kWh per month), the projected increase in wholesale electricity prices in 2016 translates into a monthly retail bill increase of about 1.0 percent

or \$0.86. In 2020, the projected increase in wholesale electricity prices translates into a monthly residential retail bill increase of about 0.8 percent or \$0.71. For commercial customers, the projected retail price impact of RGGI is about 1.1 percent in 2016 and 0.7 percent in 2020 (\$7.87 and \$5.00 per month, respectively). For industrial customers, the projected retail price impact of RGGI is about 1.7 percent in 2016 and 1.2 percent in 2020.

IPM projects electricity system operations and costs with perfect foresight, which means that there is certainty of knowledge of all future market outcomes, including allowance prices and the use of the private bank. In other words, IPM calculates when and whether it is cost-effective to make on-system emissions reductions at affected sources or to use allowances from the private bank. However, market participants may make decisions related to use of banked allowances for compliance on a shorter time horizon than projected by IPM using perfect foresight (i.e., due to uncertainty, market participants may be more likely to defer emissions reductions and rely more heavily on banked allowances in the short-term). In order to assess the use of the private bank during the short-term, an alternative usage scenario (“Alt Bank”) was examined. Under the Alt Bank scenario, it is assumed that the marketplace would use the private bank of allowances at a rate roughly 40 percent faster than under the Program Case during the 2014-2017 timeframe.

CO<sub>2</sub> emissions from New York generators are projected in the Alt Bank scenario to be 4.4 million tons (10.7 percent) lower in 2020 than Reference Case. The generators are assumed to use more of the private bank by 2017 under this scenario, therefore less allowances will be available for use in later years and more emissions reductions will occur during this timeframe. Emissions from affected sources across the RGGI region are estimated to be 81.6 million tons in 2020 under the Alt Bank scenario while they are projected to be 87.8 million tons under the Program Case.

CO<sub>2</sub> allowance prices under the Alt Bank scenario are projected to increase from approximately

\$3.60/ton (2010 dollars) in 2014 to about \$6.57/ton in 2016 and about \$10.21/ton in 2020. Prices are lower in the short-term under the Alt Bank scenario than under the Program Case because the former scenario assumes that more allowances from the private bank are being used for compliances in the short term. Similarly, prices are higher in 2020 under the Alt Bank scenario because the marketplace has fewer allowances left over in the private bank relative to the Reference Case. In addition, it is estimated that approximately 10 million allowances would be obtained by the marketplace between 2014 and 2020 from the CCR.

Under the Alt Bank scenario, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.62/ MWh higher in 2016 and \$2.72/ MWh higher in 2020, than the Reference Case. Wholesale electricity prices are estimated to increase by about 2.9 percent in 2016 and 4.9 percent in 2020 under the Alt Bank scenario relative to the Reference Case.

Sensitivity analyses were performed to develop bounds or collars around the Reference Case and Program Case projections. First, a Higher Emissions scenario that assumes higher natural gas prices and higher regional energy demand was evaluated. This scenario used natural gas prices from the Low Estimated Ultimate Recovery scenario in EIA's 2012 Annual Energy Outlook where Henry Hub natural gas prices are estimated to be \$5.31/MMBtu in 2020. Demand in this case is assumed to be about three percent higher in the near-term and four percent higher in the longer-term than the Reference Case. Likewise, a Lower Emissions scenario was also developed that assumes lower natural gas prices, lower regional energy demand, and the continued operation of the Indian Point nuclear power plants through the timeframe of the study. This scenario used natural gas prices from the High Technically Recoverable Resources scenario in EIA's 2012 Annual Energy Outlook where Henry Hub natural gas prices are estimated to be \$3.02/ MMBtu in 2020. In this case, demand is assumed to be about three percent lower in the near-term and four percent lower in the longer-term than the Reference Case.

The modeling case that evaluated the potential impacts of the Updated Model Rule using the Higher

Emissions assumptions was called the 91 Cap\_Bank\_Model Rule\_High Case. Under this scenario, allowance prices are estimated to be \$7.27/ton in 2014, \$8.13/ton in 2016 and \$10.15/ton in 2020. A sensitivity scenario was run to estimate the impacts of the Updated Model Rule with the Higher Emissions and Alt Bank assumptions. Under this 91 Cap Alt\_Bank\_Model\_Rule\_High Case, allowance prices are estimated to be about \$4.62/ton in 2014, \$6.90/ton in 2016, and \$16.44/ton in 2020.

In IPM, allowance prices would only be expected to rise above the minimum reserve price if the projected cumulative emissions over the time period exceed the cumulative cap level. When evaluating the impact of the Updated Model Rule using the Low Emissions scenario, emissions over the time period are projected to be 50 million tons less than the number of allowances available to the market (adjusted cap plus the emissions bank). Therefore, affected sources would not need to make any emission reductions and it is estimated that allowance prices would be at the minimum reserve price under this scenario.

A macroeconomic impact study to estimate the impact of the reduced CO<sub>2</sub> emissions cap, budget adjustments and the remainder of the proposed Program revisions<sup>7</sup> on jobs in the RGGI region was conducted at the direction of the New York and the Participating States by the Northeast States Coordinated Air Use Management (NESCAUM). Utilizing the Regional Economic Models, Inc. Policy Insight™ (REMI) model, a multi-state structural economic forecasting and policy analysis model that produces projections of annual values for employment, gross state product, and personal income, the study concluded that the economic impacts of the proposed Program revisions on the economies of New York and the Participating States are small and generally positive.

The macroeconomic impact study estimates that the cumulative change in employment in New York

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<sup>7</sup> The estimated impact of the RGGI Program is the increment calculated as the difference between the Reference Case and the “91 Cap Bank MR IPM Scenario.”

associated with the proposed Program revisions will be about 80,500 additional job-years over the period 2012 to 2040. A job-year is equivalent to one person employed for one year. Further, it estimates that the cumulative changes in New York's Gross State Product and Personal Income associated with the proposed Program revisions will increase approximately \$5.8 billion and \$4.7 billion, respectively (2010 dollars, calculated as the present value of estimated annual changes over the period 2012 to 2040, discounted at three percent per year to account for the time-value of money). Although these cumulative changes are minimal, they represent positive impacts for total State employment, total Gross State Product and total Personal Income.

3. Regions of adverse impact: A statewide analysis was performed for the proposed revisions to the Program and the modeling predicts that under the Program Case, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.64/ MWh higher in 2016 and \$2.12/ MWh higher in 2020, than the Reference Case. The proposed revisions to the Program are projected to increase wholesale electricity prices in New York State by about 3.0 percent in 2016 and 3.9 percent in 2020.

4. Minimizing Adverse Impact: The Department is implementing the proposed Program revisions through a cap-and-trade program. Allowance based cap and trade systems are the most cost effective means for implementing emission reductions from large stationary sources. By implementing the proposed Program revisions through an allowance based cap and trade system, the Department has minimized any potential adverse employment impacts of the revised Program, which revisions support the positive effects of the current Program.

5. Self-Employment Opportunities: Not applicable.

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6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

## 6 NYCRR Part 200, General Provisions

## Job Impact Statement

1. Nature of Impact: The Regional Greenhouse Gas Initiative (RGGI) is a cooperative, historic effort among New York and eight Participating States<sup>1</sup> and is the first mandatory, market-based carbon dioxide (CO<sub>2</sub>) emissions reduction program in the United States. Since its inception in 2008, RGGI has utilized an innovative market-based mechanism to cap and cost-effectively reduce emissions that cause climate change. Recently, New York along with the Participating States, completed a comprehensive program review and announced a proposal to lower the regional emissions cap established under RGGI to 91 million tons in 2014, declining 2.5 percent a year through 2020.<sup>2</sup> Accordingly, New York and the Participating States committed to propose revisions, pursuant to state-specific regulatory processes, to their respective CO<sub>2</sub> Budget Trading Programs to further reduce CO<sub>2</sub> emissions from power plants in the region. In order to implement the updated RGGI program in New York State, the Department of Environmental Conservation (Department) proposes to revise 6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program (Part 242 or the Program) and 6 NYCRR Part 200, General Provisions.

A macroeconomic impact study to estimate the impact of the reduced CO<sub>2</sub> emissions cap, budget adjustments and the remainder of the proposed Program revisions<sup>3</sup> on jobs in the RGGI region was conducted at the direction of the New York and the Participating States by the Northeast States Coordinated Air Use Management (NESCAUM). Utilizing the Regional Economic Models, Inc. Policy Insight™ (REMI) model, the

<sup>1</sup> In addition to New York, the RGGI Participating States include: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, Rhode Island, and Vermont.

<sup>2</sup> The Participating States released the Updated Model Rule on February 7, 2013.

<sup>3</sup> The estimated impact of the RGGI Program is the increment calculated as the difference between the Reference Case and the “91 Cap Bank MR IPM Scenario.”

study estimates that the cumulative change in employment in New York associated with the proposed Program revisions will be approximately 80,500 additional job-years over the period 2012 to 2040 (a job-year is equivalent to one person employed for one year.) Further, the study estimates that the cumulative changes in New York's Gross State Product and Personal Income associated with the proposed Part 242 revisions will increase approximately \$5.8 billion and \$4.7 billion, respectively (2010 dollars, calculated as the present value of estimated annual changes over the period 2012 to 2040, discounted at three percent per year to account for the time-value of money). Although these cumulative changes are minimal, they represent positive impacts for total State employment, total Gross State Product and total Personal Income.

The proposed Program revisions which will cap regional CO<sub>2</sub> emissions at 91 million tons annually beginning in 2014 represent a nearly 45 percent reduction from the existing cap currently in place under the Program. After 2020, the cap will remain at 78 million tons annually. Further, in order to account for the existing private bank of CO<sub>2</sub> emissions allowances already acquired at auction, and in order to help create a binding cap, the proposed Program revisions provide two distinct budget adjustments. The First Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the first control period private bank of allowances (vintages 2009, 2010, and 2011) held by market participants after the first control period. The Second Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the surplus 2012 and 2013 vintage allowances held by market participants as of the end of 2013.

The proposed revisions to Part 242 also create the Cost Containment Reserve (CCR) which will help provide additional flexibility and cost containment for the Program. The CCR allowances will be triggered and released at auctions at \$4/ton in 2014, \$6/ton in 2015, \$8/ton in 2016, and \$10/ton in 2017. Each year after 2017 the CCR trigger price will increase by 2.5 percent. If the trigger price is reached, up to 10 million additional CCR allowances will be available for purchase at auction, except in 2014, when the reserve will be

limited to five million allowances. The existing price triggers for expanding use of offsets and the one year compliance period extension will be eliminated in favor of the CCR.

Finally, the proposed Program revisions create an interim compliance obligation in part to align it with the annual compliance obligations under federal programs such as the Clean Air Interstate Rule and the Title IV Acid Rain Program. This program revision also helps to address the potential for a budget source to operate during the first couple of years of a three year compliance period and the potential to avoid their compliance obligation as a result of the business closing or falling into bankruptcy prior to the third year compliance obligation. In addition to demonstrating full compliance at the end of each three-year compliance period, regulated entities must now demonstrate that they are holding allowances equal to at least 50 percent of their emissions at end of each of the first two years in each three year compliance period. The proposed Program revisions also include minor revisions such as setting the reserve price at \$2.00 in 2014, to rise at 2.5 percent per year in subsequent years, updating all references, and the deleting early reduction allowance provisions. The majority of the proceeds from the sale of New York's allowances will be continue to be dedicated to strategic energy or consumer benefits, such as energy efficiency and clean energy technologies.

2. Categories and Numbers Affected: The Department, New York State Energy Research Development Authority (NYSERDA) and the New York State Department of Public Service (DPS) analyzed costs, including impacts to jobs, total Gross State Product and total Personal Income, associated with compliance with the proposed revisions to Part 242. This section explains NYSERDA's analysis and includes a summary of the Integrated Planning Model (IPM®)<sup>4</sup> modeling conducted by ICF International (ICF). This section also discusses the Department's analyses of the costs associated with State and local government compliance and impacts from the proposed revisions to Part 242 on the New York economy and customer bills.<sup>5,6</sup>

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<sup>4</sup> IPM® is a nationally recognized modeling tool used by the U.S. Environmental Protection Agency (EPA), state energy and environmental agencies, and private sector firms such as utilities and generation companies.

## Costs to the Regulated Sources and the Public

### Reference Case v. Program Case

Modeling analysis and review was coordinated by RGGI Inc. and New York staff, and included input from energy and environmental representatives from the Participating States and each regional ISO. In order to evaluate the potential cost impacts of the reduced CO<sub>2</sub> emissions cap and budget adjustments, including the impact on jobs, total Gross State Product and total personal income, IPM® compared a future with the revisions to the Program (Program Case) to a Reference Case (business as usual scenario) that projects how the electricity system would look if the Program remained unchanged and proposed revisions were not implemented. The modeling assumptions and input data were developed through a stakeholder process with representatives from the electricity generation sector, business and industry, environmental advocates and consumer interest groups. Modeling results were then presented to stakeholders for review and comment throughout the development of the proposed revisions to the RGGI program.

### Reference Case

Assumptions and sources of input data are specified in detail in the “RGGI DRAFT 2012 Reference Case and Sensitivity Analyses Assumptions.”<sup>7</sup> Key assumptions and data include regional electricity demand, load shapes, transmission system capacities and limits, generation unit level operation and maintenance costs and performance characteristics, fuel prices, new capacity and emission control technology costs and performance characteristics, reserve margins and local reserve requirements, RPS requirements, national and state environmental regulations, and financial market assumptions. All estimates are based on 2010 dollars.

<sup>5</sup> “REMI Economic Impacts Analysis,” by the Northeast States for Coordinated Air Use Management (NESCAUM), dated May 29, 2013. [http://www.dec.ny.gov/docs/administration\\_pdf/remi91cap2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/remi91cap2013.pdf)

<sup>6</sup> “IPM Potential Scenario Customer Bill Analysis,” by the Analysis Group, dated May 24, 2013. [http://www.dec.ny.gov/docs/administration\\_pdf/custbillanaly2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/custbillanaly2013.pdf)

<sup>7</sup> The modeling assumptions document and the tabular results for each modeling run are located at [http://www.rggi.org/design/program\\_review](http://www.rggi.org/design/program_review)

Regional electricity demand growth projections, transmission capacities and limits, and near-term expected infrastructure additions/retirements were obtained from regional ISO sources. Long range Henry Hub natural gas prices (2020), based on forecast data from U.S. Energy Information Administration (EIA) were projected to be approximately \$4.6/MMBtu (constant 2010 dollars).

A number of assumptions were used to develop the model, including: 1) the construction of new coal-fired plants was precluded to meet projected capacity shortfalls in the United States unless they include carbon capture; 2) new nuclear plant construction was limited to build outs at existing plant sites; 3) a national 3-pollutant policy (SO<sub>2</sub>, NO<sub>x</sub> and mercury) that approximates the Cross-state Air Pollution Rule (CSAPR) and the Mercury and Air Toxics Rule (MATS) is assumed; 4) RPS targets are assumed to be met in all states except New York; and 5) partial fulfillment of the RPS target is assumed in New York based upon New York ISO certainty criteria, capacity under RPS contract, and RPS funds currently approved for future solicitations (approximately \$3 billion).

Under the Reference Case, generation from new gas-fired combined cycle units is projected to supply most of the growing electricity demand. Electric generation from gas-fired plants in New York is projected to increase by approximately 37 percent from 48,109 Gigawatt hours (GWh) in 2013 to 65,983 GWh in 2020. Generation from new renewable resources (primarily wind units) is projected to increase significantly, largely in response to RPS requirements. While nuclear generation is projected to decrease by about 35 percent between 2013 and 2020 due to the assumed retirement of the Indian Point units upon their respective license expiration, generation from coal-fired plants is projected to increase by about eight percent between 2013 and 2020. Finally, generation from existing oil/gas steam units is projected to decrease over time, as a result of displacement by lower-cost electricity from new gas-fired units. Additionally, net imports of electricity into New York are projected to rise from approximately 24,000 GWh in 2013 to approximately 26,800 GWh in 2016

before decreasing to about 23,000 in 2020. CO<sub>2</sub> emissions in the Reference Case, from sources in New York State subject to the Program, are projected to increase from approximately 34.6 million tons in 2013 to about 41.7 million tons in 2020. This increase is due primarily to increased generation from new and existing gas-fired power plants to meet projected load growth.

This generation data was based on the IPM Reference Case model runs and the table displayed below:

New York Reference Case Net Generation (in GWh)	2012	2013	2014	2015	2016	2018	2020
Combined Cycle	40,419	46,344	44,171	47,637	55,024	60,509	63,743
CT	2,146	1,765	2,249	2,165	2,365	2,265	2,240
Oil/Gas	12,198	11,696	11,689	11,568	11,476	11,184	10,960
Coal	5,127	5,956	6,834	6,052	6,585	4,861	6,419
Nuclear	42,450	42,450	35,229	35,369	27,516	27,516	27,516
‘Conventional Generation Total’	102,340	108,212	100,172	102,791	102,966	106,335	110,878
Other - NUG/Cogen	1,863	1,863	1,875	1,881	1,884	1,884	1,887
Existing Conventional Hydro	27,082	27,275	27,251	27,540	27,471	27,540	27,532
Existing Renewables	5,457	5,444	5,444	5,457	5,500	5,464	5,444
‘Other Generation Total’	34,402	34,582	34,571	34,878	34,855	34,888	34,864
Biomass: Direct Fire	-	-	433	738	738	738	738

Landfill Gas	35	35	393	483	483	483	483
Hydro	-	-	452	556	556	556	556
Onshore Wind	-	-	1,155	1,908	2,627	2,627	2,627
Offshore Wind	-	-	-	-	-	-	-
Solar	81	81	252	333	379	379	427
'New Renewable Generation Total'	116	116	2,685	4,017	4,781	4,781	4,830
Total GWh	136,858	142,910	137,428	141,686	142,602	146,004	150,572

This emissions data was based on the IPM Reference Case and the table displayed below:

Reference Case CO <sub>2</sub> Emissions [Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	16	16	17	14	15	17
CT	6	7	7	7	7	7	7
ME	3	3	4	3	4	4	3
NH	2	3	2	2	2	2	2
RI	3	3	4	4	4	4	3
VT	0	0	0	0	0	0	0
NY	32	35	35	35	39	39	42
DE	4	3	4	4	5	5	5
MD	25	27	28	29	27	26	27
Total RGGI	93	96	100	102	101	102	105

Total Emissions at Affected Plants	91	93	97	100	99	99	103
Eastern Interconnect without RGGI	1,514	1,548	1,595	1,607	1,572	1,607	1,654
Total Eastern Interconnect	1,608	1,643	1,695	1,709	1,674	1,709	1,759
Total Canadian	102	98	95	97	100	101	104

## Program Case

### Interim Adjustment for Banked Allowances

Likewise, several assumptions were used to project impacts in the Program Case. For modeling purposes, the proposed CO<sub>2</sub> cap of 91 million tons, based on the approximate amount of current emissions in the RGGI region, was applied to sources subject to the Program in the Participating States. In order to account for the existing private bank of allowances and in order to help create a binding cap, the proposed revisions to the Program create provisions for two distinct budget adjustments. In order to model the budget adjustments, the annual caps were adjusted in accordance with the model rule language and the assumption that the adjustment would account for the existing bank as well as 100 percent of the surplus (current cap and emissions) for 2013.

While the Program Case allows a limited number of emissions offsets to be purchased by affected generators and used for compliance by affected generators, the model assumes that it is not economically attractive for offset suppliers to sell their products in the RGGI market until prices reached \$10 per allowance. This value is based on the reserve price under the California cap-and trade program which allows for the use of offset credits. As long as offset suppliers are able to sell similar products in the California market for prices higher than those in the RGGI market, offset suppliers would not be expected to sell into the RGGI market.

In order to obtain New York specific results, several components between the Program Case and the Reference Case are compared including generation mix, net electricity imports, changes in generation capacity, CO<sub>2</sub> emissions, CO<sub>2</sub> allowance prices, and wholesale and retail electricity price impacts. Electricity generation

from gas-fired units in 2020 is about 1,576 GWh or 2.4 percent lower in the Program Case than in the Reference Case. Generation from coal-fired units in 2020 is about 2,376 GWh or 37 percent lower in the Program Case than in the Reference Case. Net imports into New York in 2020 are projected to be about 3,900 GWh or 17 percent higher in the Program Case than in the Reference Case. Relative to the Reference Case, total capacity additions through 2020 in the Program Case are the same (5,909 MW) as in the Reference Case. Coal capacity retirements through 2020 in the Reference Case are 408 MW while the estimated value for the Program Case is 466 MW.

This generation data was based on the differences between IPM Reference Case and IPM Program Case model runs and the tables displayed below:

New York Reference Case Net Generation (in GWh)	2012	2013	2014	2015	2016	2018	2020
CC	40,419	46,344	44,171	47,637	55,024	60,509	63,743
CT	2,146	1,765	2,249	2,165	2,365	2,265	2,240
Oil/Gas	12,198	11,696	11,689	11,568	11,476	11,184	10,960
Coal	5,127	5,956	6,834	6,052	6,585	4,861	6,419
Nuclear	42,450	42,450	35,229	35,369	27,516	27,516	27,516
'Conventional Generation Total'	102,340	108,212	100,172	102,791	102,966	106,335	110,878
Other - NUG/Cogen	1,863	1,863	1,875	1,881	1,884	1,884	1,887
Existing Conventional Hydro	27,082	27,275	27,251	27,540	27,471	27,540	27,532

Existing Renewables	5,457	5,444	5,444	5,457	5,500	5,464	5,444
'Other Generation Total'	34,402	34,582	34,571	34,878	34,855	34,888	34,864
Biomass: Direct Fire	-	-	433	738	738	738	738
Landfill Gas	35	35	393	483	483	483	483
Hydro	-	-	452	556	556	556	556
Onshore Wind	-	-	1,155	1,908	2,627	2,627	2,627
Offshore Wind	-	-	-	-	-	-	-
Solar	81	81	252	333	379	379	427
'New Renewable Generation Total'	116	116	2,685	4,017	4,781	4,781	4,830
Total GWh	136,858	142,910	137,428	141,686	142,602	146,004	150,572

New York Program Case Net Generation (in GWh)							
	2012	2013	2014	2015	2016	2018	2020
CC	40,392	46,335	43,696	46,972	53,823	58,554	61,862
CT	2,147	1,769	2,259	2,247	2,502	2,497	2,545
Oil/Gas	12,208	11,696	11,640	11,496	11,463	11,168	10,977
Coal	5,235	5,956	5,937	3,887	4,679	3,179	4,043
Nuclear	42,450	42,450	35,229	35,369	27,516	27,516	27,516
'Conventional'							

Generation Total'	102,432	108,206	98,762	99,971	99,982	102,915	106,943
Other - NUG/Cogen	1,863	1,863	1,875	1,881	1,884	1,884	1,887
Existing Conventional							
Hydro	27,113	27,253	27,305	27,450	27,389	27,431	27,443
Existing Renewables	5,457	5,444	5,457	5,472	5,500	5,469	5,444
'Other Generation							
Total'	34,433	34,561	34,637	34,803	34,773	34,784	34,774
Biomass: Direct Fire	-	-	433	738	738	738	738
Landfill Gas	35	35	393	483	483	483	483
Hydro	-	-	452	556	556	556	556
Onshore Wind	-	-	1,155	1,908	2,627	2,627	2,627
Offshore Wind	-	-	-	-	-	-	-
Solar	81	81	252	333	379	379	427
'New Renewable							
Generation Total'	116	116	2,685	4,017	4,781	4,781	4,830
Total GWh	136,981	142,882	136,084	138,790	139,536	142,480	146,547

CO<sub>2</sub> emissions from New York generators in the Program Case are projected to be 3.2 million tons (eight percent) lower in 2020 than in the Reference Case. Over the 2014-2020 time period, cumulative CO<sub>2</sub> emission reductions from New York generators subject to the Program are projected to be 13 million tons in the Program Case as compared to the Reference Case. Although emissions from affected sources across the RGGI region are estimated to be 15 million tons (14.6 percent) lower under the Program Case than under the Reference Case in 2020, CO<sub>2</sub> emissions from the electricity sector in New York are projected to increase 4.9 million tons or 14.7

percent between 2014 and 2020. Principally, emissions in New York are projected to rise because the Indian Point nuclear units are assumed to retire when their current licenses expire in 2013 and 2015. The IPM model projects that the generation from these non-CO<sub>2</sub> emitting generators is likely to be replaced with fossil fuel-fired generation, at least in part. Nevertheless, CO<sub>2</sub> emission reductions over the 2014-2020 period from affected sources across the RGGI region are estimated to be 86 million tons in the Program Case compared to the Reference Case. This emissions data was based on the differences between IPM Reference Case and IPM Program Case model runs and the tables displayed below:

Reference Case CO <sub>2</sub> Emissions [Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	16	16	17	14	15	17
CT	6	7	7	7	7	7	7
ME	3	3	4	3	4	4	3
NH	2	3	2	2	2	2	2
RI	3	3	4	4	4	4	3
VT	0	0	0	0	0	0	0
NY	32	35	35	35	39	39	42
DE	4	3	4	4	5	5	5
MD	25	27	28	29	27	26	27
Total RGGI	93	96	100	102	101	102	105
Total Emissions at Affected Plants	91	93	97	100	99	99	103
Eastern Interconnect without RGGI	1,514	1,548	1,595	1,607	1,572	1,607	1,654
Total Eastern Interconnect	1,608	1,643	1,695	1,709	1,674	1,709	1,759

Total Canadian	102	98	95	97	100	101	104
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Program Case CO <sub>2</sub> Emissions [Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	15	15	15	13	14	16
CT	6	7	7	7	7	7	7
ME	3	3	4	4	4	3	3
NH	2	3	2	2	2	2	2
RI	3	4	4	4	4	4	4
VT	0	0	0	0	0	0	0
NY	32	35	34	33	36	36	38
DE	4	3	3	4	4	4	4
MD	25	27	23	23	22	17	17
Total RGGI	93	96	91	91	92	87	91
Total Emissions at Affected Plants	91	93	89	89	90	85	88
Eastern Interconnect without RGGI	1,514	1,548	1,601	1,613	1,579	1,616	1,662
Total Eastern Interconnect	1,608	1,643	1,692	1,704	1,671	1,704	1,753
Total Canadian	102	97	95	97	100	102	104

Under the Reference Case, without making any proposed Program revisions, CO<sub>2</sub> allowance prices are projected to remain at the minimum reserve price through 2020. Under the Program Case, CO<sub>2</sub> allowance prices (the cost of complying with RGGI) are projected to increase from approximately \$6.02/ton (2010 dollars) in

2014 to about \$6.73/ton in 2016 and to about \$8.41/ton in 2020. Approximately 17.6 million allowances would be obtained by the marketplace between 2014 and 2020 from the Cost Containment Reserve (CCR), which would be triggered at \$4/ton in 2014 and at \$6/ton in 2015. The acquisition of these additional allowances provides price dampening which is reflected in these estimated allowance prices.

This allowance price data was based on the IPM Reference Case and IPM Program Case model runs and the tables displayed below:

Reference Case Allowance Prices (2010\$)							
	2012	2013	2014	2015	2016	2018	2020
NO <sub>x</sub> Regional (\$/ton)	450	450	450	450	450	450	450
SO <sub>2</sub> Regional Tier 1 (\$/ton)	-	50	50	50	-	-	-
SO <sub>2</sub> Regional Tier 2 (\$/ton)	-	50	50	50	-	-	-
Regional CO <sub>2</sub> (\$/ton)	1.86	1.86	1.86	1.86	1.86	1.86	1.86

Program Case Allowance Prices (2010\$)							
	2012	2013	2014	2015	2016	2018	2020
NO <sub>x</sub> Regional (\$/ton)	600	600	600	600	600	600	600
SO <sub>2</sub> Regional Tier 1 (\$/ton)	-	6	6	7	-	-	-
SO <sub>2</sub> Regional Tier 2 (\$/ton)	-	21	22	23	-	-	-
Regional CO <sub>2</sub> (\$/ton)	1.86	1.86	6.02	6.37	6.73	7.52	8.41

Under the Program Case, New York 's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.64/MWh higher in 2016 and \$2.12/MWh higher in 2020, than the Reference Case. RGGI is projected to increase wholesale electricity prices in New York State by about 3.0 percent in 2016 and 3.9 percent in 2020. For a typical New York residential customer (using 750 kWh per month), the projected increase in wholesale electricity prices in 2016 translates into a monthly retail bill increase of about 1.0 percent or \$0.86. In 2020, the projected increase in wholesale electricity prices translates into a monthly residential retail bill increase of about 0.8 percent or \$0.71. For commercial customers, the projected retail price impact of RGGI is about 1.1 percent in 2016 and 0.7 percent in 2020 (\$7.87 and \$5.00 per month, respectively). For industrial customers, the projected retail price impact of RGGI is about 1.7 percent in 2016 and 1.2 percent in 2020.

#### Alternative Bank Scenario

IPM projects electricity system operations and costs with perfect foresight, which means that there is certainty of knowledge of all future market outcomes, including allowance prices and the use of the private bank. In other words, IPM calculates when and whether it is cost-effective to make on-system emissions reductions at affected sources or to use allowances from the private bank. However, market participants may make decisions related to use of banked allowances for compliance on a shorter time horizon than projected by IPM using perfect foresight (i.e., due to uncertainty, market participants may be more likely to defer emissions reductions and rely more heavily on banked allowances in the short-term). In order to assess the use of the private bank during the short-term, an alternative usage scenario ("Alt Bank") was examined. Under the Alt Bank scenario, it is assumed that the marketplace would use the private bank of allowances at a rate roughly 40 percent faster than under the Program Case during the 2014-2017 timeframe. This scenario is not intended to be a prediction of market behavior; rather it is intended to provide a broader sense of potential market outcomes.

CO<sub>2</sub> emissions from New York generators are projected in the Alt Bank scenario to be 4.4 million tons (10.7 percent) lower in 2020 than Reference Case. The generators are assumed to use more of the private bank by 2017 under this scenario, therefore less allowances will be available for use in later years and more emissions reductions will occur during this timeframe. Emissions from affected sources across the RGGI region are estimated to be 81.6 million tons in 2020 under the Alt Bank scenario while they are projected to be 87.8 million tons under the Program Case.

This emissions data IPM Alt Bank Case model runs and the table displayed below:

91 Alt Bank CO <sub>2</sub> Emissions							
[Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	15	16	15	13	14	15
CT	6	7	7	7	7	7	7
ME	3	3	4	4	4	3	3
NH	2	3	2	2	2	2	2
RI	3	4	4	4	4	4	4
VT	0	0	0	0	0	0	0
NY	32	35	34	34	36	36	37
DE	4	3	4	4	4	4	3
MD	25	27	26	25	23	15	14
Total RGGI	94	96	96	95	93	85	84
Total Emissions at Affected Plants	92	93	94	92	90	82	82
Eastern Interconnect without RGGI	1,514	1,548	1,598	1,610	1,578	1,617	1,665
Total Eastern Interconnect	1,608	1,643	1,694	1,705	1,671	1,702	1,750

Total Canadian	102	97	95	97	100	102	105
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CO<sub>2</sub> allowance prices under the Alt Bank scenario are projected to increase from approximately \$3.60/ton (2010 dollars) in 2014 to about \$6.57/ton in 2016 and about \$10.21/ton in 2020. Prices are lower in the short-term under the Alt Bank scenario than under the Program Case because the former scenario assumes that more allowances from the private bank are being used for compliances in the short term. Similarly, prices are higher in 2020 under the Alt Bank scenario because the marketplace has fewer allowances left over in the private bank relative to the Reference Case, and therefore more on-system emissions reductions are required from compliance entities. In addition, it is estimated that approximately 10 million allowances would be obtained by the marketplace between 2014 and 2020 from the CCR. The acquisition of these additional allowances provides some price dampening which is reflected in these estimated allowance prices.

This allowance price data was based on IPM Alt Bank Case model runs and the table displayed below:

Alt Bank Allowance Prices (2010\$)							
	2012	2013	2014	2015	2016	2018	2020
NO <sub>x</sub> Regional (\$/ton)	600	600	600	600	600	600	600
SO <sub>2</sub> Regional Tier 1 (\$/ton)	-	6	6	7	-	-	-
SO <sub>2</sub> Regional Tier 2 (\$/ton)	-	21	22	23	-	-	-
Regional CO <sub>2</sub> (\$/ton)	1.86	1.86	3.60	5.14	6.57	8.00	10.21

Under the Alt Bank scenario, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.62/MWh higher in 2016 and \$2.72/MWh higher in 2020, than the Reference Case. Wholesale electricity prices are estimated to increase by about 2.9 percent in 2016 and 4.9 percent in 2020 under the Alt Bank scenario relative to the Reference Case.

Sensitivity analyses were performed to develop bounds or collars around the Reference Case and Program Case projections. First, a Higher Emissions scenario that assumes higher natural gas prices and higher regional energy demand was evaluated. This scenario used natural gas prices from the Low Estimated Ultimate Recovery scenario in EIA's 2012 Annual Energy Outlook where Henry Hub natural gas prices are estimated to be \$5.31/MMBtu in 2020. Demand in this case is assumed to be about three percent higher in the near-term and four percent higher in the longer-term than the Reference Case. Likewise, a Lower Emissions scenario was also developed that assumes lower natural gas prices, lower regional energy demand, and the continued operation of the Indian Point nuclear power plants through the timeframe of the study. This scenario used natural gas prices from the High Technically Recoverable Resources scenario in EIA's 2012 Annual Energy Outlook where Henry Hub natural gas prices are estimated to be \$3.02/MMBtu in 2020. In this case, demand is assumed to be about three percent lower in the near-term and four percent lower in the longer-term than the Reference Case.

The modeling case that evaluated the potential impacts of the Updated Model Rule using the Higher Emissions assumptions was called the 91 Cap\_Bank\_Model Rule\_High Case. Under this scenario, allowance prices are estimated to be \$7.27/ton in 2014, \$8.13/ton in 2016 and \$10.15/ton in 2020. A sensitivity scenario was run to estimate the impacts of the Updated Model Rule with the Higher Emissions and Alt Bank assumptions. Under this 91 Cap Alt\_Bank\_Model\_Rule\_High Case, allowance prices are estimated to be about \$4.62/ton in 2014, \$6.90/ton in 2016, and \$16.44/ton in 2020.

In IPM, allowance prices would only be expected to rise above the minimum reserve price if the projected cumulative emissions over the time period exceed the cumulative cap level. When evaluating the impact of the Updated Model Rule using the Low Emissions scenario, emissions over the time period are projected to be 50 million tons less than the number of allowances available to the market (adjusted cap plus the

emissions bank). Therefore, affected sources would not need to make any emission reductions and it is estimated that allowance prices would be at the minimum reserve price under this scenario. This scenario was not actually modeled; however, ICF staff provided the assessment of the scenario described in this paragraph.

### Macroeconomic Impact Study

A macroeconomic impact study to estimate the impact of the reduced CO<sub>2</sub> emissions cap, budget adjustments and the remainder of the proposed Program revisions<sup>8</sup> on jobs in the RGGI region was conducted at the direction of the New York and the Participating States by the Northeast States Coordinated Air Use Management (NESCAUM). Utilizing the Regional Economic Models, Inc. Policy Insight™ (REMI) model, a multi-state structural economic forecasting and policy analysis model that produces projections of annual values for employment, gross state product, and personal income, the study concluded that the economic impacts of the proposed Program revisions on the economies of New York and the Participating States were very small and generally positive.

The macroeconomic impact study estimates that the cumulative change in employment in New York associated with the proposed Program revisions will be about 80,500 additional job-years over the period 2012 to 2040. A job-year is equivalent to one person employed for one year. Further, the macroeconomic impact study estimates that the cumulative changes in New York's Gross State Product and Personal Income associated with the proposed Program revisions will increase approximately \$5.8 billion and \$4.7 billion, respectively (2010 dollars, calculated as the present value of estimated annual changes over the period 2012 to 2040, discounted at three percent per year to account for the time-value of money). Although these cumulative changes are minimal, they represent positive impacts for total State employment, total Gross State Product and total Personal Income.

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<sup>8</sup> The estimated impact of the RGGI Program is the increment calculated as the difference between the Reference Case and the "91 Cap Bank MR IPM Scenario."

3. Regions of adverse impact: A Statewide analysis was performed for the proposed revisions to Part 242 and the modeling predicts that under the Program Case, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.64/MWh higher in 2016 and \$2.12/MWh higher in 2020, than the Reference Case. The proposed revisions to the Program are projected to increase wholesale electricity prices in New York State by about 3.0 percent in 2016 and 3.9 percent in 2020.

4. Minimizing Adverse Impact: The Department is implementing the proposed Program revisions through a cap-and-trade program. Allowance based cap and trade systems are the most cost effective means for implementing emission reductions from large stationary sources. By implementing the proposed Part 242 revisions through an allowance based cap and trade system, the Department has minimized any potential adverse employment impacts of the revised Program, which revisions support the positive effects of the current Program.

5. Self-Employment Opportunities: Not applicable.

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## Express Terms

### 6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

Section 242-1.1 through paragraph 242-1.2(b)(1) remains the same.

The remainder of subdivision 242-1.2(b) is revised as follows:

(2) ‘ Acid rain emissions limitation ’. As defined in 40 CFR 72.2 (see Table 1, section 200.9 of this Title), a limitation on emissions of sulfur dioxide or nitrogen oxides under the Acid Rain Program under title IV of the Clean Air Act.

(3) ‘ Acid Rain Program ’. A multi-state sulfur dioxide and nitrogen oxides air pollution control and emission reduction program established by the administrator under title IV of the CAA and 40 CFR parts 72 through 78 (see Table 1, section 200.9 of this Title).

(4) ‘ Administrator ’. Administrator means the Administrator of the United States Environmental Protection Agency or the Administrator’s authorized representative.

(5) ‘ Allocate or allocation ’. The determination by the department of the number of CO<sub>2</sub> allowances to be recorded in the compliance account of a CO<sub>2</sub> budget unit, an allocation set-aside account, the energy efficiency and clean energy technology account, or the general account of the sponsor of an approved CO<sub>2</sub> emissions offset project.

(6) ‘ Allocation year ’. A calendar year for which the department allocates or awards CO<sub>2</sub> allowances pursuant to Subparts 242-5 and 242-10 of this Part . The allocation year of each CO<sub>2</sub> allowance is

reflected in the unique identification number given to the allowance pursuant to section 242-6.4(b) of this Part.

(7) 'Allowance auction or auction' . An auction in which the New York State Research and Development Authority (NYSERDA) or its agent offers CO<sub>2</sub> allowances for sale.

[(7)](8) 'Alternate CO<sub>2</sub> authorized account representative' . For a CO<sub>2</sub> budget source and each CO<sub>2</sub> budget unit at the source, the natural person who is authorized by the owners and operators of the source and all CO<sub>2</sub> budget units at the source, in accordance with Subpart 242-2 of this Part , to represent and legally bind each owner and operator in matters pertaining to the CO<sub>2</sub> Budget Trading Program or, for a general account, the natural person who is authorized, under Subpart 242-6 of this Part, to transfer or otherwise dispose of CO<sub>2</sub> allowances held in the general account. If the CO<sub>2</sub> budget source is also subject to the CAIR NO<sub>x</sub> Ozone Season Trading Program, CAIR NO<sub>x</sub> Annual Trading Program, or CAIR SO<sub>2</sub> Trading Program then, for a CO<sub>2</sub> Budget Trading Program compliance account, this natural person shall be the same person as the alternate CAIR designated representative under such programs. If the CO<sub>2</sub> budget source is also subject to the Acid Rain Program, then for a CO<sub>2</sub> Budget Trading Program compliance account, this natural person shall be the same person as the alternate designated representative under the Acid Rain Program.

[(8)](9) ' Attribute' . A characteristic , claim, credit, benefit, emissions reduction, offset, allowance, allocation, howsoever characterized, denominated, measured or entitled, associated with electricity generated using a particular renewable fuel, such as its generation date, facility geographic location, unit vintage, emissions output, fuel, state program eligibility, or other characteristic that can be identified, accounted for, and tracked.

[(9)](10) 'Attribute credit' . An attribute credit represents the attributes related to one megawatt-hour of electricity generation.

[(10)](11) 'Automated data acquisition and handling system or DAHS'. That component of the continuous emissions monitoring system, or other emissions monitoring system approved for use under Subpart 242-8 of this Part, designed to interpret and convert individual output signals from pollutant concentration monitors, flow monitors, diluent gas monitors, and other component parts of the monitoring system to produce a continuous record of the measured parameters in the measurement units required by Subpart 242-8 of this Part.

[(11)](12) 'Award'. The determination by the department of the number of [CO<sub>2</sub> allowances to be recorded in the compliance account of a CO<sub>2</sub> budget unit for early reduction CO<sub>2</sub> allowances pursuant to section 242-5.3(b)(5) of this Part, or the determination by the department of the number of ] CO<sub>2</sub> offset allowances to be recorded in the general account of a project sponsor pursuant to 242-10.7 of this Part. Award is a type of allocation.

[(12) 'Billing meter'. To qualify as a billing meter, the measurement device must be used to measure electric or thermal output for commercial billing under a contract. The facility selling the electric or thermal output must have different owners from the owners of the party purchasing the electric or thermal output.]

(13) 'Boiler'. An enclosed fossil or other fuel-fired combustion device used to produce heat and to transfer heat to recirculating water, steam, or other medium.

(14) 'CAIR NO<sub>x</sub> Annual Trading Program'. A multi-state nitrogen oxides air pollution control and emission reduction program approved and administered by the administrator in accordance with 40 CFR part 96 subparts AA through II and 40 CFR 51.123(o)(1) or (2) or established by the administrator in accordance

with subparts AA through II of 40 CFR part 97 and 40 CFR 51.123(p) and 52.35 (see Table 1, section 200.9 of this Title), as a means of mitigating interstate transport of fine particulates and nitrogen oxides.

(15) ‘CAIR NO<sub>x</sub> Ozone Season Trading Program’. A multi-state nitrogen oxides air pollution control and emission reduction program approved and administered by the administrator in accordance with subparts AAAA through IIII of 40 CFR part 96 and 40 CFR 51.123(aa)(1) or (2) (and (bb)(1)), (bb)(2), or (dd) or established by the administrator in accordance with subparts AAAA through IIII of 40 CFR part 97 and 40 CFR 51.123(ee) and 52.35 (see Table 1, section 200.9 of this Title), as a means of mitigating interstate transport of ozone and nitrogen oxides.

(16) ‘CAIR SO<sub>2</sub> Trading Program’. A multi-state sulfur dioxide air pollution control and emission reduction program approved and administered by the administrator in accordance with subparts AAA through III of 40 CFR part 96 and 40 CFR 51.124(o)(1) or (2) or established by the administrator in accordance with subparts AAA through III of 40 CFR part 97 and 40 CFR 51.124(r) and 52.36 (see Table 1, section 200.9 of this Title), as a means of mitigating interstate transport of fine particulates and sulfur dioxide.

(17) ‘CO<sub>2</sub> allowance’. A limited authorization by the department or a participating state under the CO<sub>2</sub> Budget Trading Program to emit up to one ton of CO<sub>2</sub>, subject to all applicable limitations contained in this Part. No provision of this regulation shall be construed to limit the authority of the department or a participating state to terminate or limit such authorization to emit. This limited authorization does not constitute a property right.

(18) ‘CO<sub>2</sub> allowance deduction or deduct CO<sub>2</sub> allowances’. The permanent withdrawal of CO<sub>2</sub> allowances by the department or its agent from a CO<sub>2</sub> allowance tracking system compliance account to account

for the number of tons of CO<sub>2</sub> emitted from a CO<sub>2</sub> budget source for a control period or an interim control period, determined in accordance with Subpart 242-8 of this Part , or for the forfeit or retirement of CO<sub>2</sub> allowances as provided by this Part.

[(19) 'CO<sub>2</sub> allowance price'. The price for CO<sub>2</sub> allowances in the CO<sub>2</sub> Budget Trading Program for a particular time period as determined by the department or its agent, calculated based on a volume-weighted average of transaction prices reported to the department or its agent, and taking into account prices as reported publicly through reputable sources.]

[(20)](19) 'CO<sub>2</sub> allowances held or hold CO<sub>2</sub> allowances'. The CO<sub>2</sub> allowances recorded by the department or its agent, or submitted to the department or its agent for recordation, in accordance with Subparts 242-6 and 242-7 of this Part, in a CO<sub>2</sub> allowance tracking system account.

[(21)](20) 'CO<sub>2</sub> Allowance Tracking System'. The system by which the department or its agent records allocations, deductions, and transfers of CO<sub>2</sub> allowances under the CO<sub>2</sub> Budget Trading Program. The tracking system may also be used to track CO<sub>2</sub> emissions offset projects, CO<sub>2</sub> allowance prices and emissions from affected sources , and to determine the New York CO<sub>2</sub> Budget Trading Program adjusted budget in accordance with section 242-5.2.

[(22)](21) 'CO<sub>2</sub> Allowance Tracking System account '. An account in the CO<sub>2</sub> Allowance Tracking System established by the department or its agent for purposes of recording the allocation, holding, transferring, or deducting of CO<sub>2</sub> allowances.

[(23)](22) 'CO<sub>2</sub> allowance transfer deadline'. Midnight of the March 1<sup>st</sup> occurring after the end

of the relevant control period and each relevant interim control period or, if that March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter and is the deadline by which CO<sub>2</sub> allowances must be submitted for recordation in a CO<sub>2</sub> budget source's compliance account in order for the source to meet the CO<sub>2</sub> requirements of subdivision 242-1.5(c) of this Part for the control period and each interim control period immediately preceding such deadline.

[(24)](23) 'CO<sub>2</sub> authorized account representative'. For a CO<sub>2</sub> budget source and each CO<sub>2</sub> budget unit at the source, the natural person who is authorized by the owners and operators of the source and all CO<sub>2</sub> budget units at the source, in accordance with Subpart 242-2 of this Part, to represent and legally bind each owner and operator in matters pertaining to the CO<sub>2</sub> Budget Trading Program or, for a general account, the natural person who is authorized, under Subpart 242-6 of this Part, to transfer or otherwise dispose of CO<sub>2</sub> allowances held in the general account. If the CO<sub>2</sub> budget source is also subject to the CAIR NO<sub>x</sub> Ozone Season Trading Program, CAIR NO<sub>x</sub> Annual Trading Program, or CAIR SO<sub>2</sub> Trading Program then, for a CO<sub>2</sub> Budget Trading Program compliance account, this natural person shall be the same person as the CAIR designated representative under such programs. If the CO<sub>2</sub> budget source is also subject to the Acid Rain Program, then for a CO<sub>2</sub> Budget Trading Program compliance account, this natural person shall be the same person as the designated representative under the Acid Rain Program.

[(25)](24) 'CO<sub>2</sub> budget emissions limitation'. For a CO<sub>2</sub> budget source, the tonnage equivalent, in CO<sub>2</sub> emissions in a control period or an interim control period, of the CO<sub>2</sub> allowances available for compliance deduction for the source for a control period or an interim control period.

[(26)](25) 'CO<sub>2</sub> budget permit'. The portion of the legally binding permit issued by the department pursuant to Parts 201 and 621 of this Title to a CO<sub>2</sub> budget source or CO<sub>2</sub> budget unit which specifies all applicable CO<sub>2</sub> Budget Trading Program requirements.

[(27)](26) 'CO<sub>2</sub> budget source'. A source that includes one or more CO<sub>2</sub> budget units.

[(28)](27) 'CO<sub>2</sub> Budget Trading Program'. A multi-state CO<sub>2</sub> air pollution control and emissions reduction program established pursuant to this Part and corresponding regulations in other states as a means of reducing emissions of CO<sub>2</sub> from CO<sub>2</sub> budget sources.

(28) 'CO<sub>2</sub> Budget Trading Program adjusted budget'. The New York CO<sub>2</sub> Budget Trading Program adjusted budget is determined in accordance with section 242-5.2 and is the annual amount of CO<sub>2</sub> tons available in New York for allocation in a given allocation year, in accordance with the CO<sub>2</sub> Budget Trading Program. CO<sub>2</sub> offset allowances allocated to project sponsors and CO<sub>2</sub> CCR allowances offered for sale at an auction are separate from and additional to CO<sub>2</sub> allowances allocated from the New York CO<sub>2</sub> Budget Trading Program adjusted budget.

(29) 'CO<sub>2</sub> Budget Trading Program base budget'. The New York CO<sub>2</sub> Budget Trading Program base budget is specified in section 242-5.1 of this Part. [The annual amount of CO<sub>2</sub> tons available in New York for allocation in a given allocation year, in accordance with the CO<sub>2</sub> Budget Trading Program. ] CO<sub>2</sub> offset allowances allocated to project sponsors and CO<sub>2</sub> CCR allowances offered for sale at an auction are separate from and additional to CO<sub>2</sub> allowances allocated from the CO<sub>2</sub> Budget Trading Program base budget.

(30) 'CO<sub>2</sub> budget unit'. A unit that is subject to the CO<sub>2</sub> Budget Trading Program requirements under section 242-1.4 of this Part.

(31) 'CO<sub>2</sub> cost containment reserve allowance or CO<sub>2</sub> CCR allowance'. A CO<sub>2</sub> allowance that is offered for sale at an auction by NYSERDA or its agent for the purpose of containing the cost of CO<sub>2</sub>

Allowances. CO<sub>2</sub> CCR allowances offered for sale at an auction are separate from and additional to CO<sub>2</sub> allowances allocated from the CO<sub>2</sub> Budget Trading Program base and adjusted budgets. CO<sub>2</sub> CCR allowances are subject to all applicable limitations contained in this Part.

[(31)](32) ‘ CO<sub>2</sub> equivalent ’. The quantity of a given greenhouse gas multiplied by its global warming potential (GWP).

[(32)](33) ‘ CO<sub>2</sub> offset allowance ’. A CO<sub>2</sub> allowance that is awarded to the sponsor of a CO<sub>2</sub> emissions offset project pursuant to section 242-10.7 of this Part and is subject to the relevant compliance deduction limitations of paragraph 242-6.5(a)(3) of this Part.

[(33)](34) ‘ Combined cycle system ’. A system comprised of one or more combustion turbines, heat recovery steam generators, and steam turbines configured to improve overall efficiency of electricity generation or steam production.

[(34)](35) ‘ Combustion turbine ’. An enclosed fossil or other fuel-fired device that is comprised of a compressor (if applicable), a combustor, and a turbine, and in which the flue gas resulting from the combustion of fuel in the combustor passes through the turbine, rotating the turbine.

[(35)](36) ‘ Commence commercial operation ’. With regard to a unit that serves a generator, to have begun to produce steam, gas, or other heated medium used to generate electricity for sale or use, including test generation. For a unit that is a CO<sub>2</sub> budget unit under section 242-1.4 of this Part on the date the unit commences commercial operation, such date shall remain the unit’s date of commencement of commercial operation even if the unit is subsequently modified, reconstructed, or repowered. For a unit that is not a CO<sub>2</sub>

budget unit under section 242-1.4 of this Part on the date the unit commences commercial operation, the date the unit becomes a CO<sub>2</sub> budget unit under section 242-1.4 of this Part shall be the unit's date of commencement of commercial operation.

[(36)](37) 'Commence operation'. To begin any mechanical, chemical, or electronic process, including, with regard to a unit, start-up of a unit's combustion chamber. For a unit that is a CO<sub>2</sub> budget unit under section 242-1.4 of this Part on the date of commencement of operation, such date shall remain the unit's date of commencement of operation even if the unit is subsequently modified, reconstructed, or repowered. For a unit that is not a CO<sub>2</sub> budget unit under section 242-1.4 of this Part on the date of commencement of operation, the date the unit becomes a CO<sub>2</sub> budget unit under section 242-1.4 of this Part shall be the unit's date of commencement of operation.

[(37)](38) 'Compliance account'. A CO<sub>2</sub> Allowance Tracking System account, established by the department or its agent for a CO<sub>2</sub> budget source under Subpart 242-6 of this Part, [in which the CO<sub>2</sub> allowance allocations for the source are initially recorded and ] in which are held CO<sub>2</sub> allowances available for use by the source for a control period and each interim control period for the purpose of meeting the CO<sub>2</sub> requirements of subdivision 242-1.5(c) of this Part.

[(38) 'Consumer Price Index (CPI)'. For purposes of the CO<sub>2</sub> Budget Trading Program, the U.S. Department of Labor, Bureau of Labor Statistics unadjusted Consumer Price Index for All Urban Consumers for the U.S. city average, for All Items on the latest reference base, or if such index is no longer published, such other index as the Department determines is appropriate. The CPI for any calendar year is the 12-month average of the CPI published by the United States Department of Labor, as of the close of the 12-month period ending on August 31<sup>st</sup> of each calendar year.]

(39) ‘ Continuous emissions monitoring system or CEMS ’. The equipment required under Subpart 242-8 of this Part to sample, analyze, measure, and provide, by means of readings recorded at least once every 15 minutes (using an automated DAHS), a permanent record of stack gas volumetric flow rate, stack gas moisture content, and oxygen or carbon dioxide concentration (as applicable), in a manner consistent with 40 CFR part 75 (see Table 1, section 200.9 of this Title) and Subpart 242-8 of this Part. The following systems are types of continuous emissions monitoring systems required under Subpart 242-8 of this Part.

(i) A flow monitoring system, consisting of a stack flow rate monitor and an automated data acquisition and handling system and providing a permanent, continuous record of stack gas volumetric flow rate, in standard cubic feet per hour (scfh);

(ii) A nitrogen oxides emissions rate (or NO<sub>x</sub>-diluent) monitoring system, consisting of a NO<sub>x</sub> pollutant concentration monitor, a diluent gas (CO<sub>2</sub> or O<sub>2</sub>) monitor, and an automated data acquisition and handling system and providing a permanent, continuous record of NO<sub>x</sub> concentration, in parts per million (ppm), diluent gas concentration, in percent CO<sub>2</sub> or O<sub>2</sub>; and NO<sub>x</sub> emissions rate, in pounds per million British thermal units (lb/MMBtu);

(iii) A moisture monitoring system, as defined in 40 CFR 75.11(b)(2) (see Table 1, section 200.9 of this Title) and providing a permanent, continuous record of the stack gas moisture content, in percent H<sub>2</sub>O;

(iv) A carbon dioxide monitoring system, consisting of a CO<sub>2</sub> pollutant concentration monitor (or an oxygen monitor plus suitable mathematical equations from which the CO<sub>2</sub> concentration is

derived) and an automated data acquisition and handling system and providing a permanent, continuous record of CO<sub>2</sub> emissions, in percent CO<sub>2</sub>; and

(v) An oxygen monitoring system, consisting of an O<sub>2</sub> concentration monitor and an automated data acquisition and handling system and providing a permanent, continuous record of O<sub>2</sub>, in percent O<sub>2</sub>.

(40) 'Control period'. The control period is a three-calendar-year time period, unless extended to four years upon occurrence of a stage two trigger event. The first control period [is]was from January 1, 2009 to December 31, 2011, inclusive, provided if a stage two trigger event occurs during the first control period, then the first control period will be extended one-year to December 31, 2012, inclusive. Each subsequent sequential three-calendar-year period is a separate control period [that is subject to one one-year extension upon occurrence of a stage two trigger event during the control period. In no event may a control period be longer than four ] The first two calendar years of each control period are each defined as an interim control period, beginning on January 1, 2015.

(41) 'Cost containment reserve trigger price, or CCR trigger price'. The CCR trigger price is the minimum price at which CO<sub>2</sub> CCR allowances are offered for sale by NYSERDA or its agent at an auction. The CCR trigger price shall be \$ 4.00 per CO<sub>2</sub> allowance for calendar year 2014, \$ 6.00 per CO<sub>2</sub> allowance in calendar year 2015, \$8.00 per CO<sub>2</sub> allowance in calendar year 2016, and \$10.00 per CO<sub>2</sub> allowance in calendar year 2017. Each calendar year thereafter, the CCR trigger price shall be 1.025 multiplied by the CCR trigger price from the previous calendar year, rounded to the nearest whole cent

[(41) 'Current Market Price'. The volume-weighted average of (1) transaction prices reported to the Department or its agent, (2) prices as reported publicly through reputable sources, (3) CO<sub>2</sub> allowance award

price(s) from preceding CO<sub>2</sub> Allowance Auction(s), or (4) any combination of these options.]

[(42)](42) ‘Current Market Reserve Price (CMRP)’. The monetary amount calculated to be 80 percent of the Current Market Price.]

[(43)](42) ‘Eligible biomass’. Eligible biomass includes sustainably harvested woody and herbaceous fuel sources that are available on a renewable or recurring basis (excluding old-growth timber), including dedicated energy crops and trees, agricultural food and feed crop residues, and forest and mill [aquatic plants, unadulterated wood and wood ] residue. [residues, animal wastes, other clean organic wastes not mixed with other solid wastes, and] Eligible biomass may also include biogas[,] derived from such fuel sources [.] and animal wastes and other clean organic wastes not mixed with other solid waste. Liquid biofuels do not qualify as eligible biomass. Sustainably harvested as it applies to woody and herbaceous fuel sources will be determined by the department.

[(44)](43) ‘Energy efficiency and clean energy technology account’. A general account established and administered by [the New York State Energy Research and Development Authority (NYSERDA)].

[(45)](44) ‘Excess emissions’. Any tonnage of CO<sub>2</sub> emitted by a CO<sub>2</sub> budget source during a control period that exceeds the CO<sub>2</sub> budget emissions limitation for the source.

(45) ‘Excess interim emissions’. Any tonnage of CO<sub>2</sub> emitted by a CO<sub>2</sub> budget source during an interim control period multiplied by 0.50 that exceeds the CO<sub>2</sub> budget emissions limitation for the source.

(46) 'First control period interim adjustment for banked allowances '. An adjustment applied to the New York CO<sub>2</sub> Budget Trading Program base budget for allocation years 2014 through 2020 to address the surplus allocation year 2009, 2010 and 2011 allowances held in general and compliance accounts, including compliance accounts established pursuant to the CO<sub>2</sub> Budget Trading Program, but not including accounts opened by participating states.

[(46)](47) 'Fossil fuel'. Natural gas, petroleum, coal, or any form of solid, liquid, or gaseous fuel derived from such material.

[(47)](48) 'Fossil fuel-fired'. One of the following:

(i) With regard to a unit that commenced operation prior to January 1, 2005, the combustion of fossil fuel, alone or in combination with any other fuel, where the fossil fuel combusted comprises, or is projected to comprise, more than 50 percent of the annual heat input on a Btu basis during any year.

(ii) With regard to a unit that commences operation on or after January 1, 2005, the combustion of fossil fuel, alone or in combination with any other fuel, where the fossil fuel combusted comprises, or is projected to comprise, more than five percent of the annual heat input on a Btu basis during any year.

[(48)](49) 'General account'. A CO<sub>2</sub> Allowance Tracking System account, established under Subpart 242-6 of this Part, that is not a compliance account.

[(49)](50) ‘ Global warming potential (GWP) ’. A measure of the radiative efficiency (heat-absorbing ability) of a particular gas relative to that of carbon dioxide (CO<sub>2</sub>) after taking into account the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO<sub>2</sub>. Global warming potentials used in this Part are consistent with the values used in the Intergovernmental Panel on Climate Change, [Third] Fourth Assessment Report, the Physical [Scientific] Science Basis (Working Group I), chapter [6]2, [section 12, pages (385-391)] page 212, [2001]2007 (see Table 1, section 200.9 of this Title).

[(50)](51) ‘Gross generation’. The electrical output (in MWe) at the terminals of the generator.

(52) ‘Interim control period ’. An interim control period is a one-calendar-year time period, during each of the first and second calendar years of each three year control period. The first interim control period starts on January 1, 2015 and ends on December 31, 2015, inclusive. The second interim control period starts on January 1, 2016 and ends on December 31, 2016, inclusive. Each successive three year control period will have two interim control periods, comprised of each of the first two calendar years of that control period.

[(51)](53) ‘Life-of-the-unit contractual arrangement’. A unit participation power sales agreement under which a customer reserves, or is entitled to receive, a specified amount or percentage of nameplate capacity and/or associated energy from any specified unit pursuant to a contract:

(i) for the life of the unit;

(ii) for a cumulative term of no less than 25 years, including contracts that permit an election for early termination; or

(iii) for a period equal to or greater than 20 years or 70 percent of the economic useful life of the unit determined as of the time the unit is built, with option rights to purchase or release some portion of the nameplate capacity and associated energy generated by the unit at the end of the period.

[(52)](52) ‘Market settling period’. The first 14 months of any control period.]

[(53)](54) ‘Maximum design heat input’. The ability of a unit to combust a stated maximum amount of fuel per hour on a steady state basis, as determined by the physical design and physical characteristics of the unit.

[(54)](55) ‘Maximum potential hourly heat input’. An hourly heat input used for reporting purposes when a unit lacks certified monitors to report heat input. If the unit intends to use appendix D of 40 CFR part 75 (see Table 1, section 200.9 of this Title) to report heat input, this value should be calculated, in accordance with 40 CFR part 75 (see Table 1, section 200.9 of this Title), using the maximum fuel flow rate and the maximum gross calorific value. If the unit intends to use a flow monitor and a diluent gas monitor, this value should be reported, in accordance with 40 CFR part 75 (see Table 1, section 200.9 of this Title), using the maximum potential flow rate and either the maximum carbon dioxide concentration (in percent CO<sub>2</sub>) or the minimum oxygen concentration (in percent O<sub>2</sub>).

[(55)](56) ‘Minimum Reserve Price (MRP)’. The minimum reserve price in calendar year 2014 shall be \$2.00. Each calendar year thereafter the minimum reserve price shall be 1.025 multiplied by the minimum reserve price from the previous calendar year, rounded to the nearest whole cent. [ The monetary amount \$1.86 in 2008 and 2009. Thereafter, the monetary amount, established as of the first day of each calendar year, derived annually from use of the following formula:

$$\text{MRP}(2009+n) = \text{MRP}(2009+(n-1)) \times [1 + (\text{CPI}(2009+(n-1)) - \text{CPI}(2009+(n-2))) / \text{CPI}(2009+(n-2))]$$

where:

“MRP” is the Minimum Reserve Price;

“MRP(2009)” is \$1.86;

“n” is the number of years since 2009; and

“CPI” is the Consumer Price Index.]

[(56)](57) ‘Monitoring system’. Any monitoring system that meets the requirements of Subpart 242-8 of this Part , including a continuous emissions monitoring system, an excepted monitoring system, or an alternative monitoring system.

[(57)](58) ‘Nameplate capacity’. The maximum electrical output (in MWe) that a generator can sustain over a specified period of time when not restricted by seasonal or other deratings as measured in accordance with the United States Department of Energy standards.

[(58)](59) ‘Net electrical output ’. All electrical output supplied to the electric power grid or gross generation minus the electrical output used on-site by the facility (in MWe). For co-generation facilities, all electrical output supplied to the electric power grid, the host site and other industrial and commercial customers, but excluding electrical output used by the co-generation facility and fuel handling and processing equipment.

[(59)](60) ‘Non-CO2 budget unit’. A unit that does not meet the applicability criteria of section 242-1.4 of this Part.

[(60)](61) 'Operator'. Any person who operates, controls, or supervises a CO<sub>2</sub> budget unit or a CO<sub>2</sub> budget source and shall include, but not be limited to, any holding company, utility system, or plant manager of such a unit or source.

[(61)](62) 'Owner'. Any of the following persons:

(i) any holder of any portion of the legal or equitable title in a CO<sub>2</sub> budget unit; or

(ii) any holder of a leasehold interest in a CO<sub>2</sub> budget unit, other than a passive lessor, or a person who has an equitable interest through such lessor, whose rental payments are not based, either directly or indirectly, upon the revenues or income from the CO<sub>2</sub> budget unit; or

(iii) any purchaser of power from a CO<sub>2</sub> budget unit under a life-of-the-unit contractual arrangement in which the purchaser controls the dispatch of the unit; or

(iv) with respect to any general account, any person who has an ownership interest with respect to the CO<sub>2</sub> allowances held in the general account and who is subject to the binding agreement for the CO<sub>2</sub> authorized account representative to represent that person's ownership interest with respect to the CO<sub>2</sub> allowances.

[(62)](63) 'Participating state'. A state that has established a corresponding regulation as part of the CO<sub>2</sub> Budget Trading Program.

[(63)](64) 'Primary fuel'. Of the different fuels used, the fuel to which the highest proportion of

the heat input is attributable.

[(64)](65) ‘Receive or receipt of’. When referring to the department or its agent, to come into possession of a document, information, or correspondence (whether sent in writing or by authorized electronic transmission), as indicated in an official correspondence log, or by a notation made on the document, information, or correspondence, by the department or its agent in the regular course of business.

[(65)](66) ‘Recordation, record, or recorded’. With regard to CO<sub>2</sub> allowances, the movement of CO<sub>2</sub> allowances by the department or its agent from one CO<sub>2</sub> Allowance Tracking System account to another, for purposes of allocation, transfer, or deduction.

[(66)](67) ‘Reserve Price’. The minimum acceptable price for each CO<sub>2</sub> allowance in a specific auction. The reserve price at an auction is either the minimum reserve price or the CCR trigger price as specified in Subpart 242-5.3. [The minimum acceptable price for each CO<sub>2</sub> allowance in a specific auction. The Reserve Price is the monetary amount that is the higher of the MRP or CMRP unless the Department determines that there is not enough data to justify the calculation of a CMRP, in which case the Reserve Price will be the MRP.]

[(68)] ‘Second control period interim adjustment for banked allowances’. An adjustment applied to the New York CO<sub>2</sub> Budget Trading Program base budget for allocation years 2015 through 2020 to address the surplus allocation year 2012 and 2013 allowances held in general and compliance accounts, including compliance accounts established pursuant to the CO<sub>2</sub> Budget Trading Program, but not including accounts opened by participating states, that are in addition to the aggregate quantity of 2012 and 2013 emissions from all CO<sub>2</sub> budget sources in all the participating states.

[(67)](69) ‘Serial number’. When referring to CO<sub>2</sub> allowances, the unique identification number assigned to each CO<sub>2</sub> allowance by the department or its agent under subdivision 242-6.4(b) of this Part.

[(68)](70) ‘Source’. Any governmental, institutional, commercial, or industrial structure, installation, plant, building, or facility that emits or has the potential to emit any air pollutant. A “source,” including a “source” with multiple units, shall be considered a single “facility.”

[(69) ‘Stage one threshold price ’. The monetary amount, established as of the first day of each calendar year, derived annually from use of the following formula:

$$S1TP(2005+n) = S1TP(2005) \times [1 + (CPI(2005+(n-1)) - CPI(2005))/CPI(2005)]$$

where:

“S1TP” is the stage one threshold price;

“S1TP(2005)” is \$7;

“n” is the number of years since 2005; and

“CPI” is the Consumer Price Index.

(70) ‘Stage one trigger event’. The occurrence of any 12-month period that completely transpires following the market settling period and is characterized by an average CO<sub>2</sub> allowance price that is equal to or greater than the stage one threshold price.

(71) ‘Stage two threshold price ’. The monetary amount, established as of the first day of each

calendar year, derived annually from use of the following formula:

$$S2TP(2005+n) = [ S2TP(2005+(n-1)) \times \left[ \frac{CPI(2005+(n-1)) - CPI(2005+(n-2))}{CPI(2005+(n-2))} \right] + 0.02 ] + S2TP(2005+(n-1))$$

where:

“S2TP” is the stage two threshold price;

“S2TP(2005)” is \$10; and

“n” is the number of years since 2005.

“CPI” is the Consumer Price Index.

(72) ‘Stage two trigger event’. The occurrence of any 12-month period that completely transpires following the market settling period and is characterized by an average CO<sub>2</sub> allowance price that is equal to or greater than the stage two threshold price.]

[(73)](71) ‘ State’. A State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, and American Samoa and includes the Commonwealth of the Northern Mariana Islands.

[(74)](72) ‘Submit or serve’. To send or transmit a document, information, or correspondence to the person specified in accordance with the applicable regulation:

(i) in person;

(ii) by United States Postal Service; or

(iii) by other means of dispatch or transmission and delivery.

Compliance with any “submission,” “service,” or “mailing” deadline shall be determined by the date of dispatch, transmission, or mailing and not the date of receipt.

[(75)](73) ‘Ton or tonnage’. Any “short ton”, or 2,000 pounds. For the purpose of determining compliance with the CO<sub>2</sub> requirements of subdivision 242-1.5(c) of this Part, total tons for a control period and each interim control period shall be calculated as the sum of all recorded hourly emissions (or the tonnage equivalent of the recorded hourly emissions rates) in accordance with Subpart 242-8 of this Part , with any remaining fraction of a ton equal to or greater than 0.50 ton deemed to equal one ton and any fraction of a ton less than 0.50 ton deemed to equal zero tons. A short ton is equal to 0.9072 metric tons.

[(76)](74) ‘Total net output’. The total net megawatt hours, calculated utilizing the following formula:

$$\text{Total net output} = (\text{EO} + (\text{TO}/3.413))$$

Where:

“EO” is the total net electrical output from the CO<sub>2</sub> budget unit;

“TO” is the total useful thermal energy from the CO<sub>2</sub> budget unit in MMBtu;

“3.413” is the factor used to convert useful thermal energy from MMBtu to MWh, 3.413 MMBtu = 1 MWh.

[(77) ‘Twelve month period’. A period of 12 consecutive months determined on a rolling basis where a new 12-month period begins on the first day of each calendar month.]

(75) ‘Undistributed CO<sub>2</sub> allowance’. CO<sub>2</sub> allowances originally allocated to a set-aside account pursuant to section 242-5.3 that were not distributed.

[(78)](76) ‘Unit’. A fossil fuel-fired stationary boiler, combustion turbine, or combined cycle system.

[(79)](77) ‘Unit operating day’. A calendar day in which a unit combusts any fuel.

[(80)](78) ‘Unsold Allowance’. A CO<sub>2</sub> allowance that has been made available for sale in an auction[ conducted by NYSERDA or its agent], but not sold.

[(81)](79) ‘Voluntary renewable energy purchase’. A purchase of electricity from renewable energy generation or renewable energy attribute credits by a retail electricity customer on a voluntary basis. Renewable energy includes electricity generated from a source built on or after January 1, 2003 that is contained in the revised list of eligible electric generation technologies in the New York State Public Service Commission’s Order on Customer-Sited Tier Implementation issued and effective June 28, 2006, attached as Appendix B in the New York State Public Service Commission’s Order Regarding Retail Renewable Portfolio Standard, issued and effective September 24, 2004, except for electricity generated from a CO<sub>2</sub> budget source that co-fires eligible biomass as a compliance mechanism and for which the CO<sub>2</sub> authorized account representative requests the retirement of CO<sub>2</sub> allowances pursuant to subdivision 242-5.3(c) of this Part. The renewable energy generation or renewable energy attribute credits related to such purchases may not be used by the generator or purchaser to meet any regulatory mandate, such as a renewable portfolio standard. Existing section 242-1.3 through subdivision 242-1.4(a) remains unchanged.

Subdivision 242-1.4(b) is revised as follows:

(b) ‘Limited exemption for units with electrical output to the electric grid restricted by permit conditions’.

(1) 'Applicability'. Notwithstanding subdivision (a) of this section, any unit that, on or before December 1, 2008, [applies] applied for [a] an enforceable permit condition restricting the supply of the unit 's annual electrical output to the electric grid to less than or equal to 10 percent of the annual gross generation of the unit, and that from and after January 1, 2009 complies with the 10 percent restriction and the provisions in paragraph (b)(3) of this section, shall be exempt from the requirements of this Part, except for the provisions of this section, sections 242-1.2, 242-1.3, and 242-1.6 of this Part.

Existing paragraphs 242-1.4(b)(2) through (b)(3) remain unchanged.

Existing paragraph 242-1.4(b)(4) is deleted.

Existing subdivisions 242-1.5(a) through (b) remain unchanged.

The remainder of section 242-1.5 is amended as follows:

(c) 'CO<sub>2</sub> requirements'.

(1) The owners and operators of each CO<sub>2</sub> budget source and each CO<sub>2</sub> budget unit at the source shall hold CO<sub>2</sub> allowances available for compliance deductions under section 242-6.5 of this Part, as of the CO<sub>2</sub> allowance transfer deadline, in the source 's compliance account in an amount not less than the total CO<sub>2</sub> emissions for the control period from all CO<sub>2</sub> budget units at the source, less the CO<sub>2</sub> allowances deducted to meet the requirements of paragraph 242-1.5(c)(2) with respect to the previous two interim control periods, as determined in accordance with Subparts 242-6 and 242-8 of this Part.

(2) The owners and operators of each CO<sub>2</sub> budget source and each CO<sub>2</sub> budget unit at the source shall hold CO<sub>2</sub> allowances available for compliance deductions under section 242-6.5, as of the CO<sub>2</sub> allowance transfer deadline, in the source 's compliance account in an amount not less than the total CO<sub>2</sub> emissions for the

interim control period from all CO<sub>2</sub> budget units at the source multiplied by 0.50, as determined in accordance with Subparts 242-6 and 242-8.

[(2)](3) Each ton of CO<sub>2</sub> emitted in excess of the CO<sub>2</sub> budget emissions limitation for a control period shall constitute a separate violation of this Part and applicable state law.

(4) Each ton of excess interim emissions shall constitute a separate violation of this Part and applicable state law.

[(3)](5) A CO<sub>2</sub> budget unit shall be subject to the requirements under paragraph (c)(1) of this section starting on the later, of January 1, 2009 or the date on which the unit commences operation.

[(4)](6) CO<sub>2</sub> allowances shall be held in, deducted from, or transferred among CO<sub>2</sub> Allowance Tracking System accounts in accordance with Subparts 242-5, 242-6, and 242-7, and section 242-10.7 of this Part.

[(5)](7) A CO<sub>2</sub> allowance shall not be deducted, in order to comply with the requirements under paragraph (c)(1) or (2) of this section, for a control period or interim control period that ends prior to the allocation year for which the CO<sub>2</sub> allowance was allocated. A CO<sub>2</sub> offset allowance shall not be deducted, in order to comply with the requirements under paragraph (c)(1) or (2) of this section, beyond the applicable percent limitations set out in paragraph 242-6.5(a)(3) of this Part.

[(6)](8) A CO<sub>2</sub> allowance under the CO<sub>2</sub> Budget Trading Program is a limited authorization by the Department or a participating state to emit one ton of CO<sub>2</sub> in accordance with the CO<sub>2</sub> Budget Trading

Program. No provision of the CO<sub>2</sub> Budget Trading Program, the CO<sub>2</sub> budget permit application, or the CO<sub>2</sub> budget permit or any provision of law shall be construed to limit the authority of the Department or a participating state to terminate or limit such authorization.

[(7)](9) A CO<sub>2</sub> allowance under the CO<sub>2</sub> Budget Trading Program does not constitute a property right.

(d) 'Excess emissions requirements'. The owners and operators of a CO<sub>2</sub> budget source that has excess emissions in any control period, or excess interim emissions for any interim control period shall:

(1) forfeit the CO<sub>2</sub> allowances required for deduction under paragraph 242-6.5(d)(1) of this Part, provided CO<sub>2</sub> offset allowances may not be used to cover any part of such excess emissions; and

(2) pay any fine, penalty, or assessment or comply with any other remedy imposed under paragraph 242-6.5(d)(2) of this Part.

(e) 'Recordkeeping and reporting requirements'.

(1) Unless otherwise provided, the owners and operators of the CO<sub>2</sub> budget source and each CO<sub>2</sub> budget unit at the source shall keep on site at the source each of the following documents for a period of 10 years from the date the document is created. This period may be extended for cause, at any time prior to the end of 10 years, in writing by the department.

(i) The account certificate of representation for the CO<sub>2</sub> authorized account representative

for the source and each CO<sub>2</sub> budget unit at the source and all documents that demonstrate the truth of the statements in the account certificate of representation, in accordance with section 242-2.4 of this Part, provided that the certificate and documents shall be retained on site at the source beyond such 10-year period until such documents are superseded because of the submission of a new account certificate of representation.

(ii) All emissions monitoring information, in accordance with Subpart 242-8 of this Part and 40 CFR 75.57 (see Table 1, section 200.9 of this Title).

(iii) Copies of all reports, compliance certifications, and other submissions and all records made or required under the CO<sub>2</sub> Budget Trading Program.

(iv) Copies of all documents used to complete a CO<sub>2</sub> budget permit application and any other submission under the CO<sub>2</sub> Budget Trading Program or to demonstrate compliance with the requirements of the CO<sub>2</sub> Budget Trading Program.

(2) The CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget source and each CO<sub>2</sub> budget unit at the source shall submit the reports and compliance certifications required under the CO<sub>2</sub> Budget Trading Program, including those under Subpart 242-4 of this Part.

(f) 'Liability'.

(1) No permit revision shall excuse any violation of the requirements of the CO<sub>2</sub> Budget Trading Program that occurs prior to the date that the revision takes effect.

(2) Any provision of the CO<sub>2</sub> Budget Trading Program that applies to a CO<sub>2</sub> budget source

(including a provision applicable to the CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget source) shall also apply to the owners and operators of such source and of the CO<sub>2</sub> budget units at the source.

(3) Any provision of the CO<sub>2</sub> Budget Trading Program that applies to a CO<sub>2</sub> budget unit (including a provision applicable to the CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget unit) shall also apply to the owners and operators of such unit.

(g) 'Effect on other authorities'.

(1) No provision of the CO<sub>2</sub> Budget Trading Program, a CO<sub>2</sub> budget permit application, or a CO<sub>2</sub> budget permit, shall be construed as exempting or excluding the owners and operators and, to the extent applicable, the CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget source or CO<sub>2</sub> budget unit from compliance with any other provisions of applicable State and federal law and regulations.

Existing section 242-1.6 through paragraph 242-2.4(a)(1) remains unchanged.

Paragraph 242-2.4(a)(2) is revised as follows:

(2) the name, address, e-mail address, and telephone number [, and facsimile transmission number] of the CO<sub>2</sub> authorized account representative and any alternate CO<sub>2</sub> authorized account representative;

Existing paragraph 242-2.4(a)(3) through subdivision 242-2.6(b) remains unchanged.

(c) In order to delegate authority to make an electronic submission to the department or its agent in accordance with subdivision (a) and (b) of this section, the CO<sub>2</sub> authorized account representative or alternate CO<sub>2</sub> authorized account representative, as appropriate, must submit to the department or its agent a notice of

delegation, in a format prescribed by the department that includes the following elements:

(1) The name, address, e-mail address, and telephone number [, and facsimile transmission number] of such CO<sub>2</sub> authorized account representative or alternate CO<sub>2</sub> authorized account representative;

(2) The name, address, e-mail address, and telephone number [and facsimile transmission number] of each such natural person, herein referred to as the “electronic submission agent”;

The remainder of section 242-2.6 through section 242-3.2 is unchanged.

242-3.3 Information requirements for CO<sub>2</sub> budget permit applications.

(a) A complete CO<sub>2</sub> budget permit application shall include the following elements concerning the CO<sub>2</sub> budget source for which the application is submitted, in a format prescribed by the department:

(1) The information required in Part 201 of this Title shall be included in the CO<sub>2</sub> Budget permit application by the owner and/or operator of the CO<sub>2</sub> budget source. Applications for modifications and revisions generally need only supply information related to the proposed change, provided such information includes a complete set of data on any emissions units affected by the modification and any facility level information required in forms developed by the department to properly ascertain the nature and extent of the modification.

(2) identification of the CO<sub>2</sub> budget source, including plant name and the ORIS (Office of Regulatory Information Systems) or facility code assigned to the source by the Energy Information Administration of the United States Department of Energy, if applicable;

(3) identification of each CO<sub>2</sub> budget unit at the CO<sub>2</sub> budget source.

#### Subpart 242-4 Compliance Certification

##### 242-4.1 Compliance certification report.

(a) ‘Applicability and deadline’. For each control period in which a CO<sub>2</sub> budget source is subject to the CO<sub>2</sub> requirements of subdivision 242-1.5(c) of this Part, the CO<sub>2</sub> authorized account representative of the source shall submit to the department by the March 1<sup>st</sup> following the relevant control period, a compliance certification report. A compliance certification report is not required as part of the compliance obligation during an interim control period.

The remainder of Subpart 242-4 remains unchanged.

#### Subpart 242-5 CO<sub>2</sub> Allowance Allocations

##### 242-5.1 CO<sub>2</sub> Budget Trading Program base budget.

(a) [Except as may be modified in accordance with paragraph 242-1.4(b)(4) and section 242-5.3(c) and (d) of this Subpart, the] The CO<sub>2</sub> Budget Trading Program base budget is [64,310,805]35,228,822 tons, [annually] for the [2009 through] 2014 allocation [years] year.

(b) [Except as may be modified in accordance with section 242-1.4(b)(4) of this Part and section 242-5.3(c) and (d) of this Subpart, the ] The CO<sub>2</sub> Budget Trading Program base budget is [62,703,035]34,348,101 tons, for the 2015 allocation year.

(c) [Except as may be modified in accordance with section 242-1.4(b)(4) of this Part and section 242-

5.3(c) and (d) of this Subpart, the] The CO<sub>2</sub> Budget Trading Program base budget is [61,095,265]33,489,399 tons, for the 2016 allocation year.

(d) [Except as may be modified in accordance with section 242-1.4(b)(4) of this Part and section 242-5.3(c) and (d) of this Subpart, the] The CO<sub>2</sub> Budget Trading Program base budget is [59,487,495]32,837,536 tons, for the 2017 allocation year.

(e) [Except as may be modified in accordance with section 242-1.4(b)(4) of this Part and section 242-5.3(c) and (d) of this Subpart, the] The CO<sub>2</sub> Budget Trading Program base budget is [57,879,725]32,016,597 tons, [annually] for the 2018 allocation [year and each succeeding allocation] year.

(f) The CO<sub>2</sub> Budget Trading Program base budget is 31,216,182 tons, for the 2019 allocation year.

(g) The CO<sub>2</sub> Budget Trading Program base budget is 30,435,778 tons, annually for the 2020 allocation year and each succeeding allocation year.

242-5.2 [RESERVED] CO<sub>2</sub> Budget Trading Program adjusted budget.

(a) For allocation years 2014 through 2020, the New York CO<sub>2</sub> Budget Trading Program adjusted budget shall be the maximum number of allowances available for allocation in a given allocation year, except for CO<sub>2</sub> offset allowance and CO<sub>2</sub> CCR allowances. For allocation year 2021 and each succeeding allocation year, the CO<sub>2</sub> Budget Trading Program adjusted budget shall be the same as the CO<sub>2</sub> Budget Trading Program base budget.

(b) 'First control period interim adjustment for banked allowances'. By January 15, 2014 the department shall determine the first control period interim adjustment for banked allowances quantity for allocation years 2014 through 2020 by the following formula:

$$\text{FCPIABA} = (\text{FCPA}/7) \times \text{RS}\%$$

Where:

FCPIABA is the first control period interim adjustment for banked allowances quantity in tons.

FCPA, the first control period adjustment, is the total quantity of allocation year 2009, 2010 and 2011 CO<sub>2</sub> allowances held in general and compliance accounts, including compliance accounts established pursuant to the CO<sub>2</sub> Budget Trading Program, but not including accounts opened by participating states, as reflected in the CO<sub>2</sub> Allowance Tracking System on January 1, 2014.

$$\text{RS}\% \text{ is } 64,310,805/165,184,246$$

(c) 'Second control period interim adjustment for banked allowances'. On March 17, 2014 the department shall determine the second control period interim adjustment for banked allowances quantity for allocation years 2015 through 2020 by the following formula:

$$\text{SCPIABA} = ((\text{SCPA}-\text{SCPE})/6) \times \text{RS}\%$$

Where:

SCPIABA is the second control period interim adjustment for banked allowances quantity in tons.

SCPA, the second control period adjustment, is the total quantity of allocation year 2012 and 2013 CO<sub>2</sub> allowances held in general and compliance accounts, including compliance accounts established pursuant to the CO<sub>2</sub> Budget Trading Program, but not including accounts opened by participating states, as reflected in the CO<sub>2</sub> Allowance Tracking System on March 17, 2014.

SCPE, the second control period emissions, is the total quantity of calendar year 2012 and 2013 emissions from all CO<sub>2</sub> budget sources in all participating states, reported pursuant to the CO<sub>2</sub> Budget Trading Program as reflected in the CO<sub>2</sub> Allowance Tracking System on March 15, 2014.

RS% is 64,310,805/165,184,246

(d) 'CO<sub>2</sub> Budget Trading Program adjusted budget for 2014'. The department shall determine the New York CO<sub>2</sub> Budget Trading Program adjusted budget for the 2014 allocation year by the following formula:

AB = BB – FCPIABA

Where:

AB is the New York CO<sub>2</sub> Budget Trading Program 2014 adjusted budget in tons.

BB is the New York CO<sub>2</sub> Budget Trading Program 2014 base budget in tons.

FCPIABA is the first control period interim adjustment for banked allowances quantity in tons.

(e) 'CO<sub>2</sub> Budget Trading Program adjusted budget s for 2015 through 2020 '. On April 15, 2014, the

department shall determine the New York CO<sub>2</sub> Budget Trading Program adjusted budgets for the 2015 through 2020 allocation years by the following formula:

$$\underline{AB = BB - (FCPIABA + SCPIABA)}$$

Where:

AB is the New York CO<sub>2</sub> Budget Trading Program 2015 through 2020 adjusted budget for each respective allocation year in tons.

BB is the New York CO<sub>2</sub> Budget Trading Program 2015 through 2020 base budget for each respective allocation year in tons.

FCPIABA is the first control period interim adjustment for banked allowances quantity in tons.

SCPIABA is the second control period interim adjustment for banked allowances quantity in tons.

(f) 'Publication of adjusted budgets'. After making the determination in subdivisions 242-5.2(d) and (e), the department or its agent will publish the CO<sub>2</sub> Budget Trading Program adjusted budgets for the 2014 through 2020 allocation years.

242-5.3 CO<sub>2</sub> allowance allocations.

(a) 'Energy efficiency and clean energy technology account'. The department will allocate the CO<sub>2</sub> Budget Trading Program [base]adjusted budget to best achieve the emissions reduction goals of the CO<sub>2</sub> Budget Trading Program by promoting or rewarding investments in energy efficiency, renewable or non-carbon-

emitting technologies, and/or innovative carbon emissions abatement technologies with significant carbon reduction potential.

(1) NYSERDA will establish and administer the energy efficiency and clean energy technology account pursuant to 21 NYCRR Part 507.

(2) The department will allocate most of the CO<sub>2</sub> Budget Trading Program base budget or adjusted budget to the energy efficiency and clean energy technology account.

(3) NYSERDA will administer the energy efficiency and clean technology account so that allowances will be sold in a transparent allowance auction or auctions. The proceeds of the auction or auctions will be used to promote the purposes of the energy efficiency and clean energy technology account and for administrative costs associated with the CO<sub>2</sub> Budget Trading Program. The auction will be carried out to achieve the following objectives: achieve fully transparent and efficient pricing of allowances; promote a liquid allowance market by making entry and trading as easy and low-cost as possible; be open to participation by the categories of bidders determined by NYSERDA or its designee in consultation with the Auction Advisory Committee which meet the minimum financial requirements; monitor for and guard against the exercise of market power and market manipulation; be held as frequently as is needed to achieve design objectives; avoid interference with existing allowance markets; align well with wholesale energy and capacity markets; and be designed to not act as a barrier to efficient investment in relatively clean existing or new electricity generating sources.

(i) NYSERDA, or its agent, will not be obligated to sell any CO<sub>2</sub> allowances for less than the reserve price.

(ii) [All unsold allowances of an allocation year will be made available for sale in the succeeding auction of that allowance's allocation year, or control period if its allocation year has ended, in

which a reserve price greater than the MRP is in effect. At the end of each control period, the Department may retire any unsold allowances from the concluding control period or offer them for sale in a subsequent auction(s) during the subsequent control period (s) in which a reserve price greater than the MRP is in effect .] The department or its agent may retire unsold CO<sub>2</sub> allowances at the end of each control period.

(iii) The department or its agent may retire undistributed CO<sub>2</sub> allowances at the end of each control period.

(b) 'Cost Containment Reserve (CCR) allocation and rules for the sale of CO<sub>2</sub> CCR allowances'. The department shall allocate CO<sub>2</sub> CCR allowances, separate from and additional to the CO<sub>2</sub> Budget Trading Program base budget set forth in section 242-5.1, to the energy efficiency and clean energy technology account. The CCR allocation is for the purpose of containing the cost of CO<sub>2</sub> allowances.

(1) The department shall allocate CO<sub>2</sub> CCR allowances in the following manner:

(i) The department shall initially allocate 1,946,639 CO<sub>2</sub> CCR allowances for allocation year 2014.

(ii) On or before January 1, 2015 and each calendar year thereafter, the department shall allocate CO<sub>2</sub> CCR allowances in an amount equal to 3,893,277, minus the number of CO<sub>2</sub> CCR allowances that remain in the energy efficiency and clean energy technology account at the end of the prior calendar year.

(2) NYSERDA or its agent shall follow these rules for the sale of CO<sub>2</sub> CCR allowances:

(i) CO<sub>2</sub> CCR allowances shall only be sold at an auction in which total demand for allowances, above the CCR trigger price, exceeds the number of CO<sub>2</sub> allowances available for purchase at the auction, not including any CO<sub>2</sub> CCR allowances;

(ii) If the condition of subparagraph (i) of this paragraph is met at an auction, then the number of CO<sub>2</sub> CCR allowances offered for sale by NYSERDA or its agent at the auction shall be equal to the number of CO<sub>2</sub> CCR allowances in the energy efficiency and clean energy technology account at the time of the auction;

(iii) After all of the CO<sub>2</sub> CCR allowances in the energy efficiency and clean energy technology account have been sold in a given calendar year, no additional CO<sub>2</sub> CCR allowances will be sold at any auction for the remainder of the calendar year, even if the condition in subparagraph (i) of this paragraph is met at an auction; and

(iv) At an auction in which CO<sub>2</sub> CCR allowances are sold, the reserve price for that auction shall be the CCR trigger price.

(v) If the condition in subparagraph (i) of this paragraph is not satisfied, no CO<sub>2</sub> CCR allowances shall be offered for sale at the auction, and the reserve price for the auction shall be equal to the minimum reserve price.

(3) NYSERDA or its agent shall implement the reserve price in the following manner:

(i) No allowances shall be sold at any auction for a price below the reserve price for that

auction; and

(ii) If the total demand for allowances at an auction is less than or equal to the number of allowances made available for sale in that auction, then the auction clearing price for the auction shall be the reserve price.

['Early reduction CO<sub>2</sub> allowances'. The department may award early reduction CO<sub>2</sub> allowances (ERAs) to a CO<sub>2</sub> budget source for reductions in the CO<sub>2</sub> budget source's CO<sub>2</sub> emissions (inclusive of all emissions from CO<sub>2</sub> budget units at the CO<sub>2</sub> budget source) that are achieved by the source during the early reduction period (2006, 2007, and 2008), subject to the requirements of this subdivision. Total facility shutdowns or reductions that result from enforcement actions shall not be eligible for ERAs.

(1) The CO<sub>2</sub> budget source must submit its application for the award of ERAs by May 1, 2009.

(2) The CO<sub>2</sub> budget source must demonstrate that all CO<sub>2</sub> budget units that existed at the source during the baseline period (2003, 2004, and 2005) are included as CO<sub>2</sub> budget units for the early reduction period. New CO<sub>2</sub> budget units added at the CO<sub>2</sub> budget source must also be accounted for during the early reduction period.

(3) The department will calculate the number of ERAs to be awarded to a particular CO<sub>2</sub> budget source for the early reduction period pursuant to the following methodology:

(i) If total heat input to all CO<sub>2</sub> budget units at the CO<sub>2</sub> budget source during the early reduction period is less than or equal to the total heat input to all the CO<sub>2</sub> budget units at the CO<sub>2</sub> budget source

during the baseline period, then:

(a) ERAs shall be calculated as follows:

$$\text{ERAs} = ((\text{AEER}_{\text{BASELINE}} - \text{AEER}_{\text{ERP}}) \times (\text{EO}_{\text{ERP}} + (\text{TO}_{\text{ERP}} / 3.413))) / 2000$$

where:

“ $\text{AEER}_{\text{BASELINE}}$ ” is the average  $\text{CO}_2$  emissions rate resulting from net electrical output and useful thermal energy for all of the  $\text{CO}_2$  budget units at the  $\text{CO}_2$  budget source during the baseline period (in pounds of  $\text{CO}_2/\text{MWh}_{\text{th+e}}$ );

“ $\text{AEER}_{\text{ERP}}$ ” is the average  $\text{CO}_2$  emissions rate resulting from net electrical output and useful thermal output for all of the  $\text{CO}_2$  budget units at the  $\text{CO}_2$  budget source during the early reduction period (in pounds of  $\text{CO}_2/\text{MWh}_{\text{th+e}}$ );

“ $\text{MWh}_{\text{th+e}}$ ” is thermal plus electrical megawatt-hours;

“ $\text{EO}_{\text{ERP}}$ ” is the total net electrical output from all  $\text{CO}_2$  budget units at the  $\text{CO}_2$  budget source during the early reduction period (in  $\text{MWh}_e$ );

“ $\text{MWh}_e$ ” is electrical megawatt-hours;

“ $\text{TO}_{\text{ERP}}$ ” is the total useful thermal energy from all  $\text{CO}_2$  budget units at the  $\text{CO}_2$  budget source during the early reduction period (in  $\text{MMBtu}$ );

(b) For the purposes of this section, useful thermal energy will be converted to units of MWh by the conversion factor  $1 \text{ MWh} = 3.413 \text{ MMBtu}$ .

(c) For the purposes of this section, output shall be monitored in accordance with Subpart 242-8 of this Part.

(ii) If total heat input to all CO<sub>2</sub> budget units at the CO<sub>2</sub> budget source during the early reduction period is greater than or equal to the total heat input to all the CO<sub>2</sub> budget units at the CO<sub>2</sub> budget source during the baseline period, then:

$$\text{ERAs} = E_{\text{BASELINE}} - E_{\text{ERP}}$$

where:

“ $E_{\text{BASELINE}}$ ” are total CO<sub>2</sub> emissions from the all of the CO<sub>2</sub> budget units at the CO<sub>2</sub> budget source during the baseline period (in tons); and

“ $E_{\text{ERP}}$ ” are total CO<sub>2</sub> emissions from the all of the CO<sub>2</sub> budget units at the CO<sub>2</sub> budget source during the early reduction period (in tons).

(4) The CO<sub>2</sub> budget source must demonstrate that the data submitted in support of the early reduction application was recorded in compliance with the requirements of Subpart 242-8 of this Part for all of the baseline years and the early reduction years for which the CO<sub>2</sub> budget source was required to report CO<sub>2</sub> data pursuant to 40 CFR part 75. A CO<sub>2</sub> budget source that was not required to submit CO<sub>2</sub> data pursuant to 40 CFR part 75 for any of the years contained in the baseline period or early reduction period may petition the department as part of its application under this Subpart for the use of an alternative data source or sources for the

calculation of early reduction allowances.

(5) Once the department confirms a CO<sub>2</sub> budget source's early reductions of CO<sub>2</sub> emissions, it shall award the ERAs to the CO<sub>2</sub> budget source's compliance account by December 31, 2009.]

(c) 'Voluntary renewable energy market and eligible biomass set-aside allocation.' The department shall allocate 700,000 tons to the voluntary renewable energy market and eligible biomass set-aside account from the CO<sub>2</sub> Budget Trading Program annual [base]adjusted budget set forth in section 242- [5.1]5.2 of this Part , as applicable. The department shall administer the voluntary renewable energy and eligible biomass set-aside account in accordance with the following procedures.

(1) The department will open and manage a general account for the voluntary renewable energy market and eligible biomass set-aside account [for each allocation year].

(2) [The sponsor for a voluntary renewable energy purchase must establish a general account under subdivision 242-6.2(b) of this Part .] All submissions to the department required for the retirement of an allowance from the voluntary renewable energy market and eligible biomass set-aside account under this [section]subdivision must be from the sponsor of a voluntary renewable energy purchase, herein referred to as the "VREP applicant" or the CO<sub>2</sub> authorized account representative for a CO<sub>2</sub> budget source co-firing eligible biomass. [for the general account, herein referred to as the "VREP applicant."]

The remainder of 242-5.3 is repealed and replaced as follows:

(3) A VREP applicant or a CO<sub>2</sub> authorized account representative for a CO<sub>2</sub> budget source co-

firing eligible biomass may submit a written request to the department to retire a specified number of CO<sub>2</sub> allowances in the voluntary renewable energy market and eligible biomass set-aside account, herein referred to as a “VREEB application.” A VREEB application must be submitted by the March 1<sup>st</sup>, immediately following the allocation year for which it is being made and must include information to assure that

(i) a voluntary renewable energy purchase demonstrates accreditable CO<sub>2</sub> emissions reductions or avoidance during the control period in accordance with department measurement and verification protocol; or

(ii) for a CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget source co-firing eligible biomass as a compliance mechanism, CO<sub>2</sub> emissions from the CO<sub>2</sub> budget source are attributable to the burning of fuel that the department has determined is eligible biomass.

(4) A VREEB application regarding a voluntary renewable energy purchase shall contain data documenting purchases of voluntary renewable energy that meet the requirements of this subdivision. Such data must be from reputable sources, which may include retail electricity providers, organizations that certify renewable energy products, and other parties as determined by the department. To be considered, data must be verifiable and document the following for voluntary renewable energy purchases:

(i) Documentation of voluntary renewable energy or renewable energy attribute credit purchases by retail customers, by customer class, in the State during the control period immediately preceding the application date.

(ii) Documentation that the renewable energy or renewable energy attributes

related to voluntary renewable energy or renewable energy attribute credit sales were procured by the retail provider.

(iii) Time period when the retail purchase(s) was made.

(iv) State where the electricity was generated or the renewable energy attribute credit was created, including documentation of facility name, unique generator identification number, and fuel type.

(v) Time period when the electricity was generated or the renewable energy attribute credit was created.

(5) By the October 31<sup>st</sup> following the March 1<sup>st</sup> application deadline established in paragraph (2) of this subdivision, the department shall determine the actual MWh of voluntary renewable energy market purchases that occurred during the allocation year. The department shall retire CO<sub>2</sub> allowances in the voluntary renewable energy and eligible biomass set-aside account in an amount up to the number of tons of CO<sub>2</sub> represented by actual voluntary renewable energy market purchases, based on actual MWh purchases demonstrated by each project sponsor as follows:

$$\text{CO}_2 \text{ tons} = \text{MP} \times \text{EF}$$

where:

CO<sub>2</sub> tons, rounded down to the nearest whole ton, is the number of allowances to be placed in the retirement account.

MP is the MWh of voluntary renewable energy purchased in the State during the control period that meets the requirements of this subdivision.

EF is the CO<sub>2</sub> emissions factor for the control area where the electricity represented by the sale was generated.

(6) A VREEB application submitted by a CO<sub>2</sub> authorized account representative for a CO<sub>2</sub> budget source co-firing eligible biomass as a compliance mechanism shall contain the following information:

(i) Documentation of the department's determination that fuel combusted at the CO<sub>2</sub> budget source is eligible biomass.

(ii) The number of tons of CO<sub>2</sub> emissions from the CO<sub>2</sub> budget source attributable to the burning of eligible biomass during the allocation year, as calculated pursuant to section 242-8.7 of this Part and any other department-approved method.

(iii) By the October 31<sup>st</sup> following the March 1<sup>st</sup> application deadline established in paragraph (2) of this subdivision, the department shall determine the actual number of tons of CO<sub>2</sub> emissions from the CO<sub>2</sub> budget source attributable to the burning of eligible biomass during the allocation year. The department shall retire CO<sub>2</sub> allowances in the voluntary renewable energy and eligible biomass set-aside account in an amount up to such number of tons of CO<sub>2</sub> emissions.

(7) If more than one VREP applicant or CO<sub>2</sub> authorized account representative requests the retirement of CO<sub>2</sub> allowances pursuant to this subdivision, and the number of CO<sub>2</sub> allowances that are subject to department approved requests exceeds the number of CO<sub>2</sub> allowances in the voluntary renewable energy market

and eligible biomass set-aside account as of December 31 of the previous calendar year , the department will retire CO<sub>2</sub> allowances from the account for the VREP applicants and CO<sub>2</sub> authorized account representatives in the order in which the VREP applicants and CO<sub>2</sub> authorized account representatives submitted approvable retirement requests. For purposes of this paragraph, VREEB applications will be considered simultaneous if they are made in the same month. Should approvable VREEB applications in excess of the allocation to the relevant voluntary renewable energy market and eligible biomass set-aside account as of December 31 of the previous calendar year be submitted in the same month by different VREP applicants and CO<sub>2</sub> authorized account representatives , the department will retire CO<sub>2</sub> allowances for those VREP applicants and CO<sub>2</sub> authorized account representatives on a basis proportional to the number of CO<sub>2</sub> allowances requested by each VREP applicant and CO<sub>2</sub> authorized account representative.

(8) 'Flow back of undistributed CO<sub>2</sub> allowances from the voluntary renewable energy market and eligible biomass set-aside account'. After retiring allowances pursuant to this subdivision for an allocation year, any remaining CO<sub>2</sub> allowances will either remain in the voluntary renewable energy market and eligible biomass set-aside account or be transferred to the energy efficiency and clean energy technology account.

(d) 'Long term contract set-aside allocation. ' The department shall allocate 1,500,000 tons to the long term contract set-aside account from the CO<sub>2</sub> Budget Trading Program annual adjusted budget set forth in section 242-5.2 of this Part , as applicable . The department shall administer the long term contract set-aside account in accordance with the following procedures.

(1) The department will open and manage a general account for the long term contract set-aside account for each allocation year.

(2) The sponsor for a long term contract hardship demonstration must establish a compliance account under subdivision 242-6.2(a) of this Part. All submissions to the department required for the reward of allowances from the long term contract set-aside account under this section must be from the CO<sub>2</sub> authorized account representative for the compliance account, herein referred to as the “LTC applicant.”

(3) The LTC applicant may submit a written request to the department for the reward of a specified number of CO<sub>2</sub> allowances in the long term contract set-aside account. This request must be submitted by the December 1<sup>st</sup>, immediately preceding the allocation year for which it is being made and must include information to assure, to the department’s satisfaction, that:

(i) the long term contract was entered into prior to March 2006;

(ii) the LTC applicant’s purchase of allowances at auction or in the secondary market leads to financial hardship, because the LTC applicant is unable to pass on the cost of CO<sub>2</sub> allowances to the purchasing party under the conditions of the long term contract; and

(iii) each CO<sub>2</sub> budget unit at the CO<sub>2</sub> budget source covered by the long term contract uses natural gas as its primary fuel, or the CO<sub>2</sub> budget source’s emission rate is no higher than 1100 lbs/MWhr.

(4) The written request submitted pursuant to paragraph (3) of this subdivision shall contain, at a minimum, the following information.

(i) A copy of the long term contract and explanation that the LTC applicant is unable to:

(‘a’) pass the cost of allowances on to the purchasing party, or

(‘b’) renegotiate the terms of the contract;

(ii) Financial statements from each of the previous five years that clearly demonstrate the revenues and expenses of the LTC applicant’s budget source;

(iii) Fuel, total net output and emissions data from the previous three year period;

(iv) The portion of emissions from the CO<sub>2</sub> budget unit or units covered by the long term contract during the upcoming year;

(v) Costs associated with the CO<sub>2</sub> Budget Trading Program compared to all other costs associated with the operation of the CO<sub>2</sub> budget unit or units; and

(vi) A demonstration that the LTC applicant will suffer losses in excess of the value of allowances sought, supported by projected costs and revenues for the allocation year for which the LTC application pertains.

(5) Except as may be modified by paragraphs (6) or (9) of this subdivision, the department will determine the number of CO<sub>2</sub> allowances to be allocated to each LTC applicant that the department determines meets the eligibility requirements of paragraph (3) of this subdivision, in accordance with the following procedures:

LTC Allowances = (((LTCer) x (TO))/2000) -RLTCA;

where:

“LTC Allowances” are the result of the calculation;

“LTCer” is the applicable emission rate

“TO” is total net output from the LTC facility;

“RLTCA” is the number of allowances remaining in an LTC applicant’s compliance account

(i) For the purposes of this subdivision, total net output shall be the greatest total net output experienced by the unit for any single calendar year among the three calendar years, for which data is submitted, proceeding the date by which the department must make the CO<sub>2</sub> allocations pursuant to this subdivision.

(ii) For the purposes of this subdivision, the “LTCer” will be the lesser of the actual emission rate included in the application and 1100 lbs/MWhr.

(iii) For the purposes of this subdivision, there will be no “RLTCA” for the first application, but for each subsequent application, the department will determine the “RLTCA” to be the difference between the allowances in the LTC applicant’s compliance account and actual emissions for that allocation year.

(6) The number of CO<sub>2</sub> allowances to be allocated to an eligible LTC applicant, as determined pursuant to paragraph (5) of this subdivision, shall be discounted by the department as follows, if applicable:

(i) by the percentage of CO<sub>2</sub> allowance cost that the LTC applicant is able to pass on to the purchasing party; and

(ii) by the percentage of CO<sub>2</sub> emissions from the CO<sub>2</sub> budget source that are not covered by the long term contract.

(7) Allowances will be allocated to the LTC applicant's compliance account.

(8) Allowances allocated pursuant to this subdivision must only be used for compliance with the CO<sub>2</sub> budget emissions limitation for the source. The sale or transfer of allowances from the LTC applicant's compliance account will be considered a violation of this subdivision.

(9) If more than one LTC applicant requests the award of CO<sub>2</sub> allowances and the number of CO<sub>2</sub> allowances that are subject to the department approved requests exceeds the number of CO<sub>2</sub> allowances in the relevant long term contract set-aside account, the department will award CO<sub>2</sub> allowances for those LTC applicants on a basis proportional to the number of CO<sub>2</sub> allowances requested by each LTC applicant.

(10) 'Flow back of undistributed CO<sub>2</sub> allowances from the long term contract set-aside account'. After allocating allowances pursuant to this subdivision for an allocation year, the department will transfer any remaining CO<sub>2</sub> allowances from the long term contract set-aside account to the energy efficiency and clean energy technology account.

Existing section 242-6.1 through subdivision 242-6.2(a) remains unchanged.

(b) 'General accounts'.

(1) 'Application for general account'. Any person may apply to open a general account for the purpose of holding and transferring CO<sub>2</sub> allowances. An application for a general account may designate one

and only one CO<sub>2</sub> authorized account representative and one and only one alternate CO<sub>2</sub> authorized account representative who may act on behalf of the CO<sub>2</sub> authorized account representative. The agreement by which the alternate CO<sub>2</sub> authorized account representative is selected shall include a procedure for authorizing the alternate CO<sub>2</sub> authorized account representative to act in lieu of the CO<sub>2</sub> authorized account representative. A complete application for a general account shall be submitted to the department or its agent and shall include the following elements in a format prescribed by the department or its agent:

(i) name, address, e-mail address, and telephone number [, and facsimile transmission number] of the CO<sub>2</sub> authorized account representative and any alternate CO<sub>2</sub> authorized account representative;

Existing subparagraph 242-6.2(b)(1)(ii) through paragraph 242-6.2(b)(4) remains unchanged.

(5) ‘Delegation by CO<sub>2</sub> authorized account representative and alternate CO<sub>2</sub> authorized account representative’.

(i) A CO<sub>2</sub> authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the department or its agent provided for under Subparts 242-6 and 242-7 of this Part.

(ii) An alternate CO<sub>2</sub> authorized account representative may delegate, to one or more natural persons, his or her authority to make an electronic submission to the department or its agent provided for under Subparts 242-6 and 242-7 of this Part.

(iii) In order to delegate authority to make an electronic submission to the department or its agent in accordance with Subparagraphs (i) and (ii) of this paragraph, the CO<sub>2</sub> authorized account representative or alternate CO<sub>2</sub> authorized account representative, as appropriate, must submit to the department or its agent a notice of delegation, in a format prescribed by the department that includes the following elements:

(a) The name, address, e-mail address, and telephone number [, and facsimile transmission number ] of such CO<sub>2</sub> authorized account representative or alternate CO<sub>2</sub> authorized account representative;

(b) The name, address, e-mail address, and telephone number [and facsimile transmission number] of each such natural person, herein referred to as “electronic submission agent”;

Existing clause 242-6.2(b)(5)(iii)(c) through section 242-6.3 remains unchanged.

#### 242-6.4 Recordation of CO<sub>2</sub> allowance allocations.

(a) By January 1 [, 2009 ]of each allocation year, the department or its agent will record the CO<sub>2</sub> allowances for that allocation year in the energy efficiency and clean energy technology account, the voluntary renewable energy market and eligible biomass set-aside account, and the long term contract set-aside account [, the CO<sub>2</sub> allowances for all allocation years]. For allocation year 2014, the department shall deduct the amount of allocation year 2014 CO<sub>2</sub> allowances held in general and compliance accounts as of January 1, 2014 from the amount of 2014 allocation year CO<sub>2</sub> allowances to be recorded in the energy efficiency and c lean energy technology account.

(b) ‘Serial numbers for allocated CO<sub>2</sub> allowances’. When allocating CO<sub>2</sub> allowances to and recording them in an account, the department or its agent will assign each CO<sub>2</sub> allowance a unique identification number that will include digits identifying the year for which the CO<sub>2</sub> allowance is allocated.

[(c) On or before December 31, 2009, the Department shall record any ERAs awarded pursuant to 242-5.3(b)(5) of this Part in the CO<sub>2</sub> budget source’s compliance account.]

#### 242-6.5 Compliance.

(a) ‘ Allowances available for compliance deduction ’. CO<sub>2</sub> allowances that meet the following criteria are available to be deducted in order for a CO<sub>2</sub> budget source to comply with the CO<sub>2</sub> requirements of 242-1.5(c) of this Part for a control period or an interim control period.

(1) The CO<sub>2</sub> allowances, other than CO<sub>2</sub> offset allowances, are of allocation years that fall within a prior control period, the same control period or the same interim control period for which the allowances will be deducted.

(2) The CO<sub>2</sub> allowances are held in the CO<sub>2</sub> budget source’s compliance account as of the CO<sub>2</sub> allowance transfer deadline for that control period or interim control period or are transferred into the compliance account by a CO<sub>2</sub> allowance transfer correctly submitted for recordation under section 242-7.1 of this Part by the CO<sub>2</sub> allowance transfer deadline for that control period or interim control period.

(3) For CO<sub>2</sub> offset allowances, the number of CO<sub>2</sub> offset allowances that are available to be deducted in order for a CO<sub>2</sub> budget source to comply with the CO<sub>2</sub> requirements under subdivision 242-1.5(c) of this Part for a control period or an interim control period may not exceed [the number of tons representing the

following percentages] 3.3 percent of the CO<sub>2</sub> budget source's CO<sub>2</sub> emissions for that control period, or of 0.50 times the CO<sub>2</sub> budget source's CO<sub>2</sub> emissions for an interim control period. as determined in accordance with Subparts 242-6 and 242-8 of this Part[.].

(i) unless the provisions of Subparagraphs (ii) or (iii) of this paragraph apply, 3.3 percent;

(ii) if the department determines that there has been a stage one trigger event, five percent;

(iii) if the department determines that there has been a stage two trigger event, 10 percent.]

(4) The CO<sub>2</sub> allowances are not necessary for deductions for excess emissions for a prior control period under subdivision (d) of this section.

(b) 'Deductions for compliance'. Following the recordation, in accordance with section 242-7.2 of this Part, of CO<sub>2</sub> allowance transfers submitted for recordation in the CO<sub>2</sub> budget source's compliance account by the CO<sub>2</sub> allowance transfer deadline for a control period or interim control period, the department or its agent will deduct CO<sub>2</sub> allowances available under subdivision (a) of this section to cover the source's CO<sub>2</sub> emissions (as determined in accordance with Subpart 242-8 of this Part) for the control period or interim control period, as follows:

(1) until the amount of CO<sub>2</sub> allowances deducted equals the number of tons of total CO<sub>2</sub> emissions[,] less the CO<sub>2</sub> allowances deducted to meet the requirements of paragraph 242-1.5(c)(2) with respect to the previous two interim control periods, or 0.50 times the number of tons of total CO<sub>2</sub> emissions for an

interim control period, less any CO<sub>2</sub> emissions attributable to the burning of eligible biomass, determined in accordance with Subpart 242-8 of this Part from all CO<sub>2</sub> budget units at the CO<sub>2</sub> budget source for the control period or interim control period; or

(2) if there are insufficient CO<sub>2</sub> allowances to complete the deductions in paragraph (1) of this subdivision, until no more CO<sub>2</sub> allowances available under subdivision (a) of this section remain in the compliance account.

(c) 'Identification of available CO<sub>2</sub> allowances by serial number; default compliance deductions'.

(1) The CO<sub>2</sub> authorized account representative for a source's compliance account may request that specific CO<sub>2</sub> allowances, identified by serial number, in the compliance account be deducted for emissions or excess emissions for a control period or interim control period in accordance with subdivision (b), or (d) of this section. Such identification shall be made in the compliance certification report submitted in accordance with section 242-4.1 of this Part.

(2) The department or its agent will deduct CO<sub>2</sub> allowances for a control period or interim control period from the CO<sub>2</sub> budget source's compliance account, in the absence of an identification or in the case of a partial identification of available CO<sub>2</sub> allowances by serial number under paragraph (1) of this subdivision, in the following order:

(i) first, subject to the relevant compliance deduction limitations under paragraphs (a)(3) and (d)(1) of this section, CO<sub>2</sub> offset allowances. CO<sub>2</sub> offset allowances shall be deducted in chronological order ('i.e.', CO<sub>2</sub> offset allowances from earlier allocation years shall be deducted before CO<sub>2</sub> offset allowances from later allocation years). In the event that some, but not all CO<sub>2</sub> offset allowances from a particular

allocation year are to be deducted, CO<sub>2</sub> allowances shall be deducted by serial number, with lower serial numbered allowances deducted before higher serial numbered allowances.

(ii) Second, any CO<sub>2</sub> allowances, other than CO<sub>2</sub> offset allowances, which are available for deduction under subdivision (a) of this section. CO<sub>2</sub> allowances shall be deducted in chronological order ('i.e.', CO<sub>2</sub> allowances from earlier allocation years shall be deducted before CO<sub>2</sub> allowances from later allocation years). In the event that some, but not all CO<sub>2</sub> allowances from a particular allocation year are to be deducted, CO<sub>2</sub> allowances shall be deducted by serial number, with lower serial numbered allowances deducted before higher serial numbered allowances.

(d) 'Deductions for excess emissions'.

(1) After making the deductions for compliance under subdivision (b) of this section, the department or its agent will deduct from the CO<sub>2</sub> budget source's compliance account a number of CO<sub>2</sub> allowances, from allocation years that occur after the control period in which the source has excess emissions, equal to three times the number of the source's excess emissions. In the event that a source has insufficient CO<sub>2</sub> allowances to cover three times the number of the source's excess emissions, the source shall be required to immediately transfer sufficient allowances into its compliance account. No CO<sub>2</sub> offset allowances may be deducted to account for the source's excess emissions.

(2) Any CO<sub>2</sub> allowance deduction required under paragraph (1) of this subdivision shall not affect the liability of the owners and operators of the CO<sub>2</sub> budget source or the CO<sub>2</sub> units at the source for any fine, penalty, or assessment, or their obligation to comply with any other remedy, for the same violation, as ordered under applicable State law. The following guidelines will be followed in assessing fines, penalties or other obligations.

(i) For purposes of determining the number of days of violation, if a CO<sub>2</sub> budget source has excess emissions for a control period, each day in the control period constitutes a day in violation unless the owners and operators of the unit demonstrate that a lesser number of days should be considered.

(ii) Each ton of excess emissions is a separate violation.

(iii) For the purposes of determining the number of days of violation, if a CO<sub>2</sub> budget source has excess interim emissions for an interim control period, each day in the interim control period constitutes a day in violation unless the owners and operators of the unit demonstrate that a lesser number of days should be considered.

(iv) Each ton of excess interim emissions is a separate violation.

Existing paragraph 242-6.5(d)(3) through section 242-7.1 remains unchanged.

#### 242-7.2 Recordation.

(a) Within five business days of receiving a CO<sub>2</sub> allowance transfer, except as provided in subdivision (b) of this section, the department or its agent will record a CO<sub>2</sub> allowance transfer by moving each CO<sub>2</sub> allowance from the transferor account to the transferee account as specified by the request, provided that:

(1) the transfer is correctly submitted under section 242-7.1 of this Part; and

(2) the transferor account includes each CO<sub>2</sub> allowance identified by serial number in the transfer.

(b) A CO<sub>2</sub> allowance transfer into or out of a compliance account that is submitted for recordation following the CO<sub>2</sub> allowance transfer deadline and that includes any CO<sub>2</sub> allowances that are of allocation years that fall within a control period or interim control period prior to or the same as the control period or interim control period to which the CO<sub>2</sub> allowance transfer deadline applies will not be recorded until after completion of the process pursuant to section 242-6.5 of this Part.

(c) Where a CO<sub>2</sub> allowance transfer submitted for recordation fails to meet the requirements of subdivision (a) of this section, the department or its agent will not record such transfer.

#### 242-7.3 Notification.

(a) 'Notification of recordation'. Within five business days of recordation of a CO<sub>2</sub> allowance transfer under section 242-7.2 of this Part, the department or its agent will notify each party to the transfer. Notice will be given to the CO<sub>2</sub> authorized account representatives of both the transferor and transferee accounts.

(b) 'Notification of non-recordation'. Within 10 business days of receipt of a CO<sub>2</sub> allowance transfer that fails to meet the requirements of section 242-7.2(a) of this Subpart, the department or its agent will notify the CO<sub>2</sub> authorized account representatives of both accounts subject to the transfer of:

(1) a decision not to record the transfer, and

(2) the reasons for such non-recordation.

(c) Nothing in this section shall preclude the submission of a CO<sub>2</sub> allowance transfer for recordation

following notification of non-recording.

## Subpart 242-8 Monitoring and Reporting

### 242-8.1 General requirements.

The owners and operators, and to the extent applicable, the CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget unit, shall comply with the monitoring, recordkeeping and reporting requirements as provided in this Subpart and all applicable sections of 40 CFR part 75 (see Table 1, section 200.9 of this Title). Where referenced in the Subpart, the monitoring requirements of 40 CFR part 75 (see Table 1, section 200.9 of this Title) shall be adhered to in a manner consistent with the purpose of monitoring and reporting CO<sub>2</sub> mass emissions pursuant to this Subpart. For purposes of complying with such requirements, the definitions in section 242-1.2 of this Part and in 40 CFR 72.2 (see Table 1, section 200.9 of this Title) shall apply, and the terms “affected unit,” “designated representative,” and “continuous emissions monitoring system” (or “CEMS”) in 40 CFR part 75 (see Table 1, section 200.9 of this Title) shall be replaced by the terms “CO<sub>2</sub> budget unit,” “CO<sub>2</sub> authorized account representative,” and “continuous emissions monitoring system” (or “CEMS”), respectively, as defined in section 242-1.2 of this Part. For units not subject to an Acid Rain emissions limitation, the term “Administrator” in 40 CFR part 75 (see Table 1, section 200.9 of this Title) shall be replaced with “the department or its agent.” Owners or operators of a CO<sub>2</sub> budget unit who monitor a non-CO<sub>2</sub> budget unit pursuant to the common, multiple, or bypass stack procedures in 40 CFR 75.72(b)(2)(ii), or 40 CFR 75.16(b)(2)(ii)(B) as pursuant to 40 CFR 75.13 (see Table 1, section 200.9 of this Title), for purposes of complying with this Part, shall monitor and report CO<sub>2</sub> mass emissions from such non-CO<sub>2</sub> budget unit according to the procedures for CO<sub>2</sub> budget units established in sections 242-8.1 through 242-8.7 of this Part.

(a) ‘ Requirements for installation, certification, and data accounting ’. The owner or operator of each CO<sub>2</sub> budget unit must meet the following requirements.

(1) Install all monitoring systems necessary to monitor CO<sub>2</sub> mass emissions in accordance with 40 CFR part 75 (see Table 1, section 200.9 of this Title), except for equation G1. Equation G1 in Appendix G shall not be used to determine CO<sub>2</sub> emissions under this Part . This may require systems to monitor CO<sub>2</sub> concentration, stack gas flow rate, O<sub>2</sub> concentration, heat input, and fuel flow rate.

(2) Successfully complete all certification tests required under section 242-8.2 of this Part and meet all other requirements of this Subpart and 40 CFR part 75 (see Table 1, section 200.9 of this Title) applicable to the monitoring systems under paragraph (1) of this subdivision.

(3) Record, report and quality-assure the data from the monitoring systems under paragraph (1) of this subdivision.

(b) 'Compliance dates'. The owner or operator shall meet the monitoring system certification and other requirements of paragraphs (a)(1) through (a)(3) of this section on or before the following dates. The owner or operator shall record, report and quality-assure the data from the monitoring systems under paragraph (a)(1) of this section on and after the following dates.

(1) The owner or operator of a CO<sub>2</sub> budget unit, except for a CO<sub>2</sub> budget unit under paragraph (2) of this subdivision, that commences commercial operation before July 1, 2008, must comply with the requirements of this Subpart by January 1, 2009.

(2) The owner or operator of a CO<sub>2</sub> budget unit that commences commercial operation on or after July 1, 2008 must comply with the requirements of this Subpart by the later of the following dates:

(i) January 1, 2009; or

(ii) the earlier of:

(‘a’) 90 unit operating days after the date on which the unit commences commercial operation; or

(‘b’) 180 calendar days after the date on which the unit commences commercial operation.

(3) For the owner or operator of a CO<sub>2</sub> budget unit for which construction of a new stack or flue installation is completed after the applicable deadline under paragraph (1) or (2) of this subdivision by the earlier of:

(i) 90 unit operating days after the date on which emissions first exit to the atmosphere through the new stack or flue; or

(ii) 180 calendar days after the date on which emissions first exit to the atmosphere through the new stack or flue.

(c) ‘Reporting data’.

(1) Except as provided in paragraph (2) of this subdivision, the owner or operator of a CO<sub>2</sub> budget unit that does not meet the applicable compliance date set forth in paragraphs (b)(1), (2) and (3) of this section for any monitoring system under paragraph (a)(1) of this section shall, for each such monitoring system, determine, record, and report maximum potential (or as appropriate minimum potential) values for CO<sub>2</sub>

concentration, CO<sub>2</sub> emissions rate, stack gas moisture content, fuel flow rate, heat input and any other parameter required to determine CO<sub>2</sub> mass emissions in accordance with 40 CFR 75.31(b)(2) or (c)(3), or section 2.4 of appendix D of 40 CFR part 75 (see Table 1, section 200.9 of this Title) as applicable.

(2) The owner or operator of a CO<sub>2</sub> budget unit that does not meet the applicable compliance date set forth in paragraph (b)(3) of this section for any monitoring system under paragraph (a)(1) of this section shall, for each such monitoring system, determine, record, and report substitute data using the applicable missing data procedures in subpart D or appendix D of 40 CFR part 75 (see Table 1, section 200.9 of this Title), in lieu of the maximum potential (or as appropriate minimum potential) values for a parameter if the owner or operator demonstrates that there is continuity between the data streams for that parameter before and after the construction or installation under paragraph (b)(3) of this section.

(3) Low Mass Emissions Methodologies (LME).

(i) CO<sub>2</sub> budget units subject to an acid rain emissions limitation or [[state-specific annual or ozone season CAIR citation]] Parts 243, 244 and 245 of this Title that qualify for the optional SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub> (for acid rain) or NO<sub>x</sub> (for [[state-specific annual or ozone season CAIR citation]]) Parts 243, 244 and 245 of this Title) emissions calculations for LME units under 40 CFR 75.19 (see Table 1, section 200.9 of this Title) and report emissions for such programs using the calculations under 40 CFR 75.19 (see Table 1, section 200.9 of this Title), shall also use the CO<sub>2</sub> emissions calculations for LME units under 40 CFR 75.19 (see Table 1, section 200.9 of this Title) for purposes of compliance with this Subpart.

(ii) CO<sub>2</sub> budget units subject to an acid rain emissions limitation or [[state-specific annual or ozone season CAIR citation]] Parts 243, 244 and 245 of this Title that do not qualify for the optional SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub> (for acid rain) or NO<sub>x</sub> (for [[state-specific annual or ozone season CAIR citation]]) Parts 243, 244

and 245 of this Title) emissions calculations for LME units under 40 CFR 75.19 (see Table 1, section 200.9 of this Title), shall not use the CO<sub>2</sub> emissions calculations for LME units under 40 CFR 75.19 (see Table 1, section 200.9 of this Title) for purposes of compliance with this Subpart.

(iii) CO<sub>2</sub> budget units not subject to an acid rain emissions limitation or [[state-specific annual or ozone season CAIR citation]] Parts 243, 244 and 245 of this Title shall qualify for the optional CO<sub>2</sub> emissions calculation for LME units under 40 CFR 75.19 (see Table 1, section 200.9 of this Title), provided that they emit less than 100 tons of NO<sub>x</sub> annually and no more than 25 tons of SO<sub>2</sub> annually.

(d) 'Prohibitions'.

(1) No owner or operator of a CO<sub>2</sub> budget unit shall use any alternative monitoring system, alternative reference method, or any other alternative for the required continuous emissions monitoring system without having obtained prior written approval in accordance with section 242-8.6 of this Part.

(2) No owner or operator of a CO<sub>2</sub> budget unit shall operate the unit so as to discharge, or allow to be discharged, CO<sub>2</sub> emissions to the atmosphere without accounting for all such emissions in accordance with the applicable provisions of this Subpart and 40 CFR part 75 (see Table 1, section 200.9 of this Title).

(3) No owner or operator of a CO<sub>2</sub> budget unit shall disrupt the continuous emissions monitoring system, any portion thereof, or any other approved emissions monitoring method, and thereby avoid monitoring and recording CO<sub>2</sub> mass emissions discharged into the atmosphere, except for periods of recertification or periods when calibration, quality assurance testing, or maintenance is performed in accordance with the applicable provisions of this Subpart and 40 CFR part 75 (see Table 1, section 200.9 of this Title).

(4) No owner or operator of a CO<sub>2</sub> budget unit shall retire or permanently discontinue use of the continuous emissions monitoring system, any component thereof, or any other approved emissions monitoring system under this Subpart, except under any one of the following circumstances:

(i) The owner or operator is monitoring emissions from the unit with another certified monitoring system approved, in accordance with the applicable provisions of this Subpart and 40 CFR part 75 (see Table 1, section 200.9 of this Title), by the department for use at that unit that provides emissions data for the same pollutant or parameter as the retired or discontinued monitoring system; or

(ii) The CO<sub>2</sub> authorized account representative submits notification of the date of certification testing of a replacement monitoring system in accordance with section 242-8.2(d)(3)(i) of this Subpart.

242-8.2 Initial certification and recertification procedures.

(a) The owner or operator of a CO<sub>2</sub> budget unit shall be exempt from the initial certification requirements of this section for a monitoring system under sectionh 242-8.1(a)(1) of this Subpart if the following conditions are met:

(1) the monitoring system has been previously certified in accordance with 40 CFR part 75 (see Table 1, section 200.9 of this Title); and

(2) the applicable quality-assurance and quality-control requirements of 40 CFR 75.21 and appendix B and appendix D of 40 CFR part 75 (see Table 1, section 200.9 of this Title) are fully met for the certified monitoring system described in paragraph (1) of this subdivision.

(b) The recertification provisions of this section shall apply to a monitoring system under section 242-8.1(a)(1) of this Subpart exempt from initial certification requirements under subdivision (a) of this section.

(c) Notwithstanding subdivision (a) of this section, if the administrator has previously approved a petition under 40 CFR 75.72(b)(2)(ii), or 40 CFR 75.16(b)(2)(ii)(B) as pursuant to 40 CFR 75.13 (see Table 1, section 200.9 of this Title) for apportioning the CO<sub>2</sub> emissions rate measured in a common stack or a petition under 40 CFR 75.66 (see Table 1, section 200.9 of this Title) of this chapter for an alternative requirement in 40 CFR part 75 (see Table 1, section 200.9 of this Title), the CO<sub>2</sub> authorized account representative shall submit the petition to the department under section 242-8.6(a) of this Subpart to determine whether the approval applies under this program.

(d) Except as provided in subdivision (a) of this section, the owner or operator of a CO<sub>2</sub> budget unit shall comply with the following initial certification and recertification procedures for a continuous emissions monitoring system and an excepted monitoring system under appendix D of 40 CFR part 75 (see Table 1, section 200.9 of this Title) and under section 242-8.1(a)(1) of this Subpart. The owner or operator of a unit that qualifies to use the low mass emissions excepted monitoring methodology in 40 CFR 75.19 (see Table 1, section 200.9 of this Title) or that qualifies to use an alternative monitoring system under Subpart E of 40 CFR part 75 (see Table 1, section 200.9 of this Title) shall comply with the procedures in subdivision (e) or (f) of this section, respectively.

(1) ‘ Requirements for initial certification ’. The owner or operator shall ensure that each continuous emissions monitoring system required under section 242-8.1(a)(1) of this Subpart (which includes the automated data acquisition and handling system) successfully completes all of the initial certification testing

required under 40 CFR 75.20 (see Table 1, section 200.9 of this Title) by the applicable deadlines specified in section 242-8.1(b) of this Subpart. In addition, whenever the owner or operator installs a monitoring system in order to meet the requirements of this Subpart in a location where no such monitoring system was previously installed, initial certification in accordance with 40 CFR 75.20 (see Table 1, section 200.9 of this Title) is required.

(2) ‘Requirements for recertification’.

(i) Whenever the owner or operator makes a replacement, modification, or change in a certified continuous emissions monitoring system under section 242-8.1(a)(1) of this Subpart that the administrator or the department determines significantly affects the ability of the system to accurately measure or record CO<sub>2</sub> mass emissions or heat input or to meet the quality-assurance and quality-control requirements of 40 CFR 75.21 or appendix B to 40 CFR part 75 (see Table 1, section 200.9 of this Title), the owner or operator shall recertify the monitoring system according to 40 CFR 75.20(b) (see Table 1, section 200.9 of this Title).

(ii) For systems using stack measurements such as stack flow, stack moisture content, CO<sub>2</sub> or O<sub>2</sub> monitors, whenever the owner or operator makes a replacement, modification, or change to the flue gas handling system or the unit’s operation that the administrator or the department determines to significantly change the flow or concentration profile, the owner or operator shall recertify the continuous emissions monitoring system according to 40 CFR 75.20(b) (see Table 1, section 200.9 of this Title). Examples of changes which require recertification include: replacement of the analyzer, change in location or orientation of the sampling probe or site, or changing of flow rate monitor polynomial coefficients.

(3) ‘Approval process for initial certifications and recertification’. Subparagraphs (3)(i) through (iv) of this subdivision apply to both initial certification and recertification of a monitoring system under section

242-8.1(a)(1) of this Subpart. For recertifications, replace the words “certification” and “initial certification” with the word “recertification,” replace the word “certified” with “recertified,” and proceed in the manner prescribed in 40 CFR 75.20(b)(5) and (g)(7) (see Table 1, section 200.9 of this Title) in lieu of this section.

(i) Notification of certification. The CO<sub>2</sub> authorized account representative shall submit to the department or its agent, the appropriate EPA regional office and the administrator a written notice of the dates of certification in accordance with section 242-8.4 of this Subpart.

(ii) Certification application. The CO<sub>2</sub> authorized account representative shall submit to the department or its agent a certification application for each monitoring system. A complete certification application shall include the information specified in 40 CFR 75.63 (see Table 1, section 200.9 of this Title).

(iii) Provisional certification data. The provisional certification date for a monitor shall be determined in accordance with 40 CFR 75.20(a)(3) (see Table 1, section 200.9 of this Title). A provisionally certified monitor may be used under the CO<sub>2</sub> budget Trading Program for a period not to exceed 120 days after receipt by the department of the complete certification application for the monitoring system or component thereof under subparagraph (ii) of this paragraph. Data measured and recorded by the provisionally certified monitoring system or component thereof, in accordance with the requirements of 40 CFR part 75 (see Table 1, section 200.9 of this Title), will be considered valid quality-assured data (retroactive to the date and time of provisional certification), provided that the department does not invalidate the provisional certification by issuing a notice of disapproval within 120 days of receipt of the complete certification application by the department.

(iv) Certification application approval process. The department will issue a written notice

of approval or disapproval of the certification application to the owner or operator within 120 days of receipt of the complete certification application under subparagraph (ii) of this paragraph. In the event the department does not issue such a notice within such 120-day period, each monitoring system which meets the applicable performance requirements of 40 CFR part 75 (see Table 1, section 200.9 of this Title) and is included in the certification application will be deemed certified for use under the CO<sub>2</sub> Budget Trading Program.

(‘a’) Approval notice. If the certification application is complete and shows that each monitoring system meets the applicable performance requirements of 40 CFR part 75 (see Table 1, section 200.9 of this Title), then the department will issue a written notice of approval of the certification application within 120 days of receipt.

(‘b’) Incomplete application notice. If the certification application is not complete, then the department will issue a written notice of incompleteness that sets a reasonable date by which the CO<sub>2</sub> authorized account representative must submit the additional information required to complete the certification application. If the CO<sub>2</sub> authorized account representative does not comply with the notice of incompleteness by the specified date, then the department may issue a notice of disapproval under clause (c) of this subparagraph. The 120 day review period shall not begin before receipt of a complete certification application.

(‘c’) Disapproval notice. If the certification application shows that any monitoring system or component thereof does not meet the performance requirements of 40 CFR part 75 (see Table 1, section 200.9 of this Title), or if the certification application is incomplete and the requirement for disapproval under clause (b) of this subparagraph is met, then the department will issue a written notice of disapproval of the certification application. Upon issuance of such notice of disapproval, the provisional

certification is invalidated by the department and the data measured and recorded by each uncertified monitoring system or component thereof shall not be considered valid quality assured data beginning with the date and hour of provisional certification. The owner or operator shall follow the procedures for loss of certification in subparagraph (v) of this paragraph for each monitoring system or component thereof, which is disapproved for initial certification.

(‘d’) Audit decertification. The department may issue a notice of disapproval of the certification status of a monitor in accordance with section 242-8.3(b) of this Subpart.

(v) ‘Procedures for loss of certification’. If the department issues a notice of disapproval of a certification application under clause (iv)(‘c’) of this paragraph or a notice of disapproval of certification status under clause (iv)(‘d’) of this paragraph, then:

(‘a’) the owner or operator shall substitute the following values for each disapproved monitoring system, for each hour of unit operation during the period of invalid data beginning with the date and hour of provisional certification and continuing until the time, date, and hour specified under 40 CFR 75.20(a)(5)(i) or 40 CFR 75.20(g)(7) (see Table 1, section 200.9 of this Title):

(‘1’) for units using or intending to monitor for CO<sub>2</sub> mass emissions using heat input or for units using the low mass emissions excepted methodology under 40 CFR 75.19 (see Table 1, section 200.9 of this Title), the maximum potential hourly heat input of the unit; or

(‘2’) for units intending to monitor for CO<sub>2</sub> mass emissions using a CO<sub>2</sub> pollutant concentration monitor and a flow monitor, the maximum potential concentration of CO<sub>2</sub> and the maximum potential flow rate of the unit under section 2.1 of appendix A of 40 CFR part 75 (see Table 1, section

200.9 of this Title).

(‘b’) the CO<sub>2</sub> authorized account representative shall submit a notification of certification retest dates and a new certification application in accordance with subparagraphs (i) and (ii) of this paragraph; and

(‘c’) the owner or operator shall repeat all certification tests or other requirements that were failed by the monitoring system, as indicated in the department’s notice of disapproval, no later than 30 unit operating days after the date of issuance of the notice of disapproval.

(e) ‘ Initial certification and recertification procedures for low mass emissions units using the excepted methodologies under section 242-8.1(c)[(3)](2) of this Subpart’. The owner or operator of a unit qualified to use the low mass emissions accepted methodology under section 242-8.1(c)[(3)](2) of this Part shall meet the applicable certification and recertification requirements of 40 CFR 75.19(a)(2), 40 CFR 75.20(h) (see Table 1, section 200.9 of this Title) and section 242-8.2 of this Subpart. If the owner or operator of such a unit elects to certify a fuel flow meter system for heat input determinations, the owner or operator shall also meet the certification and recertification requirements in 40 CFR 75.20(g) (see Table 1, section 200.9 of this Title).

(f) ‘ Certification/recertification procedures for alternative monitoring systems ’. The CO<sub>2</sub> authorized account of each unit for which the owner or operator intends to use an alternative monitoring system approved by the administrator and, if applicable, the department under subpart E of 40 CFR part 75 (see Table 1, section 200.9 of this Title) shall comply with the applicable notification and application procedures of 40 CFR 75.20(f) (see Table 1, section 200.9 of this Title).

### 242-8.3 Out-of-control periods.

(a) Whenever any monitoring system fails to meet the quality assurance and quality control requirements or data validation requirements of 40 CFR part 75 (see Table 1, section 200.9 of this Title), data shall be substituted using the applicable procedures in subpart D or appendix D of 40 CFR part 75 (see Table 1, section 200.9 of this Title).

(b) 'Audit decertification'. Whenever both an audit of a monitoring system and a review of the initial certification or recertification application reveal that any monitoring system should not have been certified or recertified because it did not meet a particular performance specification or other requirement under section 242-8.2 of this Subpart or the applicable provisions of 40 CFR part 75 (see Table 1, section 200.9 of this Title), both at the time of the initial certification or recertification application submission and at the time of the audit, the department or administrator will issue a notice of disapproval of the certification status of such monitoring system. For the purposes of this subdivision, an audit shall be either a field audit or an audit of any information submitted to the department or the administrator. By issuing the notice of disapproval, the department or administrator revokes prospectively the certification status of the monitoring system. The data measured and recorded by the monitoring system shall not be considered valid quality-assured data from the date of issuance of the notification of the revoked certification status until the date and time that the owner or operator completes subsequently approved initial certification or recertification tests for the monitoring system. The owner or operator shall follow the initial certification or recertification procedures in section 242-8.2 of this Subpart for each disapproved monitoring system.

### 242-8.4 Notifications.

The CO<sub>2</sub> authorized account representative for a CO<sub>2</sub> budget unit shall submit written notice to the department and the Administrator in accordance with 40 CFR 75.61 (see Table 1, section 200.9 of this Title).

242-8.5 Recordkeeping and reporting.

(a) 'General provisions'. The CO<sub>2</sub> authorized account representative shall comply with all recordkeeping and reporting requirements in this section, the applicable record keeping and reporting requirements under 40 CFR 75.73 (see Table 1, section 200.9 of this Title) and with the requirements of section 242-2.1(e) of this Part.

(b) 'Monitoring plans'. The owner or operator of a CO<sub>2</sub> budget unit shall submit a monitoring plan in the manner prescribed in 40 CFR 75.62 (see Table 1, section 200.9 of this Title).

(c) 'Certification applications'. The CO<sub>2</sub> authorized account representative shall submit an application to the department within 45 days after completing all CO<sub>2</sub> monitoring system initial certification or recertification tests required under section 242-8.2 of this Subpart including the information required under 40 CFR 75.63 and 40 CFR 75.53(e) and (f) (see Table 1, section 200.9 of this Title).

(d) 'Quarterly reports'. The CO<sub>2</sub> authorized account representative shall submit quarterly reports, as follows:

(1) The CO<sub>2</sub> authorized account representative shall report the CO<sub>2</sub> mass emissions data and heat input data for the CO<sub>2</sub> budget unit, in an electronic format prescribed by the administrator unless otherwise prescribed by the department for each calendar quarter beginning with:

(i) for a unit that commences commercial operation before July 1, 2008, the calendar quarter covering January 1, 2009 through March 31, 2009; or

(ii) for a unit commencing commercial operation on or after July 1, 2008, the calendar quarter corresponding to, the earlier of the date of provisional certification or the applicable deadline for initial certification under section 242-8.1(b) of this Part or, unless that quarter is the third or fourth quarter of 2008, in which case reporting shall commence in the quarter covering January 1, 2009 through March 31, 2009.

(2) The CO<sub>2</sub> authorized account representative shall submit each quarterly report to the department or its agent within 30 days following the end of the calendar quarter covered by the report. Quarterly reports shall be submitted in the manner specified in Subpart H of 40 CFR part 75 and 40 CFR 75.64 (see Table 1, section 200.9 of this Title). Quarterly reports shall be submitted for each CO<sub>2</sub> budget unit (or group of units using a common stack), and shall include all of the data and information required in subpart G of 40 CFR part 75 (see Table 1, section 200.9 of this Title), except for opacity, NO<sub>x</sub>, and SO<sub>2</sub> provisions.

(3) Compliance certification. The CO<sub>2</sub> authorized account representative shall submit to the department or its agent a compliance certification in support of each quarterly report based on reasonable inquiry of those persons with primary responsibility for ensuring that all of the unit's emissions are correctly and fully monitored. The certification shall state that:

(i) the monitoring data submitted were recorded in accordance with the applicable requirements of this Subpart and 40 CFR part 75 (see Table 1, section 200.9 of this Title), including the quality assurance procedures and specifications;

(ii) for a unit with add-on CO<sub>2</sub> emissions controls and for all hours where data are substituted in accordance with 40 CFR 75.34(a)(1) (see Table 1, section 200.9 of this Title), the add-on

emissions controls were operating within the range of parameters listed in the quality assurance/quality control program under appendix B of 40 CFR part 75 (see Table 1, section 200.9 of this Title) and the substitute values do not systematically underestimate CO<sub>2</sub> emissions; and

(iii) the CO<sub>2</sub> concentration values substituted for missing data under Subpart D of 40 CFR part 75 (see Table 1, section 200.9 of this Title) do not systematically underestimate CO<sub>2</sub> emissions.

#### 242-8.6 Petitions.

(a) Except as provided in subdivision (c) of this section, the CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget unit that is subject to an acid rain emissions limitation may submit a petition under to the administrator under 40 CFR 75.66 (see Table 1, section 200.9 of this Title) and to the department requesting approval to apply an alternative to any requirement of 40 CFR Part 75 (see Table 1, section 200.9 of this Title). Application of an alternative to any requirement of 40 CFR Part 75 (see Table 1, section 200.9 of this Title) is in accordance with this Subpart only to the extent that the petition is approved in writing by the administrator, and subsequently approved in writing by the department.

(b) 'Petitions for a CO<sub>2</sub> budget unit that is not subject to an acid rain emissions limitation'.

(1) The CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget unit that is not subject to an acid rain emissions limitation may submit a petition to the administrator under 40 CFR 75.66 (see Table 1, section 200.9 of this Title) and to the department requesting approval to apply an alternative to any requirement of 40 CFR Part 75. Application of an alternative to any requirement of 40 CFR Part 75 (see Table 1, section 200.9 of this Title) is in accordance with this Subpart only to the extent that the petition is approved in writing by the administrator, and subsequently approved in writing by the department.

(2) In the event that the administrator declines to review a petition under this Subpart, the CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget unit that is not subject to an acid rain emissions limitation may submit a petition to the department requesting approval to apply an alternative to any requirement of this Subpart. That petition shall contain all of the relevant information specified in 40 CFR 75.66 (see Table 1, section 200.9 of this Title). Application of an alternative to any requirement of 40 CFR 75.66 (see Table 1, section 200.9 of this Title). Application of an alternative to any requirement of 40 CFR part 75 (see Table 1, section 200.9 of this Title) is in accordance with this Subpart only to the extent that the petition is approved in writing by the department.

(c) The CO<sub>2</sub> authorized account representative of a CO<sub>2</sub> budget unit that is subject to an acid rain emissions limitation may submit a petition under 40 CFR 75.66 (see Table 1, section 200.9 of this Title) to the administrator requesting approval to apply an alternative to a requirement concerning any additional CEMS required under the common stack provisions of 40 CFR 75.72 (see Table 1, section 200.9 of this Title) or a CO<sub>2</sub> concentration CEMS used under 40 CFR 75.71(a)(2) (see Table 1, section 200.9 of this Title). Application of an alternative to any requirement of this Subpart is in accordance with this Subpart only to the extent the petition is approved in writing by both the department and the administrator.

Existing subdivisions 242-8.7(a) through (d) remain unchanged. Subdivision (e) is amended as follows:

(e) Fuel sampling methods and fuel sampling technology shall be consistent with the New York State Renewable Portfolio Standard Biomass Power Guide[book, May 2006 ]September 2011 (see Table 1, section 200.9 of this Title).

Existing section 242-8.8 is deleted.

Subpart 242-9 RESERVED

Subpart 242-10 CO<sub>2</sub> Emissions Offset Projects

242-10.1 CO<sub>2</sub> emissions offset purpose

The department will provide for the award of CO<sub>2</sub> offset allowances to sponsors of CO<sub>2</sub> emissions offset projects [or CO<sub>2</sub> emissions credit retirements ] that have reduced or avoided atmospheric loading of CO<sub>2</sub>, CO<sub>2</sub> equivalent or sequestered carbon as demonstrated in accordance with the applicable provisions of this Subpart. The requirements of this Subpart seek to ensure that CO<sub>2</sub> offset allowances awarded represent CO<sub>2</sub> equivalent emission reductions or carbon sequestration that are real, additional, verifiable, enforceable, and permanent within the framework of a standards-based approach. Subject to the relevant compliance deduction limitations of section 242-6.5(a)(3) of this Part , CO<sub>2</sub> offset allowances may be used by any CO<sub>2</sub> budget source for compliance purposes.

Existing subdivisions 242-10.2(a) through (j) remain unchanged.

(k) ‘ Commercial building ’. A building to which the provisions of ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition) - 2010 (see Table 1, section 200.9 of this Title) apply, which includes buildings except low-rise residential buildings. Low-rise residential buildings include single family homes, multifamily structures of three stories or fewer above grade, and manufactured homes (modular and mobile).

Existing subdivisions 242-10.2(l) through (af) remain unchanged.

(ag) ‘ Residential building ’. A low-rise residential building to which the provisions of ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition) - 2010 (see Table 1, section 200.9 of this Title) do not apply. Includes single family homes, multifamily structures of three stories or fewer above grade, and manufactured homes (modular and mobile).

Existing subdivisions 242-10.2(ah) through 242-10.3(a) remain unchanged.

[(b) ‘Eligible CO<sub>2</sub> emissions credit retirements ’. To qualify for the award of CO<sub>2</sub> offset allowances a CO<sub>2</sub> emissions credit retirement shall satisfy all the applicable requirements of this Subpart.

(1) CO<sub>2</sub> emissions credit retirements include the permanent retirement of greenhouse gas allowances or credits issued pursuant to any governmental mandatory carbon constraining program outside the United States that places a specific tonnage limit on greenhouse gas emissions, or certified greenhouse gas emissions, provided the allowances or credits are acceptable and valid for use in that program at the time of the filing of the consistency application under section 242-10.4 of this Part , or certified greenhouse gas emissions reduction credits issued pursuant to the United Nations Framework Convention on Climate Change (UNFCCC) or protocols adopted through the UNFCCC process.

(2) The department may award CO<sub>2</sub> offset allowances for CO<sub>2</sub> emissions credit retirements only after the occurrence of a stage two trigger event.]

[(c)](b) ‘Project sponsor’. Any person may act as the sponsor of an eligible CO<sub>2</sub> emissions offset project [or CO<sub>2</sub> emissions credit retirement ], provided that person meets the requirements at section 242-10.4 of this Subpart.

[(d)](c) ‘General additionality requirements’. Except as provided with respect to specific offset project standards in section 242-10.5 of this Subpart, the following general requirements shall apply.

(1) CO<sub>2</sub> offset allowances shall not be awarded to an offset project [or CO<sub>2</sub> emissions credit

retirement] that is required pursuant to any local, state or federal law, regulation, or administrative or judicial order. If an offset project receives a consistency determination under section 242-10.4 of this Subpart and is later required by local, State or Federal law, regulation, or administrative or judicial order, then the offset project shall remain eligible for the award of CO<sub>2</sub> offset allowances until the end of its current allocation period but its eligibility shall not be extended for an additional allocation period.

(2) CO<sub>2</sub> offset allowances shall not be awarded to an offset project that includes an electric generation component, unless the project sponsor transfers legal rights to any and all attribute credits (other than the CO<sub>2</sub> offset allowances awarded under section 242-10.7 of this Subpart) generated from the operation of the offset project that may be used for compliance with a renewable portfolio standard or other regulatory requirement, to the department or its agent.

(3) CO<sub>2</sub> offset allowances shall not be awarded to an offset project that receives funding or other incentives from any system benefit fund, or funds or other incentives provided through the energy efficiency and clean energy technology account allocation required pursuant to section 242-5.3(a) of this Part.

(4) CO<sub>2</sub> offset allowances shall not be awarded to an offset project [or CO<sub>2</sub> emissions credit retirement] that is awarded credits or allowances under any other mandatory or voluntary greenhouse gas program.

[(e)](d) 'Maximum allocation periods for CO<sub>2</sub> emissions offset projects'.

(1) 'Maximum allocation periods'. Except as provided in paragraph (2) of this subdivision, the department may award CO<sub>2</sub> offset allowances under section 242-10.7 of this Subpart for an initial 10 -year allocation period. At the end of the initial 10 -year allocation period, the department may award CO<sub>2</sub> offset

allowances for a second 10 -year allocation period, provided the offset sponsor has submitted a consistency application pursuant to section 242-10.4 of this Subpart prior to the expiration of the initial allocation period, and the department has issued a consistency determination pursuant to section 242-10.4(e)(2) of this Subpart.

(2) ‘ Maximum afforestation allocation period ’. The department may award CO<sub>2</sub> offset allowances under section 242-10.7 of this Subpart for any afforestation offset project for an initial 20 -year allocation period. At the end of the initial 20 -year allocation period, the department may award CO<sub>2</sub> offset allowances for a second 20 -year allocation period, provided the offset sponsor has submitted a consistency application for the afforestation offset project pursuant to section 242-10.4 of this Subpart prior to the expiration of the initial allocation period, and the department has issued a consistency determination pursuant to section 242-10.4(e)(2) of this Subpart. At the end of the second 20 -year allocation period, the department may award CO<sub>2</sub> offset allowances for a third 20 -year allocation period, provided the offset sponsor has submitted a consistency application for the afforestation offset project pursuant to section 242-10.4 of this Subpart prior to the expiration of the second allocation period, and the department has issued a consistency determination pursuant to section 242-10.4(e)(2) of this Part. In no event may an afforestation offset project be awarded CO<sub>2</sub> offset allowances for more than a total of 60 allocation years.

[(f) ‘Timing of offset projects ’. The department may award CO<sub>2</sub> offset allowances under section 242-10.7 of this Part only for offset projects that are initially commenced on or after December 20, 2005.]

[(g)](e) ‘ Offset project audit ’. Project sponsors shall provide , in writing, an access agreement to the Department granting the department or its agent access to the physical location of the offset project to inspect for compliance with this Subpart. For offset projects located in any state or other U.S. jurisdiction that is not a participating state, project sponsors shall also provide , in writing, an access agreement to the department

granting the cooperating department with access to the physical location of the offset project to inspect for compliance with this Subpart.

[(h)](f) ‘ Ineligibility due to noncompliance ’. If at any time the department determines that a project sponsor has not complied with the requirements of this Subpart, then the department may revoke and retire any and all CO<sub>2</sub> offset allowances in the project sponsor’s account. If at any time the department determines that an offset project does not comply with the requirements of this Subpart, then the department may revoke any approvals it has issued relative to that offset project.

#### 242-10.4 Application process

(a) ‘ Establishment of general account ’. The sponsor of an offset project [or CO<sub>2</sub> emissions credit retirement] must establish a general account under section 242-6.2(b) of this Part . All submissions to the department required for the award of CO<sub>2</sub> offset allowances under this Subpart must be from the CO<sub>2</sub> authorized account representative for the general account of the sponsor of the relevant offset project [or CO<sub>2</sub> emissions credit retirement], herein referred to as “project sponsor.”

(b) ‘Consistency application deadlines’.

[(1) For offset projects commenced prior to January 1, 2009, the project sponsor must submit the consistency application by June 30, 2009.]

[(2)](1) [For offset projects commenced on or after January 1, 2009,] [t]The consistency application must be submitted by the date that is six months after the offset project is commenced.

[(3)](2) Any consistency application that fails to meet the deadlines of this subdivision will result in the

denial of the consistency application and the continued ineligibility of the subject offset project.

(c) 'Consistency application contents'.

(1) For an offset project, the consistency application must include the following information.

(i) The project's sponsor's name, address, e-mail address, telephone number [, facsimile transmission number,] and account number.

(ii) The offset project description as required by the relevant provisions of section 242-10.5 of this Subpart.

(iii) A demonstration that the offset project meets all applicable requirements set forth in this Subpart.

(iv) The emissions baseline determination as required by the relevant provisions of section 242-10.5 of this Subpart.

(v) An explanation of how the projected reduction or avoidance of atmospheric loading of CO<sub>2</sub> or CO<sub>2</sub> equivalent or the sequestration of carbon is to be quantified, monitored, and verified as required by the relevant provisions of section 242-10.5 of this Subpart.

(vi) A completed consistency application agreement that reads as follows: "The undersigned project sponsor recognizes and accepts that the application for, and the receipt of, CO<sub>2</sub> offset allowances under the CO<sub>2</sub> Budget Trading Program is predicated on the project sponsor following all the

requirements of Subpart 242-10. The undersigned project sponsor holds the legal rights to the offset project, or has been granted the right to act on behalf of a party that holds the legal rights to the offset project. I understand that eligibility for the award of CO<sub>2</sub> offset allowances under Subpart 242-10 is contingent on meeting the requirements of Subpart 242-10. I authorize the department or its agent to audit this offset project for purposes of verifying that the offset project, including the monitoring and verification plan, has been implemented as described in this application. I understand that this right to audit shall include the right to enter the physical location of the offset project. I submit to the legal jurisdiction of New York State.”

(vii) A statement and certification report signed by the offset project sponsor certifying that all offset projects for which the sponsor has received CO<sub>2</sub> offset allowances under this Subpart (or similar provisions in the rules of other participating states), under the sponsor’s ownership or control (or under the ownership or control of any entity which controls, is controlled by, or has common control with the sponsor) are in compliance with all applicable requirements of the CO<sub>2</sub> Budget Trading Program in all participating states.

(viii) A verification report and certification statement signed by an independent verifier accredited pursuant to section 242-10.6 of this Subpart that expresses that the independent verifier has reviewed the entire application and evaluated the following in relation to the applicable requirements at sections 242-10.3 and 242-10.5 of this Subpart, and any applicable guidance issued by the department.

(‘a’) The adequacy and validity of information supplied by the project sponsor to demonstrate that the offset project meets the applicable eligibility requirements of sections 242-10.3 and 242-10.5 of this Subpart.

(‘b’) The adequacy and validity of information supplied by the project sponsor to demonstrate baseline emissions pursuant to the applicable requirements at section 242-10.5 of this Subpart.

(‘c’) The adequacy of the monitoring and verification plan submitted pursuant to the applicable requirements at section 242-10.5 of this Subpart.

(‘d’) Such other evaluations and statements as may be required by the department.

(ix) Disclosure of any voluntary or mandatory programs, other than the CO<sub>2</sub> Budget Trading Program, to which greenhouse gas emissions data related to the offset project has been, or will be reported.

(x) For offset projects located in a state or United States jurisdiction that is not a participating state, a demonstration that the project sponsor has complied with all requirements of the cooperating department in the state or United States jurisdiction where the offset project is located.

[(2) For a CO<sub>2</sub> emissions credit retirement, the consistency application must include sufficient information to demonstrate that the CO<sub>2</sub> emissions credit is eligible pursuant to subdivision 242-10.3(b) of this Part, was lawfully held by the project sponsor, and has been permanently and irrevocably retired.]

[(3)](2) Consistency applications shall be submitted in a format approved by the department.

(d) ‘Prohibition against filing consistency applications in more than one participating state’.

[(1)] Consistency applications may not be submitted to the department if a consistency application has already been submitted for the same project, or any portion of the same project, in another participating state, unless the consistency application was rejected because more of the CO<sub>2</sub> equivalent

emissions reduction or carbon sequestration due to the offset project is projected to occur in New York than in any other participating state.

[(2) Consistency applications may not be submitted to the department if a consistency application has been already submitted for the same CO<sub>2</sub> emissions credit retirement in another participating state.]

(e) 'Department action on consistency applications'.

(1) 'Completeness determination'. Within 30 days following receipt of the consistency application filed pursuant to subdivision (b) of this section, the department will notify the project sponsor whether the consistency application is complete. A complete consistency application is one that is in an approved form and is determined by the department to be complete for the purpose of commencing review of the consistency application. In no event shall a completeness determination prevent the department from requesting additional information in order to enable the department to make a consistency determination under paragraph (2) of this subdivision.

(2) 'Consistency determination'. Within 90 days of making the completeness determination under paragraph (1) of this subdivision, the department will issue a determination as to whether the offset project is consistent with the requirements of this section and section 242-10.3 of this Subpart and the requirements of the applicable offset project standard of section 242-10.5 of this Subpart. For any offset project found to lack consistency with these requirements, the department will inform the project sponsor of the offset project's deficiencies.

#### 242-10.5 CO<sub>2</sub> emissions offset project standards

(a) 'Landfill methane capture and destruction'. In order to qualify for the award of CO<sub>2</sub> offset allowances under this Subpart, offset projects that capture and destroy methane from landfills shall meet the

requirements of this subdivision and all applicable requirements of this Subpart.

(1) 'Eligibility'. Eligible offset projects shall occur at landfills that are not subject to the New Source Performance Standards (NSPS) for municipal solid waste landfills, 40 CFR part 60, Subpart Cc and Subpart WWW (see Table 1, section 200.9 of this Title).

(2) 'Offset project description'. The offset project sponsor shall provide a detailed narrative of the offset project actions to be taken, including documentation that the offset project meets the eligibility requirements of paragraph (1) of this subdivision. The project narrative shall include the following information.

(i) owner and operator of the offset project;

(ii) location and specifications of the landfill where the offset project will occur, including waste in place;

(iii) owner and operator of the landfill where the offset project will occur; and

(iv) specifications of the equipment to be installed and a technical schematic of the offset project.

(3) Emissions baseline determination. The emissions baseline shall represent the potential fugitive landfill emissions of CH<sub>4</sub> (in tons of CO<sub>2</sub>e), as represented by the CH<sub>4</sub> collected and metered for thermal destruction as part of the offset project, and calculated in accordance with this paragraph.

$$\text{Emissions (tons CO}_2\text{e)} = (\text{V} \times \text{M} \times (1-\text{OX}) \times \text{GWP})/2000$$

where:

V = Volume of CH<sub>4</sub> collected (ft<sup>3</sup>)

M = Mass of CH<sub>4</sub> per cubic foot (0.04246 lbs/ft<sup>3</sup> default value at 1 atmosphere and 20° C)

OX = Oxidation factor (0.10), representing estimated portion of collected CH<sub>4</sub> that would have eventually oxidized to CO<sub>2</sub> if not collected

GWP = CO<sub>2</sub>e global warming potential of CH<sub>4</sub> ([23]25)

(4) Calculating emissions reductions. Emissions reductions shall be determined based on potential fugitive CH<sub>4</sub> emissions that would have occurred at the landfill if metered CH<sub>4</sub> collected from the landfill for thermal destruction as part of the offset project was not collected and destroyed. CO<sub>2</sub>e emissions reductions shall be calculated as follows:

$$\text{Emissions Reductions (tons CO}_2\text{e)} = (V \times M \times (1 - \text{OX}) \times C_{\text{ef}} \times \text{GWP})/2000$$

where:

V = Volume of CH<sub>4</sub> collected (ft<sub>3</sub>)

M = Mass of CH<sub>4</sub> per cubic foot (0.04246 lbs/ft<sup>3</sup> default value at 1 atmosphere and 20° C)

OX = Oxidation factor (0.10), representing estimated portion of collected CH<sub>4</sub> that would have eventually oxidized to CO<sub>2</sub> if not collected

C<sub>ef</sub> = Combustion efficiency of methane control technology (0.98)

GWP = CO<sub>2</sub>e global warming potential of CH<sub>4</sub> ([23]25)

(5) ‘Monitoring and verification requirements’. Offset projects shall employ a landfill gas collection system that provides continuous metering and data computation of landfill gas volumetric flow rate and CH<sub>4</sub> concentration. Annual monitoring and verification reports shall include monthly volumetric flow rate

and CH<sub>4</sub> concentration data, including documentation that the CH<sub>4</sub> was actually supplied to the combustion source. Monitoring and verification is also subject to the following requirements.

(i) The project sponsor shall submit a monitoring and verification plan as part of the consistency application that includes a quality assurance and quality control program associated with equipment used to determine landfill gas volumetric flow rate and CH<sub>4</sub> composition. The monitoring and verification plan shall also include provisions for ensuring that measuring and monitoring equipment is maintained, operated, and calibrated based on manufacturer recommendations, as well as provisions for the retention of maintenance records for audit purposes. The monitoring and verification plan shall be certified by an independent verifier accredited pursuant to section 242-10.6 of this Part.

(ii) The project sponsor shall annually verify landfill gas CH<sub>4</sub> composition through landfill gas sampling and independent laboratory analysis using applicable U.S. Environmental Protection Agency laboratory test methods.

(b) 'Reduction in emissions of sulfur hexafluoride (SF<sub>6</sub>)'. In order to qualify for the award of CO<sub>2</sub> offset allowances under this Subpart, offset projects that prevent emissions of sulfur hexafluoride to the atmosphere from equipment in the electricity transmission and distribution sector, through capture and storage, recycling, or destruction, shall meet the requirements of this subdivision and all applicable requirements of this Subpart.

(1) 'Eligibility'.

(i) Eligible offset projects shall consist of incremental actions beyond those taken during the baseline year to achieve a reduction in SF<sub>6</sub> emissions relative to the baseline year. Eligible actions may include an expansion of existing actions. The identified actions to be taken shall be consistent with the guidance

provided in [International Electrotechnical Commission (IEC) TS 61634, “High-Voltage Switchgear and Controlgear-Use and Handling of Sulfur Hexafluoride (SF<sub>6</sub>) in High-Voltage Switchgear and Controlgear - Edition 1,” (IEC TS 61634) ] High-voltage switchgear and controlgear - Part 303: Use and handling of sulfur hexafluoride (SF<sub>6</sub>) (IEC/TR 62271-303 ed1.0) and Electric Power Institute (EPRI), “SF<sub>6</sub> Management for Substations” (1020014, 2010) (see Table 1, section 200.9 of this Title).

(ii) Except as provided in subparagraph (iii) of this paragraph, eligible offset projects shall have an SF<sub>6</sub> entity-wide emissions rate for the baseline year that is less than the applicable emissions rate in Table 1. The entity-wide SF<sub>6</sub> emissions rate shall be calculated as follows:

$$\text{SF}_6 \text{ Emissions Rate (\%)} = (\text{Total SF}_6 \text{ Emissions for Reporting Year}) / (\text{Total SF}_6 \text{ Nameplate Capacity at End of Reporting Year})$$

where:

‘SF<sub>6</sub> Nameplate Capacity ’ refers to all SF<sub>6</sub>-containing equipment owned and/or operated by the entity, at full and proper SF<sub>6</sub> charge of the equipment rather than the actual charge of the equipment (which may reflect leakage).

Table 1

SF<sub>6</sub> Emissions Rate Performance Standards

A. Emission Regions

<u>Region A</u>	<u>Region B</u>	<u>Region C</u>	<u>Region D</u>	<u>Region E</u>
Connecticut	Alabama	Colorado	Arkansas	Alaska
Delaware	District of Columbia	Illinois	Iowa	Arizona
Maine	Florida	Indiana	Kansas	California

Massachusetts	Georgia	Michigan	Louisiana	Hawaii
New Jersey	Kentucky	Minnesota	Missouri	Idaho
New York	Maryland	Montana	Nebraska	Nevada
New Hampshire	Mississippi	North Dakota	New Mexico	Oregon
Pennsylvania	North Carolina	Ohio	Oklahoma	Washington
Rhode Island	South Carolina	South Dakota	Texas	
Vermont	Tennessee	Utah		
	Virginia	Wisconsin		
	West Virginia	Wyoming		

#### B. Emissions Rate Performance Standards

<u>Region</u>	<u>Emission Rate<sup>a</sup></u>
Region A	9.68%
Region B	5.22%
Region C	9.68%
Region D	5.77%
Region E	3.65%
U.S. (National)	9.68%

<sup>a</sup> Based on weighted average 2004 emissions rates for U.S. EPA SF<sub>6</sub> Partnership utilities in each region. If the weighted average emissions rate in a region is higher than the national weighted average, the default performance standard is the national weighted average emissions rate.

(iii) An SF<sub>6</sub> offset project shall be eligible even if the SF<sub>6</sub> entity-wide emissions rate in the baseline year exceeds the applicable rate in subparagraph (ii) of this paragraph, provided that the project sponsor demonstrates and the department determines that the project is being implemented at a transmission and/or distribution entity serving a predominantly urban service territory and that at least two of the following factors prevent optimal management of SF<sub>6</sub>.

(‘a’) The entity is comprised of older than average installed transmission and distribution equipment in relation to the national average age of equipment.

(‘b’) A majority of the entity’s electricity load is served by equipment that is located underground, and poor accessibility of such underground equipment precludes management of SF<sub>6</sub> emissions through regular ongoing maintenance.

(‘c’) The inability to take a substantial portion of equipment out of service, as such activity would impair system reliability.

(‘d’) Required equipment purpose or design for a substantial portion of entity transmission and distribution equipment results in inherently leak-prone equipment.

(2) Offset project description. The offset project sponsor shall provide a detailed narrative of the offset project actions to be taken, including documentation that the offset project meets the eligibility requirements of paragraph (1) of this subdivision. The offset project narrative shall include the following information:

(i) description of the transmission and/or distribution entity suitable in detail to specify

the service territory served by the entity; and

(ii) owner and operator of the transmission and/or distribution entity.

(3) Emissions baseline determination. If the consistency application is filed after [June 30]January 1, 2009, baseline SF<sub>6</sub> emissions shall be determined based on annual entity-wide reporting of SF<sub>6</sub> emissions for the calendar year immediately preceding the calendar year in which the consistency application is filed (designated the baseline year). [If the consistency application is filed by June 30, 2009, the baseline year may be 2005, but no earlier.] The reporting entity shall systematically track and account for all entity-wide uses of SF<sub>6</sub> in order to determine entity-wide emissions of SF<sub>6</sub>. The scope of such tracking and accounting shall include all electric transmission and distribution assets and all SF<sub>6</sub>-containing and SF<sub>6</sub>-handling equipment owned and/or operated by the reporting entity.

(i) Emissions shall be determined based on the following mass balance method:

$$\text{SF}_6 \text{ Emissions (lbs.)} = (\text{SF}_6 \text{ Change in Inventory}) + (\text{SF}_6 \text{ Purchases and Acquisitions}) - (\text{SF}_6 \text{ Sales and Disbursements}) - (\text{Change in Total SF}_6 \text{ Nameplate Capacity of Equipment})$$

where:

‘Change in Inventory’ is the difference between the quantity of SF<sub>6</sub> gas in storage at the beginning of the reporting year and the quantity in storage at the end of the reporting year. The term “quantity in storage” includes all SF<sub>6</sub> gas contained in cylinders (such as 115-pound storage cylinders), gas carts, and other storage containers. It does not refer to SF<sub>6</sub> gas held in SF<sub>6</sub>-using operating equipment. The change in inventory will be negative if the quantity of SF<sub>6</sub> gas in storage increases over the course of the year.

‘Purchases and Acquisitions of SF<sub>6</sub>’ is the sum of all the SF<sub>6</sub> gas acquired from other parties during the reporting year, as contained in storage containers or SF<sub>6</sub>-using operating equipment.

‘Sales and disbursements of SF<sub>6</sub>’ is the sum of all the SF<sub>6</sub> gas sold or otherwise disbursed to other parties during the reporting year, as contained in storage containers and SF<sub>6</sub>-using operating equipment.

‘Change in Total SF<sub>6</sub> Nameplate Capacity of Equipment’ is the net change in the total volume of SF<sub>6</sub>-containing operating equipment during the reporting year. The net change in nameplate capacity is equal to new equipment nameplate capacity, minus retired equipment nameplate capacity. This quantity will be negative if the retired equipment has a total nameplate capacity larger than the total nameplate capacity of the new equipment. ‘Total nameplate capacity’ refers to the full and proper SF<sub>6</sub> charge of the equipment rather than to the actual charge, which may reflect leakage.

(ii) Emissions shall be calculated as follows:

$$\text{Emissions (tons CO}_2\text{e)} = [(V_{\text{iby}} - V_{\text{iey}}) + (PA_{\text{psd}} + PA_{\text{e}} + PA_{\text{rre}}) - (SD_{\text{op}} + SD_{\text{rs}} + SD_{\text{df}} + SD_{\text{sor}}) - (CNP_{\text{ne}} - CNP_{\text{rse}})] \\ \times \text{GWP}/2000$$

where (all SF<sub>6</sub> values in lbs.):

$V_{\text{iby}}$  = SF<sub>6</sub> inventory in cylinders, gas carts, and other storage containers (not SF<sub>6</sub>-containing operating equipment) at the beginning of the reporting year

$V_{\text{iey}}$  = SF<sub>6</sub> inventory in cylinders, gas carts, and other storage containers (not SF<sub>6</sub>-containing operating equipment) at the end of the reporting year

$PA_{psd}$  = SF<sub>6</sub> purchased from suppliers or distributors in cylinders

$PA_e$  = SF<sub>6</sub> provided by equipment manufacturers with or inside SF<sub>6</sub>-containing operating equipment

$PA_{re}$  = SF<sub>6</sub> returned to the reporting entity after off-site recycling

$SD_{op}$  = Sales of SF<sub>6</sub> to other parties, including gas left in SF<sub>6</sub>-containing operating equipment that is sold

$SD_{rs}$  = Returns of SF<sub>6</sub> to supplier (producer or distributor)

$SD_{df}$  = SF<sub>6</sub> sent to destruction facilities

$SD_{sor}$  = SF<sub>6</sub> sent off-site for recycling

$CNP_{ne}$  = Total SF<sub>6</sub> nameplate capacity of new SF<sub>6</sub>-containing operating equipment at proper full charge

$CNP_{rse}$  = Total SF<sub>6</sub> nameplate capacity of retired or sold SF<sub>6</sub>-containing operating equipment at proper full charge

$GWP$  = CO<sub>2e</sub> global warming potential of SF<sub>6</sub> (22,[200]800)

(iii) As part of the consistency application required pursuant to section 242-10.4(b) and (c) of this Subpart and in annual monitoring and verification reports required pursuant to section 242-10.7(b) and (c) of this Subpart, the project sponsor shall provide the documentation required at Subparagraphs (5)(i) through (iii) of this subdivision to support emissions calculations.

(4) Calculating emissions reductions. Emissions reductions shall represent the annual entity-wide emissions reductions of SF<sub>6</sub> for the reporting entity, relative to emissions in the baseline year. Emissions reductions shall be determined as follows, using the quantification method outlined in subparagraph (3)(ii) of this subdivision to determine emissions in both the baseline year and reporting year(s):

Emissions Reduction (tons CO<sub>2e</sub>) = (Total Pounds of SF<sub>6</sub> Emissions in Baseline Reporting Year) – (Total

Pounds of SF<sub>6</sub> Emissions in Reporting Year) x GWP/2000

where:

GWP = CO<sub>2</sub>e global warming potential of SF<sub>6</sub> (22,[200]800)

Existing paragraph 242-10.5(b)(5) through clause 242-10.5(c)(3)(vii)(b) remains unchanged.

Existing subparagraph 242-10.5(c)(3)(viii) is revised as follows:

(viii) Direct measurement procedures shall be consistent with current forestry good practice and the guidance contained in U.S. Department of Energy, Technical Guidelines Voluntary Reporting of Greenhouse Gases (1605(b)) Program; Chapter 1, Emissions Inventories; Part 1 Appendix: Forestry; section 3: Measurement Protocols for Forest Carbon Sequestration (March 2006) (see Table 1, section 200.9 of this Title).

Existing paragraph 242-10.5(c)(4) through clause 242-10.5(d)(1)(i)(g) remains unchanged.

Existing subparagraph 242-10.5(d)(1)(ii) through the remainder of subpart 242-10.5 is revised as follows:

(ii) Performance standards.

(‘a’) ‘All end-use energy efficiency offset projects’. All offset projects under this subdivision shall meet the applicable performance criteria set forth in this clause.

(‘1’) Installation best practice. Any combustion equipment and related air handling equipment (HVAC systems) installed as part of an offset project shall be sized and installed in accordance with the applicable requirements and specifications outlined in this subclause.

(‘i’) Commercial HVAC systems shall meet the applicable sizing and installation requirements of ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition)-2010 [-2004]: Energy Standard for Buildings Except Low-Rise Residential Buildings and ANSI/ASHRAE Standard [62.1-2004] 62.2-2010: Ventilation for Acceptable Indoor Air Quality (see Table 1, section 200.9 of this Title).

(‘ii’) Residential HVAC systems shall meet the applicable sizing specifications of Air Conditioner Contractors of America (ACCA) Manual J: Residential Load Calculation (Eighth Edition-Full), and the applicable installation specifications of ANSI/ACCA 5 QI - 2007 “HVAC Quality Installation Specification,” [Air Conditioner Contractors of America] (see Table 1, section 200.9 of this Title).

(‘2’) ‘ Whole-building energy performance ’. Eligible new buildings or whole-building retrofits that are part of an offset project shall meet the requirements of this subclause.

(‘i’) Commercial buildings shall exceed the energy performance requirements of ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition)-2010 [-2004]: Energy Standard for Buildings Except Low-Rise Residential Buildings (see Table 1, section 200.9 of this Title) by 30 percent, with the exception of multi-family residential buildings classified as commercial by ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition)-2010 [-2004] (see Table 1, section 200.9 of this Title), which shall exceed these energy performance requirements by 20 percent.

(‘ii’) Residential buildings shall exceed the energy performance requirements of the [2004]2012 International Energy Conservation Code Supplement (see Table 1, section 200.9 of this Title) by 30 percent.

[(b) ‘Offset projects commenced before January 1, 2009 ’. Energy conservation measures implemented as part of an offset project commenced before January 1, 2009 shall meet the performance and prescriptive criteria set forth in this clause.

(1) ‘Combustion equipment’. Combustion equipment installed as part of an offset project commenced before January 1, 2009 shall meet the energy efficiency performance standards contained in this subclause.

(i) ‘Commercial boilers’. Commercial boilers shall meet or exceed the energy efficiency criteria in Table 1 below.

<u>Table 1</u>			
Minimum Commercial Boiler Energy Efficiency			
<u>Technology</u>	<u>Size (Btu/hr)</u>	<u>Rating Method</u>	<u>Minimum Efficiency</u>
Gas-fired <sup>a</sup>	125,000-300,000	AFUE	≥ 88.0%
	300,000-12,500,000	Thermal Efficiency <sup>b</sup>	≥ 90.0%
Oil-fired	>300,000	Thermal Efficiency	≥ 8.0%

<sup>a</sup> Gas-fired boilers shall be installed with controls that allow the boiler to operate in condensing mode and installed with vents designed for positive vent static pressure and vent gas temperature that leads to condensate production in the vent.

<sup>b</sup> Thermal Efficiency is defined as useful energy output (Btu) divided by energy input (Btu), and

presented as a percentage. This shall be measured under steady state conditions, at full rated useful thermal output, 140°F supply from, and 120°F return water temperature to, the boiler.

(ii) ‘ Residential combustion equipment ’. Residential combustion equipment, including furnaces, boilers, and water heaters, shall meet or exceed the energy efficiency criteria in Table 2 below.

<u>Table 2</u>		
Minimum Residential Combustion Equipment <sup>a</sup> Energy Efficiency		
<u>Technology</u>	<u>Rating Method</u>	<u>Minimum Efficiency</u>
Gas-fired furnace	AFUE	≥94%
Oil-fired furnace	AFUE	≥92%
Gas/oil-fired boiler	AFUE	≥90%
Gas/oil-fired water heater	Energy Factor	≥0.62

<sup>a</sup>For furnaces, defined as equipment with a heat input rate of less than 225,000 Btu/hr; for boilers, defined as equipment with a heat input rate of less than 300,000 Btu/hr; for water heaters, defined as equipment subject to 10 CFR 430.

(2) ‘ Other energy conservation measures ’. All other energy conservation measures implemented as part of an offset project shall meet the prescriptive requirements, as applicable, in Energy Benchmark for High Performance Buildings, Version 1.1, New Buildings Institute, 2005 (herein referred to as EBHPB), or state building energy codes, whichever result in better energy performance. Energy

conservation measures without specified performance criteria in the referenced EBHPB shall meet the requirements of Federal Energy Management Program (FEMP) Product Energy Efficiency Recommendations, issued pursuant to Executive Orders 13123 and 13221, ENERGY STAR® - qualified and FEMP-designated Products, Energy-Efficient Products - How to Buy Products with Low Standby Power, and the following FEMP products: Fluorescent Lamps and Ballasts, Fluorescent Luminaires, Downlight Luminaires, Industrial Luminaires, Air-Cooled Electric Chillers, Water-Cooled Electric Chiller, Air-Source and Water-Source Heat Pumps, Ground-Source Heat Pumps, Commercial Boilers, Electric Motors, Gas Griddles, Ice Machines, Electric Water Heaters, Gas Water Heaters, Faucets, Showerheads, Urinals (See Table 1, section 200.9 of this Title) or Energy Star criteria issued jointly by the U.S. Environmental Protection Agency and U.S. Department of Energy for Battery Charging Systems, Clothes Washers, Dishwashers, Refrigerators and Freezers - Residential, Commercial Solid Door Refrigerators and Freezers, Room Air Conditioners, Dehumidifiers, Cordless Phones, Combination Units, TVs, and VCRs, Digital-to-Analog Converter Boxes, DVD products and Home Audio, External Power Adaptors, Boilers, Ceiling Fans, Central Air Conditioners and Air-Source Heat Pumps, Furnaces, Geothermal Heat Pumps, Light Commercial Heating and Cooling, Programmable Thermostats, Ventilating Fans, Compact Fluorescent Bulbs, Exit Signs, Residential Light Fixtures, Traffic Signals, Computers, Imaging Equipment: Copiers, Fax Machines, Mailing Machines, Monitors, Commercial Fryers, Commercial Hot Food Holding Cabinets, Commercial and Industrial Transformers, Commercial Steam Cookers, Roof Products, Room Air Cleaners, Vending Machines, Water Coolers, Windows, Doors and Skylights (See Table 1, section 200.9 of this Title), whichever result in better energy performance.]

[(c)](b') Maximum market penetration rate for offset projects commenced on or after January 1, 2009. For offset projects initiated on or after January 1, 2009, the project sponsor shall demonstrate, to the satisfaction of the department, that the energy conservation measures implemented as part of the offset project have a market penetration rate of less than five percent.

(2) Offset project description. The offset project sponsor shall provide a detailed narrative of the offset project actions to be taken, including documentation that the offset project meets the eligibility requirements of paragraph (1) of this subdivision. The offset project narrative shall include the following information:

(i) location and specifications of the building(s) where the offset project actions will occur;

(ii) owner and operator of the building(s);

(iii) the parties implementing the offset project, including lead contractor(s), subcontractors, and consulting firms;

(iv) specifications of equipment and materials to be installed as part of the offset project; and

(v) building plans and offset project technical schematics, as applicable.

(3) Emissions baseline determination. The emissions baseline shall be determined in accordance with the requirements of this paragraph, based on energy usage (MMBtu) by fuel type for each energy conservation measure, derived using historic fuel use data from the most recent calendar year for which data is available, and multiplied by an emissions factor and oxidation factor for each respective fuel in Table [3]2 below.

<u>Table [3]2</u>		
Emissions and Oxidation Factors		
<u>Fuel</u>	<u>Emissions Factor</u> ( <u>lbs. CO<sub>2</sub>/MMBtu</u> )	<u>Oxidation Factor</u>
Natural Gas	116.98	0.995
Propane	139.04	0.995
Distillate Fuel Oil	161.27	0.99

(i) Isolation of applicable energy conservation measure baseline. The baseline energy usage of the application to be targeted by the energy conservation measure shall be isolated in a manner consistent with the guidance at paragraph (5) of this subdivision.

(ii) Annual baseline energy usage shall be determined as follows:

$$\text{Energy Usage (MMBtu)} = \text{BEU}_{\text{AECM}} \times A$$

where:

$\text{BEU}_{\text{AECM}}$  = Annual pre-installation baseline energy use by fuel type (MMBtu) attributable to the application(s) to be targeted by the energy conservation measure(s). If applicable building codes or equipment standards require that equipment or materials installed as part of the offset project meet certain minimum energy performance requirements, baseline energy usage for the application shall assume that equipment or materials are installed that meet such minimum requirements. For offset projects that replace existing combustion equipment, the assumed minimum energy performance required by applicable building codes or equipment standards shall be that which applies to new equipment that uses the same fuel type as the equipment being replaced. Baseline energy usage shall be determined in accordance with the applicable requirements at paragraph (5) of this subdivision.

A = Adjustments to account for differing conditions during the two time periods (pre-installation and post-installation), such as weather, building occupancy, and changes in building use or function. Adjustments shall be determined in accordance with the applicable requirements at paragraph (5) of this subdivision.

(iii) Annual baseline emissions shall be determined as follows:

$$\text{Emissions (lbs. CO}_2\text{)} = \sum_{i=1}^n \text{BEU}_i \times \text{EF}_i \times \text{OF}_i$$

where:

$\text{BEU}_i$  = Annual baseline energy usage for fuel type  $i$  (MMBtu) demonstrated pursuant to the requirements at Subparagraphs (5)(i) through (iv) of this subdivision.

$\text{EF}_i$  = Emissions factor (lbs.  $\text{CO}_2$ /MMBtu) for fuel type  $i$  listed at paragraph (3), Table [3](2) of this subdivision.

$\text{OF}_i$  = Oxidation factor for fuel type  $i$  listed at paragraph (3), Table [3](2) of this subdivision.

(4) Calculating emissions reductions. Emissions reductions shall be determined based upon annual energy savings by fuel type (MMBtu) for each energy conservation measure, multiplied by the emissions factor and oxidation factor for the respective fuel type at paragraph (3), Table [3](2) of this subdivision.

(i) Annual energy savings shall be determined as follows:

$$\text{Energy Savings (MMBtu)} = (\text{BEU}_{\text{AECM}} \times A) - (\text{PIEU}_{\text{ECM}} \times A)$$

where:

$\text{BEU}_{\text{AECM}}$  = Annual pre-installation baseline energy use by fuel type (MMBtu) calculated pursuant to Subparagraphs (5)(i) through (iv) of this subdivision.

$\text{PIEU}_{\text{ECM}}$  = Annual post-installation energy use by fuel type (MMBtu) attributable to the energy conservation measure. Post-installation energy usage shall be determined in accordance with the applicable requirements at Subparagraphs (5)(i) through (iv) of this subdivision.

A = Adjustments to account for any differing conditions during the two time periods (pre-installation and post-installation), such as weather, building occupancy, and changes in building use or function. Adjustments shall be determined in accordance with the applicable requirements at paragraph (5) of this subdivision.

(ii) Annual emissions reductions shall be determined as follows:

$$\text{Emissions Reduction (lbs. CO}_2\text{)} = \sum_{i=1}^n \text{ES}_i \times \text{EF}_i \times \text{OF}_i$$

where:

$\text{ES}_i$  = Energy savings for fuel type  $i$  (MMBtu) demonstrated pursuant to the requirements at paragraph (5) of this subdivision.

$EF_i$  = Emissions factor (lbs. CO<sub>2</sub>/MMBtu) for fuel type i listed at paragraph (3), Table [3](2) of this subdivision.

$OF_i$  = Oxidation factor for fuel type i listed at paragraph (3), Table [3](2) of this subdivision.

(5) Monitoring and verification requirements. As part of the consistency application, the project sponsor shall provide a monitoring and verification plan certified by an independent verifier accredited pursuant to section 242-10.6 of this Subpart. Annual monitoring and verification reports shall be certified by an independent verifier accredited pursuant to section 242-10.6 of this Subpart. Independent verifiers must conduct a site audit when reviewing the first monitoring and verification report submitted by the project sponsor, except for offset projects that save less than 1,500 MMBtu per year. For offset projects that save less than 1,500 MMBtu per year, the project sponsor must provide the independent verifier with equipment specifications and copies of equipment invoices and other relevant offset project-related invoices. All offset project documentation, including the consistency application and monitoring and verification reports, shall be signed by a Professional Engineer, identified by license number. Monitoring and verification shall also meet the following requirements.

(i) General energy measurement and verification requirements. Monitoring and verification of energy usage shall be demonstrated through a documented process consistent with the following protocols and procedures, as applicable.

(‘a’) For existing commercial buildings, determination of baseline energy usage shall be consistent with the ‘International Performance Measurement & Verification Protocol, Volume I: Concepts and Options for Determining Energy and Water Savings (IPMVP)’, “Option B. Retrofit Isolation” and “Option D. Calibrated Simulation.” (see Table 1, section 200.9 of this Title) If a building project involves

only energy conservation measures implemented as part of a CO<sub>2</sub> emissions offset project, a process consistent with IPMVP “Option C. Whole Facility” may be used, as applicable. Application of the IPMVP general guidance shall be consistent with the applicable detailed specifications in ‘ASHRAE Guideline 14-2002, Measurement of Energy and Demand Savings’ (see Table 1, section 200.9 of this Title).

(‘b’) For new commercial buildings, determination of baseline energy usage shall be consistent with the International Performance Measurement & Verification Protocol, Volume III: Concepts and Options for Determining Energy Savings in New Construction (IPMVP), “Option D. Calibrated Simulation.” (see Table 1, section 200.9 of this Title) Application of the IPMVP general guidance shall be consistent with the applicable detailed specifications in ASHRAE Guideline 14-2002, Measurement of Energy and Demand Savings (see Table 1, section 200.9 of this Title).

(‘c’) For existing and new residential buildings, determination of baseline energy usage shall be consistent with the requirements of the RESNET National Energy Rating Technical Standards and National Home Energy Rating Technical Guidelines, [2006]2013 (Chapter 3 and Appendix A of [2006]2013 Mortgage Industry National Home Energy Rating System Standards) (see Table 1, section 200.9 of this Title).

(ii) ‘ Isolation of applicable energy conservation measure ’. In calculating both baseline energy usage and energy savings, the applicant shall isolate the impact of each eligible energy conservation measure (ECM), either through direct metering or energy simulation modeling. For offset projects with multiple ECMs, and where individual ECMs can affect the performance of others, the sum of energy savings due to individual ECMs shall be adjusted to account for the interaction of ECMs. For commercial buildings, this process shall be consistent with the requirements of ASHRAE Guideline 14-2002, Measurement of Energy and

Demand Savings, and ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition) -2010 [2004]: Energy Standard for Buildings Except Low-Rise Residential Buildings (see Table 1, section 200.9 of this Title). For residential buildings, this process shall be consistent with the requirements of the RESNET National Energy Rating Technical Standards and National Home Energy Rating Technical Guidelines, [2006] 2013 (Chapter 3 and Appendix A of [2006]2013 Mortgage Industry National Home Energy Rating System Standards) (see Table 1, section 200.9 of this Title).

(‘a’) Reductions in energy usage due to the energy conservation measure shall be based upon actual energy usage data. Energy simulation modeling shall only be used to determine the relative percentage contribution to total fuel usage (for each respective fuel type) of the application targeted by the energy conservation measure.

(iii) Calculation of energy savings. Annual energy savings are to be determined based on the following:

$$\text{Energy Savings (MMBtu)} = (\text{BEU}_{\text{AECM}} \times A) - (\text{PIEU}_{\text{ECM}} \times A)$$

where:

$\text{BEU}_{\text{AECM}}$  = Annual pre-installation baseline energy use by fuel type (MMBtu) attributable to the application(s) to be targeted by the energy conservation measure(s), based upon annual fuel usage data for the most recent calendar year for which data is available. For new buildings, baseline energy use for a reference building equivalent in basic configuration, orientation, and location to the building in which the eligible energy conservation measure(s) is implemented shall be determined according to ASHRAE Guideline 14-2002, Measurement of Energy and Demand Savings and ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition) - 2010[2004], section 11 and Appendix G (see Table 1, section 200.9 of this Title). Where energy simulation modeling

is used to evaluate an existing building, modeling shall be conducted in accordance with ASHRAE Guideline 14-2002, Measurement of Energy and Demand Savings, and ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition) - 2010[-2004], section 11 and Appendix G (see Table 1, section 200.9 of this Title). For existing and new residential buildings, energy simulation modeling shall be conducted in accordance with the requirements of the RESNET National Energy Rating Technical Standards and National Home Energy Rating Technical Guidelines, [2006]2013 (Chapter 3 and Appendix A of [2006]2013 Mortgage Industry National Home Energy Rating System Standards) (see Table 1, section 200.9 of this Title).

$PIEU_{ECM}$  = Annual post-installation energy use by fuel type (MMBtu) attributable to the energy conservation measure, to be verified based on annual energy usage after installation of the energy conservation measure(s), consistent with the requirements of ASHRAE Guideline 14-2002, Measurement of Energy and Demand Savings. Where energy simulation modeling is used to evaluate a new or existing building, modeling shall be conducted in accordance with ASHRAE Guideline 14-2002, Measurement of Energy and Demand Savings, and ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition)[-2004], section 11 and Appendix G (see Table 1, section 200.9 of this Title). For existing and new residential buildings, energy simulation modeling shall be consistent with the requirements of the RESNET National Energy Rating Technical Standards and National Home Energy Rating Technical Guidelines, [2006] 2013 (Chapter 3 and Appendix A of [2006]2013 Mortgage Industry National Home Energy Rating System Standards) (see Table 1, section 200.9 of this Title).

A = Adjustments to account for any differing conditions during the two time periods (pre-installation and post-installation), such as weather (weather normalized energy usage based on heating and cooling degree days), building occupancy, and changes in building use or function. For commercial buildings, adjustments shall be consistent with the specifications of ASHRAE Guideline 14-2002, Measurement of Energy and Demand Savings, and ANSI/ASHRAE/IESNA Standard 90.1 (SI Edition) - 2010[-2004], section 11 and Appendix G

(see Table 1, section 200.9 of this Title). For residential buildings, adjustments shall be consistent with the specifications of the RESNET National Energy Rating Technical Standards and National Home Energy Rating Technical Guidelines, [2006] 2013 (Chapter 3 and Appendix A of [2006]2013 Mortgage Industry National Home Energy Rating System Standards) (see Table 1, section 200.9 of this Title).

(iv) 'Provision for sampling of multiple like offset projects in residential buildings'.

Offset projects that implement similar measures in multiple residential buildings may employ representative sampling of buildings to determine aggregate baseline energy usage and energy savings. Sampling protocols shall employ sound statistical methods such that there is 95 percent confidence that the reported value is within 10 percent of the true mean. Any sampling plan shall be certified by an independent verifier, accredited pursuant to section 242-10.6 of this Subpart.

(e) Avoided methane emissions from agricultural manure management operations. To Qualify for the award of CO<sub>2</sub> offset allowances under this Subpart, offset projects that capture and destroy methane from animal manure and organic food waste using anaerobic digesters shall meet the requirements of this subdivision and all applicable requirements of this Subpart.

(1) 'Eligibility'.

(i) Eligible offset projects shall consist of the destruction of that portion of methane generated by an anaerobic digester that would have been generated in the absence of the offset project through the uncontrolled anaerobic storage of manure or organic food waste.

(ii) Eligible offset projects shall employ only manure-based anaerobic digester systems using livestock manure as the majority of digester feedstock, defined as more than 50 percent of the mass input

into the digester on an annual basis. Organic food waste used by an anaerobic digester shall only be that which would have been stored in anaerobic conditions in the absence of the offset project.

(iii) The provisions of section 242-10.3[(d)](c)(2) and (3) of this Subpart shall not apply to agricultural manure management offset projects provided either of the following requirements are met.

(‘a’) The offset project is located in a state that has a market penetration rate for anaerobic digester projects of five percent or less. The market penetration determination shall utilize the most recent market data available at the time of submission of the consistency application pursuant to section 242-10.4 of this Subpart and shall be determined as follows:

$$MP (\%) = MG_{AD} / MG_{STATE}$$

where:

$MG_{AD}$  = Average annual manure generation for the number of dairy cows and swine serving all anaerobic digester projects in the applicable state at the time of submission of a consistency application pursuant to section 242-10.4 of this Subpart.

$MG_{STATE}$  = average annual manure production of all dairy cows and swine in the state at the time of submission of a consistency application pursuant to section 242-10.4 of this Subpart.

(‘b’) The offset project is located at a farm with 4,000 or less head of dairy cows, or a farm with equivalent animal units, assuming an average live weight for dairy cows (lbs/cow) of 1,400 lbs.,

or, if the project is a regional-type digester, total annual manure input to the digester is designed to be less than the average annual manure produced by a farm with 4,000 or less head of dairy cows, or a farm with equivalent animal units, assuming an average live weight for dairy cows (lbs/cow) of 1,400 lbs.

(2) Offset project description. The offset project sponsor shall provide a detailed narrative of the offset project actions to be taken, including documentation that the offset project meets the eligibility requirements of paragraph (1) of this subdivision. The offset project narrative shall include the following information:

(i) owner and operator of the offset project;

(ii) location and specifications of the facility where the offset project will occur;

(iii) owner and operator of the facility where the offset project will occur;

(iv) specifications of the equipment to be installed and a technical schematic of the offset project; and

(v) location and specifications of the facilities from which anaerobic digester influent will be received, if different from the facility where the offset project will occur.

(3) Emissions baseline determination. The emissions baseline shall represent the potential emissions of the CH<sub>4</sub> that would have been produced in a baseline scenario under uncontrolled anaerobic storage conditions and released directly to the atmosphere in the absence of the offset project.

(i) Baseline CH<sub>4</sub> emissions shall be calculated as follows:

$$\text{CO}_2\text{e (tons)} = (\text{V}_m \times \text{M}) / 2000 \times \text{GWP}$$

where:

CO<sub>2</sub>e = Potential CO<sub>2</sub>e emissions due to calculated CH<sub>4</sub> production under site-specific anaerobic storage and weather conditions

V<sub>m</sub> = Volume of CH<sub>4</sub> produced each month from degradation of volatile solids in a baseline uncontrolled anaerobic storage scenario under site-specific storage and weather conditions for the facility at which the manure or organic food waste is generated (ft<sup>3</sup>)

M = Mass of CH<sub>4</sub> per cubic foot (0.04246 lb/ft<sup>3</sup> default value at one atmosphere and 20°C)

GWP = Global warming potential of CH<sub>4</sub> ([23]25)

(ii) The estimated amount of volatile solids degraded each month under the uncontrolled anaerobic storage baseline scenario (kg) shall be calculated as follows:

$$\text{VS}_{\text{deg}} = \text{VS}_{\text{avail}} \times f$$

where:

VS = volatile solids as determined from the equation:

$$\text{VS} = \text{M}_m \times \text{TS}\% \times \text{VS}\%$$

where:

$M_m$  = mass of manure or organic food waste produced per month (kg)

$TS_{\%}$  = concentration (percent) of total solids in manure or organic food waste as determined through EPA 160.3 testing method (U.S.EPA Method Number 160.3, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020)) (see Table 1, section 200.9 of this Title)

$VS_{\%}$  = concentration (percent) of volatile solids in total solids as determined through EPA 160.4 testing method (U.S.EPA Method Number 160.4, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020)) (see Table 1, section 200.9 of this Title)

$VS_{avail}$  = volatile solids available for degradation in manure or organic food waste storage each month as determined from the equation:

$$VS_{avail} = VS_p + \frac{1}{2} VS_{in} - VS_{out}$$

where:

$VS_p$  = volatile solids present in manure or organic food waste storage at beginning of month (left over from previous month) (kg)

$VS_{in}$  = volatile solids added to manure or organic food waste storage during the course of the month (kg). The factor of  $\frac{1}{2}$  is multiplied by this number to represent the average mass of volatile solids available for degradation for the entire duration of the month.

$VS_{out}$  = volatile solids removed from the manure or organic food waste storage for land application or export (assumed value based on standard farm practice)

$f$  = van 't Hoff-Arrhenius factor for the specific month as determined using the equation below. Using a base temperature of 30° C, the equation is as follows:

$$f = \exp\{[E(T_2 - T_1)] / [(GC \times T_1 \times T_2)]\}$$

where:

$f$  = conversion efficiency of VS to CH<sub>4</sub> per month

$E$  = activation energy constant (15,175 cal/mol)

$T_2$  = average monthly ambient temperature for facility where manure or organic food waste is generated (converted from ° Celsius to ° Kelvin) as determined from the nearest National Weather Service certified weather station (if reported temperature °C > 5° C; if reported temperature °C < 5° C, then  $F = 0.104$ )

$T_1 = 303.16$  (30° C converted to °K)

$GC$  = ideal gas constant (1.987 cal/K mol)

(iii) The volume of CH<sub>4</sub> produced (ft<sup>3</sup>) from degradation of volatile solids shall be calculated as follows:

$$V_m = (VS_{deg} \times B_o) \times 35.3147$$

where:

$V_m$  = volume of CH<sub>4</sub> (ft<sup>3</sup>)

$VS_{deg}$  = volatile solids degraded (kg)

$B_o$  = manure or organic food waste type-specific maximum methane generation constant (m<sup>3</sup> CH<sub>4</sub>/kg VS degraded). For dairy cow manure,  $B_o = 0.24$  m<sup>3</sup> CH<sub>4</sub>/kg VS degraded. The methane generation constant for

other types of manure shall be those cited at U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-[2005]2010, Annex 3, Table A-[162]191 (U.S. EPA, April 15, [2007]2012) (see Table 1, section 200.9 of this Title), unless the project sponsor proposes an alternate methane generation constant. If the project sponsor proposes to use a methane generation constant other than the ones found in the above-cited reference, the project sponsor must provide justification and documentation to the department.

(4) Calculating emissions reductions. Emissions reductions shall be determined based on the potential emissions (in tons of CO<sub>2</sub>e) of the CH<sub>4</sub> that would have been produced in the absence of the offset project under a baseline scenario that represents uncontrolled anaerobic storage conditions, as calculated pursuant to subparagraphs (3)(i) through (iii) of this subdivision, and released directly to the atmosphere. Emissions reductions may not exceed the potential emissions of the anaerobic digester, as represented by the annual volume of CH<sub>4</sub> produced by the anaerobic digester, as monitored pursuant to paragraph (5) of this subdivision. If the project is a regional-type digester, CO<sub>2</sub> emissions due to transportation of manure and organic food waste from the site where the manure and organic food waste was generated to the anaerobic digester shall be subtracted from the emissions reduction calculated pursuant to subparagraphs (3)(i) through (iii) of this subdivision. Transport CO<sub>2</sub> emissions shall be determined through one of the following methods.

(i) Documentation of transport fuel use for all shipments of manure and organic food waste from off-site to the anaerobic digester during each reporting year and a log of transport miles for each shipment. CO<sub>2</sub> emissions shall be determined through the application of an emissions factor for the fuel type used. If this option is chosen, the following emissions factors shall be applied as appropriate.

(‘a’) Diesel fuel: 22.912 lbs. CO<sub>2</sub>/gallon.

(‘b’) Gasoline: 19.878 lbs. CO<sub>2</sub>/gallon.

(‘c’) Other fuel: submitted emissions factor approved by the department.

(ii) Documentation of total tons of manure and organic food waste transported from off-site for input into the anaerobic digester during each reporting year, as monitored pursuant to subparagraph (5)(i) of this subdivision, and a log of transport miles and fuel type used for each shipment. CO<sub>2</sub> emissions shall be determined through the application of a ton-mile transport emission factor for the fuel type used. If this option is chosen, the following emissions factors shall be applied as appropriate for each ton of manure delivered, and multiplied by the number of miles transported.

(‘a’) Diesel fuel: 0.131 lbs. CO<sub>2</sub> per ton-mile.

(‘b’) Gasoline: 0.133 lbs. CO<sub>2</sub> per ton-mile.

(‘c’) Other fuel: submitted emissions factor approved by the department.

(5) Monitoring and verification requirements. Offset projects shall employ a system that provides metering of biogas volumetric flow rate and determination of CH<sub>4</sub> concentration. Annual monitoring and verification reports shall include monthly biogas volumetric flow rate and CH<sub>4</sub> concentration determination. Monitoring and verification shall also meet the following requirements.

(i) If the offset project is a regional-type digester, manure and organic food waste from each distinct source supplying to the anaerobic digester shall be sampled monthly to determine the amount of

volatile solids present. Any emissions reduction will be calculated according to mass of manure and organic food waste (kg) being digested and percentage of volatile solids present before digestion, consistent with the requirements at paragraph (3) of this subdivision and subparagraph (iii) of this paragraph, and apportioned accordingly among sources. The project sponsor shall provide supporting material and receipts tracking the monthly receipt of manure and organic food waste (kg) used to supply the anaerobic digester from each supplier.

(ii) If the offset project includes the digestion of organic food waste eligible pursuant to subparagraph (1)(ii) of this subdivision, organic food waste shall be sampled monthly to determine the amount of volatile solids present before digestion, consistent with the requirements at paragraph (3) of this subdivision and subparagraph (iii) of this paragraph, and apportioned accordingly.

(iii) The project sponsor shall submit a monitoring and verification plan as part of the consistency application that includes a quality assurance and quality control program associated with equipment used to determine biogas volumetric flow rate and CH<sub>4</sub> composition. The monitoring and verification plan shall be specified in accordance with the applicable monitoring requirements listed in Table [1] below. The monitoring and verification plan shall also include provisions for ensuring that measuring and monitoring equipment is maintained, operated, and calibrated based on manufacturer's recommendations, as well as provisions for the retention of maintenance records for audit purposes. The monitoring and verification plan shall be certified by an independent verifier accredited pursuant to section 242-10.6 of this Subpart.

Table [1]

Input Monitoring Requirements

Input Parameter	Measurement Unit	Frequency of Sampling	Sampling Method(s)
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Influent flow (mass) into the digester	Kilograms (kg) per month (wet weight)	Monthly total into the digester	<p>a) Recorded weight</p> <p>b) Digester influent pump flow</p> <p>c) Livestock population and application of American Society of Agricultural and Biological Engineers (ASABE) standard (ASAE D384.2, March 2005) <u>(see Table 1, section 200.9 of this Title)</u></p>
Influent total solids concentration (TS)	Percent (of sample)	Monthly, depending upon recorded variations	<p>U.S. EPA Method Number 160.3, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020) <u>(see Table 1, section 200.9 of this Title)</u></p>

Influent volatile solids (VS) concentration	Percent (of TS)	Monthly, depending upon recorded variations	USEPA Method Number 160.4, Methods for the Chemical Analysis of Water and Wastes (MCAWW) (EPA/600/4-79/020) ( <u>see Table 1, section 200.9 of this Title</u> )
Average monthly ambient temperature	Temperature °C	Monthly (based on farm averages)	Closest National Weather Service-certified weather station

(iv) The project sponsor shall verify biogas CH<sub>4</sub> composition quarterly through gas sampling and third party laboratory analysis using applicable U.S. EPA test methods.

#### 242-10.6 Accreditation of independent verifiers

(a) 'Standards for accreditation'. Independent verifiers may be accredited by the department to provide verification services as required of project sponsors under this Subpart, provided that independent verifiers meet all of the requirements of this section.

(1) Verifier minimum requirements. Each accredited independent verifier shall demonstrate knowledge of the following topics:

(i) utilizing engineering principles;

(ii) quantifying greenhouse gas emissions;

(iii) developing and evaluating air emissions inventories:

(iv) auditing and accounting principles;

(v) information management systems;

(vi) the requirements of this Subpart and other applicable requirements of this Part; and

(vii) such other qualifications as may be required by the department to provide competent verification services as required for individual offset categories specified at section 242-10.5 of this Subpart.

(2) Organizational qualifications. Accredited independent verifiers shall demonstrate that they meet the following requirements:

(i) verifiers shall have no direct or indirect financial relationship, beyond a contract for provision of verification services, with any offset project developer or project sponsor;

(ii) verifiers shall employ staff with professional licenses, knowledge, and experience appropriate to the specific category(ies) of offset projects at section 242-10.5 of this Subpart that they seek to verify;

(iii) verifiers shall hold a minimum of one million U.S. dollars of professional liability insurance. If the insurance is in the name of a related entity, the verifier shall disclose the financial relationship

between the verifier and the related entity, and provide documentation supporting the description of the relationship; and

(iv) verifiers shall demonstrate that they have implemented an adequate management protocol to identify potential conflicts of interest with regard to an offset project, offset project developer, or project sponsor, or any other party with a direct or indirect financial interest in an offset project that is seeking or has been granted approval of a consistency application pursuant to section 242-10.4(e) of this Subpart, and remedy any such conflicts of interest prior to providing verification services.

(3) Pre-qualification of verifiers. The department may require prospective verifiers to successfully complete a training course, workshop, or test developed by the department or its agent, prior to submitting an application for accreditation.

(b) ' Application for accreditation '. An application for accreditation shall not contain any proprietary information, and shall include the following:

(1) the applicant 's name, address, e-mail address, and telephone number [, and facsimile transmission number];

(2) documentation that the applicant has at least two years of experience in each of the knowledge areas specified at subparagraphs (a)(1)(i) through (v) of this section, and as may be required pursuant to subparagraph (a)(1)(vii) of this section;

(3) documentation that the applicant has successfully completed the requirements at paragraph

(a)(3) of this section, as applicable;

(4) a sample of at least one work product that provides supporting evidence that the applicant meets the requirements at paragraphs (a)(1) and (2) of this section. The work product shall have been produced, in whole or part, by the applicant and shall consist of a final report or other material provided to a client under contract in previous work. For a work product that was jointly produced by the applicant and another entity, the role of the applicant in the work product shall be clearly explained;

(5) documentation that the applicant holds professional liability insurance as required pursuant to subparagraph (a)(2)(iii) of this section.

(6) documentation that the applicant has implemented an adequate management protocol to address and remedy any conflict of interest issues that may arise, as required pursuant to subparagraph (a)(2)(iv) of this section.

(c) ' Department action on applications for accreditation '. The department shall approve or deny a complete application for accreditation within 45 days after submission. Upon approval of an application for accreditation, the independent verifier shall be accredited for a period of three years from the date of application approval.

(d) ' Reciprocity'. Independent verifiers accredited in other participating states may be deemed to be accredited in New York State, at the discretion of the department.

(e) 'Conduct of accredited verifiers'.

(1) Prior to engaging in verification services for an offset project sponsor, the accredited verifier shall disclose all relevant information to the department to allow for an evaluation of potential conflict of interest with respect to an offset project, offset project developer, or project sponsor. The accredited verifier shall disclose information concerning its ownership, past and current clients, related entities, as well as any other facts or circumstances that have the potential to create a conflict of interest.

(2) Accredited verifiers shall have an ongoing obligation to disclose to the department any facts or circumstances that may give rise to a conflict of interest with respect to an offset project, offset project developer, or project sponsor.

(3) The department may reject a verification report and certification statement from an accredited verifier, submitted as part of a consistency application required pursuant to section 242-10.4(b) of this Subpart or submitted as part of a monitoring and verification report submitted pursuant to section 242-10.7(b) of this Subpart, if the department determines that the accredited verifier has a conflict of interest related to the offset project, offset project developer, or project sponsor.

(4) The department may revoke the accreditation of a verifier at any time given cause, for the following:

(i) failure to fully disclose any issues that may lead to a conflict of interest situation with respect to an offset project, offset project developer, or project sponsor;

(ii) the verifier is no longer qualified due to changes in staffing or other criteria;

(iii) negligence or neglect of responsibilities pursuant to the requirements of this Subpart;

and

(iv) intentional misrepresentation of data or other intentional fraud.

242-10.7 Award and recordation of CO<sub>2</sub> offset allowances.

(a) 'Quantities of CO<sub>2</sub> offset allowances that may be awarded, and subsequently recorded'.

(1) Award of CO<sub>2</sub> offset allowances for [.

(i) '[CO<sub>2</sub> emissions offset projects [']'. Following the issuance of a consistency determination under section 242-10.4(e)(2) of this Subpart and the approval of a monitoring and verification report under the provisions of subdivision (e) of this section, the department will award one CO<sub>2</sub> offset allowance for each ton of demonstrated reduction in CO<sub>2</sub> or CO<sub>2</sub> equivalent emissions or sequestration of CO<sub>2</sub>.

[(ii) 'CO<sub>2</sub> emissions credit retirement '. If a project sponsor received a consistency determination pursuant to section 242-10.4(e)(2) of this Subpart, one CO<sub>2</sub> offset allowance will be awarded for each ton of reduction of CO<sub>2</sub> or CO<sub>2</sub> equivalent or sequestration of CO<sub>2</sub>, represented by the relevant credits or allowances retired. If a credit or allowance is represented in metric tons, 1.1023 tons will be awarded for every metric ton, provided that total CO<sub>2</sub> offset allowances awarded shall be rounded down to the nearest whole ton.]

(2) Recordation of CO<sub>2</sub> offset allowances. After CO<sub>2</sub> offset allowances are awarded under paragraph (1) of this subdivision, the department shall record such CO<sub>2</sub> offset allowances in the project sponsor's general account.

(b) 'Deadlines for submittal of monitoring and verification reports'.

(1) For CO<sub>2</sub> emissions offset projects undertaken prior to January 1, 2009, the project sponsor

must submit the monitoring and verification report covering the pre-2009 period by June 30, 2009.

(2) For CO<sub>2</sub> emissions offset projects undertaken on or after January 1, 2009, the monitoring and verification report must be submitted within 6 months following the completion of the last calendar year during which the offset project achieved CO<sub>2</sub> equivalent reductions or sequestration of CO<sub>2</sub> for which the project sponsor seeks the award of CO<sub>2</sub> offset allowances.

(c) Contents of monitoring and verification reports. For an offset project, the monitoring and verification report must include the following information.

(1) The project's sponsor's name, address, e-mail address, telephone number [ , facsimile transmission number,] and account number.

(2) The CO<sub>2</sub> emissions reduction or CO<sub>2</sub> sequestration determination as required by the relevant provisions of section 242-10.5 of this Subpart, including a demonstration that the project sponsor complied with the required quantification, monitoring, and verification procedures under section 242-10.5 of this Subpart, as well as those outlined in the consistency application approved pursuant to section 242-10.4(e)(2) of this Subpart.

(3) A signed statement that reads "The undersigned project sponsor hereby confirms and attests that the offset project upon which this monitoring and verification report is based is in full compliance with all of the requirements of Subpart 242-10. The project sponsor holds the legal rights to the offset project, or has been granted the right to act on behalf of a party that holds the legal rights to the offset project. I understand that eligibility for the award of CO<sub>2</sub> offset allowances under Subpart 242-10 is contingent on meeting the requirements of Subpart 242-10. I authorize the department or its agent to audit this offset project for purposes

of verifying that the offset project, including the monitoring and verification plan, has been implemented as described in the consistency application that was the subject of a consistency determination by the department. I understand that this right to audit shall include the right to enter the physical location of the offset project and to make available to the department or its agent, any and all documentation relating to the offset project at the department's request. I submit to the legal jurisdiction of New York State.”

(4) A certification signed by the offset project sponsor certifying that all offset projects for which the sponsor has received offset allowances under this Subpart (or similar provisions in the rules of other participating states), under the sponsor's ownership or control (or under the ownership or control of any entity which controls, is controlled by, or has common control with the sponsor) are in compliance with all applicable requirements of the CO<sub>2</sub> Budget Trading Program in all participating states.

(5) A verification report and certification statement signed by an independent verifier accredited pursuant to section 242-10.6 of this Subpart that documents that the independent verifier has reviewed the monitoring and verification report and evaluated the following in relation to the applicable requirements at section 242-10.5 of this Subpart, and any applicable guidance issued by the department.

(i) The adequacy and validity of information supplied by the project sponsor to determine CO<sub>2</sub> emissions reductions or CO<sub>2</sub> sequestration pursuant to the applicable requirements at section 242-10.5 of this Subpart.

(ii) The adequacy and consistency of methods used to quantify, monitor, and verify CO<sub>2</sub> emissions reductions and CO<sub>2</sub> sequestration in accordance with the applicable requirements at section 242-10.5 of this Subpart and as outlined in the consistency application approved pursuant to section 242-10.4(e)(2) of this Subpart.

(iii) Such other evaluations and verification reviews as may be required by the department. The adequacy and validity of information supplied by the project sponsor to demonstrate that the offset project meets the applicable eligibility requirements of section 242-10.5 of this Subpart.

(6) Disclosure of any voluntary or mandatory programs, other than the CO<sub>2</sub> Budget Trading Program, to which greenhouse gas emissions data related to the offset project has been, or will be reported.

(7) For offset projects located in a state or United States jurisdiction that is not a participating state, a demonstration that the project sponsor has complied with all requirements of the cooperating department in the state or United States jurisdiction where the offset project is located.

(d) 'Prohibition against filing monitoring and verification reports in more than one participating state'. Monitoring and verification reports may only be filed under this section for projects that have received consistency determinations under section 242-10.4(e)(2) of this Subpart. Monitoring and verification reports may not be filed under this section for projects that have received consistency determinations in other participating states.

(e) 'Department action on monitoring and verification reports'. The department will approve or deny a complete monitoring and verification report within 45 days following receipt of a complete report. A complete monitoring and verification report is one that is in a format approved by the department and is determined to be complete for the purposes of commencing review of the monitoring and verification report. In no event shall a completeness determination prevent the department from requesting additional information in order to enable the department to approve or deny a monitoring and verification report filed under this section.

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6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

## 6 NYCRR Part 200, General Provisions

## Rural Area Flexibility Analysis

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative, historic effort among New York and eight Participating States<sup>1</sup> and is the first mandatory, market-based carbon dioxide ( CO<sub>2</sub>) emissions reduction program in the United States. Since its inception in 2008, RGGI has utilized an innovative market-based mechanism to cap and cost-effectively reduce emissions that cause climate change. Recently, New York along with the Participating States, completed a comprehensive program review and announced a proposal to lower the regional emissions cap established under RGGI to 91 million tons in 2014, declining 2.5 percent a year through 2020.<sup>2</sup> Accordingly, New York and the Participating States committed to propose revisions, pursuant to state-specific regulatory processes, to their respective CO<sub>2</sub> Budget Trading Programs to further reduce CO<sub>2</sub> emissions from power plants in the region. In order to implement the updated RGGI program in New York State, the Department of Environmental Conservation (Department) proposes to revise 6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program (the Program) and 6 NYCRR Part 200, General Provisions.

The promulgation of the proposed revisions to Part 242 and the amendments to Part 200, apply to affected sources statewide, including those located in rural areas. Since the regulations apply equally to affected facilities statewide, rural areas are not impacted any differently than other areas in the State. The Department is implementing the proposed revisions to the Program through a cap-and-trade program. Allowance based cap and trade systems are the most cost effective means for implementing emission reductions from large stationary sources, therefore the Department has minimized any potential adverse economic impacts of the revised

<sup>1</sup> In addition to New York, the RGGI Participating States include: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, Rhode Island, and Vermont.

<sup>2</sup> The Participating States released the Updated Model Rule on February 7, 2013.

Program to all sources on a statewide basis.

The proposed Program revisions which will cap regional CO<sub>2</sub> emissions at 91 million tons annually beginning in 2014 represent a nearly 45 percent reduction from the existing cap currently in place under the Program. After 2020, the cap will remain at 78 million tons annually. Further, in order to account for the existing private bank of CO<sub>2</sub> emissions allowances already acquired at auction, and in order to help create a binding cap, the proposed Program revisions provide two distinct budget adjustments. The First Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the first control period private bank of allowances (vintages 2009, 2010, and 2011) held by market participants after the first control period. The Second Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the surplus 2012 and 2013 vintage allowances held by market participants as of the end of 2013.

The proposed Program revisions also create the Cost Containment Reserve (CCR) which will help provide additional flexibility and cost containment for the Program. The CCR allowances will be triggered and released at auctions at \$4/ton in 2014, \$6/ton in 2015, \$8/ton in 2016, and \$10/ton in 2017. Each year after 2017 the CCR trigger price will increase by 2.5 percent. If the trigger price is reached, up to 10 million additional CCR allowances will be available for purchase at auction, except in 2014, when the reserve will be limited to 5 million allowances. The existing price triggers for expanding use of offsets and the one year compliance period extension will be eliminated in favor of the CCR.

Finally, the proposed Program revisions create an interim compliance obligation in part to align it with the annual compliance obligations under federal programs such as the Clean Air Interstate Rule and the Title IV Acid Rain Program. This program revision also helps to address the potential for a budget source to operate during the first couple of years of a three year compliance period and the potential to avoid their compliance

obligation as a result of the business closing or falling into bankruptcy prior to the third year compliance obligation. In addition to demonstrating full compliance at the end of each three-year compliance period, regulated entities must now demonstrate that they are holding allowances equal to at least 50 percent of their emissions at end of each of the first two years in each three year compliance period. The proposed Program revisions also include minor revisions such as setting the reserve price at \$2.00 in 2014, to rise at 2.5 percent per year in subsequent years, updating all references, and the deleting early reduction allowance provisions. The majority of the proceeds from the sale of New York's allowances will be continue to be dedicated to strategic energy or consumer benefits, such as energy efficiency and clean energy technologies.

#### TYPES AND ESTIMATED NUMBER OF RURAL AREAS AFFECTED

The promulgation of the proposed revisions to the Program and the amendments to Part 200, apply to affected sources statewide. All public and private businesses subject to the regulations regardless of location, including those in rural areas, will be affected.

#### REPORTING, RECORD KEEPING AND OTHER COMPLIANCE REQUIREMENTS

The proposed revisions to the Program do not change the applicability provisions of the current Program. Therefore, sources already subject to the current Program will remain subject to the proposed revisions to the Program. While the second control period under the current Program will remain unchanged and will include years 2012-2014 with a CO<sub>2</sub> allowance transfer deadline of March 1, 2015, the proposed Program revisions will require affected sources and units to comply with the emission limitations of the Program beginning on January 1, 2014.

The proposed revisions to the Program create a modified compliance schedule called an interim compliance period which is defined as each of the first two years of each three-year control period. The first

interim control period under the revised Program will take place in year 2015; the second interim control period will take place in year 2016. In each of the first two calendar years of each three year control period (e.g., 2015 and 2016), the owners and operators of each source subject to the revised Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, as of the CO<sub>2</sub> allowance transfer deadline (midnight of March 1<sup>st</sup> or, if March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter), in the source's compliance account that is not less than 50 percent of the total tons of CO<sub>2</sub> emissions for that interim control period. A unit is subject to the interim control period requirements of the Program starting on the later of January 1, 2015 or date the unit commences operation.

Accordingly, at the end of each control period, (e.g., 2017), the owners and operators of each source subject to the revised Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, as of the CO<sub>2</sub> allowance transfer deadline (midnight of March 1<sup>st</sup> or, if March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter), in the source's compliance account that is not less than the total tons of CO<sub>2</sub> emissions for the control period less the CO<sub>2</sub> allowances deducted for the previous two interim control periods.

Additionally, for each control period in which a CO<sub>2</sub> budget source is subject to the proposed revisions to Program, the CO<sub>2</sub> authorized account representative of the source must continue to submit to the Department by the March 1<sup>st</sup> following the relevant control period, a compliance certification report for each source covering all such units.<sup>3</sup> As noted above, since the second control period for the Program remains unchanged, the first CO<sub>2</sub> allowance transfer deadline under the proposed revisions to the Program will occur on March 1, 2015.

### COSTS

In addition to the needs analysis, the Department, NYSERDA and the New York State Department of Public Service (DPS) analyzed costs and impacts associated with compliance with the proposed revisions to the

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<sup>3</sup> Sources will not be required to submit a compliance certification report for any interim control periods.

Program. This section explains NYSERDA's analysis and includes a summary of the Integrated Planning Model (IPM®) modeling conducted by ICF International (ICF). IPM® is a nationally recognized modeling tool used by the U.S. Environmental Protection Agency (EPA), state energy and environmental agencies, and private sector firms such as utilities and generation companies. This section also discusses the Department's analysis of the costs associated with State and local government compliance and impacts from the proposed revisions to the Program on the New York economy and customer bills.<sup>4,5</sup>

## Costs to the Regulated Sources and the Public

### Reference Case v. Program Case

Modeling analysis and review was coordinated by RGGI Inc. and New York staff, and included input from energy and environmental representatives from the Participating States and each regional ISO. To estimate the potential impacts of the revisions to the Program, IPM® compared a future with the revisions to the Program (Program Case) to a Reference Case (business as usual scenario) that projects how the electricity system would look if the Program remained unchanged and proposed revisions were not implemented. The modeling assumptions and input data were developed through a stakeholder process with representatives from the electricity generation sector, business and industry, environmental advocates and consumer interest groups. Modeling results were then presented to stakeholders for review and comment throughout the development of the proposed revisions to the RGGI program.

### Reference Case

Assumptions and sources of input data are specified in detail in the "RGGI DRAFT 2012 Reference Case and Sensitivity Analyses Assumptions."<sup>6</sup> Key assumptions and data include regional electricity demand,

<sup>4</sup> "REMI Economic Impacts Analysis," by the Northeast States for Coordinated Air Use Management (NESCAUM), dated May 29, 2013. [http://www.dec.ny.gov/docs/administration\\_pdf/remi91cap2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/remi91cap2013.pdf)

<sup>5</sup> "IPM Potential Scenario Customer Bill Analysis," by the Analysis Group, dated May 24, 2013. [http://www.dec.ny.gov/docs/administration\\_pdf/custbillanaly2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/custbillanaly2013.pdf)

load shapes, transmission system capacities and limits, generation unit level operation and maintenance costs and performance characteristics, fuel prices, new capacity and emission control technology costs and performance characteristics, reserve margins and local reserve requirements, RPS requirements, national and state environmental regulations, and financial market assumptions. All estimates are based on 2010 dollars. Regional electricity demand growth projections, transmission capacities and limits, and near-term expected infrastructure additions/retirements were obtained from regional ISO sources. Long range Henry Hub natural gas prices (2020), based on forecast data from U.S. Energy Information Administration (EIA) were projected to be approximately \$4.6/MMBtu (constant 2010 dollars).

A number of assumptions were used to develop the model, including: 1) the construction of new coal-fired plants was precluded to meet projected capacity shortfalls in the United States unless they include carbon capture; 2) new nuclear plant construction was limited to build outs at existing plant sites; 3) a national 3-pollutant policy (SO<sub>2</sub>, NO<sub>x</sub> and mercury) that approximates the Cross-state Air Pollution Rule (CSAPR) and the Mercury and Air Toxics Rule (MATS) is assumed; 4) RPS targets are assumed to be met in all states except New York; and 5) partial fulfillment of the RPS target is assumed in New York based upon New York ISO certainty criteria, capacity under RPS contract, and RPS funds currently approved for future solicitations (approximately \$3 billion).

Under the Reference Case, generation from new gas-fired combined cycle units is projected to supply most of the growing electricity demand. Electric generation from gas-fired plants in New York is projected to increase by approximately 37 percent from 48,109 Gigawatt hours ( GWh) in 2013 to 65,983 GWh in 2020. Generation from new renewable resources (primarily wind units) is projected to increase significantly, largely in response to RPS requirements. While nuclear generation is projected to decrease by about 35% percent between

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<sup>6</sup> The modeling assumptions document and the tabular results for each modeling run are located at [http://www.rggi.org/design/program\\_review](http://www.rggi.org/design/program_review)

2013 and 2020 due to the assumed retirement of the Indian Point units upon their respective license expiration, generation from coal-fired plants is projected to increase by about eight percent between 2013 and 2020. Finally, generation from existing oil/gas steam units is projected to decrease over time, as a result of displacement by lower-cost electricity from new gas-fired units. Additionally, net imports of electricity into New York are projected to rise from approximately 24,000 GWh in 2013 to approximately 26,800 GWh in 2016 before decreasing to about 23,000 in 2020. CO<sub>2</sub> emissions in the Reference Case, from sources in New York State subject to the Program, are projected to increase from approximately 34.6 million tons in 2013 to about 41.7 million tons in 2020. This increase is due primarily to increased generation from new and existing gas-fired power plants to meet projected load growth.

This generation data was based on the IPM Reference Case model runs and the table displayed below:

New York Reference Case Net Generation (in GWh)	2012	2013	2014	2015	2016	2018	2020
Combined Cycle	40,419	46,344	44,171	47,637	55,024	60,509	63,743
CT	2,146	1,765	2,249	2,165	2,365	2,265	2,240
Oil/Gas	12,198	11,696	11,689	11,568	11,476	11,184	10,960
Coal	5,127	5,956	6,834	6,052	6,585	4,861	6,419
Nuclear	42,450	42,450	35,229	35,369	27,516	27,516	27,516
‘Conventional Generation Total’	102,340	108,212	100,172	102,791	102,966	106,335	110,878
Other - NUG/Cogen	1,863	1,863	1,875	1,881	1,884	1,884	1,887
Existing Conventional							

Hydro	27,082	27,275	27,251	27,540	27,471	27,540	27,532
Existing Renewables	5,457	5,444	5,444	5,457	5,500	5,464	5,444
‘Other Generation Total’	34,402	34,582	34,571	34,878	34,855	34,888	34,864
Biomass: Direct Fire	-	-	433	738	738	738	738
Landfill Gas	35	35	393	483	483	483	483
Hydro	-	-	452	556	556	556	556
Onshore Wind	-	-	1,155	1,908	2,627	2,627	2,627
Offshore Wind	-	-	-	-	-	-	-
Solar	81	81	252	333	379	379	427
‘New Renewable Generation Total’	116	116	2,685	4,017	4,781	4,781	4,830
Total GWh	136,858	142,910	137,428	141,686	142,602	146,004	150,572

This emissions data was based on the IPM Reference Case and the table displayed below:

Reference Case CO2 Emissions [Million Tons]	2012	2013	2014	2015	2016	2018	2020
MA	17	16	16	17	14	15	17
CT	6	7	7	7	7	7	7
ME	3	3	4	3	4	4	3
NH	2	3	2	2	2	2	2
RI	3	3	4	4	4	4	3

VT	0	0	0	0	0	0	0
NY	32	35	35	35	39	39	42
DE	4	3	4	4	5	5	5
MD	25	27	28	29	27	26	27
Total RGGI	93	96	100	102	101	102	105
Total Emissions at Affected Plants	91	93	97	100	99	99	103
Eastern Interconnect without RGGI	1,514	1,548	1,595	1,607	1,572	1,607	1,654
Total Eastern Interconnect	1,608	1,643	1,695	1,709	1,674	1,709	1,759
Total Canadian	102	98	95	97	100	101	104

## Program Case

### Interim Adjustment for Banked Allowances

Likewise, several assumptions were used to project impacts in the Program Case. For modeling purposes, the proposed CO<sub>2</sub> cap of 91 million tons, based on the approximate amount of current emissions in the RGGI region, was applied to sources subject to the Program in the Participating States. In order to account for the existing private bank of allowances and in order to help create a binding cap, the proposed revisions to the Program create provisions for two distinct budget adjustments. In order to model the budget adjustments, the annual caps were adjusted in accordance with the model rule language and the assumption that the adjustment would account for the existing bank as well as 100 percent of the surplus (current cap and emissions) for 2013.

While the Program Case allows a limited number of emissions offsets to be purchased by affected generators and used for compliance by affected generators, the model assumes that it is not economically attractive for offset suppliers to sell their products in the RGGI market until prices reached \$10 per allowance. This value is based on the reserve price under the California cap-and-trade program which allows for the use of

offset credits. As long as offset suppliers are able to sell similar products in the California market for prices higher than those in the RGGI market, offset suppliers would not be expected to sell into the RGGI market.

In order to obtain New York specific results, several components between the Program Case and the Reference Case are compared including generation mix, net electricity imports, changes in generation capacity, CO<sub>2</sub> emissions, CO<sub>2</sub> allowance prices, and wholesale and retail electricity price impacts. Electricity generation from gas-fired units in 2020 is about 1,576 GWh or 2.4 percent lower in the Program Case than in the Reference Case. Generation from coal-fired units in 2020 is about 2,376 GWh or 37 percent lower in the Program Case than in the Reference Case. Net imports into New York in 2020 are projected to be about 3,900 GWh or 17 percent higher in the Program Case than in the Reference Case. Relative to the Reference Case, total capacity additions through 2020 in the Program Case are the same (5,909 MW) as in the Reference Case. Coal capacity retirements through 2020 in the Reference Case are 408 MW while the estimated value for the Program Case is 466 MW.

This generation data was based on the differences between IPM Reference Case and IPM Program Case model runs and the tables displayed below:

New York Reference Case Net Generation (in GWh)	2012	2013	2014	2015	2016	2018	2020
CC	40,419	46,344	44,171	47,637	55,024	60,509	63,743
CT	2,146	1,765	2,249	2,165	2,365	2,265	2,240
Oil/Gas	12,198	11,696	11,689	11,568	11,476	11,184	10,960
Coal	5,127	5,956	6,834	6,052	6,585	4,861	6,419

Nuclear	42,450	42,450	35,229	35,369	27,516	27,516	27,516
‘Conventional Generation Total’	102,340	108,212	100,172	102,791	102,966	106,335	110,878
Other - NUG/Cogen	1,863	1,863	1,875	1,881	1,884	1,884	1,887
Existing Conventional Hydro	27,082	27,275	27,251	27,540	27,471	27,540	27,532
Existing Renewables	5,457	5,444	5,444	5,457	5,500	5,464	5,444
‘Other Generation Total’	34,402	34,582	34,571	34,878	34,855	34,888	34,864
Biomass: Direct Fire	-	-	433	738	738	738	738
Landfill Gas	35	35	393	483	483	483	483
Hydro	-	-	452	556	556	556	556
Onshore Wind	-	-	1,155	1,908	2,627	2,627	2,627
Offshore Wind	-	-	-	-	-	-	-
Solar	81	81	252	333	379	379	427
‘New Renewable Generation Total’	116	116	2,685	4,017	4,781	4,781	4,830
Total GWh	136,858	142,910	137,428	141,686	142,602	146,004	150,572

New York Program Case Net Generation (in GWh)							
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	2012	2013	2014	2015	2016	2018	2020
CC	40,392	46,335	43,696	46,972	53,823	58,554	61,862
CT	2,147	1,769	2,259	2,247	2,502	2,497	2,545
Oil/Gas	12,208	11,696	11,640	11,496	11,463	11,168	10,977
Coal	5,235	5,956	5,937	3,887	4,679	3,179	4,043
Nuclear	42,450	42,450	35,229	35,369	27,516	27,516	27,516
'Conventional Generation Total'	102,432	108,206	98,762	99,971	99,982	102,915	106,943
Other - NUG/Cogen	1,863	1,863	1,875	1,881	1,884	1,884	1,887
Existing Conventional Hydro	27,113	27,253	27,305	27,450	27,389	27,431	27,443
Existing Renewables	5,457	5,444	5,457	5,472	5,500	5,469	5,444
'Other Generation Total'	34,433	34,561	34,637	34,803	34,773	34,784	34,774
Biomass: Direct Fire	-	-	433	738	738	738	738
Landfill Gas	35	35	393	483	483	483	483
Hydro	-	-	452	556	556	556	556
Onshore Wind	-	-	1,155	1,908	2,627	2,627	2,627
Offshore Wind	-	-	-	-	-	-	-
Solar	81	81	252	333	379	379	427
'New Renewable Generation Total'	116	116	2,685	4,017	4,781	4,781	4,830
Total GWh	136,981	142,882	136,084	138,790	139,536	142,480	146,547

CO<sub>2</sub> emissions from New York generators in the Program Case are projected to be 3.2 million tons (eight percent) lower in 2020 than in the Reference Case. Over the 2014-2020 time period, cumulative CO<sub>2</sub> emission reductions from New York generators subject to the Program are projected to be 13 million tons in the Program Case as compared to the Reference Case. Although emissions from affected sources across the RGGI region are estimated to be 15 million tons (14.6 percent) lower under the Program Case than under the Reference Case in 2020, CO<sub>2</sub> emissions from the electricity sector in New York are projected to increase 4.9 million tons or 14.7 percent between 2014 and 2020. Principally, emissions in New York are projected to rise because the Indian Point nuclear units are assumed to retire when their current licenses expire in 2013 and 2015. The IPM model projects that the generation from these non-CO<sub>2</sub> emitting generators is likely to be replaced with fossil fuel-fired generation, at least in part. Nevertheless, CO<sub>2</sub> emission reductions over the 2014-2020 period from affected sources across the RGGI region are estimated to be 86 million tons in the Program Case compared to the Reference Case.

This emissions data was based on the differences between IPM Reference Case and IPM Program Case model runs and the tables displayed below:

Reference Case CO2 Emissions [Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	16	16	17	14	15	17
CT	6	7	7	7	7	7	7
ME	3	3	4	3	4	4	3
NH	2	3	2	2	2	2	2
RI	3	3	4	4	4	4	3

VT	0	0	0	0	0	0	0
NY	32	35	35	35	39	39	42
DE	4	3	4	4	5	5	5
MD	25	27	28	29	27	26	27
Total RGGI	93	96	100	102	101	102	105
Total Emissions at Affected Plants	91	93	97	100	99	99	103
Eastern Interconnect without RGGI	1,514	1,548	1,595	1,607	1,572	1,607	1,654
Total Eastern Interconnect	1,608	1,643	1,695	1,709	1,674	1,709	1,759
Total Canadian	102	98	95	97	100	101	104

Program Case CO2 Emissions							
[Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	15	15	15	13	14	16
CT	6	7	7	7	7	7	7
ME	3	3	4	4	4	3	3
NH	2	3	2	2	2	2	2
RI	3	4	4	4	4	4	4
VT	0	0	0	0	0	0	0
NY	32	35	34	33	36	36	38
DE	4	3	3	4	4	4	4
MD	25	27	23	23	22	17	17
Total RGGI	93	96	91	91	92	87	91

Total Emissions at Affected Plants	91	93	89	89	90	85	88
Eastern Interconnect without RGGI	1,514	1,548	1,601	1,613	1,579	1,616	1,662
Total Eastern Interconnect	1,608	1,643	1,692	1,704	1,671	1,704	1,753
Total Canadian	102	97	95	97	100	102	104

Under the Reference Case, without making any proposed Program revisions, CO<sub>2</sub> allowance prices are projected to remain at the minimum reserve price through 2020. Under the Program Case, CO<sub>2</sub> allowance prices (the cost of complying with RGGI) are projected to increase from approximately \$6.02/ton (2010 dollars) in 2014 to about \$6.73/ton in 2016 and to about \$8.41/ton in 2020. Approximately 17.6 million allowances would be obtained by the marketplace between 2014 and 2020 from the Cost Containment Reserve (CCR), which would be triggered at \$4/ton in 2014 and at \$6/ton in 2015. The acquisition of these additional allowances provides price dampening which is reflected in these estimated allowance prices.

This allowance price data was based on the IPM Reference Case and IPM Program Case model runs and the tables displayed below:

Reference Case Allowance Prices (2010\$)							
	2012	2013	2014	2015	2016	2018	2020
NO <sub>x</sub> Regional (\$/ton)	450	450	450	450	450	450	450
SO <sub>2</sub> Regional Tier 1 (\$/ton)	-	50	50	50	-	-	-
SO <sub>2</sub> Regional Tier 2 (\$/ton)	-	50	50	50	-	-	-
Regional CO <sub>2</sub> (\$/ton)	1.86	1.86	1.86	1.86	1.86	1.86	1.86

Program Case Allowance Prices (2010\$)							
	2012	2013	2014	2015	2016	2018	2020
NO <sub>x</sub> Regional (\$/ton)	600	600	600	600	600	600	600
SO <sub>2</sub> Regional Tier 1 (\$/ton)	-	6	6	7	-	-	-
SO <sub>2</sub> Regional Tier 2 (\$/ton)	-	21	22	23	-	-	-
Regional CO <sub>2</sub> (\$/ton)	1.86	1.86	6.02	6.37	6.73	7.52	8.41

Under the Program Case, New York’s wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.64/MWh higher in 2016 and \$2.12/MWh higher in 2020, than the Reference Case. RGGI is projected to increase wholesale electricity prices in New York State by about 3.0 percent in 2016 and 3.9 percent in 2020. For a typical New York residential customer (using 750 kWh per month), the projected increase in wholesale electricity prices in 2016 translates into a monthly retail bill increase of about 1.0 percent or \$0.86. In 2020, the projected increase in wholesale electricity prices translates into a monthly residential retail bill increase of about 0.8 percent or \$0.71. For commercial customers, the projected retail price impact of RGGI is about 1.1 percent in 2016 and 0.7 percent in 2020 (\$7.87 and \$5.00 per month, respectively). For industrial customers, the projected retail price impact of RGGI is about 1.7 percent in 2016 and 1.2 percent in 2020.

#### Alternative Bank Scenario

IPM projects electricity system operations and costs with perfect foresight, which means that there is certainty of knowledge of all future market outcomes, including allowance prices and the use of the private bank. In other words, IPM calculates when and whether it is cost-effective to make on-system emissions

reductions at affected sources or to use allowances from the private bank. However, market participants may make decisions related to use of banked allowances for compliance on a shorter time horizon than projected by IPM using perfect foresight (i.e., due to uncertainty, market participants may be more likely to defer emissions reductions and rely more heavily on banked allowances in the short-term). In order to assess the use of the private bank during the short-term, an alternative usage scenario (“Alt Bank”) was examined. Under the Alt Bank scenario, it is assumed that the marketplace would use the private bank of allowances at a rate roughly 40 percent faster than under the Program Case during the 2014-2017 timeframe. This scenario is not intended to be a prediction of market behavior; rather it is intended to provide a broader sense of potential market outcomes.

CO<sub>2</sub> emissions from New York generators are projected in the Alt Bank scenario to be 4.4 million tons (10.7 percent) lower in 2020 than Reference Case. The generators are assumed to use more of the private bank by 2017 under this scenario, therefore less allowances will be available for use in later years and more emissions reductions will occur during this timeframe. Emissions from affected sources across the RGGI region are estimated to be 81.6 million tons in 2020 under the Alt Bank scenario while they are projected to be 87.8 million tons under the Program Case.

This emissions data IPM Alt Bank Case model runs and the table displayed below:

91 Alt Bank CO2 Emissions [Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	15	16	15	13	14	15

CT	6	7	7	7	7	7	7
ME	3	3	4	4	4	3	3
NH	2	3	2	2	2	2	2
RI	3	4	4	4	4	4	4
VT	0	0	0	0	0	0	0
NY	32	35	34	34	36	36	37
DE	4	3	4	4	4	4	3
MD	25	27	26	25	23	15	14
Total RGGI	94	96	96	95	93	85	84
Total Emissions at Affected Plants	92	93	94	92	90	82	82
Eastern Interconnect without RGGI	1,514	1,548	1,598	1,610	1,578	1,617	1,665
Total Eastern Interconnect	1,608	1,643	1,694	1,705	1,671	1,702	1,750
Total Canadian	102	97	95	97	100	102	105

CO<sub>2</sub> allowance prices under the Alt Bank scenario are projected to increase from approximately \$3.60/ton (2010 dollars) in 2014 to about \$6.57/ton in 2016 and about \$10.21/ton in 2020. Prices are lower in the short-term under the Alt Bank scenario than under the Program Case because the former scenario assumes that more allowances from the private bank are being used for compliances in the short term. Similarly, prices are higher in 2020 under the Alt Bank scenario because the marketplace has fewer allowances left over in the private bank relative to the Reference Case, and therefore more on-system emissions reductions are required from compliance entities. In addition, it is estimated that approximately 10 million allowances would be obtained by the marketplace between 2014 and 2020 from the CCR. The acquisition of these additional allowances provides some price dampening which is reflected in these estimated allowance prices.

This allowance price data was based on IPM Alt Bank Case model runs and the table displayed below:

Alt Bank Allowance Prices (2010\$)							
	2012	2013	2014	2015	2016	2018	2020
NO <sub>x</sub> Regional (\$/ton)	600	600	600	600	600	600	600
SO <sub>2</sub> Regional Tier 1 (\$/ton)	-	6	6	7	-	-	-
SO <sub>2</sub> Regional Tier 2 (\$/ton)	-	21	22	23	-	-	-
Regional CO <sub>2</sub> (\$/ton)	1.86	1.86	3.60	5.14	6.57	8.00	10.21

Under the Alt Bank scenario, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.62/ MWh higher in 2016 and \$2.72/ MWh higher in 2020, than the Reference Case. Wholesale electricity prices are estimated to increase by about 2.9 percent in 2016 and 4.9 percent in 2020 under the Alt Bank scenario relative to the Reference Case.

Sensitivity analyses were performed to develop bounds or collars around the Reference Case and Program Case projections. First, a Higher Emissions scenario that assumes higher natural gas prices and higher regional energy demand was evaluated. This scenario used natural gas prices from the Low Estimated Ultimate Recovery scenario in EIA's 2012 Annual Energy Outlook where Henry Hub natural gas prices are estimated to be \$5.31/MMBtu in 2020. Demand in this case is assumed to be about three percent higher in the near-term and four percent higher in the longer-term than the Reference Case. Likewise, a Lower Emissions scenario was also developed that assumes lower natural gas prices, lower regional energy demand, and the continued operation of the Indian Point nuclear power plants through the timeframe of the study. This scenario used natural gas prices from the High Technically Recoverable Resources scenario in EIA's 2012 Annual Energy Outlook where Henry Hub natural gas prices are estimated to be \$3.02/ MMBtu in 2020. In this case, demand is assumed to be about three percent lower in the near-term and four percent lower in the longer-term than the Reference Case.

The modeling case that evaluated the potential impacts of the Updated Model Rule using the Higher Emissions assumptions was called the 91 Cap\_Bank\_Model Rule\_High Case. Under this scenario, allowance prices are estimated to be \$7.27/ton in 2014, \$8.13/ton in 2016 and \$10.15/ton in 2020. A sensitivity scenario was run to estimate the impacts of the Updated Model Rule with the Higher Emissions and Alt Bank assumptions. Under this 91 Cap Alt\_Bank\_Model\_Rule\_High Case, allowance prices are estimated to be about \$4.62/ton in 2014, \$6.90/ton in 2016, and \$16.44/ton in 2020.

In IPM, allowance prices would only be expected to rise off of the minimum reserve price if the projected cumulative emissions over the time period exceed the cumulative cap level. When evaluating the impact of the Updated Model Rule using the Low Emissions scenario, emissions over the time period are projected to be 50 million tons less than the number of allowances available to the market (adjusted cap plus the emissions bank). Therefore, affected sources would not need to make any emission reductions and it is estimated that allowance prices would be at the minimum reserve price under this scenario. This scenario was not actually modeled; however, ICF staff provided the assessment of the scenario described in this paragraph.

A macro-economic impact study of the Program was also conducted at the direction of the Participating States through NESCAUM to estimate the potential impact of the Program revisions on the economies of participating states. The study used the REMI computer model. As mentioned above, the study concluded that the economic impacts of RGGI on the economies of the participating states, including New York, were generally positive, albeit relatively small. For example, the cumulative changes in New York's Gross State Product and Personal Income associated with the proposed revisions to the program will be about \$5.8 billion and \$4.7 billion, respectively (2010 dollars, calculated as the present value of estimated annual changes over the period 2012 to 2040, discounted at three percent per year to account for the time-value of money). The

cumulative change in employment in New York associated with the Program will be about 80,500 job-years over the period 2012 to 2040. A job-year is equivalent to one person employed for one year.

### MINIMIZING ADVERSE IMPACT

The promulgation of the proposed revisions to the Program and the amendments to Part 200, apply to affected sources statewide, including those located in rural areas. Since the regulations apply equally to affected facilities statewide, rural areas are not impacted any differently than other areas in the State. The Department is implementing the proposed revisions to the Program through a cap-and-trade program. Allowance based cap and trade systems are the most cost effective means for implementing emission reductions from large stationary sources, therefore the Department has minimized any potential adverse economic impacts of the Program to all sources on a statewide basis.

### RURAL AREA PARTICIPATION

New York and the Participating States committed to a comprehensive program review during the initial development of RGGI and agreed to evaluate: program success; program impacts; additional emissions reductions; imports and emissions leakage; and offsets. The Participating States initiated program review in the fall of 2010 with the announcement of its first stakeholder meeting and concluded the process in February, 2013. More than a dozen stakeholder meetings and webinars were conducted during this period by the Participating States and RGGI Incorporated (RGGI, Inc.)<sup>7</sup> whereby public input was obtained on a number of program elements. Prior to each stakeholder meeting, agency staff and RGGI, Inc. distributed pertinent written material to the participants and posted meeting documents on the RGGI, Inc. web site. The stakeholder meetings were open to the public and all interested parties were encouraged to provide comment. All stakeholder comments were ultimately considered in the development of the Draft Updated Model Rule, which contained detailed

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<sup>7</sup> RGGI, Inc. is a 501(c)(3) non-profit corporation created to provide technical and administrative services to the Participating States.

regulatory text, and was released to the stakeholders for comment on November 20, 2012 . The final version of the Updated Model Rule was released by the Participating States on February 7, 2013, which contained additional updates based on stakeholder feedback received on the Draft Updated Model Rule.

Supplemental to the regional stakeholder process, New York conducted a separate stakeholder process designed to provide updates on the status of the regional process and to afford additional opportunity for New York's stakeholders to provide comment. Seven meetings and staff availability sessions were held in New York and when possible, the Department sent list-serve notices to New York stakeholders announcing regional meetings and webinars. This included, for example, presentations by Department representatives, regarding RGGI program review and the proposed revisions to the Program, at the Business Council's <sup>8</sup> Spring Environmental Conference on April 18, 2013 and Annual Meeting in Bolton Landing on September 19, 2012.

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<sup>8</sup> The Business Council of New York State, Inc ., is the leading business organization in New York State, representing the interests of large and small firms throughout the state. Its membership is made up of thousands of member companies, as well as local chambers of commerce and professional and trade associations.

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6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

## 6 NYCRR Part 200, General Provisions

## Rural Area Flexibility Analysis Summary

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative, historic effort among New York and eight Participating States<sup>1</sup> and is the first mandatory, market-based carbon dioxide ( CO<sub>2</sub>) emissions reduction program in the United States. Since its inception in 2008, RGGI has utilized an innovative market-based mechanism to cap and cost-effectively reduce emissions that cause climate change. Recently, New York along with the Participating States, announced a proposal to lower the regional emissions cap established under RGGI to 91 million tons in 2014, declining 2.5 percent a year through 2020.<sup>2</sup> In order to implement the updated RGGI program in New York State, the Department of Environmental Conservation (Department) proposes to revise 6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program (the Program) and 6 NYCRR Part 200, General Provisions.

The promulgation of the proposed revisions to Part 242 and the amendments to Part 200, apply to affected sources statewide, including those located in rural areas. Since the regulations apply equally to affected facilities statewide, rural areas are not impacted any differently than other areas in the State. The Department is implementing the proposed revisions to the Program through a cap-and-trade program. Allowance based cap and trade systems are the most cost effective means for implementing emission reductions from large stationary sources, therefore the Department has minimized any potential adverse economic impacts of the revised Program to all sources on a statewide basis.

The proposed Program revisions will cap regional CO<sub>2</sub> emissions at 91 million tons annually beginning

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<sup>1</sup> In addition to New York, the RGGI Participating States include: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, Rhode Island, and Vermont.

<sup>2</sup> The Participating States released the Updated Model Rule on February 7, 2013.

in 2014. After 2020, the cap will remain at 78 million tons annually. Further, in order to account for the existing private bank of CO<sub>2</sub> emissions allowances already acquired at auction, and in order to help create a binding cap, the proposed Program revisions provide two distinct budget adjustments. The proposed Program revisions also create the Cost Containment Reserve (CCR) which will help provide additional flexibility and cost containment for the Program. The CCR allowances will be triggered and released at auctions at \$4/ton in 2014, \$6/ton in 2015, \$8/ton in 2016, and \$10/ton in 2017. Each year after 2017 the CCR trigger price will increase by 2.5 percent. If the trigger price is reached, up to 10 million additional CCR allowances will be available for purchase at auction, except in 2014, when the reserve will be limited to five million allowances. Finally, the proposed Program revisions create an interim compliance obligation. In addition to demonstrating full compliance at the end of each three-year compliance period, regulated entities must now demonstrate that they are holding allowances equal to at least 50 percent of their emissions at end of each of the first two years in each three year compliance period.

#### TYPES AND ESTIMATED NUMBER OF RURAL AREAS AFFECTED

The promulgation of the proposed revisions to the Program apply to affected sources statewide. All public and private businesses subject to the regulations regardless of location, including those in rural areas, will be affected.

#### REPORTING, RECORD KEEPING AND OTHER COMPLIANCE REQUIREMENTS

The proposed revisions to the Program do not change the applicability provisions of the current Program. Therefore, sources already subject to the current Program will remain subject to the proposed revisions to the Program. While the second control period under the current Program will remain unchanged and will include years 2012-2014 with a CO<sub>2</sub> allowance transfer deadline of March 1, 2015, the proposed Program revisions will require affected sources and units to comply with the emission limitations of the Program beginning on January

1, 2014.

The proposed revisions to the Program create a modified compliance schedule called an interim compliance period which is defined as each of the first two years of each three-year control period. In each of the first two calendar years of each three year control period (e.g., 2015 and 2016 ) each source subject to the revised Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions in the source's compliance account that is not less than 50 percent of the total tons of CO<sub>2</sub> emissions for that interim control period. Accordingly, at the end of each control period, ( e.g., 2017) each source subject to the revised Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, in the source's compliance account that is not less than the total tons of CO<sub>2</sub> emissions for the control period less the CO<sub>2</sub> allowances deducted for the previous two interim control periods. Additionally, for each control period in which a CO<sub>2</sub> budget source is subject to the proposed revisions to Program, the CO<sub>2</sub> authorized account representative of the source must continue to submit a compliance certification report for each source covering all such units.<sup>3</sup>

## COSTS

The Department, New York State Energy Research Development Authority (NYSERDA) and the New York State Department of Public Service (DPS) analyzed costs and impacts associated with compliance with the proposed revisions to the Program. This section explains NYSERDA's analysis and includes a summary of the Integrated Planning Model (IPM®) modeling conducted by ICF International (ICF). IPM® is a nationally recognized modeling tool used by the U.S. Environmental Protection Agency (EPA), state energy and environmental agencies, and private sector firms such as utilities and generation companies. This section also discusses the Department's analysis of the costs associated with State and local government compliance and impacts from the proposed revisions to the Program on the New York economy and customer bills.<sup>4</sup>

<sup>3</sup> Sources will not be required to submit a compliance certification report for any interim control periods.

<sup>4</sup> "REMI Economic Impacts Analysis," by the Northeast States for Coordinated Air Use Management

Modeling analysis and review was coordinated by RGGI Inc. and New York staff, and included input from energy and environmental representatives from the Participating States and each regional ISO. To estimate the potential impacts of the revisions to the Program, IPM® compared a future with the revisions to the Program (Program Case) to a Reference Case (business as usual scenario) that projects how the electricity system would look if the Program remained unchanged and proposed revisions were not implemented.

Assumptions and sources of input data are specified in detail in the “RGGI DRAFT 2012 Reference Case and Sensitivity Analyses Assumptions.”<sup>6</sup> Key assumptions and data include regional electricity demand, load shapes, transmission system capacities and limits, generation unit level operation and maintenance costs and performance characteristics, fuel prices, new capacity and emission control technology costs and performance characteristics, reserve margins and local reserve requirements, RPS requirements, national and state environmental regulations, and financial market assumptions. All estimates are based on 2010 dollars. Long range Henry Hub natural gas prices (2020), based on forecast data from U.S. Energy Information Administration (EIA) were projected to be approximately \$4.6/MMBtu (constant 2010 dollars).

Under the Reference Case, generation from new gas-fired combined cycle units is projected to supply most of the growing electricity demand. Electric generation from gas-fired plants in New York is projected to increase by approximately 37 percent from 48,109 Gigawatt hours ( GWh) in 2013 to 65,983 GWh in 2020. Generation from new renewable resources (primarily wind units) is projected to increase significantly, largely in

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(NESCAUM), dated May 29, 2013. [http://www.dec.ny.gov/docs/administration\\_pdf/remi91cap2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/remi91cap2013.pdf)

<sup>5</sup> “IPM Potential Scenario Customer Bill Analysis,” by the Analysis Group, dated May 24, 2013.

[http://www.dec.ny.gov/docs/administration\\_pdf/custbillanaly2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/custbillanaly2013.pdf)

<sup>6</sup> The modeling assumptions document and the tabular results for each modeling run are located at [http://www.rggi.org/design/program\\_review](http://www.rggi.org/design/program_review)

response to RPS requirements. While nuclear generation is projected to decrease by about 35 percent between 2013 and 2020 due to the assumed retirement of the Indian Point units upon their respective license expiration, generation from coal-fired plants is projected to increase by about eight percent between 2013 and 2020. Finally, generation from existing oil/gas steam units is projected to decrease over time, as a result of displacement by lower-cost electricity from new gas-fired units. Additionally, net imports of electricity into New York are projected to rise from approximately 24,000 GWh in 2013 to approximately 26,800 GWh in 2016 before decreasing to about 23,000 in 2020. CO<sub>2</sub> emissions in the Reference Case, from sources in New York State subject to the Program, are projected to increase from approximately 34.6 million tons in 2013 to about 41.7 million tons in 2020.

Similar to the Reference Case analysis, several assumptions were used to project impacts in the Program Case. For modeling purposes, the proposed CO<sub>2</sub> cap of 91 million tons, based on the approximate amount of current emissions in the RGGI region, was applied. In order to model the budget adjustments, the annual caps were adjusted in accordance with the model rule language and the assumption that the adjustment would account for the existing bank as well as 100 percent of the surplus (current cap and emissions) for 2013. While the Program Case allows a limited number of emissions offsets to be purchased, the model assumes that it is not economically attractive for offset suppliers to sell their products in the RGGI market until prices reached \$10 per allowance.

In order to obtain New York specific results, several components between the Program Case and the Reference Case are compared including generation mix, net electricity imports, changes in generation capacity, CO<sub>2</sub> emissions, CO<sub>2</sub> allowance prices, and wholesale and retail electricity price impacts. Electricity generation from gas-fired units in 2020 is about 1,576 GWh or 2.4 percent lower in the Program Case than in the Reference Case. Generation from coal-fired units in 2020 is about 2,376 GWh or 37 percent lower in the Program Case

than in the Reference Case. Net imports into New York in 2020 are projected to be about 3,900 GWh or 17 percent higher in the Program Case than in the Reference Case. Relative to the Reference Case, total capacity additions through 2020 in the Program Case are the same (5,909 MW) as in the Reference Case. Coal capacity retirements through 2020 in the Reference Case are 408 MW while the estimated value for the Program Case is 466 MW.

CO<sub>2</sub> emissions from New York generators in the Program Case are projected to be 3.2 million tons (eight percent) lower in 2020 than in the Reference Case. Over the 2014-2020 time period, cumulative CO<sub>2</sub> emission reductions from New York generators subject to the Program are projected to be 13 million tons in the Program Case as compared to the Reference Case. Although emissions from affected sources across the RGGI region are estimated to be 15 million tons (14.6 percent ) lower under the Program Case than under the Reference Case in 2020, CO<sub>2</sub> emissions from the electricity sector in New York are projected to increase 4.9 million tons or 14.7 percent between 2014 and 2020. Principally, emissions in New York are projected to rise because the Indian Point nuclear units are assumed to retire when their current licenses expire in 2013 and 2015. The IPM model projects that the generation from these non-CO<sub>2</sub> emitting generators is likely to be replaced with fossil fuel-fired generation, at least in part. Nevertheless, CO<sub>2</sub> emission reductions over the 2014-2020 period from affected sources across the RGGI region are estimated to be 86 million tons compared to the Reference Case.

Under the Reference Case, without making any proposed Program revisions, CO<sub>2</sub> allowance prices are projected to remain at the minimum reserve price through 2020. Under the Program Case, CO<sub>2</sub> allowance prices (the cost of complying with RGGI) are projected to increase from approximately \$6.02/ton (2010 dollars) in 2014 to about \$6.73/ton in 2016 and to about \$8.41/ton in 2020. Approximately 17.6 million allowances would be obtained by the marketplace between 2014 and 2020 from the Cost Containment Reserve (CCR), which would be triggered at \$4/ton in 2014 and at \$6/ton in 2015.

Under the Program Case, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.64/MWh higher in 2016 and \$2.12/MWh higher in 2020, than the Reference Case. RGGI is projected to increase wholesale electricity prices in New York State by about 3.0 percent in 2016 and 3.9 percent in 2020. For a typical New York residential customer (using 750 kWh per month), the projected increase in wholesale electricity prices in 2016 translates into a monthly retail bill increase of about 1.0 percent or \$0.86. In 2020, the projected increase in wholesale electricity prices translates into a monthly residential retail bill increase of about 0.8 percent or \$0.71. For commercial customers, the projected retail price impact of RGGI is about 1.1 percent in 2016 and 0.7 percent in 2020 (\$7.87 and \$5.00 per month, respectively). For industrial customers, the projected retail price impact of RGGI is about 1.7 percent in 2016 and 1.2 percent in 2020.

IPM projects electricity system operations and costs with perfect foresight, which means that there is certainty of knowledge of all future market outcomes, including allowance prices and the use of the private bank. However, market participants may make decisions related to use of banked allowances for compliance on a shorter time horizon. In order to assess the use of the private bank during the short-term, an alternative usage scenario ("Alt Bank") was examined. Under the Alt Bank scenario, it is assumed that the marketplace would use the private bank of allowances at a rate roughly 40 percent faster than under the Program Case during the 2014-2017 timeframe. CO<sub>2</sub> emissions from New York generators are projected in the Alt Bank scenario to be 4.4 million tons (10.7 percent) lower in 2020 than Reference Case. The generators are assumed to use more of the private bank by 2017 under this scenario, therefore less allowances will be available for use in later years and more emissions reductions will occur during this timeframe. Emissions from affected sources across the RGGI region are estimated to be 81.6 million tons in 2020 under the Alt Bank scenario while they are projected to be 87.8 million tons under the Program Case.

CO<sub>2</sub> allowance prices under the Alt Bank scenario are projected to increase from approximately \$3.60/ton (2010 dollars) in 2014 to about \$6.57/ton in 2016 and about \$10.21/ton in 2020. Prices are lower in the short-term under the Alt Bank scenario than under the Program Case because the former scenario assumes that more allowances from the private bank are being used for compliances in the short term. Similarly, prices are higher in 2020 under the Alt Bank scenario because the marketplace has fewer allowances left over in the private bank relative to the Reference Case. Under the Alt Bank scenario, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.62/MWh higher in 2016 and \$2.72/MWh higher in 2020, than the Reference Case. Wholesale electricity prices are estimated to increase by about 2.9 percent in 2016 and 4.9 percent in 2020 under the Alt Bank scenario relative to the Reference Case.

Sensitivity analyses were performed to develop bounds or collars around the Reference Case and Program Case projections. First, a Higher Emissions scenario that assumes higher natural gas prices and higher regional energy demand was evaluated. This scenario used natural gas prices from the Low Estimated Ultimate Recovery scenario in EIA's 2012 Annual Energy Outlook where Henry Hub natural gas prices are estimated to be \$5.31/MMBtu in 2020. Demand in this case is assumed to be about three percent higher in the near-term and four percent higher in the longer-term. Likewise, a Lower Emissions scenario was also developed that assumes lower natural gas prices, lower regional energy demand, and the continued operation of the Indian Point nuclear power plants through the timeframe of the study. This scenario used natural gas prices from the High Technically Recoverable Resources scenario where Henry Hub natural gas prices are estimated to be \$3.02/MMBtu in 2020. In this case, demand is assumed to be about three percent lower in the near-term and four percent lower in the longer-term.

The modeling case that evaluated the potential impacts of the Updated Model Rule using the Higher Emissions assumptions was called the 91 Cap\_Bank\_Model Rule\_High Case. Under this scenario, allowance

prices are estimated to be \$7.27/ton in 2014, \$8.13/ton in 2016 and \$10.15/ton in 2020. A sensitivity scenario was run to estimate the impacts of the Updated Model Rule with the Higher Emissions and Alt Bank assumptions. Under this 91 Cap Alt\_Bank\_Model\_Rule\_High Case, allowance prices are estimated to be about \$4.62/ton in 2014, \$6.90/ton in 2016, and \$16.44/ton in 2020. In IPM, allowance prices would only be expected to rise off of the minimum reserve price if the projected cumulative emissions over the time period exceed the cumulative cap level. When evaluating the impact of the Updated Model Rule using the Low Emissions scenario, emissions over the time period are projected to be 50 million tons less than the number of allowances available to the market (adjusted cap plus the emissions bank). Therefore, affected sources would not need to make any emission reductions and it is estimated that allowance prices would be at the minimum reserve price under this scenario.

A macroeconomic impact study to estimate the impact of the reduced CO<sub>2</sub> emissions cap, budget adjustments and the remainder of the proposed Program revisions<sup>7</sup> on jobs in the RGGI region was conducted at the direction of the New York and the Participating States by the Northeast States Coordinated Air Use Management (NESCAUM). Utilizing the Regional Economic Models, Inc. Policy Insight™ (REMI) model the study concludes that the economic impacts of the proposed Program revisions on the economies of New York and the Participating States are small and generally positive.

The macroeconomic impact study estimates that the cumulative change in employment in New York associated with the proposed Program revisions will be about 80,500 additional job-years over the period 2012 to 2040. It also estimates that the cumulative changes in New York's Gross State Product and Personal Income associated with the proposed Program revisions will increase approximately \$5.8 billion and \$4.7 billion, respectively (2010 dollars, calculated as the present value of estimated annual changes over the period 2012 to

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<sup>7</sup> The estimated impact of the RGGI Program is the increment calculated as the difference between the Reference Case and the "91 Cap Bank MR IPM Scenario."

2040, discounted at three percent per year to account for the time-value of money).

### MINIMIZING ADVERSE IMPACT

The promulgation of the proposed revisions to the Program and the amendments to Part 200, apply to affected sources statewide, including those located in rural areas. Since the regulations apply equally to affected facilities statewide, rural areas are not impacted any differently than other areas in the State. The Department is implementing the proposed revisions to the Program through a cap-and-trade program. Allowance based cap and trade systems are the most cost effective means for implementing emission reductions from large stationary sources, therefore the Department has minimized any potential adverse economic impacts of the Program to all sources on a statewide basis.

### RURAL AREA PARTICIPATION

New York and the Participating States committed to a comprehensive program review during the initial development of RGGI and agreed to evaluate: program success; program impacts; additional emissions reductions; imports and emissions leakage; and offsets. The Participating States initiated program review in the fall of 2010 with the announcement of its first stakeholder meeting and concluded the process in February, 2013. Supplemental to the regional stakeholder process, New York conducted a separate stakeholder process designed to provide updates on the status of the regional process and to afford additional opportunity for New York's stakeholders to provide comment.

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6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

## 6 NYCRR Part 200, General Provisions

## Regulatory Flexibility Analysis for Small Businesses and Local Governments

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative, historic effort among New York and eight Participating States<sup>1</sup> and is the first mandatory, market-based carbon dioxide ( CO<sub>2</sub>) emissions reduction program in the United States. Since its inception in 2008, RGGI has utilized an innovative market-based mechanism to cap and cost-effectively reduce emissions that cause climate change. Recently, New York along with the Participating States, completed a comprehensive program review and announced a proposal to lower the regional emissions cap established under RGGI to 91 million tons in 2014, declining 2.5 percent a year through 2020.<sup>2</sup> Accordingly, New York and the Participating States committed to propose revisions, pursuant to state-specific regulatory processes, to their respective CO<sub>2</sub> Budget Trading Programs to further reduce CO<sub>2</sub> emissions from power plants in the region. In order to implement the updated RGGI program in New York State, the Department of Environmental Conservation (Department) proposes to revise 6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program (the Program) and 6 NYCRR Part 200, General Provisions.

The proposed Program revisions which will cap regional CO<sub>2</sub> emissions at 91 million tons annually beginning in 2014 represent a nearly 45 percent reduction from the existing cap currently in place under the Program. After 2020, the cap will remain at 78 million tons annually. Further, in order to account for the existing private bank of CO<sub>2</sub> emissions allowances already acquired at auction, and in order to help create a binding cap, the proposed Program revisions provide two distinct budget adjustments. The First Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the first control period

<sup>1</sup> In addition to New York, the RGGI Participating States include: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, Rhode Island, and Vermont.

<sup>2</sup> The Participating States released the Updated Model Rule on February 7, 2013.

private bank of allowances (vintages 2009, 2010, and 2011) held by market participants after the first control period. The Second Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the surplus 2012 and 2013 vintage allowances held by market participants as of the end of 2013.

The proposed Program revisions also create the Cost Containment Reserve (CCR) which will help provide additional flexibility and cost containment for the Program. The CCR allowances will be triggered and released at auctions at \$4/ton in 2014, \$6/ton in 2015, \$8/ton in 2016, and \$10/ton in 2017. Each year after 2017 the CCR trigger price will increase by 2.5 percent. If the trigger price is reached, up to 10 million additional CCR allowances will be available for purchase at auction, except in 2014, when the reserve will be limited to five million allowances. The existing price triggers for expanding use of offsets and the one year compliance period extension will be eliminated in favor of the CCR.

Finally, the proposed Program revisions create an interim compliance obligation in part to align it with the annual compliance obligations under federal programs such as the Clean Air Interstate Rule and the Title IV Acid Rain Program. This program revision also helps to address the potential for a budget source to operate during the first couple of years of a three year compliance period and the potential to avoid their compliance obligation as a result of the business closing or falling into bankruptcy prior to the third year compliance obligation. In addition to demonstrating full compliance at the end of each three-year compliance period, regulated entities must now demonstrate that they are holding allowances equal to at least 50 percent of their emissions at end of each of the first two years in each three year compliance period. The proposed Program revisions also include minor revisions such as setting the reserve price at \$2.00 in 2014, to rise at 2.5 percent per year in subsequent years, updating all references, and the deleting early reduction allowance provisions. The majority of the proceeds from the sale of New York's allowances will be continue to be dedicated to strategic energy or consumer benefits, such as energy efficiency and clean energy technologies.

The burning of fossil fuels to generate electricity is a major contributor to climate change because fossil-fuel generators emit large amounts of CO<sub>2</sub>, the principal greenhouse gas (GHG). Overwhelming scientific evidence suggests that a warming climate poses a serious threat to the environmental resources and public health of New York State - the very same resources and public health the Legislature has charged the Department to preserve and protect. The warming climate threatens the State's air quality, water quality, marine and freshwater fisheries, salt and freshwater wetlands, surface and subsurface drinking water supplies, river and stream impoundment infrastructure, and forest species and wildlife habitats. Not only will the proposed Program revisions help to further counter the threat of a warming climate, they will also produce significant environmental co-benefits in the form of improved local air quality, and a more robust, diverse and clean energy supply in the State.

1. Effects on Small Businesses and Local Governments. No small businesses will be directly affected by the adoption of the proposed revisions to 6 NYCRR Part 242 and the amendments to 6 NYCRR Part 200.

The only local government affected by the proposed revisions to the Program is the Jamestown Board of Public Utilities (JBPU), a municipally owned utility which owns and operates the S. A. Carlson Generating Station (SACGS). Emissions monitoring at SACGS currently meets the monitoring provisions of the current Program, and no additional monitoring costs will be incurred under the proposed revisions to the Program. The costs associated with the proposed revisions to the Program will be dictated by how JBPU decides to comply with the provisions of the regulation.

2. Compliance Requirements. The JBPU, as owner and operator of the SACGS, will need to comply with the proposed revisions to the Program, as described below.

The proposed revisions to the Program do not change the applicability provisions of the current Program. Therefore, sources already subject to the current Program will remain subject to the proposed revisions to the Program. While the second control period under the current Program will remain unchanged and will include years 2012-2014 with a CO<sub>2</sub> allowance transfer deadline of March 1, 2015, the proposed Program revisions will require affected sources and units to comply with the emission limitations of the Program beginning on January 1, 2014.

The proposed revisions to the Program create a modified compliance schedule called an interim compliance period which is defined as each of the first two years of each three-year control period. The first interim control period under the revised Program will take place in year 2015; the second interim control period will take place in year 2016. In each of the first two calendar years of each three year control period (e.g., 2015 and 2016), the owners and operators of each source subject to the revised Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, as of the CO<sub>2</sub> allowance transfer deadline (midnight of March 1<sup>st</sup> or, if March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter), in the source's compliance account that is not less than 50 percent of the total tons of CO<sub>2</sub> emissions for that interim control period. A unit is subject to the interim control period requirements of the Program starting on the later of January 1, 2015 or date the unit commences operation.

Accordingly, at the end of each control period, (e.g., 2017), the owners and operators of each source subject to the revised Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, as of the CO<sub>2</sub> allowance transfer deadline (midnight of March 1<sup>st</sup> or, if March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter), in the source's compliance account that is not less than the total tons of CO<sub>2</sub> emissions for the control period less the CO<sub>2</sub> allowances deducted for the previous two interim control periods.

Additionally, for each control period in which a CO<sub>2</sub> budget source is subject to the proposed revisions to Program, the CO<sub>2</sub> authorized account representative of the source must continue to submit to the Department by the March 1<sup>st</sup> following the relevant control period, a compliance certification report for each source covering all such units.<sup>3</sup> As noted above, since the second control period for the Program remains unchanged, the first CO<sub>2</sub> allowance transfer deadline under the proposed revisions to the Program will occur on March 1, 2015.

3. Professional Services. The only local government affected by the proposed revisions to the Program, the JBPU, may need to hire outside professional consultants to comply with the proposed revisions to the Program and the amendments to 6 NYCRR Part 200. This work would likely be associated with any analyses of the revised Program. If it is determined that capital investments are needed to comply, design and construction management services will likely need to be procured.

4. Compliance Costs. In addition to the costs identified for regulated parties and the public, State and local governments will also incur costs. The Jamestown Board of Public Utilities (JBPU), a municipally owned utility, owns and operates the S.A. Carlson Generating Station (SACGS). Emissions monitoring at SACGS currently meets the monitoring provisions of the current Program, and no additional monitoring costs will be incurred under the proposed revisions to the Program. Notwithstanding this, just like any other owner or operator of any source subject to the revised Program, the JBPU will need to purchase CO<sub>2</sub> allowances equal to the number of tons of CO<sub>2</sub> emitted. The Department limited the analysis of control costs to the purchase of allowances needed to comply with the proposed revisions to the Program and predicts that CO<sub>2</sub> allowances will cost between \$6.00 in 2014 and \$9.00 in 2020 (in 2010 \$) per ton for CO<sub>2</sub> under the Program Case.

In order to estimate total costs for SACGS under the proposed revisions to the Program, the Department

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<sup>3</sup> Sources will not be required to submit a compliance certification report for any interim control periods.

reviewed 2009 through 2012 emissions from Jamestown 's affected unit. During that time period, Jamestown 's emissions ranged from a low of 4,261 tons to a high of 117,311 tons. Based on these emissions values, allowances needed to cover emissions are estimated to cost between a low of \$25,600 and a potential high of \$1 million, annually. These costs will eventually be passed on to the JBPU consumers.

The JBPU has a range of compliance options and can utilize the flexibility mechanisms inherent in the proposed revisions to the Program. Since the revised program has a three year control period with the compliance obligation at the end of the control period, the emission peaks associated with electricity generation will be averaged out and more long term planning options will be available to SACGS. Although the proposed Program revisions include an Interim Control Period that requires JBPU to cover 50 percent of their emissions in each of the first two years of a three year control period, it is not anticipated that this interim requirement will significantly reduce the flexibility available to JBPU. The JBPU will also incur costs associated with the administration of the revised Program.

5. Economic and Technical Feasibility. The JBPU has the option to do any combination of the following to comply with the proposed revisions to the Program: increase the efficiency of the natural gas-fired turbine, co-fire biofuel; purchase allowances, or purchase offsets. The addition of the CCR under the proposed Program revisions, in fact, adds more immediate relief to all affected sources, including the JBPU , by adding allowances to the market when the CCR triggers are hit. Any or all of these options are technologically and economically feasible to apply to SACGS.

6. Minimizing Adverse Impact. The promulgation of the proposed revisions to the Program and the amendments to 6 NYCRR Part 200 do not directly affect small businesses. Only one local government is affected by the proposed revisions to the Program, the JBPU. The proposed revisions to the Program constitute

an emissions allowance based cap and trade program. Cap and trade systems are the most cost effective means for implementing emission reductions from large stationary sources. By continuing to implement the Program and proposed Program revisions, the Department will minimize any associated adverse economic impacts on the JBPU.

7. Small Business and Local Government Participation. The JBPU was included on every stakeholder invitation sent to the Department's list serve. The Department is not aware if the JBPU received those notifications or if the JBPU participated in the public forums established by the Department to discuss the revisions to the Program with interested parties.

8. Cure Period. The proposed revisions to 6 NYCRR Part 242 will be effective on January 1, 2014. No additional cure period or other additional opportunity for ameliorative action is included in the revisions to 6 NYCRR Part 242. First, sources that will be subject to the proposed revisions to 6 NYCRR Part 242 are already subject to the existing Program, and have been since the regulation was initially promulgated in 2008 (or since they commenced operation). Second, because of the cap-and-trade nature of the revisions to the Program which includes periodic compliance deadlines, sources have flexibility to emit any amount of CO<sub>2</sub> during a control period, provided such emissions are covered by an adequate amount of CO<sub>2</sub> allowances by the relevant CO<sub>2</sub> allowance transfer deadline. For example, the second control period under the existing Program dates from years 2012-2014, with a CO<sub>2</sub> allowance transfer deadline of March 1, 2015. This is unchanged under the proposed revisions to the Program, and will continue to provide sources with flexibility and time to comply with the proposed revisions to the Program. Finally, while the proposed revisions include a new annual interim compliance requirement, the first interim compliance period will be year 2015 with a CO<sub>2</sub> allowance transfer deadline of March 1, 2016. This provides additional time for sources to plan for compliance with the proposed new interim compliance obligation. For these reasons, no additional cure period or other additional opportunity

for ameliorative action is necessary for the proposed revisions to 6 NYCRR Part 242.

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6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

## 6 NYCRR Part 200, General Provisions

## Regulatory Impact Statement

## INTRODUCTION

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative, historic effort among New York and eight Participating States<sup>1</sup> and is the first mandatory, market-based carbon dioxide (CO<sub>2</sub>) emissions reduction program in the United States. Since its inception in 2008, RGGI has utilized an innovative market-based mechanism to cap and cost-effectively reduce emissions that cause climate change. Recently, New York along with the Participating States, completed a comprehensive program review and announced a proposal to lower the regional emissions cap established under RGGI to 91 million tons in 2014, declining 2.5 percent a year through 2020.<sup>2</sup> Accordingly, New York and the Participating States committed to propose revisions, pursuant to state-specific regulatory processes, to their respective CO<sub>2</sub> Budget Trading Programs to further reduce CO<sub>2</sub> emissions from power plants in the region. In order to implement the updated RGGI program in New York State, the Department of Environmental Conservation (Department) proposes to revise 6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program (the Program) and 6 NYCRR Part 200, General Provisions.

The proposed Program revisions which will cap regional CO<sub>2</sub> emissions at 91 million tons annually beginning in 2014 represent a nearly 45 percent reduction from the existing cap currently in place under the Program. After 2020, the cap will remain at 78 million tons annually. Further, in order to account for the existing private bank of CO<sub>2</sub> emissions allowances already acquired at auction, and in order to help create a binding cap, the proposed Program revisions provide two distinct budget adjustments. The First Control Period

<sup>1</sup> In addition to New York, the RGGI Participating States include: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, Rhode Island, and Vermont.

<sup>2</sup> The Participating States released the Updated Model Rule on February 7, 2013.

Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the first control period private bank of allowances (vintages 2009, 2010, and 2011) held by market participants after the first control period. The Second Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the surplus 2012 and 2013 vintage allowances held by market participants as of the end of 2013.

The proposed Program revisions also create the Cost Containment Reserve (CCR) which will help provide additional flexibility and cost containment for the Program. The CCR allowances will be triggered and released at auctions at \$4/ton in 2014, \$6/ton in 2015, \$8/ton in 2016, and \$10/ton in 2017. Each year after 2017 the CCR trigger price will increase by 2.5 percent. If the trigger price is reached, up to 10 million additional CCR allowances will be available for purchase at auction, except in 2014, when the reserve will be limited to five million allowances. The existing price triggers for expanding use of offsets and the one year compliance period extension will be eliminated in favor of the CCR.

Finally, the proposed Program revisions create an interim compliance obligation in part to align it with the annual compliance obligations under federal programs such as the Clean Air Interstate Rule and the Title IV Acid Rain Program. This program revision also helps to address the potential for a budget source to operate during the first couple of years of a three year compliance period and the potential to avoid their compliance obligation as a result of the business closing or falling into bankruptcy prior to the third year compliance obligation. In addition to demonstrating full compliance at the end of each three-year compliance period, regulated entities must now demonstrate that they are holding allowances equal to at least 50 percent of their emissions at end of each of the first two years in each three year compliance period. The proposed Program revisions also include minor revisions such as setting the reserve price at \$2.00 in 2014, to rise at 2.5 percent per year in subsequent years, updating all references, and the deleting early reduction allowance provisions. The majority of the proceeds from the sale of New York's allowances will be continue to be dedicated to strategic

energy or consumer benefits, such as energy efficiency and clean energy technologies.

The burning of fossil fuels to generate electricity is a major contributor to climate change because fossil-fuel generators emit large amounts of CO<sub>2</sub>, the principal greenhouse gas (GHG). Overwhelming scientific evidence suggests that a warming climate poses a serious threat to the environmental resources and public health of New York State - the very same resources and public health the Legislature has charged the Department to preserve and protect. The warming climate threatens the State's air quality, water quality, marine and freshwater fisheries, salt and freshwater wetlands, surface and subsurface drinking water supplies, river and stream impoundment infrastructure, and forest species and wildlife habitats. Not only will the proposed Program revisions help to further counter the threat of a warming climate, they will also produce significant environmental co-benefits in the form of improved local air quality, and a more robust, diverse and clean energy supply in the State.

#### STATUTORY AUTHORITY

The statutory authority to reduce the CO<sub>2</sub> emissions cap and to provide for the budget adjustments derives primarily from the Department's authority to prevent and control air pollution, as set out in the Environmental Conservation Law (ECL) at Sections 1-0101, 1-0303, 3-0301, 19-0103, 19-0105, 19-0107, 19-0301, 19-0303, 19-0305, 71-2103, 71-2105.

The general powers of the New York State Energy Research and Development Authority (NYSERDA) that are relevant to the ability to sell allowances, including CCR allowances, in a transparent auction are set forth in the Public Authorities Law Sections 1851, 1854 and 1855.

Brief synopses of the statutory sections which grant the Department authority to promulgate these

revisions to the Program and to prevent and control air pollution are outlined below.

ECL Section 1-0101. This section declares that it is a policy of New York State to conserve, improve and protect its natural resources and environment and control air pollution in order to enhance the health, safety and welfare of the people of New York State and their overall economic and social well being. Section 1-0101 further expresses, among other things, that it is the policy of New York State to coordinate the State's environmental plans, functions, powers and programs with those of the federal government and other regions and manage air resources to the end that the State may fulfill its responsibility as trustee of the environment for present and future generations. This section further declares that the Department shall promote patterns of development and technology that minimize adverse impacts on the environment.

ECL Section 1-0303. This section defines the term "pollution". Pollution is defined as "the presence in the environment of conditions and or contaminants in quantities of characteristics which are or may be injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property throughout such areas of the state as shall be affected thereby." The reduction in the CO<sub>2</sub> emissions cap and the budget adjustments will remove conditions and contaminants from the environment which are injurious to human, plant and animal life or to property throughout the State.

ECL Section 3-0301. This section empowers the Department to coordinate and develop programs to carry out the environmental policy of New York State set forth in section 1-0101. Section 3-0301 specifically empowers the Department to: provide for the prevention and abatement of air pollution; cooperate with officials and representatives of the federal government, other States and interstate agencies regarding problems affecting the environment of New York State; encourage and undertake scientific investigation and research on the ecological process, pollution prevention and abatement, and other areas essential to understanding and

achievement of the environmental policy set forth in section 1-0101; monitor the environment to afford more effective and efficient control practices; identify changes in ecological systems and to warn of emergency conditions; enter into contracts with any person to do all things necessary or convenient to carry out the functions, powers and duties of the Department; and adopt such regulations as may be necessary, convenient or desirable to effectuate the environmental policy of the State.

ECL Section 19-0103. This section declares that it is the policy of New York State to maintain a reasonable degree of purity of air resources. In carrying out such policy, the Department is required to balance public health and welfare, the industrial development of the State, propagation and protection of flora and fauna, and the protection of personal property and other resources. To that end, the Department is required to use all available practical and reasonable methods to prevent and control air pollution in the State.

ECL Section 19-0105. This section declares that it is the purpose of Article 19 of the ECL to safeguard the air resources of New York State under a program which is consistent with the policy expressed in section 19-0103 and in accordance with other provisions of Article 19.

ECL Section 19-0107. This section defines the terms "air contaminant" and "air pollution". "Air contaminant" is defined as "a dust, fume, gas, mist, odor, smoke, vapor, pollen, noise or any combination thereof." "Air pollution" is defined as "the presence in the outdoor atmosphere of one or more air contaminants in quantities, of characteristics and of a duration which are injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property throughout the state or throughout such areas of the state as shall be affected thereby." Further reductions of CO<sub>2</sub> emissions and budget adjustments pursuant to the proposed Program revisions fit well within these definitions because they are gases which are present in the outdoor atmosphere in quantities that engender and/or provoke climate change, which is

injurious to life and property in New York State.

ECL Section 19-0301. This section declares that the Department has the power to promulgate regulations for preventing, controlling or prohibiting air pollution, and shall include in such regulations provisions prescribing the degree of air pollution that may be permitted and the extent to which air contaminants may be emitted to the air by any source in any area of the State. The Department also has the authority to cooperate with other states, interstate agencies, or international agencies with respect to the control of air pollution or air contamination.

ECL Section 19-0303. This section provides that the terms of any air pollution control regulation promulgated by the Department may differentiate between particular types and conditions of air pollution and air contamination sources. Section 19-0303 also provides that the Department, in adopting any regulation which contains a requirement that is more stringent than the Clean Air Act or its implementing regulations, must include in the Regulatory Impact Statement, an evaluation of the cost-effectiveness of the proposed regulation in comparison to the cost-effectiveness of reasonably available alternatives and a review of the reasonably available alternative measures along with an explanation of the reasons for rejecting such alternatives (see alternatives section at pages 74-79).

ECL Section 19-0305. This section authorizes the Department to enforce the codes, rules and regulations established in accordance with Article 19. Section 19-0305 also empowers the Department to conduct or cause to be conducted studies and research with respect to air pollution control, abatement or prevention.

ECL Section 71-2103 and Section 71-2105. These sections set forth the civil and criminal penalty

structures for violations of Article 19.

Brief synopses of the statutory sections which grant NYSERDA authority to implement the proposed Program revisions are outlined below.

Public Authorities Law (PAL). The proposed Program revisions are designed to allocate the CO<sub>2</sub> allowances (including CCR allowances) to the Energy Efficiency and Clean Energy Technology (EE&CET) Account which was created and will be administered by NYSERDA. NYSERDA will continue to administer the EE&CET Account so that CO<sub>2</sub> allowances will be sold in a transparent allowance auction or auctions and the proceeds of the auction or auctions will be used to promote and reward investments in energy efficiency, renewable or non-carbon emitting technologies, and/or innovative carbon emissions abatement technologies with significant carbon reducing potential.

The proposed Program revisions will create the Cost Containment Reserve (CCR) which will help provide additional flexibility and cost containment. NYSERDA will ensure that the CCR allowances will be triggered and released at auctions at \$4/ton in 2014, \$6/ton in 2015, \$8/ton in 2016, and \$10/ton in 2017. Each year after 2017 the CCR trigger price will increase by 2.5 percent. If the trigger price is reached, up to 10 million additional CCR allowances will be available for purchase at auction, except in 2014, when the reserve will be limited to five million allowances.

NYSERDA currently administers energy efficiency and clean technology programs funded by the EE&CET allocation pursuant to its authority under PAL Section 1854 and Title 9-A of Article 8 of the PAL, and will continue to do so under the proposed revisions to the Program. Section 1854 states that “the purposes of NYSERDA shall be to develop and implement new energy technologies consistent with economic, social and

environmental objectives, to develop and encourage energy conservation technologies.”

Title 9-A establishes the green jobs - green New York program for the purposes of promoting energy efficiency, energy conservation and the installation of clean energy technologies; the reducing GHG emissions; supporting sustainable community development; to create green job opportunities, including opportunities for new entrants into the State’s workforce, the long-term unemployed and displaced workers; and to using innovative financing mechanisms to finance energy efficiency improvements through energy cost savings.

“Energy conservation technologies” are defined in PAL Section 1851(11) as “all methods of conserving energy, of improving the efficiency of energy utilization and of preserving and protecting the environment...in connection with the use of energy.” PAL Section 1891(12) defines “qualified energy efficiency services” and provides a list of qualified measures that are eligible for funding under the Program.

NYSERDA’s authority under PAL Section 1854 includes the following:

“1. Research, development and demonstration. To conduct, sponsor, assist and foster programs of research, development and demonstration in new energy technologies including but not limited to : energy conservation; production of power from new sources with emphasis on renewable energy sources such as solar, wind, bioconversion and solid waste; storage of energy with emphasis on inertial and battery storage; conversion and/or technological improvement of facilities now utilizing nuclear fission energy and fossil fuel energy technologies; transmission and distribution of power; and conversion of energy and improvements of efficiencies of such conversion, including the power after assessing and taking into account environmental considerations thereof, to establish, acquire, operate, develop and manage facilities therefor.”

“2. The provision of services. To provide services required for the development and use of new energy

technologies and related methods by the industrial, commercial, medical, scientific, public interest, educational and governmental organizations within the state, including the power to establish, acquire and develop facilities therefore not otherwise available within the state, and to operate and manage such facilities.”

“11. To advise and assist the governor and legislature in the development and implementation of state policies relating to energy and energy resources.”

“18. To provide for the deposit of all or a portion of the proceeds collected by the authority from the auction or sale of emissions allowances allocated by the department of environmental conservation to the authority pursuant to regulations adopted by the department of environmental conservation to a green jobs-green New York fund to be established in the custody of the commissioner of taxation and finance. The monies in such fund shall be available for the green jobs-green New York program pursuant to title nine-A of article eight of this chapter.”

Although NYSERDA’s Allowance Auction Program (21 NYCRR Part 507) will not be revised as part of this rulemaking, this authority allows NYSERDA to continue to administer the EE&CET Account so that the proceeds of the auctions can be used to promote and reward investments in energy efficiency, renewable or non-carbon-emitting technologies, and/or innovative carbon emissions abatement technologies with significant carbon reduction potential and similar energy conservation technologies. The stated purposes of the EE&CET Account are consistent with NYSERDA’s authority to conduct, sponsor and assist programs related to new energy technologies and qualified energy efficiency services and to provide services related to their development.

PAL Section 1855. The general powers that are relevant to NYSERDA’s authority to administer the

EE&CET Account to promote and reward investments in energy efficiency, renewable or non-carbon-emitting technologies, and/or innovative carbon emissions abatement technologies with significant carbon reduction potential, and to sell allowances (including CCR allowances) in a transparent auction are also set forth in PAL Section 1855. NYSERDA's authority under Sections 1854 and 1855 enables it to accept and sell the allowances and utilize the proceeds to promote and reward investments related to energy conservation technologies similar to the stated purposes of the EE&CET Account.

NYSERDA's authority to auction the CO<sub>2</sub> allowances and CCR allowances is enumerated in their powers:

“10. To enter into any contracts and to execute all instruments necessary or convenient for the exercise of its corporate powers and the fulfillment of its corporate purposes under this title.”

“14. To accept any gifts or grants or loans of funds or property or financial or other aid in any form from the federal government or any agency or instrumentality thereof or from the state or from any other source and to comply, subject to the provisions of this title, with the terms and conditions thereof.”

“17. To do all things necessary or convenient to carry out its corporate purposes and exercise the powers given and granted by this title.”

### LEGISLATIVE OBJECTIVES

Through numerous legislative enactments, the Legislature has directed and empowered the Department to promote the safety, health and welfare of the public, protect the State's natural environment, and also help assure a safe, dependable and economical supply of energy to the people of the State. The warming climate

represents an enormous environmental challenge for the State, because unabated, climate change will continue to have serious adverse impacts on the State's natural resources, public health and infrastructure. Power plants that burn fossil fuel emit significant quantities of CO<sub>2</sub>, a chief contributor to the unnatural warming of our climate. New York power plants represent approximately one-fifth of all GHG emissions in the State.<sup>3</sup> In 2012, New York power plants subject to the Program emitted approximately 35 million tons of CO<sub>2</sub> into the atmosphere. By continuing to impose emissions limitations on fossil fuel-fired electric generating sources under a revised flexible cap-and-trade program, the Department is acting to preserve and protect the State's environment while maintaining a reliable supply of electricity. These air quality improvements will mitigate the impacts of climate change in New York, thereby contributing to public safety, health and welfare. The regulatory flexibility provided under the revisions to the Program, including the CCR and Offset provisions, helps to ensure continued reliability and adequacy of the State's electricity supply, assists in the furtherance of public health, and is necessary for continued industrial development and preservation of physical property.

New York and the Participating States committed to a comprehensive program review during the initial development of RGGI and agreed to evaluate: program success; program impacts; additional emissions reductions; imports and emissions leakage; and offsets. The Participating States initiated program review in the fall of 2010 with the announcement of its first stakeholder meeting and concluded the process in February, 2013. More than a dozen stakeholder meetings and webinars were conducted during this period by the Participating States and RGGI Incorporated (RGGI, Inc.)<sup>4</sup> whereby public input was obtained on a number of program elements. Prior to each stakeholder meeting, agency staff and RGGI, Inc. distributed pertinent written material to the participants and posted meeting documents on the RGGI, Inc. web site. The stakeholder meetings were

<sup>3</sup> "Patterns and Trends New York State Energy Profiles: 1996-2010," Final Report, April 2012. [http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Energy-Prices-Data-and-Reports/EA-Reports-and-Studies/Patterns-and-Trends.aspx?sc\\_database=web](http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Energy-Prices-Data-and-Reports/EA-Reports-and-Studies/Patterns-and-Trends.aspx?sc_database=web)

<sup>4</sup> RGGI, Inc. is a 501(c)(3) non-profit corporation created to provide technical and administrative services to the Participating States.

open to the public and all interested parties were encouraged to provide comment. All stakeholder comments were ultimately considered in the development of the Draft Updated Model Rule, which contained detailed regulatory text, and was released to the stakeholders for comment on November 20, 2012. The final version of the Updated Model Rule was released by the Participating States on February 7, 2013, which contained additional updates based on stakeholder feedback received on the Draft Updated Model Rule.

Supplemental to the regional stakeholder process, New York conducted a separate stakeholder process designed to provide updates on the status of the regional process and to afford additional opportunity for New York's stakeholders to provide comment. Seven meetings and staff availability sessions were held in New York and when possible, the Department sent list-serve notices to New York stakeholders announcing regional meetings and webinars. This included, for example, presentations by Department representatives, regarding RGGI program review and the proposed revisions to the Program, at the Business Council's <sup>5</sup> Spring Environmental Conference on April 18, 2013 and Annual Meeting in Bolton Landing on September 19, 2012.

## NEEDS AND BENEFITS

### Introduction

Mitigating the impacts of a warming climate represents one of the most pressing environmental challenges for the State, the nation and the world. Extensive scientific data demonstrates the need for immediate worldwide action to reduce emissions from burning fossil fuels and supports the conclusion that great benefits will accrue if fossil fuel-fired emissions are reduced through programs like RGGI. This section outlines the Department's analysis of the need for the proposed Program revisions, principally the proposed reduction in the CO<sub>2</sub> emissions cap and budget adjustments, and discusses its considerable benefits.

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<sup>5</sup> The Business Council of New York State, Inc., is the leading business organization in New York State, representing the interests of large and small firms throughout the state. Its membership is made up of thousands of member companies, as well as local chambers of commerce and professional and trade associations.

First, this section explains the updated basic science of global climate change and the greenhouse effect and forcing effect that emissions of anthropogenic GHGs have on climate change. Second, this section explains the need for a binding CO<sub>2</sub> emissions cap and budget adjustments as illustrated by the most recent scientific findings and projected future impacts of climate warming on the region. Third, this section explains the Program benefits from the revisions to the Program including the substantial reduction of power plant emissions and the benefits of the CCR and Offsets programs. Finally, it explains the benefits associated with the auctioning of allowances, including CCR allowances for purposes of energy efficiency and clean energy technologies.

### The Greenhouse Effect and the Warming Climate

A naturally occurring greenhouse effect has regulated the earth's climate system for millions of years. Solar energy from the sun that reaches the surface of the earth is radiated back out into the atmosphere as long wave or infrared radiation. CO<sub>2</sub> and other naturally occurring GHGs trap heat in our atmosphere, maintaining the average temperature of the planet approximately 50 degrees Fahrenheit (°F) higher than it normally would be. An enhanced greenhouse effect and associated climate change results as large quantities of anthropogenic GHGs, especially CO<sub>2</sub> from the burning of fossil fuels, are added to the atmosphere.

Since the mid-1700's, atmospheric concentrations of GHGs have increased substantially due to human activities such as fossil fuel use and land-use change. This is important because CO<sub>2</sub>, as well as other GHGs, persist in the atmosphere for hundreds of years and, thus, have a lasting effect on the climate. Today, atmospheric CO<sub>2</sub> concentrations exceed 398 parts per million --- nearly 40 percent higher than preindustrial levels, and according to ice core data, higher than at any point in the past 800,000 years.<sup>6</sup>

There is clear scientific consensus that anthropogenic emissions of CO<sub>2</sub> are contributing to the observed

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<sup>6</sup>National Research Council of the National Academies. Climate Change: Evidence, Impacts, and Choices. 2012. Available at <http://nas-sites.org/americasclimatechoices/more-resources-on-climate-change/climate-change-lines-of-evidence-booklet/>.

warming of the planet as presented in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.<sup>7</sup> The large and persuasive body of research demonstrates through unequivocal evidence that the Earth's lower atmosphere, oceans, and land surfaces are warming; sea level is rising; and snow cover, mountain glaciers, and Arctic sea ice are shrinking. The Earth's climate is changing, with adverse consequences already well documented across the globe, in our nation and in the State. Extreme heat events are increasing and intense storms are occurring with greater frequency. Many of the observed climate changes are beyond what can be explained by natural variability of the climate.<sup>8,9</sup>

In 2005, the United States National Academies of Science and the national academies of 10 other industrial nations reached a number of important conclusions about the need for government action to reduce emissions.<sup>10</sup> The reduction of the emissions cap is further supported by a recent report analyzed by New York and the Participating States during Program review called "America's Climate Choices." This 2011 report by the National Academy of Sciences, recently emphasized again, the pressing need for action to reduce emissions and to limit the magnitude of climate change:

Climate change poses significant risks for a broad range of human and natural systems;

The faster emissions are reduced, the lower the risks posed by climate change. Each additional ton of GHG emitted commits us to further change and greater risks;

<sup>7</sup> IPCC WGI Fourth Assessment Report, Climate Change 2007: The Physical Science Basis, February 2007, and available at: <http://www.ipcc.ch>.

<sup>8</sup> American Meteorological Society (AMS). Climate Change. An Information Statement of the American Meteorological Society. Adopted by AMS Council 20 August 2012.

<sup>9</sup> Hansen, J., Sato, M., Ruedy, R. 2012. 'Perception of climate change'. Proceedings from the National Academy of Sciences. [www.pnas.org/cgi/doi/10.1073/pnas.1205276109](http://www.pnas.org/cgi/doi/10.1073/pnas.1205276109). This study found that during the period from 1951-1980, extremely hot summers covered just 1 percent of Earth's land area. This had risen to 10 percent of the Earth's land area by the period from 1981-2010, and even higher during the 2006-2010 period. Based upon statistical analysis of global summertime temperatures, the authors concluded with a high degree of confidence, "extreme anomalies were a consequence of global warming because their likelihood in the absence of global warming was exceedingly small."

<sup>10</sup> Joint Science Academies' Statement: Global Response to Climate Change, issued June 7, 2005, and available at <http://www.nationalacademies.org/onpi/06072005.pdf>.

It is imprudent to wait for unacceptable impacts to occur before taking action because the effects of GHG emissions do not fully manifest themselves for decades, and once manifested, many of these changes will persist for hundreds, even thousands of years; and

The sooner that serious efforts to reduce GHG proceed, less pressure will be made for steeper (and thus likely more expensive) emission reductions later.<sup>11</sup>

### Impacts from Emissions Already Observed in New York's Climate

The need for the reduction of CO<sub>2</sub> emissions is clearly supported by numerous direct impacts that have been observed in New York State.

**Temperature.** Temperatures in New York State have risen during the twentieth century, with the greatest warming coming in recent decades – temperatures have risen by approximately 0.6°F per decade since 1970, with winter warming more than 1.1°F per decade.<sup>12</sup> This warming includes an increase in the number of extreme hot days (days at or above 90°F) and a decrease in the number of cold days (days at or below 32°F). New York experienced record high nighttime temperatures in the summer of 2010.<sup>13</sup>

**Sea level rise.** Sea level in the coastal waters of New York State and up the Hudson River has been steadily rising over the 20th century, chiefly as a result of thermal expansion of ocean waters, melting of land ice and local changes in the height of land relative to the height of the continental

<sup>11</sup> The National Academy of Sciences. Committee on America's Climate Choices, Board on Atmospheric Sciences and Climate Division on Earth and Life Studies, National Research Council. 'America's Climate Choices Final Report'. 2011. <http://americasclimatechoices.org/>

<sup>12</sup> Rosenzweig, C., W. Solecki, A. DeGaetano, M. O'Grady, S. Hassol, P. Grabhorn (Eds.). 'Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation'. New York State Energy Research and Development Authority (NYSERDA). <http://www.nysERDA.ny.gov/climaid>

<sup>13</sup> Natural Resources Defense Council (NRDC). 'The Worst Summer Ever? Record Temperatures Heat Up the United States'. September 2010. NRDC. <http://www.nrdc.org/globalwarming/hottestsummer/>

land mass. Tide-gauge observations in New York indicate that rates of relative sea level rise were significantly greater than the global mean, ranging from 2.41 to 2.77 millimeters per year (0.9 to 1.1 inches per decade).<sup>14</sup>

#### Future Impacts from Emissions Predicted for New York's Climate

Predictions of future impacts associated with emissions in New York further support the need for a substantial reduction in the CO<sub>2</sub> emissions cap. 'Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation' (ClimAID) project examines how sea level rise, changes in precipitation patterns, and more frequent severe weather conditions will affect New York's economy, environment, community life and human health. The project uses regionalized climate projections to develop adaptation recommendations and is a climate change preparedness resource for planners, policymakers, and the public.<sup>15</sup> The ClimAID project predicts the following:

**Air temperatures.** Air temperatures are expected to rise across New York, by 1.5 F° to 3°F by the 2020s, 3 F° to 5.5°F by the 2050s, and 4 F° to 9°F by the 2080s. By the end of the century, the greatest relative warming is projected for the northern regions of the State. The ranges in projected temperatures reflect potential future GHG emissions scenarios. The lower ends of the temperature ranges represent the projected outcome of lower emissions scenarios in which society dramatically reduces heat-trapping gas emissions and atmospheric GHG levels begin to stabilize. Likewise, the higher ends represent higher emissions scenarios in which emissions continue to increase and atmospheric GHG concentrations continue to rise. Sharp cuts in global emissions could result in smaller increases in temperatures, while a continuation of business as usual could result in increases greater than the highest projections.

<sup>14</sup> Titus, J.G. 'Coastal Sensitivity to Sea-Level Rise: A Focus on the Mid-Atlantic Region. Synthesis and Assessment Product 4.1'. U.S. Climate Change Science Program. 2009.

<http://www.epa.gov/climatechange/effects/coastal/sap4-1.html>

<sup>15</sup> Rosenzweig, 'op.cit.'

Precipitation. Annual average precipitation in New York is projected to increase by up to 5 percent by the 2020s, up to 10 percent by the 2050s and up to 15 percent by the 2080s, with the greatest increases in the northern part of the State. The increased precipitation will not be evenly distributed over the course of the year; much of it is likely to occur during the winter months, while slightly reduced precipitation is possible for the late summer and early fall. The recent trend of increased heavy downpours and less light rains precipitation is expected to continue.

Sea Level Rise. A recent study based upon 60 years of tide-gauge records indicates that the rate of increase for sea level rise along approximately 1000 km of the east coast of the United States, including New York, remains at approximately three to four times higher than the global average.<sup>16</sup> The New York State Sea Level Rise Task Force, charged by the State Legislature with assessing impacts to the State's coastlines from rising seas and recommending protective and adaptive measures, projected the sea level rise values in Table 1 for two regions in New York. The projections for sea level rise represent the middle range of values from model-based probabilities (16 global climate models by three GHG emissions scenarios) rounded to the nearest inch. The projections for sea level rise with rapid ice-melt scenario assume acceleration of recent rates of ice melt in the Greenland and west Antarctic ice sheets.

Table 1. Projected Sea Level Rise in Two Regions of New York

Lower Hudson Valley & Long Island	2020s	2050s	2080s
Sea level rise	2 to 5 in	7 to 12 in	12 to 23 in
Sea level rise with rapid ice-melt scenario	5 to 10 in	19 to 29 in	41 to 55 in
Mid-Hudson Valley & Capital Region	2020s	2050s	2080s

<sup>16</sup> Sallenger, A.H., Doran, K.S., Howd, P.A. Hotspot of accelerated sea-level rise on the Atlantic coast of North America. *Nature Climate Change*. Published online June 24, 2012. doi: 10.1038/NCLIMATE1597.

Sea level rise	1 to 4 in	5 to 9 in	8 to 18 in
Sea level rise with rapid ice-melt scenario	4 to 9 in	17 to 26 in	37 to 50 in

Source: New York State Sea Level Rise Task Force Report. December, 2010.<sup>17</sup>

Changes in Extreme Events. Extreme climate events, such as heat waves and heavy rainstorms, significantly impact New York’s communities and natural resources. Based on climate models, the ClimAID researchers developed probabilities of the future occurrence of extreme events in New York State. These results demonstrate that heat waves are expected to become more frequent and intense, heavy precipitation events are expected to become more frequent, and storm-related coastal flooding is expected to increase with rising sea levels.

#### Future Impacts from Emissions for New York State’s Resource Sectors

The need for the significantly reduced CO<sub>2</sub> emissions cap and budget adjustments are further supported by the ClimAID Study<sup>18</sup> which enumerates a number of predictions specifically for New York’s valued resources.

#### Water Resources

Rising air temperatures intensify the water cycle by driving increased evaporation and precipitation. The resulting altered patterns of precipitation include more rain falling in heavy events, often with longer dry periods in between. Heavy downpours have increased over the past 50 years and this trend is projected to continue, causing an increase in localized flash flooding in urban areas and hilly regions. Flooding has the potential to increase pollutants in the water supply and inundate wastewater treatment plants and other vulnerable

<sup>17</sup> “New York State Sea Level Rise Task Force Report to the Legislature,” December 31, 2010.

[http://www.dec.ny.gov/docs/administration\\_pdf/slrffinalrep.pdf](http://www.dec.ny.gov/docs/administration_pdf/slrffinalrep.pdf)

<sup>18</sup> Rosenzweig, ‘op.cit.’

development within floodplains. Less frequent summer rainfall is expected to result in additional, and possibly longer, summer dry periods, potentially impacting the ability of water supply systems to meet demands. Reduced summer flows on large rivers and lowered groundwater tables could lead to conflicts among competing water users. Increasing water temperatures in rivers and streams will affect aquatic health and reduce the capacity of streams to assimilate effluent from wastewater treatment plants.

### Coastal Zones

High water levels, strong winds, and heavy precipitation resulting from strong coastal storms already cause billions of dollars in damage and disrupt transportation and power distribution systems. Sea level rise will lead to more frequent and extensive coastal flooding. Warming ocean waters raise sea level through thermal expansion and have the potential to strengthen the most powerful storms.

Barrier islands are being dramatically altered by strong coastal storms, such as Hurricane Sandy, as ocean waters over wash dunes, create new inlets, and erode beaches. Sea level rise will greatly amplify risks to coastal populations and will lead to permanent inundation of low-lying areas, more frequent flooding by storm surges, and increased beach erosion. Loss of coastal wetlands reduces species diversity, including fish and shellfish populations. Some marine species, such as lobsters, are moving north from New York, while other species, such as the blue claw crab, are increasing in the warmer waters. Saltwater could reach farther up the Hudson River Estuary, potentially contaminating water supplies. Tides and storm surges may propagate farther, increasing flood risk both near and far from the coast. Sea level rise may also become the dominant stressor acting on vulnerable salt marshes.

### Ecosystems

Within the next several decades, New York State is likely to see widespread shifts in species

composition in the State's forests and other natural landscapes, with the loss of spruce-fir forests, alpine tundra and boreal plant communities. Climate change favors the expansion of some invasive species into New York, such as the aggressive weed, kudzu, and the insect pest, hemlock woolly adelgid. Some habitat and food generalists (such as white-tailed deer) may also benefit. A longer growing season and the potential fertilization effect of increasing CO<sub>2</sub> could increase the productivity of some hardwood tree species, provided growth is not limited by other factors such as drought or nutrient deficiency. CO<sub>2</sub> fertilization tends to preferentially increase the growth rate of fast growing species, which are often weeds and other invasive species. Lakes, streams, inland wetlands and associated aquatic species will be highly vulnerable to changes in the timing, supply, and intensity of rainfall and snowmelt, groundwater recharge and duration of ice cover. Increasing water temperatures will negatively affect brook trout and other native coldwater fish.

### Agriculture

Increased summer heat stress will negatively affect cool-season crops and livestock unless farmers take adaptive measures such as shifting to more heat-tolerant crop varieties and improving cooling capacity of livestock facilities. Increased weed and pest pressure associated with longer growing seasons and warmer winters will be an increasingly important challenge. Water management will be a more serious challenge for New York farmers in the future due to increased frequency of heavy rainfall events, and more frequent and intense summer water deficits by mid-to late-century.

### Public Health

Demand for health services and the need for public health surveillance and monitoring will increase as the climate continues to change. Heat-related illness and death are projected to increase, while cold-related deaths are projected to decrease. Increases in heat-related death, however, are projected to outweigh reductions

in cold-related death. More intense precipitation and flooding along the coasts and rivers could lead to increased stress and mental health impacts, impaired ability to deliver public health and medical services, increased respiratory diseases such as asthma, and increased outbreaks of gastrointestinal diseases. Cardiovascular and respiratory-related illness and death will be affected by worsening air quality, including more smog, wildfires, pollens, and molds. Vector-borne diseases, such as those spread by mosquitoes and ticks (‘e.g.’, West Nile virus and Lyme disease), may expand or their distribution patterns may change, either of which may adversely affect additional populations. Water supply, recreational water quality, and food production will be at increased risk due to increased temperatures and changing precipitation patterns. Water- and food-borne diseases are likely to increase without mitigation and adaptation intervention.

## Transportation

Over the next few decades, heat waves and heavy precipitation events are likely to dominate the causes for moderate, more frequent transportation problems such as flooded streets and delays in mass transit. By later this century, it is very likely that coastal flooding will be more frequent and intense due to sea level rise. Major adaptations are likely to be needed, not only in the coastal zones, but also in the Hudson River Estuary all the way to Troy and Albany as sea level rise and storm surge propagate up the tide-controlled Hudson River. Materials used in transportation infrastructure, such as asphalt and train rails, are vulnerable to increased temperatures and frequency of extreme heat events. Air conditioning requirements in buses, trucks, and trains, and ventilation requirements for tunnels will increase.

Low-lying transportation systems such as subways and tunnels, especially in coastal and near-coastal areas, are at particular risk of flooding as a result of sea level rise, storm surge, and heavy precipitation events. Transportation systems are vulnerable to ice and snowstorms, although requirements for salting and snow removal may decrease as precipitation tends to occur more often as rain than snow. Freeze/thaw cycles that

disturb roadbeds may increase in some regions as winter temperatures rise. Runways may need to be lengthened in some locations since hotter air provides less lift and hence requires higher speeds for takeoff. Newer, more powerful aircraft can reduce this potential impact. The Great Lakes may see a shorter season of winter ice cover, leading to a longer shipping season. However, reduced ice cover may result in an increase in “lake-effect” snow events, which cause various transportation problems.

New York State has the most days per year of freezing rain in the nation. This phenomenon affects air and ground transportation directly and indirectly through electric and communication outages. It is unknown how climate change will influence the frequency of freezing rain in the future.

#### Telecommunications

Communication service delivery is vulnerable to hurricanes, lightning, ice, snow, wind storms, and other extreme weather events, some of which are projected to change in frequency and/or intensity. The delivery of telecommunication services is sensitive to power outages, such as those resulting from the increased electrical demand associated with heat waves, which are expected to increase with climate change. Communication lines and other infrastructure are vulnerable to heavy precipitation events, flooding, and freezing rain. In coastal and near-coastal areas, sea level rise in combination with coastal storm surge flooding will be a considerable threat later this century.

#### Energy Sector

Impacts of climate change on energy demand are likely to be more significant than impacts on supply. Climate change will adversely affect system operations, increase the difficulty of ensuring adequate supply during peak demand periods, and exacerbate problematic conditions, such as the urban heat island effect. More

frequent heat waves will cause an increase in the use of air conditioning, stressing power supplies and increasing peak demand loads. Increased air and water temperatures will decrease the efficiency of power plants as they decrease cooling capacity.

Coastal infrastructure is vulnerable to flooding as a result of sea level rise and coastal storms; hydropower is vulnerable to projected increases in summer drought. The availability and reliability of solar power systems are vulnerable to changes in cloud cover although this may be offset by advances in technology; wind power systems are similarly vulnerable to changes in wind speed and direction. Biomass energy availability depends on weather conditions during the growing season which will also be affected by a changing climate.

Transformers and distribution lines for both electric and gas supply are vulnerable to extreme weather events, such as heat waves and flooding. Higher winter temperatures are expected to decrease winter heating demand, which will primarily affect natural gas markets, while increases in cooling demand will affect electricity markets; such changes will vary regionally. The indirect financial impacts of climate change may be greater than the direct impacts of climate change. These indirect impacts include those to investors and insurance companies as infrastructure becomes more vulnerable and those borne by consumers due to changing energy prices and the need to use more energy.

As outlined above, climate change is expected to impact New York's communities, economy and energy systems, affecting public health and safety, environment and natural resources, commerce and infrastructure. Consistent with its mission to protect the safety, health, and welfare of the public and the environmental resources of the State, the Department proposes the substantial reduction of the CO<sub>2</sub> emissions cap and budget adjustments, to address the specific potential harms identified and the overall nature and extent of threat of harm

to the State from climate change.

#### Emissions from Power Plants in New York

The burning of fossil fuels in New York power plants is a major contributor to increased atmospheric concentrations of CO<sub>2</sub>. In 2012, power plants in the State subject to the Program burned fossil fuels to produce approximately 35 million tons of CO<sub>2</sub> and significant amounts of other harmful pollutants that impact the health and welfare of New Yorkers. Since CO<sub>2</sub> emissions from the energy sector represent approximately one-fifth<sup>19</sup> of the State's total GHG emissions, any effort to curb the State's contribution to atmospheric concentrations of CO<sub>2</sub> must address CO<sub>2</sub> pollution from power plants.

In 1992, 154 nations, including the United States signed a treaty establishing the goal of stabilizing atmospheric GHG concentrations at a level that would prevent dangerous anthropogenic interference with the climate system. In response to scientific projections of likely severe climate impacts if global average temperatures rise more than approximately 3.6°F (2°C) above pre-industrial levels, the U.S. signed the 2009 Copenhagen CO<sub>2</sub> Accord<sup>20</sup> setting the target of limiting temperature increases to 2°C. As reported in 2007 by the IPCC, the best available scientific estimates indicate that there is an approximately 50 percent likelihood that the 2°C threshold will be exceeded when atmospheric CO<sub>2</sub> concentrations rise above 450 parts per million (ppm). Scientists project that stabilizing total atmospheric GHG concentrations (CO<sub>2</sub> plus the other long-lived GHGs, which include methane, nitrous oxide, ozone and several manmade fluorine-containing gases) at 450-500 ppm would provide a medium (approximately 50 percent) likelihood that warming will not exceed 2°C.

<sup>19</sup> "Patterns and Trends New York State Energy Profiles: 1996-2010," Final Report, April 2012. [http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Energy-Prices-Data-and-Reports/EA-Reports-and-Studies/Patterns-and-Trends.aspx?sc\\_database=web](http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Energy-Prices-Data-and-Reports/EA-Reports-and-Studies/Patterns-and-Trends.aspx?sc_database=web)

<sup>20</sup> Copenhagen Accord to the United Nations Framework Convention on Climate Change, Copenhagen Climate change Conference, December, 2009  
[http://unfccc.int/documentation/documents/advanced\\_search/items/6911.php?preref=600005735#beg](http://unfccc.int/documentation/documents/advanced_search/items/6911.php?preref=600005735#beg)

Scientific estimates of global emission levels required to maintain this concentration of atmospheric GHGs indicate that developed nations will need emission reductions of 80 percent from 1990 levels by mid-century. Given the considerable global CO<sub>2</sub> emissions already released to the atmosphere between 2000 and 2011, there is significant risk of exceeding the 2°C target unless decisive, global action is not taken within this decade.

By modeling effective GHG emissions reduction, New York can encourage other states and nations to turn around the accumulation of heat-trapping GHG in the atmosphere. New York's acknowledged leadership position confers a unique opportunity to influence the ultimate costs the State and its citizens will bear from climate change.

#### Components of the Proposed Program Revisions

The reduction in the CO<sub>2</sub> emissions cap to current levels represents a critical step to combat the significant challenges presented by climate change and to advance sound energy policies that foster energy efficiency and energy independence.

The proposed Program revisions will cap regional emissions at 91 million tons annually beginning in 2014 and will reduce that level by 2.5 percent each year through 2020. This represents a nearly 45 percent reduction from the existing cap currently in place under the program. After 2020, the cap will remain at 78 million tons annually.

Further, in order to account for the existing private bank of CO<sub>2</sub> emissions allowances already acquired at auction, and in order to help create a binding cap, the proposed Program revisions provide two distinct budget (cap) adjustments. The First Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the first control period private bank of allowances (vintages 2009, 2010, & 2011) held by

market participants after the first control period. The first adjustment will reduce New York's budget (the annual cap) by its portion of the regional cap (approximately 38.93 percent) in each allocation year over the seven year period 2014-2020. The Second Control Period Interim Adjustment for Banked Allowances will reduce the budget for 100 percent of the surplus 2012 and 2013 vintage allowances held by market participants as of the end of 2013. The second adjustment will reduce New York's budget (the annual cap) by its portion of the regional cap (approximately 38.93 percent) in each allocation year over the six year period 2015-2020.

In order to provide additional flexibility and cost containment the proposed Program revisions also create the Cost Containment Reserve (CCR). The CCR allowances will be triggered and released at auctions at \$4/ton in 2014, \$6/ton in 2015, \$8/ton in 2016, and \$10/ton in 2017. Each year after 2017 the CCR trigger price will increase by 2.5 percent. If the trigger price is reached, up to 10 million additional CCR allowances will be available for purchase at auction, except in 2014, when the reserve will be limited to 5 million allowances. The existing price triggers for expanding use of offsets and the one year compliance period extension will be eliminated in favor of the CCR.

As designed and implemented, the proposed reduction to the CO<sub>2</sub> emissions cap and budget adjustments will also achieve significant additional reductions outside of the power sector through reinvestment of auction proceeds for end-use energy efficiency and greenhouse gas emission reduction projects.

Finally, the proposed Program revisions create an interim compliance obligation in part to align it with the annual compliance obligations under federal programs such as the Clean Air Interstate Rule and the Title IV Acid Rain Program. This program revision also helps to address the potential for a budget source to operate during the first couple of years of a three year compliance period and the potential to avoid their compliance obligation as a result of the business closing or falling into bankruptcy prior to the third year compliance

obligation. In addition to demonstrating full compliance at the end of each three-year compliance period, regulated entities must now demonstrate that they are holding allowances equal to at least 50 percent of their emissions at end of the first two years in each three year compliance period. The proposed Program amendments also include minor revisions such as setting the reserve price at \$2.00 in 2014, to rise at 2.5 percent per year in subsequent years, updating all references, and the deleting early reduction allowance provisions. The majority of the proceeds from the sale of New York's allowances will be continue to be dedicated to strategic energy or consumer benefits, such as energy efficiency and clean energy technologies.

### Benefits from the Proposed Program Revisions

Global action is needed to solve climate change and renewed action in New York now will have local and Statewide benefits. Significant economic opportunities and environmental and health co-benefits such as reduced air pollution and improved public health are expected from programs that mitigate GHG emissions. First and foremost the reduction of the emissions cap and budget adjustments are projected to result in cumulative emission reductions, within the Participating States (2014 through 2020, including offsets), of 86 million tons of CO<sub>2</sub>. In addition, the Program's mandatory, market-based carbon control mechanisms will remain unchanged and will continue to function properly and deliver positive economic benefits.<sup>21,22,23,24,25</sup>

In New York, auction proceeds will continue to support additional emission reductions through investments in energy efficiency, renewable and clean energy and innovative carbon-abatement technologies, as guided by the RGGI Operating Plan.<sup>26</sup> NYSERDA regulations established the Advisory Group of stakeholders,

<sup>21</sup> Hibbard, P., Tierney, S., Okie, A., Darling, P. 'The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States (Review of the Use of RGGI Auction Proceeds from the First Three-Year Compliance Period)'. Analysis Group. November 15, 2011.

<sup>22</sup> [http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic\\_Impact\\_RGGI\\_Report.pdf](http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic_Impact_RGGI_Report.pdf)

<sup>23</sup> [http://www.env-ne.org/public/resources/pdf/ENE\\_RGGI\\_Macroeconomic\\_Benefits\\_110915.pdf](http://www.env-ne.org/public/resources/pdf/ENE_RGGI_Macroeconomic_Benefits_110915.pdf)

<sup>24</sup> <http://www.synapse-energy.com/Downloads/SynapseReport.2012-02.RAP.RGGI-Energy-Efficiency-Benefits.10-027A.pdf>

<sup>25</sup> <http://theenergycollective.com/wurzelmann/59328/rggi-s-benefits-costs-and-why-it-should-stay>

<sup>26</sup> [http://www.eany.org/images/Reports/rggi\\_success\\_apr2012.pdf](http://www.eany.org/images/Reports/rggi_success_apr2012.pdf)

which will continue to represent a broad array of energy and environmental interests, to provide advice on how best to utilize auction proceeds. The Operating Plan will continue to be reviewed and revised on an annual basis and the Advisory Group is convened to provide input.

The most recent version of the Operating Plan dated November 2012 estimates that the current investment of a portion of New York's proceeds in the Green Jobs - Green New York, Residential Energy Services, Municipal Water and Wastewater, and Industrial Process Improvement programs during a three year period will result in non-discounted lifetime savings of 1.9 million tons of CO<sub>2</sub> emissions and a non-discounted lifetime savings of \$390 million on customer energy bills.

Projected benefits from the proposed revisions are detailed in a study by the Northeast States Coordinated Air Use Management (NESCAUM) that estimates the macroeconomic impacts of the program in the RGGI region. The study uses the Regional Economic Models, Inc. Policy Insight™ (REMI) model, a multi-state structural economic forecasting and policy analysis model that produces projections of employment, gross state product, and personal income.<sup>27</sup> The macroeconomic results reflect the potential impacts associated with the proposed revisions to the program (including the investment of auction proceeds in an estimated portfolio of energy efficiency, clean energy and carbon abatement programs). The study estimates that the cumulative changes in New York's Gross State Product and Personal Income associated with the proposed revisions to the program will be about \$5.8 billion and \$4.7 billion, respectively (2010 dollars, calculated as the present value of estimated annual changes over the period 2012 to 2040, discounted at three percent per year to account for the

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<sup>26</sup> New York State Energy and Research Development Authority (NYSERDA). 'Operating Plan for Investments in New York under the CO<sub>2</sub> Budget Trading Program and the CO<sub>2</sub> Allowance Auction Program'. NYSERDA. November 2012. <http://www.nyserd.ny.gov/Energy-and-the-Environment/Regional-Greenhouse-Gas-Initiative/Auction-Proceeds.aspx>

<sup>27</sup> "REMI Economic Impacts Analysis," by the Northeast States for Coordinated Air Use Management (NESCAUM), June 3, 2013. [http://www.rggi.org/docs/ProgramReview/REMI%2091%20Cap%20Bank%20MR\\_2013\\_06\\_03.pdf](http://www.rggi.org/docs/ProgramReview/REMI%2091%20Cap%20Bank%20MR_2013_06_03.pdf)

time-value of money). In the context of New York 's total Gross State Product and total Personal Income these changes represent small but positive changes.

While the Operating Plan and macroeconomic modeling provide estimates of future benefits associated with the investment of projected auction proceeds in New York, NYSERDA will continue to prepare quarterly status reports that will include: a summary of program activities and implementation; an estimate of program benefits; and an accounting of program costs and expenditures associated with the actual receipt of proceeds through that point in time. The last quarterly progress report of the year also serves as an annual evaluation and status report. The annual report will also provide information on the geographic distribution of Program funding and benefits across the State.

The annual report for the quarter ending December 31, 2012 reflects benefits associated with spending through that date. The table below illustrates the estimated cumulative annual benefits (as of December 31, 2012) at the portfolio and program levels from all currently operational projects installed since the start of the existing Program. These metrics, prepared by NYSERDA Program evaluation and implementation staff, represent the best estimate of Program benefits to date and are adjusted over time as individual programs are evaluated and results are adjusted based on those evaluation studies.

Summary of Cumulative Portfolio Benefits through December 31, 2012<sup>28</sup>

Benefits	Results through December 31, 2012
Net Greenhouse Gas Emission Savings <sup>1</sup> (Annual Tons CO <sub>2e</sub> <sup>2</sup> )	56,764

<sup>28</sup> New York State Energy and Research Authority, "New Yorks RGGI-Funded Programs Status Report," Quarter Ending December 31, 2012. <http://www.nyserdera.ny.gov/Energy-and-the-Environment/Regional-Greenhouse-Gas-Initiative/Evaluations-of-Funds.aspx>

Net Electricity Savings (Annual MWh)	16,895
Renewable Energy Generation (Annual MWh)	4,345
Net Natural Gas Savings (Annual MMBtu)	203,118
Net Fuel Oil Savings (Annual MMBtu)	337,096
Net Propane Savings (Annual MMBtu)	16,593
Net Steam Savings (Annual MMBtu)	15,969
Net Wood Savings (Annual MMBtu)	3,079
Net Kerosene Savings (Annual MMBtu)	1,026
Net Gasoline Savings (Annual MMBtu)	-
Net Residual Oil Savings (Annual MMBtu)	144
Net Diesel Savings (Annual MMBtu)	-
Total Fuel Savings (Annual MMBtu)	577,024
Annual Energy Bill Savings to Participating Customers (\$ Million)	12.0

<sup>1</sup> These emission reductions are associated with both electric and fossil-fuel saving measures.

Under a cap-and-trade system, the total number of emission allowances is determined by regulation. Regulated entities can purchase allowances and collectively emit up to the cap that is currently in place. Therefore, in the near term, electric efficiency projects may not decrease the overall amount of emissions going into the atmosphere. Nevertheless, electric efficiency projects will reduce end-users' responsibility or footprint associated with emissions from electricity production.

<sup>2</sup> CO<sub>2</sub>e stands for carbon dioxide equivalent and describes the amount of CO<sub>2</sub> that would have the same global warming potential.

NYSERDA projects the discounted lifetime savings of the cumulative values in the table to result in approximate: fuel savings of 8.7 million MMBtu; electricity savings of 294,000 MWh; bill savings of \$223 million; and CO<sub>2</sub> emission reductions of 753,000 tons. These annual values were converted to lifetime savings by applying a measure life assumption for each program that is based on the life of the longest-lived measure for that specific program. A five percent discount rate is applied to weight the impacts of the benefits over time.

The Program portfolio also results in non-energy benefits. For instance: Program funds were leveraged to obtain \$100 million in Federal funding to support a New York based Photovoltaic (PV) Manufacturing Consortium; ten regional sustainability plans were created with the involvement of more than 2,500 New York stakeholders; and a series of technical analyses related to offshore wind development have been completed.

#### Complementary GHG Programs in New York

The Program and the proposed revisions to the Program, along with Greenhouse Gas Exhaust Emission Standards (6 NYCRR Part 218- 8), CO<sub>2</sub> Performance Standards for Major Electric Generating Facilities (6 NYCRR Part 251), and the Renewable Portfolio Standard (RPS) are key components of New York's comprehensive GHG reduction policy. Working together, these programs benefit New York by reducing GHG emissions from the electricity generating sector and the motor vehicles sector, which are the two largest contributors of GHG emissions in New York State.

First, the Department adopted California GHG exhaust emission standards (6 NYCRR Subpart 218-8) for new motor vehicles to reduce emissions of GHGs, including most recently with amendments adopted in 2012. Section 177 of the Clean Air Act (42 United States Code Section 7507) permits states other than California to adopt motor vehicle emission standards, provided those standards are identical to California's

standards. New York has chosen to adopt California's more stringent motor vehicle standards since the early 1990s, in order to obtain emission reductions from new motor vehicles not provided by Federal new motor vehicle standards.

Secondly, the Department promulgated CO<sub>2</sub> Performance Standards for Major Electric Generating Facilities (6 NYCRR Part 251) in 2012, which prevents new high carbon emitting sources in the power sector (like coal-fired plants without carbon capture and sequestration or another control technology) and establishes CO<sub>2</sub> emission standards for new major electric generating facilities. Part 251 also establishes CO<sub>2</sub> emission standards for the expansion of existing electric generating facilities that increase electrical output capacity by at least 25 MW. The Program and Part 251 work together - RGGI sets an overall cap on CO<sub>2</sub> emissions from all new and existing fossil fuel-fired sources 25 MW and larger, while Part 251 sets a specific source-level CO<sub>2</sub> emission limit on all new and expanding sources 25 MW or larger.

Finally, the primary objective of the RPS is to improve New York's environment and increase energy diversity in order to reduce reliance on fossil fueled energy sources within a competitive energy market. The RPS seeks to increase the amount of electricity purchased from renewable sources in New York to 30 percent by 2015. Eligible energy technologies include anaerobic digestion, biomass, fuel cells, hydroelectric, solar, tidal, and wind. The RPS features centralized procurement managed by NYSERDA which manages the RPS Program and solicits bids for renewable energy.

Climate change is a global problem and effective action at the national and international level is necessary in order to stabilize atmospheric GHG concentrations at acceptable levels. Notwithstanding this, action now at the State and regional level to reduce GHG emissions and to implement the revisions to the Program will benefit and reduce the risk of injury to New York and its citizens and residents from climate

change. The risks of injury from a warming climate increases with the rate and magnitude of the warming, and in turn, the rate and magnitude of warming is primarily dependent upon the level of CO<sub>2</sub> emissions. The reductions in CO<sub>2</sub> emissions from power plants under the revisions to the Program contribute to a reduction in the risk of injury to New York and its citizens and residents from global climate change. In addition, by implementing the proposed revisions to the Program now, New York and the Participating States can:

Reduce the long-term costs of addressing climate change. By acting now, states can avoid the need for more disruptive measures later.

Position the region ahead of competitors. Taking early and continued action to reduce the region's carbon-intensity will create a competitive advantage relative to other parts of the country when action at the national and international level becomes unavoidable.

Capture environmental co-benefits. Reducing power sector carbon emissions provides numerous environmental co-benefits, including reduced emissions of other pollutants associated with fossil-based electricity generation. Additional co-benefits will be realized through the offsets component of the program which encourages afforestation, reduced agricultural emissions, and reduced consumption of natural gas, propane, and home heating oil. Additionally, co-benefits will be realized by allocating almost 100 percent of the CO<sub>2</sub> allowances to the EE&CET account to be auctioned by NYSERDA and have the resulting proceeds utilized for the account's purposes.

Drive new technology. By attaching tangible financial value to avoided carbon emissions, the proposed Program revisions provides a market incentive for developing and deploying new technologies that can increase fuel efficiency, utilize non-carbon resources (including renewable technologies such as wind and solar power), and reduce or eliminate carbon emissions from combustion sources. In addition, to the extent that the auctioning of allowances will spur additional investments in clean energy technologies, the auctions drive the deployment of new technologies in the State.

Promote improved supply-side and demand-side efficiency. The proposed Program revisions create a

direct incentive to reduce the fossil fuel inputs required to produce electricity through more efficient generating technologies. The Program's offsets provisions will continue to create incentives to promote improved demand-side efficiency, including not only more efficient technologies for reducing electricity consumption, but technologies for reducing primary energy consumption - both natural gas and home heating oil - in residential and commercial buildings. In addition, the allocation of offset allowances to create incentives for energy efficiency provide s direct incentives for end-use and supply-side energy efficiency projects in the State.

Improve the region 's energy security and reduce its exposure to higher energy prices. By creating a market incentive for low-carbon and non-carbon electricity technologies and by promoting increased supply-side and demand-side efficiency, the proposed Program revisions reduce the Northeast 's long-term exposure to high fossil fuel energy prices . Efficiency improvements and advances in new energy technology fostered by the proposed Program revisions can help buffer the region from the considerable economic risks associated with continued dependence on these fuels.

Stimulate economic development. The proposed Program revisions provide a positive stimulus for economic growth in the region by creating incentives for new technologies that could be developed in-region, promoting a more efficient and cleaner electricity generating sector, prompting other activities through its offsets program and improving efficiency. NYSERDA 's investment of proceeds from the auctioning of allowances provides further economic benefits.

As outlined above, the revisions to the Program will provide numerous benefits and continue to position New York as a leader in innovative and progressive climate change policies. In the absence of a comprehensive federal program, New York must continue to monitor issues that may minimize or threaten the effectiveness of the Program such as the potential for emissions leakage.

Emissions Leakage

Emissions Leakage refers to a potential shift of electricity generation from capped sources subject to the Program, to higher-emitting sources not subject to the Program, in and outside of the State.<sup>29</sup> Emissions leakage is defined as the increase in CO<sub>2</sub> emissions outside the RGGI region that may “net out” (or partially eliminate) a portion of the emissions reductions made within the RGGI region. Emissions leakage is an important concept because electricity is routinely transmitted across regional boundaries to meet economic and reliability objectives.

The Department examined emissions leakage in the Final Generic Environmental Impact Statement for the existing Program, accepted on August 13, 2008, and has continued to evaluate the potential for emissions leakage since the Program’s inception. New York and the Participating States examined leakage for CO<sub>2</sub> and other pollutants from the electric generating sector, such as NO<sub>x</sub> and SO<sub>2</sub>. However, since the federal action under the Clean Air Interstate Rule (CAIR) resulted in emissions caps for NO<sub>x</sub> and SO<sub>2</sub>, from the electric generating sector, emissions may shift, but will not increase as a result of the Program.

Over the past few years, the RGGI Electricity Monitoring Staff Working Group (Staff Working Group) analyzed potential emissions leakage and issued two annual monitoring reports.<sup>30,31</sup> These reports summarized data for electricity generation, electricity imports, and related CO<sub>2</sub> emissions for the Participating States from 2005 through 2010 and concluded that during the first two years of RGGI Program operation (2009 and 2010), there was no increase in CO<sub>2</sub> emissions or the CO<sub>2</sub> emission rate (pounds of CO<sub>2</sub> per megawatt hour, or lb CO<sub>2</sub>/MWh) from non-RGGI electric generation serving load in the ten-state RGGI region. Thus, for that period, these reports found no evidence of emissions leakage caused by the existing Program.

<sup>29</sup> WRI White Paper: Greenhouse Gas Emissions Trading in the U.S. States: Observations and Lessons from the OTC NO<sub>x</sub> Budget Program, A. Aulisi, A.E. Farrell, J. Pershing, S. VanDeveer. 2005.

<sup>30</sup> [http://rggi.org/docs/Elec\\_monitoring\\_report\\_11\\_09\\_14.pdf](http://rggi.org/docs/Elec_monitoring_report_11_09_14.pdf)

<sup>31</sup> [http://rggi.org/docs/Market/Elec\\_Monitoring\\_Report\\_12\\_07\\_30\\_Final.pdf](http://rggi.org/docs/Market/Elec_Monitoring_Report_12_07_30_Final.pdf)

In addition to the Electricity Monitoring reports issued by the Participating States, the New York ISO Inc., (NYISO) together with researchers at Rensselaer Polytechnic Institute (RPI), evaluated whether the Program's cost of compliance has resulted in emissions leakage. The NYISO and RPI developed econometric models to explain power transfers and CO<sub>2</sub> emissions from power plants in Pennsylvania from 2008 through 2010. While the models concluded that electrical loads, fuel costs, and non-emitting generation all have statistically significant impacts on emissions and power transfers, or both, the model was not able to show a statistically significant impact from the Program costs on either of the variables.<sup>32</sup> In other words, the report concludes that there is no evidence that the existing Program has caused emissions leakage.

Thus, according to the reports and studies conducted to date, no evidence of emissions leakage associated with the existing Program has been found. In order to estimate the amount of potential leakage associated with the proposed revisions to the Program including the cap reduction, the electricity sector modeling analysis estimated CO<sub>2</sub> emissions in and outside of the region. Cumulative CO<sub>2</sub> emissions reductions were compared between the RGGI region and the Eastern Interconnection<sup>33</sup> (which includes the RGGI region) plus the eastern Canadian provinces. Cumulative emission reductions within the Participating States (2014 through 2020, including offsets) are projected to be 86 million tons of CO<sub>2</sub>. Over the same period, cumulative reductions in the entire Eastern Interconnect region are projected to be 28 million tons of CO<sub>2</sub>. While the emissions leakage reports are being offered to guide New York and the region in making critical policy decisions, if monitoring indicates that leakage associated with the Program occurs and needs to be addressed, a number of states including New York,<sup>34</sup> are already moving to implement significant energy efficiency programs which help

<sup>32</sup> An Empirical Test for Inter-State Carbon-Dioxide Emissions Leakage Resulting from the Regional Greenhouse Gas Initiative, April 20, 2011.

[http://www.nyiso.com/public/webdocs/media\\_room/publications\\_presentations/Other\\_Reports/Other\\_Reports/ARCHIVE/Report\\_on\\_Empirical\\_Test\\_for\\_Interstate\\_CO2\\_Emissions\\_Leakage\\_04202011\\_FINAL.pdf](http://www.nyiso.com/public/webdocs/media_room/publications_presentations/Other_Reports/Other_Reports/ARCHIVE/Report_on_Empirical_Test_for_Interstate_CO2_Emissions_Leakage_04202011_FINAL.pdf)

<sup>33</sup> The Eastern Interconnection (EI) includes the eastern two-thirds of the continental United States (excluding most of Texas and Florida). The Canadian portion includes Ontario east to the Maritime Provinces.

<sup>34</sup> CASE 07-M-0548 - Order Establishing Energy Efficiency Portfolio Standard and Approving Programs. (June

mitigate the effects of any emissions leakage.

Further, at the conclusion of the Program review, the Participating States committed to engage in a collaborative effort informed by discussions with their respective ISOs to: identify and evaluate potential imports tracking tools; conduct further modeling to ascertain energy and price implications of any potential policy on emissions associated with imported electricity; and pursue additional legal research, leading to a workable, practicable, and legal mechanism to address emissions associated with imported electricity.

Benefits Associated with the Program Revisions with Respect to the Auction and Allocation of Allowances to Energy Efficiency and Clean Energy Technologies (EE & CET).<sup>35</sup>

Like the current Program, the proposed Program revisions require the Department and NYSERDA to continue to auction almost 100 percent of the allowances to ensure that the value of the cap-and-trade program inures to the consumers who pay for the Program, while at the same time allows for the rapid distribution of allowances into the marketplace where generators subject to the Program may purchase them. In further support of these goals, the auctions will continue to achieve, but will not be limited to, the following objectives: achieving fully transparent and efficient pricing of allowances; promoting a liquid allowance market by making entry and trading as easy and low-cost as possible; being open to participation by the categories of bidders determined by NYSERDA or its designee in consultation with the Auction Advisory Committee which meet the

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23, 2008)

<http://www3.dps.ny.gov/W/PSCWeb.nsf/ArticlesByTitle/06F2FEE55575BD8A852576E4006F9AF7?OpenDocument>

<sup>35</sup> The Program is designed to allocate most of the CO<sub>2</sub> allowances to the EE&CET Account (the “EE & CET Allocation”). The EE & CET Allocation is administered by NYSERDA, which currently administers similar energy efficiency and clean energy technology programs, and allowances in the account are sold in transparent allowance auctions. This allocation achieves the emissions reduction goals of the Program and reduces impacts on consumers by promoting or rewarding investments in energy efficiency, renewable or non-carbon-emitting technologies, innovative carbon emissions abatement technologies with significant carbon reduction potential, and/or the administration of the Program.

minimum financial requirements; monitoring for and guarding against the exercise of market power and market manipulation; being held as frequently as is needed to achieve design objectives; avoiding interference with existing allowance markets; aligning well with wholesale energy and capacity markets; and not acting as a barrier to efficient investment in relatively clean existing or new electricity generating sources.

NYSERDA's New York CO<sub>2</sub> Allowance Auction regulation, found at 21 NYCRR 507, establishes the rules for conducting auctions of CO<sub>2</sub> allowances to be administered by NYSERDA or its designee as part of the program. As stated in the regulations which will not be revised as part of this rulemaking, New York intends to continue to participate in uniform regional auctions for the allowances that it will be offering for sale. As part of the regional auction process, New York and the Participating States will continue to follow specific design elements for: reserve price; auction structure and format; allowance sale schedule; level of participation; treatment of unsold allowances; notice of auctions; monitoring; and auction results. Additional details and rules for each regional CO<sub>2</sub> allowance auction are provided in the Auction Notice issued by New York and the Participating States for each auction.

The Reserve Price is the minimum acceptable price for each CO<sub>2</sub> allowance in a specific auction. The reserve price at an auction is either the Minimum Reserve Price (MRP) or the Cost Containment Reserve (CCR)<sup>36</sup> trigger price, depending on the level of demand for allowances at the auction. Its use is important for mitigating the potential for auction prices to clear significantly below current market prices, due to tacit or explicit collusion, weak competition, or to maintain a minimum rate of progress in reducing emissions below business as usual.

The revisions to the Program provide that the MRP will be set at \$2.00 in 2014 and increases by 2.5

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<sup>36</sup> See discussion of Cost Containment Reserve provision on page 32.

percent each year. The CCR trigger prices are set at \$4.00 in 2014, \$6.00 in 2015, \$8.00 in 2016, and \$10.00 in 2017, rising by 2.5 percent each year thereafter in order to account for inflation.

### Allowance Apportionment

Apportionment is the term used to describe the process by which the Participating States propose to distribute the regional emissions cap to individual state budgets. While there were a number of discussions surrounding apportionment during this Program review, it was agreed that a full review would not occur until the next Program review slated for 2016. Therefore, New York retains the same percentage of the regional cap established under the existing Program (approximately 38.93 percent). Notwithstanding this, in allocation years 2014, 2015, and 2016 only, New York is proposing to reduce its base budget from the amount that would otherwise result from this percentage by 200,000 allowances. Concurrently, the State of Rhode Island's base budget would increase by 200,000 allowances over that same time frame. New York is one of five RGGI states (also DE, MA, MD and VT) that has agreed to this temporary adjustment of their apportionment in order to provide more allowances to Rhode Island. When RGGI was initially established, allowances were apportioned among the states largely on the basis of emissions. While most RGGI states have experienced emissions from the affected source sector well below their portion of the regional cap between 2009 and 2012, emissions increases in Rhode Island have exceeded Rhode Island's apportioned percentage substantially in each year of the program. The temporary adjustment of allowances is intended to reduce Rhode Island's "shortfall" until the RGGI states have the opportunity for a thorough evaluation of the apportionment of allowances under the regional cap during the next program review planned for 2016. That evaluation will consider whether the apportionment formula should be changed and, if so, what criteria should govern that apportionment: emissions, electricity consumption, population etc.

It should be noted that this reduction does not change the State's percentage as it is applied to the interim

adjustments or the cost containment reserve (CCR). Each of these will be based on the existing and continuing apportionment percentage of approximately 38.93 percent. In addition, the proposed rule eliminates the Reduction in the CO<sub>2</sub> Budget Trading Program base budget currently required under the limited exemption for units with an enforceable permit condition restricting the supply of the unit's annual electrical output to the electric grid to less than or equal to 10 percent of the annual gross generation from the unit. This will result in New York having more allowances to auction, despite the temporary reappportionment of some allowances to Rhode Island, than if it retained this provision.

Further, while this temporary reduction alters the cap trajectory for New York and Rhode Island relative to the 2.5 percent annual reduction for 2014, 2015 and 2016, it does not impact the regional cap trajectory. In other words, the regional emissions cap will decline by 2.5 percent each year from 2015 through 2020. In addition, in 2017, both states' base budgets realign to the existing apportionment percentages, and thus move back to the 2.5 percent trajectory based on calculating that trajectory from the starting year of 2014.

#### Allowance Set-Asides

The Department proposes to maintain the amount of CO<sub>2</sub> allowances allocated to the two existing set-aside accounts under the Program and proposes a modification to the existing voluntary renewable energy market set-aside to include eligible biomass, and minor clarifications to the long term contract (LTC) set-aside. Accordingly, the Department will allocate 700,000 and 1,500,000 tons to the voluntary renewable energy market and eligible biomass set-aside and long term contract set-aside accounts, respectively, from the CO<sub>2</sub> Budget Trading Program annual adjusted budget.

The Department proposes to modify the existing "voluntary renewable energy market set-aside" in subdivision 242-5.3(c) to include eligible biomass. This revision expands eligibility for retiring CO<sub>2</sub> allowances

from the set-aside to include CO<sub>2</sub> budget sources that co-fire eligible biomass as a compliance mechanism. The Program currently allows CO<sub>2</sub> budget sources to deduct, as a compliance mechanism, CO<sub>2</sub> emissions attributable to the burning of eligible biomass from its CO<sub>2</sub> allowance compliance obligation. When this occurs, the amount of CO<sub>2</sub> emissions covered by the program decreases, meaning that demand for CO<sub>2</sub> allowances also decreases. Moreover, the amount of CO<sub>2</sub> allowances available to other CO<sub>2</sub> budget sources for compliance would correspondingly increase, potentially resulting in an “inflated” or over-allocated CO<sub>2</sub> emissions budget and regional CO<sub>2</sub> emissions cap. Thus, in order to help maintain the overall environmental integrity of the CO<sub>2</sub> emissions budget and regional CO<sub>2</sub> emissions cap, CO<sub>2</sub> allowances should also be retired from the Program if and when CO<sub>2</sub> emissions are exempted from the Program. Therefore, when a CO<sub>2</sub> budget source deducts CO<sub>2</sub> emissions from its compliance obligation as a result of co-firing eligible biomass, the Department proposes to also allow for the retirement of the corresponding number of CO<sub>2</sub> allowances from the set-aside.

The proposed revisions to the Program maintain the existing provisions for voluntary renewable energy purchases. A voluntary renewable energy purchase is a purchase of electricity from renewable energy generation or from renewable energy attribute credits by a retail electricity customer on a voluntary basis. Renewable energy includes electricity generated from biomass, wind, solar thermal, photovoltaic, geothermal, hydroelectric facilities certified by the Low Impact Hydropower Institute, wave and tidal action, and fuel cells powered by renewable fuels. The renewable energy generation or renewable energy attribute credits related to such purchases may not be used by the generator or purchaser to meet any regulatory mandate, such as an RPS. The Department will continue to retire allowances under the voluntary renewable energy market and eligible biomass set-aside for voluntary renewable energy purchases.

The 700,000 ton voluntary renewable energy market set-aside was calculated using information from the renewable energy market as it relates to the RPS with allowance for some market growth. Since the inception of

the program, this set-aside has been significantly under-subscribed and less than half of the annual 700,000 CO<sub>2</sub> allowance allocation has been retired each year on behalf of voluntary renewable energy purchases. The proposed expansion of eligibility in subdivision 242-5.3(c) increases the likelihood that the set-aside will be fully utilized. However, should the set-aside become over-subscribed, the Department maintains the proportional retirement provision in the set-aside, and any undistributed allowances from the set-aside may remain in the set-aside account for future retirement.

Under the proposed revisions to the Program, the LTC set-aside in subdivision 242-5.3(d) will continue to be available to CO<sub>2</sub> budget sources that can demonstrate, to the Department's satisfaction that: the LTC was entered into prior to March 2006; purchasing of allowances at auction or in the secondary market leads to substantial financial hardship because the LTC applicant is unable to pass on the cost of CO<sub>2</sub> allowances to the purchasing party under the conditions of the LTC; and source's primary fuel is natural gas or the CO<sub>2</sub> budget source's CO<sub>2</sub> emission rate is no higher than 1100 lbs/MWhr. The proposed revisions to the LTC set-aside are intended to clarify the operation and administration of the set-aside, consistent with the Department's interpretation of subdivision 242-5.3(d) pursuant to Declaratory Ruling 19-18, which the Department issued on November 5, 2009.

Pursuant to the requirements in the regulation, each year the Department has reduced the quantity of allowances available for auction pursuant to the Reduction in the CO<sub>2</sub> Budget Trading Program base budget required under the "Behind-the Meter" provisions. This limited exemption for units with an enforceable permit condition restricting the supply of the unit's annual electrical output to the electric grid to less than or equal to 10 percent of the annual gross generation from the unit requires the Department to reduce the CO<sub>2</sub> Budget Trading Program base budget to remove the tons equal to the exempt unit's average annual emissions from the previous three calendar years. The Department is proposing to eliminate this provision because the regional cap, established under the program revisions, did not account for the emissions from these sources; therefore it is no

longer necessary to subtract the emissions attributed to them from the base budget.

## Summary of Needs and Benefits

New York 's climate is changing, in part as a result of emissions from the burning of fossil fuels to generate electricity; reducing emissions now will help reduce the risk and magnitude of future climate changes. The proposed revisions to the Program will reduce the emissions from New York power plants that cause and contribute to global climate change, while at the same time promote energy efficiency and clean renewable energy in the State. The EE & CET Allocation will ensure that electricity consumers in a deregulated market receive the maximum benefits from the program at the least possible cost, and the investment of proceeds from the auction of allowances will provide further economic and environmental benefit.

## COSTS

### Introduction

In addition to the needs analysis, the Department, NYSERDA and the New York State Department of Public Service (DPS) analyzed costs and impacts associated with compliance with the proposed revisions to the Program. This section explains NYSERDA 's analysis and includes a summary of the Integrated Planning Model (IPM®) modeling conducted by ICF International (ICF). IPM® is a nationally recognized modeling tool used by the U.S. Environmental Protection Agency (EPA), state energy and environmental agencies, and private sector firms such as utilities and generation companies. This section also discusses the Department's analysis of the costs associated with State and local government compliance and impacts from the proposed revisions to the Program on the New York economy and customer bills.<sup>37,38</sup>

<sup>37</sup> "REMI Economic Impacts Analysis," by the Northeast States for Coordinated Air Use Management (NESCAUM), dated May 29, 2013. [http://www.dec.ny.gov/docs/administration\\_pdf/remi91cap2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/remi91cap2013.pdf)

<sup>38</sup> "IPM Potential Scenario Customer Bill Analysis," by the Analysis Group, dated May 24, 2013. [http://www.dec.ny.gov/docs/administration\\_pdf/custbillanaly2013.pdf](http://www.dec.ny.gov/docs/administration_pdf/custbillanaly2013.pdf)

## Costs to the Regulated Sources and the Public

### Reference Case v. Program Case

Modeling analysis and review was coordinated by RGGI Inc. and New York staff, and included input from energy and environmental representatives from the Participating States and each regional ISO. To estimate the potential impacts of the revisions to the Program, IPM® compared a future with the revisions to the Program (Program Case) to a Reference Case (business as usual scenario) that projects how the electricity system would look if the Program remained unchanged and proposed revisions were not implemented. The modeling assumptions and input data were developed through a stakeholder process with representatives from the electricity generation sector, business and industry, environmental advocates and consumer interest groups. Modeling results were then presented to stakeholders for review and comment throughout the development of the proposed revisions to the RGGI program.

### Reference Case

Assumptions and sources of input data are specified in detail in the “RGGI DRAFT 2012 Reference Case and Sensitivity Analyses Assumptions.”<sup>39</sup> Key assumptions and data include regional electricity demand, load shapes, transmission system capacities and limits, generation unit level operation and maintenance costs and performance characteristics, fuel prices, new capacity and emission control technology costs and performance characteristics, reserve margins and local reserve requirements, RPS requirements, national and state environmental regulations, and financial market assumptions. All estimates are based on 2010 dollars. Regional electricity demand growth projections, transmission capacities and limits, and near-term expected infrastructure additions/retirements were obtained from regional ISO sources. Long range Henry Hub natural gas prices (2020), based on forecast data from U.S. Energy Information Administration (EIA) were projected to

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<sup>39</sup> The modeling assumptions document and the tabular results for each modeling run are located at [http://www.rggi.org/design/program\\_review](http://www.rggi.org/design/program_review)

be approximately \$4.6/MMBtu (constant 2010 dollars).

A number of assumptions were used to develop the model, including: 1) the construction of new coal-fired plants was precluded to meet projected capacity shortfalls in the United States unless they include carbon capture; 2) new nuclear plant construction was limited to build outs at existing plant sites; 3) a national 3-pollutant policy (SO<sub>2</sub>, NO<sub>x</sub> and mercury) that approximates the Cross-state Air Pollution Rule (CSAPR) and the Mercury and Air Toxics Rule (MATS) is assumed; 4) RPS targets are assumed to be met in all states except New York; and 5) partial fulfillment of the RPS target is assumed in New York based upon New York ISO certainty criteria, capacity under RPS contract, and RPS funds currently approved for future solicitations (approximately \$3 billion).

Under the Reference Case, generation from new gas-fired combined cycle units is projected to supply most of the growing electricity demand. Electric generation from gas-fired plants in New York is projected to increase by approximately 37 percent from 48,109 Gigawatt hours (GWh) in 2013 to 65,983 GWh in 2020. Generation from new renewable resources (primarily wind units) is projected to increase significantly, largely in response to RPS requirements. While nuclear generation is projected to decrease by about 35 percent between 2013 and 2020 due to the assumed retirement of the Indian Point units upon their respective license expiration, generation from coal-fired plants is projected to increase by about eight percent between 2013 and 2020. Finally, generation from existing oil/gas steam units is projected to decrease over time, as a result of displacement by lower-cost electricity from new gas-fired units. Additionally, net imports of electricity into New York are projected to rise from approximately 24,000 GWh in 2013 to approximately 26,800 GWh in 2016 before decreasing to about 23,000 in 2020. CO<sub>2</sub> emissions in the Reference Case, from sources in New York State subject to the Program, are projected to increase from approximately 34.6 million tons in 2013 to about 41.7 million tons in 2020. This increase is due primarily to increased generation from new and existing gas-

fired power plants to meet projected load growth.

This generation data was based on the IPM Reference Case model runs and the table displayed below:

New York Reference Case Net Generation (in GWh)	2012	2013	2014	2015	2016	2018	2020
Combined Cycle	40,419	46,344	44,171	47,637	55,024	60,509	63,743
CT	2,146	1,765	2,249	2,165	2,365	2,265	2,240
Oil/Gas	12,198	11,696	11,689	11,568	11,476	11,184	10,960
Coal	5,127	5,956	6,834	6,052	6,585	4,861	6,419
Nuclear	42,450	42,450	35,229	35,369	27,516	27,516	27,516
'Conventional Generation Total'	102,340	108,212	100,172	102,791	102,966	106,335	110,878
Other - NUG/Cogen	1,863	1,863	1,875	1,881	1,884	1,884	1,887
Existing Conventional Hydro	27,082	27,275	27,251	27,540	27,471	27,540	27,532
Existing Renewables	5,457	5,444	5,444	5,457	5,500	5,464	5,444
'Other Generation Total'	34,402	34,582	34,571	34,878	34,855	34,888	34,864
Biomass: Direct Fire	-	-	433	738	738	738	738
Landfill Gas	35	35	393	483	483	483	483
Hydro	-	-	452	556	556	556	556

Onshore Wind	-	-	1,155	1,908	2,627	2,627	2,627
Offshore Wind	-	-	-	-	-	-	-
Solar	81	81	252	333	379	379	427
'New Renewable Generation Total'	116	116	2,685	4,017	4,781	4,781	4,830
Total GWh	136,858	142,910	137,428	141,686	142,602	146,004	150,572

This emissions data was based on the IPM Reference Case and the table displayed below:

Reference Case CO2 Emissions [Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	16	16	17	14	15	17
CT	6	7	7	7	7	7	7
ME	3	3	4	3	4	4	3
NH	2	3	2	2	2	2	2
RI	3	3	4	4	4	4	3
VT	0	0	0	0	0	0	0
NY	32	35	35	35	39	39	42
DE	4	3	4	4	5	5	5
MD	25	27	28	29	27	26	27
Total RGGI	93	96	100	102	101	102	105
Total Emissions at Affected Plants	91	93	97	100	99	99	103
Eastern Interconnect without RGGI	1,514	1,548	1,595	1,607	1,572	1,607	1,654

Total Eastern Interconnect	1,608	1,643	1,695	1,709	1,674	1,709	1,759
Total Canadian	102	98	95	97	100	101	104

## Program Case

### Interim Adjustment for Banked Allowances

Likewise, several assumptions were used to project impacts in the Program Case. For modeling purposes, the proposed CO<sub>2</sub> cap of 91 million tons, based on the approximate amount of current emissions in the RGGI region, was applied to sources subject to the Program in the Participating States. In order to account for the existing private bank of allowances and in order to help create a binding cap, the proposed revisions to the Program create provisions for two distinct budget adjustments.<sup>40</sup> In order to model the budget adjustments, the annual caps were adjusted in accordance with the model rule language and the assumption that the adjustment would account for the existing bank as well as 100 percent of the surplus (current cap and emissions) for 2013.

While the Program Case allows a limited number of emissions offsets to be purchased by affected generators and used for compliance by affected generators, the model assumes that it is not economically attractive for offset suppliers to sell their products in the RGGI market until prices reached \$10 per allowance. This value is based on the reserve price under the California cap-and trade program which allows for the use of offset credits. As long as offset suppliers are able to sell similar products in the California market for prices higher than those in the RGGI market, offset suppliers would not be expected to sell into the RGGI market.

In order to obtain New York specific results, several components between the Program Case and the Reference Case are compared including generation mix, net electricity imports, changes in generation capacity, CO<sub>2</sub> emissions, CO<sub>2</sub> allowance prices, and wholesale and retail electricity price impacts. Electricity generation

<sup>40</sup> See discussion of the Interim Adjustment provisions on pages 31 and 32.

from gas-fired units in 2020 is about 1,576 GWh or 2.4 percent lower in the Program Case than in the Reference Case. Generation from coal-fired units in 2020 is about 2,376 GWh or 37 percent lower in the Program Case than in the Reference Case. Net imports into New York in 2020 are projected to be about 3,900 GWh or 17 percent higher in the Program Case than in the Reference Case. Relative to the Reference Case, total capacity additions through 2020 in the Program Case are the same (5,909 MW) as in the Reference Case. Coal capacity retirements through 2020 in the Reference Case are 408 MW while the estimated value for the Program Case is 466 MW.

This generation data was based on the differences between IPM Reference Case and IPM Program Case model runs and the tables displayed below:

New York Reference Case Net Generation (in GWh)	2012	2013	2014	2015	2016	2018	2020
CC	40,419	46,344	44,171	47,637	55,024	60,509	63,743
CT	2,146	1,765	2,249	2,165	2,365	2,265	2,240
Oil/Gas	12,198	11,696	11,689	11,568	11,476	11,184	10,960
Coal	5,127	5,956	6,834	6,052	6,585	4,861	6,419
Nuclear	42,450	42,450	35,229	35,369	27,516	27,516	27,516
'Conventional Generation Total'	102,340	108,212	100,172	102,791	102,966	106,335	110,878
Other - NUG/Cogen	1,863	1,863	1,875	1,881	1,884	1,884	1,887
Existing Conventional Hydro	27,082	27,275	27,251	27,540	27,471	27,540	27,532

Existing Renewables	5,457	5,444	5,444	5,457	5,500	5,464	5,444
'Other Generation Total'	34,402	34,582	34,571	34,878	34,855	34,888	34,864
Biomass: Direct Fire	-	-	433	738	738	738	738
Landfill Gas	35	35	393	483	483	483	483
Hydro	-	-	452	556	556	556	556
Onshore Wind	-	-	1,155	1,908	2,627	2,627	2,627
Offshore Wind	-	-	-	-	-	-	-
Solar	81	81	252	333	379	379	427
'New Renewable Generation Total'	116	116	2,685	4,017	4,781	4,781	4,830
Total GWh	136,858	142,910	137,428	141,686	142,602	146,004	150,572

New York Program Case Net Generation (in GWh)							
	2012	2013	2014	2015	2016	2018	2020
CC	40,392	46,335	43,696	46,972	53,823	58,554	61,862
CT	2,147	1,769	2,259	2,247	2,502	2,497	2,545
Oil/Gas	12,208	11,696	11,640	11,496	11,463	11,168	10,977
Coal	5,235	5,956	5,937	3,887	4,679	3,179	4,043
Nuclear	42,450	42,450	35,229	35,369	27,516	27,516	27,516
'Conventional'							

Generation Total'	102,432	108,206	98,762	99,971	99,982	102,915	106,943
Other - NUG/Cogen	1,863	1,863	1,875	1,881	1,884	1,884	1,887
Existing Conventional							
Hydro	27,113	27,253	27,305	27,450	27,389	27,431	27,443
Existing Renewables	5,457	5,444	5,457	5,472	5,500	5,469	5,444
'Other Generation							
Total'	34,433	34,561	34,637	34,803	34,773	34,784	34,774
Biomass: Direct Fire	-	-	433	738	738	738	738
Landfill Gas	35	35	393	483	483	483	483
Hydro	-	-	452	556	556	556	556
Onshore Wind	-	-	1,155	1,908	2,627	2,627	2,627
Offshore Wind	-	-	-	-	-	-	-
Solar	81	81	252	333	379	379	427
'New Renewable							
Generation Total'	116	116	2,685	4,017	4,781	4,781	4,830
Total GWh	136,981	142,882	136,084	138,790	139,536	142,480	146,547

CO<sub>2</sub> emissions from New York generators in the Program Case are projected to be 3.2 million tons (eight percent) lower in 2020 than in the Reference Case. Over the 2014-2020 time period, cumulative CO<sub>2</sub> emission reductions from New York generators subject to the Program are projected to be 13 million tons in the Program Case as compared to the Reference Case. Although emissions from affected sources across the RGGI region are estimated to be 15 million tons (14.6 percent) lower under the Program Case than under the Reference Case in 2020, CO<sub>2</sub> emissions from the electricity sector in New York are projected to increase 4.9 million tons or 14.7

percent between 2014 and 2020. Principally, emissions in New York are projected to rise because the Indian Point nuclear units are assumed to retire when their current licenses expire in 2013 and 2015. The IPM model projects that the generation from these non-CO<sub>2</sub> emitting generators is likely to be replaced with fossil fuel-fired generation, at least in part. Nevertheless, CO<sub>2</sub> emission reductions over the 2014-2020 period from affected sources across the RGGI region are estimated to be 86 million tons in the Program Case compared to the Reference Case.

This emissions data was based on the differences between IPM Reference Case and IPM Program Case model runs and the tables displayed below:

Reference Case CO2 Emissions [Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	16	16	17	14	15	17
CT	6	7	7	7	7	7	7
ME	3	3	4	3	4	4	3
NH	2	3	2	2	2	2	2
RI	3	3	4	4	4	4	3
VT	0	0	0	0	0	0	0
NY	32	35	35	35	39	39	42
DE	4	3	4	4	5	5	5
MD	25	27	28	29	27	26	27
Total RGGI	93	96	100	102	101	102	105
Total Emissions at Affected Plants	91	93	97	100	99	99	103
Eastern Interconnect without RGGI	1,514	1,548	1,595	1,607	1,572	1,607	1,654

Total Eastern Interconnect	1,608	1,643	1,695	1,709	1,674	1,709	1,759
Total Canadian	102	98	95	97	100	101	104

Program Case CO2 Emissions [Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	15	15	15	13	14	16
CT	6	7	7	7	7	7	7
ME	3	3	4	4	4	3	3
NH	2	3	2	2	2	2	2
RI	3	4	4	4	4	4	4
VT	0	0	0	0	0	0	0
NY	32	35	34	33	36	36	38
DE	4	3	3	4	4	4	4
MD	25	27	23	23	22	17	17
Total RGGI	93	96	91	91	92	87	91
Total Emissions at Affected Plants	91	93	89	89	90	85	88
Eastern Interconnect without RGGI	1,514	1,548	1,601	1,613	1,579	1,616	1,662
Total Eastern Interconnect	1,608	1,643	1,692	1,704	1,671	1,704	1,753
Total Canadian	102	97	95	97	100	102	104

Under the Reference Case, without making any proposed Program revisions, CO<sub>2</sub> allowance prices are projected to remain at the minimum reserve price through 2020. Under the Program Case, CO<sub>2</sub> allowance prices

(the cost of complying with RGGI) are projected to increase from approximately \$6.02/ton (2010 dollars) in 2014 to about \$6.73/ton in 2016 and to about \$8.41/ton in 2020. Approximately 17.6 million allowances would be obtained by the marketplace between 2014 and 2020 from the Cost Containment Reserve (CCR), which would be triggered at \$4/ton in 2014 and at \$6/ton in 2015.<sup>41</sup> The acquisition of these additional allowances provides price dampening which is reflected in these estimated allowance prices.

This allowance price data was based on the IPM Reference Case and IPM Program Case model runs and the tables displayed below:

Reference Case Allowance Prices (2010\$)							
	2012	2013	2014	2015	2016	2018	2020
NO <sub>x</sub> Regional (\$/ton)	450	450	450	450	450	450	450
SO <sub>2</sub> Regional Tier 1 (\$/ton)	-	50	50	50	-	-	-
SO <sub>2</sub> Regional Tier 2 (\$/ton)	-	50	50	50	-	-	-
Regional CO <sub>2</sub> (\$/ton)	1.86	1.86	1.86	1.86	1.86	1.86	1.86

Program Case Allowance Prices (2010\$)							
	2012	2013	2014	2015	2016	2018	2020
NO <sub>x</sub> Regional (\$/ton)	600	600	600	600	600	600	600

<sup>41</sup> See discussion of Cost Containment Reserve provisions on pages 32.

SO <sub>2</sub> Regional Tier 1 (\$/ton)	-	6	6	7	-	-	-
SO <sub>2</sub> Regional Tier 2 (\$/ton)	-	21	22	23	-	-	-
Regional CO <sub>2</sub> (\$/ton)	1.86	1.86	6.02	6.37	6.73	7.52	8.41

Under the Program Case, New York’s wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.64/MWh higher in 2016 and \$2.12/MWh higher in 2020, than the Reference Case. RGGI is projected to increase wholesale electricity prices in New York State by about 3.0 percent in 2016 and 3.9 percent in 2020. For a typical New York residential customer (using 750 kWh per month), the projected increase in wholesale electricity prices in 2016 translates into a monthly retail bill increase of about 1.0 percent or \$0.86. In 2020, the projected increase in wholesale electricity prices translates into a monthly residential retail bill increase of about 0.8 percent or \$0.71. For commercial customers, the projected retail price impact of RGGI is about 1.1 percent in 2016 and 0.7 percent in 2020 (\$7.87 and \$5.00 per month, respectively). For industrial customers, the projected retail price impact of RGGI is about 1.7 percent in 2016 and 1.2 percent in 2020.

#### Alternative Bank Scenario

IPM projects electricity system operations and costs with perfect foresight, which means that there is certainty of knowledge of all future market outcomes, including allowance prices and the use of the private bank. In other words, IPM calculates when and whether it is cost-effective to make on-system emissions reductions at affected sources or to use allowances from the private bank. However, market participants may make decisions related to use of banked allowances for compliance on a shorter time horizon than projected by IPM using perfect foresight (i.e., due to uncertainty, market participants may be more likely to defer emissions reductions and rely more heavily on banked allowances in the short-term). In order to assess the use of the private bank during the short-term, an alternative usage scenario (“Alt Bank”) was examined. Under the Alt

Bank scenario, it is assumed that the marketplace would use the private bank of allowances at a rate roughly 40 percent faster than under the Program Case during the 2014-2017 timeframe. This scenario is not intended to be a prediction of market behavior; rather it is intended to provide a broader sense of potential market outcomes.

CO<sub>2</sub> emissions from New York generators are projected in the Alt Bank scenario to be 4.4 million tons (10.7 percent) lower in 2020 than Reference Case. The generators are assumed to use more of the private bank by 2017 under this scenario, therefore less allowances will be available for use in later years and more emissions reductions will occur during this timeframe. Emissions from affected sources across the RGGI region are estimated to be 81.6 million tons in 2020 under the Alt Bank scenario while they are projected to be 87.8 million tons under the Program Case.

This emissions data IPM Alt Bank Case model runs and the table displayed below:

91 Alt Bank CO2 Emissions							
[Million Tons]							
	2012	2013	2014	2015	2016	2018	2020
MA	17	15	16	15	13	14	15
CT	6	7	7	7	7	7	7
ME	3	3	4	4	4	3	3
NH	2	3	2	2	2	2	2
RI	3	4	4	4	4	4	4
VT	0	0	0	0	0	0	0
NY	32	35	34	34	36	36	37
DE	4	3	4	4	4	4	3
MD	25	27	26	25	23	15	14

Total RGGI	94	96	96	95	93	85	84
Total Emissions at Affected Plants	92	93	94	92	90	82	82
Eastern Interconnect without RGGI	1,514	1,548	1,598	1,610	1,578	1,617	1,665
Total Eastern Interconnect	1,608	1,643	1,694	1,705	1,671	1,702	1,750
Total Canadian	102	97	95	97	100	102	105

CO<sub>2</sub> allowance prices under the Alt Bank scenario are projected to increase from approximately \$3.60/ton (2010 dollars) in 2014 to about \$6.57/ton in 2016 and about \$10.21/ton in 2020. Prices are lower in the short-term under the Alt Bank scenario than under the Program Case because the former scenario assumes that more allowances from the private bank are being used for compliances in the short term. Similarly, prices are higher in 2020 under the Alt Bank scenario because the marketplace has fewer allowances left over in the private bank relative to the Reference Case, and therefore more on-system emissions reductions are required from compliance entities. In addition, it is estimated that approximately 10 million allowances would be obtained by the marketplace between 2014 and 2020 from the CCR. The acquisition of these additional allowances provides some price dampening which is reflected in these estimated allowance prices.

This allowance price data was based on IPM Alt Bank Case model runs and the table displayed below:

Alt Bank Allowance Prices (2010\$)							
	2012	2013	2014	2015	2016	2018	2020
NO <sub>x</sub> Regional (\$/ton)	600	600	600	600	600	600	600
SO <sub>2</sub> Regional Tier 1 (\$/ton)	-	6	6	7	-	-	-
SO <sub>2</sub> Regional Tier 2 (\$/ton)	-	21	22	23	-	-	-
Regional CO <sub>2</sub> (\$/ton)	1.86	1.86	3.60	5.14	6.57	8.00	10.21

Under the Alt Bank scenario, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.62/MWh higher in 2016 and \$2.72/MWh higher in 2020, than the Reference Case. Wholesale electricity prices are estimated to increase by about 2.9 percent in 2016 and 4.9 percent in 2020 under the Alt Bank scenario relative to the Reference Case.

Sensitivity analyses were performed to develop bounds or collars around the Reference Case and Program Case projections. First, a Higher Emissions scenario that assumes higher natural gas prices and higher regional energy demand was evaluated. This scenario used natural gas prices from the Low Estimated Ultimate Recovery scenario in EIA's 2012 Annual Energy Outlook where Henry Hub natural gas prices are estimated to be \$5.31/MMBtu in 2020. Demand in this case is assumed to be about three percent higher in the near-term and four percent higher in the longer-term than the Reference Case. Likewise, a Lower Emissions scenario was also developed that assumes lower natural gas prices, lower regional energy demand, and the continued operation of the Indian Point nuclear power plants through the timeframe of the study. This scenario used natural gas prices from the High Technically Recoverable Resources scenario in EIA's 2012 Annual Energy Outlook where Henry Hub natural gas prices are estimated to be \$3.02/MMBtu in 2020. In this case, demand is assumed to be about three percent lower in the near-term and four percent lower in the longer-term than the Reference Case.

The modeling case that evaluated the potential impacts of the Updated Model Rule using the Higher Emissions assumptions was called the 91 Cap\_Bank\_Model Rule\_High Case. Under this scenario, allowance prices are estimated to be \$7.27/ton in 2014, \$8.13/ton in 2016 and \$10.15/ton in 2020. A sensitivity scenario was run to estimate the impacts of the Updated Model Rule with the Higher Emissions and Alt Bank assumptions. Under this 91 Cap Alt\_Bank\_Model\_Rule\_High Case, allowance prices are estimated to be about \$4.62/ton in 2014, \$6.90/ton in 2016, and \$16.44/ton in 2020.

In IPM, allowance prices would only be expected to rise off of the minimum reserve price if the projected cumulative emissions over the time period exceed the cumulative cap level. When evaluating the impact of the Updated Model Rule using the Low Emissions scenario, emissions over the time period are projected to be 50 million tons less than the number of allowances available to the market (adjusted cap plus the emissions bank). Therefore, affected sources would not need to make any emission reductions and it is estimated that allowance prices would be at the minimum reserve price under this scenario. This scenario was not actually modeled; however, ICF staff provided the assessment of the scenario described in this paragraph.

A macro-economic impact study of the Program was also conducted at the direction of the Participating States through NESCAUM to estimate the potential impact of the Program on the economies of participating states. The study used the REMI computer model. As mentioned above, the study concluded that the economic impacts of RGGI on the economies of the participating states, including New York, were generally positive, albeit relatively small. For example, the cumulative changes in New York's Gross State Product and Personal Income associated with the proposed revisions to the program will be about \$5.8 billion and \$4.7 billion, respectively (2010 dollars, calculated as the present value of estimated annual changes over the period 2012 to 2040, discounted at three percent per year to account for the time-value of money). The cumulative change in employment in New York associated with the Program will be about 80,500 job-years over the period 2012 to 2040. A job-year is equivalent to one person employed for one year.

#### Costs to State and Local Governments

In addition to the costs identified for regulated parties and the public, State and local governments will incur costs. The Jamestown Board of Public Utilities (JBPU), a municipally owned utility, owns and operates the S.A. Carlson Generating Station (SACGS). Emissions monitoring at SACGS currently meets the monitoring provisions of the program, and no additional monitoring costs will be incurred under the proposed revisions to

the Program. Notwithstanding this, just like any other owner or operator of any source subject to the Program, the JBPU will need to purchase CO<sub>2</sub> allowances equal to the number of tons of CO<sub>2</sub> emitted. The Department limited the analysis of control costs to the purchase of allowances to comply with the Program and assumed the costs of allowances will be between \$6.00 in 2014 and \$9.00 in 2020 (in 2010 \$) per ton for CO<sub>2</sub> under the Program Case. To estimate total costs for SACGS under the program, the Department reviewed 2009 through 2012 emissions from Jamestown's affected unit. During that time period, Jamestown's emissions ranged from a low of 4,261 tons to a high of 117,311 tons. An estimate of compliance costs, based on these emissions values, indicates that purchasing allowances to cover emissions will result in estimated costs between a low of \$25,600 and a potential high of \$1 million annually. These costs will eventually be passed on to the consumers of electricity from the JBPU.

The JBPU has a range of compliance options and can utilize the flexibility inherent under the Program to comply. Since the program has a three year control period with the compliance obligation at the end of the control period, the emission peaks associated with electricity generation will be averaged out and more long term planning options will be available to SACGS. Although the program revisions include an Interim Control Period,<sup>42</sup> that will require JBPU to cover 50 percent of their emissions in each of the first two years of a three year control period, it is not anticipated that this interim requirement will significantly reduce the flexibility available to JBPU. The JBPU will also incur costs associated with the administration of the program.

#### Department Costs

The Department will continue to incur staff costs associated with the implementation of the Program, including staff resources to review monitoring plans submitted by generators and to analyze data submitted to EPA to determine emissions and compliance obligations. Specifically, the Department requires sufficient staff

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<sup>42</sup> See discussion of Interim Control Period provision on page 33.

to: review and process set-aside and offset applications; submit set-aside award requests for execution; modify permits and inspect generator facilities, including the continuous emission monitors; and analyze the Program 's effectiveness. It should be noted, that there are no additional costs projected for the Department as a result of the Program revisions. The revised cost estimate below factors in efficiencies gained from experience relative to all tasks associated with the Department's implementation of the various aspects of the Program.

Between 10 and 15 individuals are required to permit, inspect and administer the Program across the State. In order to determine the net increase in costs to the Department associated with these requirements, the Department will first evaluate existing programs to determine if any additional resources are needed. Since all of the facilities impacted by the program are already required to obtain Title V permits pursuant to 6 NYCRR Part 201, modifications under the Program will require minimal additional staff resources. Similarly, all Title V facilities covered by the Program are currently required to determine compliance with all of the requirements in the permit; these annual evaluations currently look at compliance with reporting and monitoring requirements of Title IV and the requirements of Parts 227-3, 243, 244 and 245.

In addition to the traditional program activities associated with reviews, permitting, inspection and compliance, the Department must also continue to administer the set-aside and offset provisions in the program which require the Department to review and process applications in the CO<sub>2</sub> Allowance Tracking System (COATS) and to monitor and verify reports submitted by offset project sponsors. The Department 's administration of the offsets component of the Program will be supported by independent verification reports completed by independent verifiers to certify the adequacy of the consistency application. Thus, the Program will require office support for permitting and compliance activities and additional staff will be required to administer the set-aside and offsets provisions of the Program. The Department estimates that between two and four person years, the full time equivalent of working 100 percent on a project for a full work year expressed as 220 days are required to implement all aspects of the Program at a cost of \$150,000 per person year or up to

\$600,000 annually.

NYSERDA will also continue to incur costs to administer and evaluate the use of auction proceeds from the Program and it will continue to convene an Advisory Group to provide guidance on how to best use auction proceeds and to assist with the development of the Operating Plan. The Plan is reviewed and revised on an annual basis by NYSERDA and an Advisory Group includes: 1) program selection criteria; 2) an anticipated schedule for implementation of the programs; 3) descriptions of the measurement, verification, and evaluation methods that will be used to judge the impacts and success of the programs; and 4) a quantification of NYSERDA's costs for administration and evaluation of the programs. In the 2012 Plan, program evaluation and administration costs were budgeted at five and eight percent, respectively, of total revenues. These figures are consistent with the rates approved by the New York State Public Service Commission for public benefit energy efficiency and technology and market development programs funded by the System Benefits Charge (SBC) and are expected to be comparable to those approved by the PSC for SBC programs.

An annual State Cost Recovery Fee under Section 2975 of the PAL for general governmental services is assessed to NYSERDA which is allocated proportionately among all NYSERDA programs and funding sources. The budget in the 2012 Operating Plan includes an estimate based on the current annual assessment of the fee allocated to the RGGI funded programs (1.7 percent of revenues). Future proceeds will be assessed the New York State Cost Recovery Fee ( SCRF) at the established rate during that respective timeframe. The fee is intended to reimburse the State for the cost attributable to provision of government services to authority and public benefit corporations.

A significant portion of program costs are allocated to the operation and administration of COATS and conducting allowance auctions. From 2009 through 2012, contributions to RGGI Inc., and its agents were \$4

million. It is anticipated that these costs will not change dramatically in the future; therefore, future costs are estimated to be approximately \$900,000 per year moving forward.

### LOCAL GOVERNMENT MANDATES

This is not a mandate on local governments. The revised Program will continue to apply equally to any entity that owns or operates a subject source. Local governments have no additional compliance obligations as compared to other entities subject to the revised Program. The JBPU, a municipally owned public utility, owns and operates the SACGS. JBPU contains one combined cycle turbine at the SACGS that is currently subject to the Program and will remain subject to the revised Program ; no other additional record keeping, reporting, or other requirements will be imposed on local governments under this program.

### PAPERWORK

Under the existing Program and the proposed revisions to the Program, the owners and operators of each source and each unit at the source shall retain the following documents for a period of 10 years from the date the document is created:

- 1) Account certificate of representation form;
- 2) Emissions monitoring information. CO<sub>2</sub> budget sources are required to report emissions and allowance transfers via electronic means which will minimize the paperwork burden on sources;
- 3) Copies of all reports, compliance certifications, and other submissions and all records made or required under the program;
- 4) Copies of all documents used to complete a permit application and any other submission under the program or to demonstrate compliance with the program;
- 5) Copies of all documents used to complete a consistency application and monitoring and verification report to demonstrate compliance with the offset provisions of the program; and

6) Copies of all documents required as part of an auction application.

For each control period in which one or more units at a source are subject to the CO<sub>2</sub> budget emission limitation, the CO<sub>2</sub> authorized account representative of the source shall submit to the Department, a compliance certification report for each source covering all such units. This must be submitted by the March 1<sup>st</sup> following the relevant control period for all units subject to the Program.

### DUPLICATION

The emissions monitoring and reporting requirements of the revised Program are unchanged from those of the existing Program, and are identical to those of the Title IV program and 6 NYCRR Parts 243, 244 and 245. Since these requirements are identical, monitoring and reporting done for the federal program can be used to comply with the monitoring and reporting requirements of the revised Program.

### ALTERNATIVES

#### Alternatives Considered

#### No Action Alternative

The No Action alternative would leave the current Program in place and the Program cap and flexibility provisions within it would remain unchanged. During program review, the Department, along with DPS and NYSERDA, participated in a rigorous and comprehensive regional evaluation of the program supported by an extensive regional stakeholder process that engaged the regulated community, environmental nonprofits, consumer and industry advocates, and other interested stakeholders. Through this process, which started in late 2010, the Department sought to ensure RGGI's continued success - effectively reducing CO<sub>2</sub> emissions while

providing benefits to consumers and the State. Program review revealed:

- A significant excess supply of allowances relative to actual emission levels in the region, and
- The current cost control measures in the program, which are based upon expansion of the percentage of offset allowances allowable for compliance, would likely be ineffective in controlling costs if the emissions cap was made binding.

The excess supply of allowances or over-allocation was the result of a number of factors. As highlighted in a Draft White Paper prepared by NYSERDA <sup>43</sup>, a number of factors contributed to the observed decrease of CO<sub>2</sub> emissions from the RGGI region electricity sector in from 2005 to 2009. The Draft White Paper identified three primary drivers of the decrease: 1) lower electricity load (due to weather; energy efficiency programs and customer-sited generation; and the economy); 2) fuel-switching from petroleum and coal to natural gas (due to relatively low natural gas prices); and 3) changes in available capacity mix (due to increased nuclear capacity availability and uprates; reduced available coal capacity; increased wind capacity; and increased use of hydro capacity).

Since the intent of the Program was and is to reduce CO<sub>2</sub> emissions from the electricity sector, the proposed revision to the Program recognize that over allocation of allowances reduces the effectiveness of the cap and minimizes the impact of the Program in achieving meaningful emission reductions. “Over allocation is a problem for program success and, in the design of future programs, designers should take precautions to avoid it. The environmental effectiveness of cap-and-trade regulation will really only be proven when programs create truly constrained allowance markets that force the maximally feasible emissions reductions that our environmental laws have so often required. <sup>44</sup>” Since the No Action alternative would leave the Program

<sup>43</sup> Relative Effects of Various Factors on RGGI Electricity Sector CO<sub>2</sub> Emissions: 2009 Compared to 2005, Draft White Paper, November 2, 2010. [http://rggi.org/docs/Retrospective\\_Analysis\\_Draft\\_White\\_Paper.pdf](http://rggi.org/docs/Retrospective_Analysis_Draft_White_Paper.pdf)

unchanged and would not address the issue of over allocation, it was not selected.

### Modeling Different Cap Alternatives

The Department also considered different regional emissions cap levels as additional alternatives, rather than the 91 million ton regional emission cap that is proposed to be implemented under the revised Program. In order to determine the difference in the Program's impact under various scenarios and to support program review, the Participating States conducted REMI macroeconomic modeling, customer electricity bill analysis, and revised electricity sector modeling using the IPM. Comprehensive electricity sector modeling and economic analysis was considered to support evaluation of potential modifications to the program. The most critical of these evaluations was the assessment of different cap levels to address over allocation of allowances. As discussed above, over allocation was influenced by a number of factors and was perhaps the most important issue addressed during program review.

First, different cap levels were assessed using the IPM model to determine their effectiveness in achieving emission reductions under the program. CO<sub>2</sub> cap trajectories of 120 million tons, 115 million tons and 106 million tons were assessed starting in 2014. In each case, the cap declines from those levels at 2.5 percent per year through the modeled time horizon, or 2020. When the IPM Reference Case was updated in August 2012, projected emissions were significantly lower than previous modeling. Cumulatively, emissions dropped about 17 percent from the previous reference case and emissions at RGGI affected sources were projected to be only 91 million tons in 2012. Based on this updated information, an analysis of the March 2012 potential cap scenarios demonstrated that: the 115 and 120 cap levels and assumptions would result in prices remaining at the minimum reserve price; cumulatively, allowances would exceed emissions because emissions

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<sup>44</sup> The Overallocation Problem In Cap-And-Trade: Moving Toward Stringency, Lesley K. McAllister, 2009. [http://www.columbiaenvironmentallaw.org/assets/pdfs/34.2/7\\_McAllister\\_34.2.pdf](http://www.columbiaenvironmentallaw.org/assets/pdfs/34.2/7_McAllister_34.2.pdf)

had fallen so significantly; the 106 cap level analysis indicated a need to address the projected private bank of allowances carried into 2014 and beyond. As a result of this, new modeling scenarios relative to the updated reference case of 106, 101, 97 and 91 million tons, with an adjustment for banked allowances, were subsequently evaluated.

Based on a review of all modeling iterations and after careful consideration, New York and the Participating States decided to propose to lower the regional CO<sub>2</sub> emissions cap to align the cap with current emissions levels, while accounting for allowances held by market participants in excess of the quantity needed to demonstrate compliance. Accordingly, New York and the Participating States selected and proposed a regional emissions cap in 2014 equal to 91 million tons declining 2.5 percent each year from 2015 through 2020.

The bank of allowances held by market participants is addressed with two interim adjustments for banked allowances. The first adjustment will be made over a seven-year period (2014-2020) for the first control period private bank of allowances and a second adjustment will be made over a six-year period (2015-2020) for the 2012 and 2013 private bank of allowances. These adjustments are necessary in order to account for the existing private bank of CO<sub>2</sub> emissions allowances already acquired at auction, and in order to help create a binding cap, the proposed Program amendments provide two distinct budget adjustments.

#### CCR, CCR Levels and Program Flexibility Alternatives

Flexibility provided under the Program maintains environmental integrity and provides compliance alternatives for regulated sources. As described above, compliance flexibility is inherent under a cap-and-trade program as compared to traditional command-and-control regulation. Under the existing Program, additional flexibility was provided through the expansion of allowable offset usage, the addition of international offsets

and an extension of the compliance period. During program review, the Participating States recognized complexity associated with these provisions and their inability to provide immediate cost containment for the Program. Accordingly, the proposed revisions to the Program include a new CCR, which is a reserved quantity of allowances, in addition to the cap, that would only be available if defined allowance price triggers are exceeded. The CCR was chosen because the no action alternative of retaining the existing flexibility provisions would not have provided measurable cost control in an efficient, transparent and predictable manner.

During program review, the following two sets of price triggers were modeled with an annual CCR limit of 10 million allowances: (1) \$5.00 in 2014, \$7.00 from 2015 to 2017 and \$10.00 from 2018 through 2020; and (2) \$4.00 in 2014, \$6.00 in 2015, \$8.00 in 2016 and \$10.00 from 2017 through 2020. The CCR allowances would be made available immediately in any auction in which demand for allowances at prices above the CCR trigger price exceeds the supply of allowances offered for sale in that auction prior to the addition of any CCR allowances. If the CCR is triggered, the CCR allowances will only be sold at or above the CCR trigger price. After careful consideration of these alternatives, the Department determined that the CCR will be equal to five million short tons in 2014 and 10 million short tons each year thereafter, and the CCR trigger prices will be \$4.00 in 2014, \$6.00 in 2015, \$8.00 in 2016, and \$10.00 in 2017. Each year after 2017, the CCR trigger price will increase by 2.5 percent.

In addition to the CCR, the existing flexibility provisions were reviewed. The proposed Program retains the allowable offset usage percentage at 3.3 percent, and deletes the existing offset price triggers that raise the allowable percentage of offsets and that allow the use of international CO<sub>2</sub> emission credit retirements. The offset price triggers and the potential extension of the control period to four years are replaced by the CCR mechanism, to provide measurable cost control in an efficient, transparent and predictable manner.

## FEDERAL STANDARDS

In December 2009, EPA issued findings concluding that current and projected concentrations of GHGs in the atmosphere endanger the public health and welfare of current and future generations (the Endangerment Finding).<sup>45</sup> Following the Endangerment Finding, EPA has taken numerous additional actions under the Clean Air Act (Act) regarding the regulation of GHG emissions. As a result of these actions, according to EPA, GHGs became “subject to regulation” under the Act as of January 2, 2011. EPA promulgated a rule to tailor the major source applicability thresholds for GHG emissions for purposes of the Prevention of Significant Deterioration (PSD) and Title V programs under the Act (the “GHG Tailoring Rule”),<sup>46</sup> which the Department subsequently incorporated in its 6 NYCRR Parts 200, 201, and 231. PSD provisions establish preconstruction permitting requirements for new major stationary sources and major modifications at existing stationary sources. Most notably, PSD includes the requirement that applicable sources are subject to Best Available Control Technology (BACT) for GHGs.

EPA is currently committed, pursuant to a litigation settlement, to propose new source performance standards (NSPS) under section 111 of the Act for GHG emissions from power plants. This would include an NSPS for new sources pursuant to section 111(b) of the Act, as well as emission guidelines for required state regulation of GHG emissions from existing power plants under section 111(d) of the Act. In March 2012, EPA proposed a GHG NSPS for new power plants under section 111(b) of the Act. EPA has not finalized this proposal, nor has it proposed any emissions guidelines for existing sources under section 111(d) of the Act. GHG NSPS for new or existing sources would likely apply to sources that are subject to the Program. The Department will continue to monitor the development of power plant GHG NSPS for both new and existing sources by EPA. If EPA ultimately adopts a GHG NSPS for new or existing sources, the Department will

<sup>45</sup> Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 FR 66496, December 15, 2009.

<sup>46</sup> Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 FR 31514, June 3, 2010.

consider any necessary or appropriate action regarding the Program.

While stationary sources may be subject to Title V and PSD permitting requirements for GHGs under the Act, provided they meet or exceed the relevant applicability thresholds established by the GHG Tailoring Rule, there are currently no specific CO<sub>2</sub> emission standards for stationary sources in the federal regulations. In addition, PSD covers only new or modified sources. Therefore, because there currently is no specific federal standard, the proposed revisions to the Program continues a regulatory program that has the effect of being more stringent than current federal standards. The proposed revisions to the Program are protective of public health and the environment in the absence of similar federal emission standards. The potential adverse impact to global air quality and New York State's environment from CO<sub>2</sub> emissions necessitates that New York State take action now to minimize CO<sub>2</sub> emissions that contribute to climate change.

Due in part to the lack of a federal program, the Department has determined that fossil fuel-fired electricity generators must reduce emissions of CO<sub>2</sub> now. As explained above, the proposed revisions to the Program - including most notably the proposed reduction in the CO<sub>2</sub> emission cap - help to further this objective. Although national and international action is needed, the efforts undertaken by New York and the Participating States as part of revising the RGGI program will slow the rate and magnitude of climate change thereby reducing the risk of injury to the State and its citizens.

As an environmental leader, New York has participated in efforts to develop national emissions reduction programs for CO<sub>2</sub>. The Department recognizes the benefits of a national program and will continue to participate on national and regional initiatives to encourage the development of such programs. In the event that a national market based trading program is developed, it will be rigorously reviewed for consistency and timing of the program.

## COMPLIANCE SCHEDULE

The proposed revisions to the Program do not change the applicability provisions of the current Program. Therefore, sources already subject to the current Program will remain subject to the proposed revisions to the Program. Moreover, pursuant to the proposed revisions, the second control period under the Program will remain from 2012-2014, with a CO<sub>2</sub> allowance transfer deadline of March 1, 2015. The revised Program will require affected sources and units to comply with the emission limitations of the Program beginning in 2014.

The proposed revisions to the Program create a modified compliance schedule called interim compliance periods which are defined as each of the first two years of a three-year control period. The first interim control period under the revised Program will be the year 2015. Accordingly, at the end of each control period, the owners and operators of each source subject to the Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, as of the CO<sub>2</sub> allowance transfer deadline (midnight of March 1<sup>st</sup> or, if March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter), in the source's compliance account that is not less than the total tons of CO<sub>2</sub> emissions for the control period less the CO<sub>2</sub> allowances deducted for the previous two interim control periods. In the first two calendar years of each three year control period (interim control period), the owners and operators of each source subject to the Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, as of the CO<sub>2</sub> allowance transfer deadline (midnight of March 1<sup>st</sup> or, if March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter), in the source's compliance account that is not less than 50 percent of the total tons of CO<sub>2</sub> emissions for that interim control period. A unit was subject to the control period requirement starting on the later of January 1, 2009 or the date the unit commences operation. A unit is subject to the interim control period requirements of the Program starting on the later of January 1, 2015 or date the unit commences operation.

For each control period in which a CO<sub>2</sub> budget source is subject to the Program, the CO<sub>2</sub> authorized account representative of the source must submit to the Department by the March 1<sup>st</sup> following the relevant control period, a compliance certification report for each source covering all such units. As noted above, the first CO<sub>2</sub> allowance transfer deadline under the proposed revisions to the Program will be March 1, 2015.

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6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program

## 6 NYCRR Part 200, General Provisions

## Regulatory Impact Statement Summary

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative, historic effort among New York and eight Participating States<sup>1</sup> and is the first mandatory, market-based carbon dioxide ( CO<sub>2</sub>) emissions reduction program in the United States. Recently, New York along with the Participating States, completed a comprehensive program review and announced a proposal to lower the regional emissions cap established under RGGI to 91 million tons in 2014, declining 2.5 percent a year through 2020.<sup>2</sup> In order to implement the updated RGGI program in New York State, the Department of Environmental Conservation (Department) proposes to revise 6 NYCRR Part 242, CO<sub>2</sub> Budget Trading Program (the Program) and 6 NYCRR Part 200, General Provisions.

The statutory authority to reduce the CO<sub>2</sub> emissions cap and to provide for the budget adjustments derives primarily from the Department's authority to prevent and control air pollution, as set out in the Environmental Conservation Law (ECL) at Sections 1-0101, 1-0303, 3-0301, 19-0103, 19-0105, 19-0107, 19-0301, 19-0303, 19-0305, 71-2103, 71-2105. The general powers of the New York State Energy Research and Development Authority (NYSERDA) that are relevant to the ability to sell allowances, including CCR allowances, in a transparent auction are set forth in the Public Authorities Law Sections 1851, 1854 and 1855.

The warming climate represents an enormous environmental challenge for the State, because unabated, climate change will continue to have serious adverse impacts on the State's natural resources, public health and

<sup>1</sup> In addition to New York, the RGGI Participating States include: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, Rhode Island, and Vermont.

<sup>2</sup> The Participating States released the Updated Model Rule on February 7, 2013.

infrastructure. New York power plants represent approximately one-fifth of all GHG emissions in the State.<sup>3</sup> In 2012, New York power plants subject to the Program emitted approximately 35 million tons of CO<sub>2</sub> into the atmosphere.

New York and the Participating States committed to a comprehensive program review during the initial development of RGGI and agreed to evaluate: program success; program impacts; additional emissions reductions; imports and emissions leakage; and offsets. The Participating States initiated program review in the fall of 2010 with the announcement of its first stakeholder meeting and concluded the process in February, 2013. Supplemental to the regional stakeholder process, New York conducted a separate stakeholder process designed to provide updates on the status of the regional process and to afford additional opportunity for New York's stakeholders to provide comment.

Mitigating the impacts of a warming climate represents one of the most pressing environmental challenges for the State, the nation and the world. Extensive scientific data demonstrates the need for immediate worldwide action to reduce emissions from burning fossil fuels and supports the conclusion that great benefits will accrue if fossil fuel-fired emissions are reduced through programs like RGGI.

A naturally occurring greenhouse effect has regulated the earth's climate system for millions of years. CO<sub>2</sub> and other naturally occurring GHGs trap heat in our atmosphere, maintaining the average temperature of the planet approximately 50°F higher than it normally would be. An enhanced greenhouse effect and associated climate change results as large quantities of anthropogenic GHGs, especially CO<sub>2</sub> from the burning of fossil fuels, are added to the atmosphere. Since the mid-1700's, atmospheric concentrations of GHGs have increased

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<sup>3</sup>“Patterns and Trends New York State Energy Profiles: 1996-2010,” Final Report, April 2012. [http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Energy-Prices-Data-and-Reports/EA-Reports-and-Studies/Patterns-and-Trends.aspx?sc\\_database=web](http://www.nyserda.ny.gov/BusinessAreas/Energy-Data-and-Prices-Planning-and-Policy/Energy-Prices-Data-and-Reports/EA-Reports-and-Studies/Patterns-and-Trends.aspx?sc_database=web)

substantially due to human activities such as fossil fuel use and land-use change. Today, atmospheric CO<sub>2</sub> concentrations exceed 398 parts per million - nearly 40 percent higher than preindustrial levels.<sup>4</sup>

The need for the reduction of CO<sub>2</sub> emissions is clearly supported by numerous direct impacts that have been observed in New York State. Temperatures in New York State have risen during the twentieth century, with the greatest warming coming in recent decades - temperatures have risen by approximately 0.6°F per decade since 1970, with winter warming more than 1.1°F per decade.<sup>5</sup> This warming includes an increase in the number of extreme hot days (days at or above 90°F) and a decrease in the number of cold days (days at or below 32°F). New York experienced record high nighttime temperatures in the summer of 2010.<sup>6</sup> Sea level in the coastal waters of New York State and up the Hudson River has been steadily rising over the 20th century. Tide-gauge observations in New York indicate that rates of relative sea level rise were significantly greater than the global mean, ranging from 2.41 to 2.77 millimeters per year (0.9 to 1.1 inches per decade).<sup>7</sup>

Predictions of future impacts associated with emissions in New York further support the need for a substantial reduction in the CO<sub>2</sub> emissions cap. ‘Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation’ (ClimAID) project examines how sea level rise, changes in precipitation patterns, and more frequent severe weather conditions will affect New York’s economy, environment, community life and human health. The ClimAID project predicts the following:

<sup>4</sup> National Research Council of the National Academies. Climate Change: Evidence, Impacts, and Choices. 2012. Available at <http://nas-sites.org/americasclimatechoices/more-resources-on-climate-change/climate-change-lines-of-evidence-booklet/>.

<sup>5</sup> Rosenzweig, C., W. Solecki, A. DeGaetano, M. O’Grady, S. Hassol, P. Grabhorn (Eds.). ‘Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation’. New York State Energy Research and Development Authority (NYSERDA). <http://www.nyserda.ny.gov/climaid>

<sup>6</sup> Natural Resources Defense Council (NRDC). ‘The Worst Summer Ever? Record Temperatures Heat Up the United States’. September 2010. NRDC. <http://www.nrdc.org/globalwarming/hottestsummer/>

<sup>7</sup> Titus, J.G. ‘Coastal Sensitivity to Sea-Level Rise: A Focus on the Mid-Atlantic Region. Synthesis and Assessment Product 4.1’. U.S. Climate Change Science Program. 2009. <http://www.epa.gov/climatechange/effects/coastal/sap4-1.html>

Air temperatures are expected to rise across New York, by 1.5°F to 3°F by the 2020s, 3°F to 5.5°F by the 2050s, and 4°F to 9°F by the 2080s . Annual average precipitation in New York is projected to increase by up to five percent by the 2020s, up to 10 percent by the 2050s and up to 15 percent by the 2080s, with the greatest increases in the northern part of the State. A recent study based upon 60 years of tide-gauge records indicates that the rate of increase for sea level rise along approximately 1000 km of the east coast of the United States , including New York, remains at approximately three to four times higher than the global average. <sup>8</sup> Extreme climate events, such as heat waves and heavy rainstorms, significantly impact New York 's communities and natural resources.

The need for the significantly reduced CO<sub>2</sub> emissions cap and budget adjustments are further supported by the ClimAID Study<sup>9</sup> which enumerates a number of predictions specifically for New York's valued resources such as: 1) Rising air temperatures intensify the water cycle by driving increased evaporation and precipitation. The resulting altered patterns of precipitation include more rain falling in heavy events, often with longer dry periods in between ; 2) high water levels, strong winds, and heavy precipitation resulting from strong coastal storms already cause billions of dollars in damage and disrupt transportation and power distribution systems. Barrier islands are being dramatically altered by strong coastal storms, such as Hurricane Sandy, as ocean waters over wash dunes, create new inlets, and erode beaches; 3) within the next several decades, New York State is likely to see widespread shifts in species composition in the State's forests and other natural landscapes; 4) lakes, streams, inland wetlands and associated aquatic species will be highly vulnerable to changes in the timing, supply, and intensity of rainfall and snowmelt, groundwater recharge and duration of ice cover ; 5) increased summer heat stress will negatively affect cool-season crops and livestock unless farmers take adaptive measures such as shifting to more heat-tolerant crop varieties and improving cooling capacity of livestock facilities; 6)

<sup>8</sup> Sallenger, A.H., Doran, K.S., Howd, P.A. Hotspot of accelerated sea-level rise on the Atlantic coast of North America. *Nature Climate Change*. Published online June 24, 2012. doi: 10.1038/NCLIMATE1597.

<sup>9</sup> Rosenzweig, 'op.cit.'

demand for health services and the need for public health surveillance and monitoring will increase ; 7) over the next few decades, heat waves and heavy precipitation events are likely to dominate the causes for moderate, more frequent transportation problems such as flooded streets and delays in mass transit; 8) communication service delivery is vulnerable to hurricanes, lightning, ice, snow, wind storms, and other extreme weather events, some of which are projected to change in frequency and/or intensity; 9) impacts of climate change on energy demand are likely to be more significant than impacts on supply. Climate change will adversely affect system operations, increase the difficulty of ensuring adequate supply during peak demand periods, and exacerbate problematic conditions, such as the urban heat island effect.

The reduction in the CO<sub>2</sub> emissions cap to current levels represents a critical step to combat the significant challenges presented by climate change and to advance sound energy policies that foster energy efficiency and energy independence. The proposed Program revisions will cap regional emissions at 91 million tons annually beginning in 2014 and will reduce that level by 2.5 percent each year through 2020. Further, in order to account for the existing private bank of CO<sub>2</sub> emissions allowances already acquired at auction, and in order to help create a binding cap, the proposed Program revisions provide two distinct budget (cap) adjustments. In order to provide additional flexibility and cost containment the proposed Program revisions also create the Cost Containment Reserve (CCR). Finally, the proposed Program revisions create an interim compliance obligation. The Department proposes to maintain the amount of CO<sub>2</sub> allowances allocated to the two existing set-aside accounts under the Program and proposes a modification to the existing voluntary renewable energy market set-aside to include eligible biomass, and minor clarifications to the long term contract (LTC) set-aside.

The Department, NYSERDA and the New York State Department of Public Service (DPS) analyzed costs and impacts associated with compliance with the proposed revisions to the Program. CO<sub>2</sub> allowance prices

(the cost of complying with RGGI) are projected to increase from approximately \$6.02/ton (2010 dollars) in 2014 to about \$6.73/ton in 2016 and to about \$8.41/ton in 2020. Under the Program Case, New York's wholesale electricity prices (including both energy and capacity costs) are projected to be \$1.64/ MWh higher in 2016 and \$2.12/ MWh higher in 2020, than the Reference Case. RGGI is projected to increase wholesale electricity prices in New York State by about 3.0 percent in 2016 and 3.9 percent in 2020. For a typical New York residential customer (using 750 kWh per month), the projected increase in wholesale electricity prices in 2016 translates into a monthly retail bill increase of about 1.0 percent or \$0.86. In 2020, the projected increase in wholesale electricity prices translates into a monthly residential retail bill increase of about 0.8 percent or \$0.71. For commercial customers, the projected retail price impact of RGGI is about 1.1 percent in 2016 and 0.7 percent in 2020 (\$7.87 and \$5.00 per month, respectively). For industrial customers, the projected retail price impact of RGGI is about 1.7 percent in 2016 and 1.2 percent in 2020. A macro-economic impact study of the Program was also conducted. The study concluded that the economic impacts of RGGI on the economies of the participating states, including New York, were generally positive, albeit relatively small.

There will be costs associated with the administration of the program. The Department will continue to incur staff costs associated with the implementation of the Program. It should be noted, that there are no additional costs projected for the Department as a result of the Program revisions. The revised cost estimate factors in efficiencies gained from experience relative to all tasks associated with the Department's implementation of the various aspects of the Program. The Department estimates that between two and four person years are required to implement all aspects of the Program at a cost of \$150,000 per person year or up to \$600,000 annually. NYSERDA will also continue to incur costs to administer and evaluate the use of auction proceeds from the Program. In the 2012 Operating Plan, program evaluation and administration costs were budgeted at five and eight percent, respectively, of total revenues. An annual State Cost Recovery Fee under Section 2975 of the PAL for general governmental services is assessed to NYSERDA which is allocated

proportionately among all NYSERDA programs and funding sources. The budget in the 2012 Operating Plan includes an estimate based on the current annual assessment of the fee allocated to the RGGI funded programs (1.7 percent of revenues). A significant portion of program costs are allocated to the operation and administration of COATS and conducting allowance auctions. It is anticipated that these costs will not change dramatically in the future; therefore, future costs are estimated to be approximately \$900,000 per year moving forward.

Under the existing Program and the proposed revisions to the Program, the owners and operators of each source and each unit at the source shall retain the following documents for a period of ten years from the date the document is created: account certificate of representation form; Emissions monitoring information; copies of all reports and compliance certifications; copies of all documents used to complete a permit application; copies of all documents used to complete a consistency application; and copies of all documents required as part of an auction application.

For each control period in which one or more units at a source are subject to the CO<sub>2</sub> budget emission limitation, the CO<sub>2</sub> authorized account representative of the source shall submit to the Department, a compliance certification report for each source covering all such units. This must be submitted by the March 1<sup>st</sup> following the relevant control period for all units subject to the Program.

The Department examined the “No Action” alternative which would leave the current Program in place and the Program cap and flexibility provisions within it would remain unchanged. Since the “No Action” alternative would leave the Program unchanged and would not address the issue of over allocation, it was not selected. The Department also considered different regional emissions cap levels as additional alternatives, rather than the 91 million ton regional emission cap that is proposed to be implemented under the revised

Program. Lastly, flexibility provided for under the Program provided through the expansion of allowable offset usage, the addition of international offsets and an extension of the compliance period were evaluated. During program review, the Participating States recognized complexity associated with these provisions and their inability to provide immediate cost containment for the Program. Accordingly, the proposed revisions to the Program include a new CCR.

There currently is no specific federal standard, the proposed revisions to the Program continues a regulatory program that has the effect of being more stringent than current federal standards. The proposed revisions to the Program are protective of public health and the environment in the absence of similar federal emission standards. The potential adverse impact to global air quality and New York State's environment from CO<sub>2</sub> emissions necessitates that New York State take action now to minimize CO<sub>2</sub> emissions that contribute to climate change. Due in part to the lack of a federal program, the Department has determined that fossil fuel-fired electricity generators must reduce emissions of CO<sub>2</sub> now.

The proposed revisions to the Program do not change the applicability provisions of the current Program. Therefore, sources already subject to the current Program will remain subject to the proposed revisions to the Program. While the second control period under the current Program will remain unchanged and will include years 2012-2014 with a CO<sub>2</sub> allowance transfer deadline of March 1, 2015, the proposed Program revisions will require affected sources and units to comply with the emission limitations of the Program beginning on January 1, 2014.

The proposed revisions to the Program create a modified compliance schedule called an interim compliance period which is defined as each of the first two years of each three-year control period. The first interim control period under the revised Program will take place in year 2015; the second interim control period

will take place in year 2016. In each of the first two calendar years of each three year control period (e.g., 2015 and 2016), the owners and operators of each source subject to the revised Program shall hold a number of CO<sub>2</sub> allowances available for compliance deductions, as of the CO<sub>2</sub> allowance transfer deadline (midnight of March 1<sup>st</sup> or, if March 1<sup>st</sup> is not a business day, midnight of the first business day thereafter), in the source's compliance account that is not less than 50 percent of the total tons of CO<sub>2</sub> emissions for that interim control period. A unit is subject to the interim control period requirements of the Program starting on the later of January 1, 2015 or date the unit commences operation.

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From: Jodi Feld </o=lawnet/ou=first administrative group/cn=recipients/cn=jodifeld>  
To: khudnell@nc.rr.com <khudnell@nc.rr.com>  
Cc: Pedro Medina </o=lawnet/ou=first administrative group/cn=recipients/cn=pedromedina>; Robert Schuwerk </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=rschuwerk>; Janice Dean </o=lawnet/ou=first administrative group/cn=recipients/cn=janicedean>; Monica Wagner </o=lawnet/ou=first administrative group/cn=recipients/cn=monicawagner>  
Bcc:  
Subject: lithographic printing document  
Date: Wed Jun 12 2013 12:51:09 EDT  
Attachments: Hudnell Report Doc 12.pdf  
print.pdf

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Hi Ken - As we just discussed, we need 2-3 paragraphs from you which contain the following information:

- A description of the lithographic printing process and how solvents (PCE) are used in the process and in the clean up.

As we just discussed, I am forwarding you a copy of a document which was listed as one of your references in your expert report and which you may find helpful in developing this testimony. I have also attached a copy of a USEPA document, "Profile of the Printing and Publishing Industry". This is one of many USEPA "Industry Sector Notebooks" that provide general information on various industries. Although not originally included as one of your references, you may find this useful as well.

As we discussed, I am also awaiting your supplemental publications list, which will contain a listing of all of your publications in the last 10 years. I understand that you have not testified, either at deposition or trial, in the last 4 years.

Our papers are due by June 24th and we therefore, need these documents ASAP. I really appreciate your willingness to get this done by Saturday. Please feel free to call me on my cell phone if you have any questions over the weekend. My #is516 286-6090. Also, I understand that you will be running a conference all next week but please let me know where I can reach you if we have any last minute questions. Thanks Ken!

Jodi Feld, Chief Scientist  
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Filename: Hudnell Report Doc 12.pdf  
Last Modified: Wed Jun 12 12:51:09 EDT 2013

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# **Cleaner Technologies Substitutes Assessment:**

## **Lithographic Blanket Washes**

*September 1997*



**Developed by the Design for the Environment Program  
in Cooperation with:**

The University of Tennessee Center for Clean Products and Clean Technologies,

Printing Industries of America,

The Environmental Group (formerly, the Environment Conservation Board of the  
Graphic Communications Industry), and

The Graphic Arts Technical Foundation

## Chapter 1 Introduction

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This chapter introduces the Design for the Environment (DfE) Cleaner Technologies Substitutes Assessment (CTSA) for the lithographic printing industry. Section 1.1 contains background materials on the project, partners involved in the project, and the methodologies and assumptions used to create this CTSA. Section 1.2 discusses general aspects of the lithographic printing industry, such as what types of products are printed, how they are printed, and how the printing presses are washed. Section 1.3 discusses both traditional blanket washes and alternative blanket washes, and includes details on prices of the washes. Section 1.4 reviews the blanket wash market. Lists of blanket wash manufacturers and typical blanket wash components are presented. Section 1.5 describes the automatic blanket washing technology. The potential performance, cost, environmental impacts, and health and safety issues associated with using an automatic blanket washer are described.

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  - 1.4.4 Market Conditions
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### 1.1 PROJECT BACKGROUND

#### 1.1.1 Design for the Environment Lithography Project

The Design for the Environment (DfE) Lithography Project is a unique voluntary partnership between the lithographic printing industry and the U.S. Environmental Protection Agency (EPA) dedicated to helping printers improve their efforts to protect the environment. Because the printing industry is characterized by small companies that rarely have the time or resources to gather information on alternatives to their current products and processes, few printers have access to sufficient information to choose safer or lower risk chemicals, work practices, and technologies. The DfE Lithography Project aims to help fill this information gap. The goal of the project is to provide printers with pollution prevention and chemical risk information on product and technology substitutes, so that printers are better equipped to incorporate environmental concerns into their day-to-day business decisions. Specifically, the efforts of the DfE Lithography Project have focused on the risks, costs, and performance of alternatives to the traditional, highly volatile cleaners typically used for washing the press blankets.

**1.1 PROJECT BACKGROUND****Project Considerations**

The focus of this assessment was specifically defined by the project partners and has many limitations. Some of the global limitations are listed below, other limitations, specific to a particular portion of the project, are given in the applicable sections.

- This assessment focuses on the use of manual blanket washes in small lithographic printing facilities using only one press with four color units. Exposure estimates related to blanket wash use in larger facilities may be higher.
- The exposure and risk estimates reflect a small portion of the potential exposures within a lithographic printing facility. Many of the chemicals found in these formulations may also be present in the inks or other cleaning solvents used in a shop. Incremental reduction of exposures from blanket wash use will reduce cumulative exposures from all sources in a printing facility.
- The risks associated with volatile organic compound (VOC) releases were not examined in this assessment. Because VOC releases are a driving factor behind current regulations affecting printers, VOC content for the formulations are given at the request of industry participants. The concerns associated with VOC releases are addressed by federal, state, and local regulations and were not re-evaluated here.
- The regulatory information contained in the CTSA may be useful in moving away from chemicals that trigger compliance issues, however this document is not intended to provide compliance assistance. If the reader has questions regarding compliance concerns they should contact their federal, state, or local regulatory authorities.
- The 37 blanket wash formulations assessed in this report were voluntarily submitted by participating suppliers and are not intended to be representative of the entire blanket wash market.
- The performance and cost data are not based on rigorous scientific studies. Some of this information is subjective and is based on limited data points.
- Screening-level risk characterization techniques were used. The risk characterization results, therefore, contain limitations regarding confidence.

**1.1.3 DfE Lithography Project Methodology**

The DfE Program began working with the printing industry when the Printing Industries of America (PIA) requested the EPA's assistance in evaluating some of the environmental claims of products used by printers. This effort ultimately grew into three projects, each aimed at preventing pollution in a different sector of the printing industry: Screen Printing, Lithography, and Flexography. Each project addresses a specific area of environmental concern in the printing process. The screen printing project focuses on screen reclamation, the flexography project concentrates on the various ink systems used, and the lithography project examines the blanket washing process.

To thoroughly evaluate alternative blanket washes, the DfE Lithography Project sought to form partnerships with industry representatives. The DfE Lithography partners include PIA and its regional affiliates, the Graphic Arts Technical Foundation (GATF), the Environmental Conservation Board of the Graphic Communications Industry, the University of Tennessee's Center for Clean Products and Clean Technologies, and individual printers and suppliers.

## 1.1 PROJECT BACKGROUND

The project partners were particularly concerned about the environmental and human health risks of blanket washes because traditionally these products are petroleum-based solvents with a volatile organic compound (VOC) content of greater than 60%. While these high VOC washes leave the blanket dry after cleaning, the quick-drying properties come from the VOCs that evaporate into the air where they may pose a potential risk to workers' health and to the environment. VOCs can have an adverse impact on ambient air quality because of their contribution to the formation of ground level ozone. Using the expertise of EPA, the DfE Lithography Project examined the risks of the alternative blanket washes by collecting health hazard and environmental release information (e.g., releases to air, water, land) associated with the use of the potential substitute blanket washes.

### Concentrate on the Needs of Smaller Printers

The project partners were aware that although many large printers already have access to information about new and developing systems and technologies, smaller printers may not have the time or resources to investigate the latest technology and products. To respond to the needs of smaller printers, the DfE Lithography Project partners agreed that the primary efforts of the project should focus on the manual blanket washes as they are typically used in smaller print shops; i.e., on sheetfed, non-heatset presses that are less than 26" wide. Much of the information presented here is applicable or translatable to larger facilities.

### Identify Alternative Blanket Washes

All blanket washes evaluated in this project were commercially available products, voluntarily donated by suppliers. Nineteen suppliers participated in the project, submitting a total of 36 substitute formulations to be compared with a baseline formulation.

### Choice of VM&P Naphtha as the Baseline Formulation

In the initial stages of the Lithography Project, the Project partners chose VM&P naphtha as the baseline against which to compare the 36 substitute washes. Varnish Makers & Painters (VM&P) Naphtha, composed of 100% solvent naphtha, light aliphatic and referred to as Formulation 28 in certain sections of the text, was chosen primarily because it is well known among lithographers as an effective blanket wash. Many lithographers have used VM&P naphtha in their shops and know how well it works in their applications and what it costs. VM&P naphtha is known to be highly effective at very low cost, however, because of its high VOC content (100%), printers are searching for formulations to replace it.

### Conduct Performance Demonstrations

The performance demonstrations were conducted in two phases: laboratory testing and field demonstrations. Laboratory testing of each blanket wash was conducted by GATF in Pittsburgh to ascertain certain chemical characteristics, including flash point, VOC content, and pH. Additional laboratory tests (described in Chapter 4 of this document) were conducted to determine the effectiveness of each wash and the potential for adverse effects on the blanket. Only those washes meeting minimum performance standards were used in the field demonstrations.

Once the Performance Demonstration was underway, certain suppliers who originally submitted blanket washes, later chose to withdraw from the demonstration. Their reasons included not wishing to reveal to EPA their complete formulations or concern over the potential results of the performance tests. The formulations that were withdrawn after work had already begun were numbers 2, 13, and 15. For this reason, those numbers are missing from all of the tables in the CTSA.

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## 1.1 PROJECT BACKGROUND

proprietary formulation data. While specific methods were developed by the DfE Lithography Project team for conducting the performance demonstration and the cost analysis, the standard methodologies of the EPA Office of Pollution Prevention and Toxics (OPPT) Existing Chemicals Program were used for the Human Health Hazards, Environmental Hazards, Environmental Releases and Occupational Exposure Assessment, General Population Exposure Assessment, and Risk Assessment sections of the CTSA.

### Identify Conservation and Additional Improvement Opportunities

The project partners were interested in identifying energy and natural resource issues and improvement opportunities associated with using the various substitute blanket washes. Although the blanket washing process is not particularly energy- or resource-intensive, a printer can still help conserve energy and resources through his or her choice of blanket washing products and the manner in which the products are used.

There are a variety of techniques which may be employed at lithographic print shops to prevent pollution, to reduce chemical consumption, and to minimize waste. Results of a pollution prevention survey which asked lithographers to identify what activities they currently employ to achieve a more environmentally friendly workplace are presented. In addition, options for recycling solvents and for extracting solvents from press wipes are addressed, as are methods for treating spent solvents so that they may be reused. Solvent recycling systems used in conjunction with brush-based automatic blanket wash systems are also discussed.

### Evaluate Trade-Off Issues

The trade-off issues associated with the environmental and human health risk, cost, performance, and other analyses undertaken by the project partners are evaluated. This includes a social benefit and cost discussion and a summarization of the project's findings.

## 1.2 OVERVIEW OF LITHOGRAPHIC PRINTING

### 1.2.1 Products Printed

Lithography is currently the most prevalent printing technology in the United States. According to an estimate by A.F. Lewis & Co., Inc., a market research firm specializing in the graphic arts industry, there are over 53,000 establishments employing printing presses, and approximately 49,000 of these use lithographic presses. Lithographic printers are primarily small businesses, with roughly 85% of the plants employing fewer than 20 people. The success of lithographic printing is due to the ability of the process to produce high quality text and illustrations cheaply and effectively in short, medium, and high volume production runs. Consequently, lithography dominates the printing of books and newspapers, as well as magazines and other periodical publications. Some other applications of the lithographic printing process include advertising, envelopes, labels and tags, stationery, greeting cards, and packaging. Lithography accounts for almost 50% of the commercial printing market; however, the ascendancy of the lithographic process may soon be challenged by both improvements in flexography and relatively new plateless technologies which make up the fastest growing sector of the printing industry.

### 1.2.2 Printing Mechanism

The lithographic printing process involves a plate on which the image and non-image areas are on the same plane, as opposed to being either raised or indented. In this type of single plane, or planographic, printing, the image is maintained by taking advantage of the mutual repulsion of oil and water. Plates are treated so that the non-image area attracts water, while the image area

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### 1.3 PROFILE OF THE BLANKET WASH USE CLUSTER

Blanket washes consist of varying types of solvent, some of which can pose risks to human health and the environment. New, potentially less harmful blanket washes are appearing on the market, giving printers the opportunity to reduce impacts on the environment and minimize risk to workers. As these alternatives to the traditional solvents become more widespread, printers have had more questions about where to find comparative risk, performance and cost information. The DfE Lithography Project addresses these concerns by providing this comparative information on a wide variety of blanket wash formulations.

### 1.3 PROFILE OF THE BLANKET WASH USE CLUSTER

#### 1.3.1 Traditional Blanket Washes

Traditional lithographic blanket washes are petroleum-based solvents, often mixed with detergent and/or water. Petroleum-based cleaners typically remove ink quickly and evaporate rapidly, requiring minimal down time for the press. The advantages of these conventional cleaners, however, come at a price. Petroleum-based cleaners often contain greater than 60% VOCs. VOCs, defined as any volatile compound containing the element carbon, have health and safety concerns associated with their use, and have been implicated in the formation of ground level ozone. Still, conventional cleaners continue to dominate the market because of their effectiveness as well as their low cost.

The price of a petroleum-based blanket wash will vary according to the quantity purchased as well as the prevailing price of crude oil. At least two major U.S. manufacturers of blanket washes in the United States have product lines dominated by petroleum-based, water-miscible solvents. Prices for these blanket washes range from \$8/gallon to \$10/gallon and average \$9/gallon when purchasing a 55-gallon drum. The market is very fractured, as the largest producers of blanket cleaner in the United States are estimated to control less than 10% of the total U.S. market. The market share attained by the largest blanket wash manufacturers is limited by competition from the many small blanket wash producers serving local markets.

Large printing operations will often benefit from bulk pricing, storing large quantities of wash in on-site storage tanks. Medium-sized printers tend to purchase blanket wash by the drum (55-gallons), while small operations typically pay the highest per unit costs by purchasing cases of single gallon containers. Per gallon prices can decrease by as much as 30% when purchasing a 55-gallon drum versus a single gallon container.

#### 1.3.2 Alternative Blanket Washes

Petroleum-based blanket washes currently dominate the market; however, as concerns regarding the release of VOCs and potential health impacts mount, increasing pressure will be placed on blanket wash manufacturers to develop alternatives. Current evidence suggests that industry has responded to concerns regarding VOC releases, with some blanket wash manufacturers devoting 100% of product development time to the production of products that are lower in hazardous materials and VOCs.<sup>1</sup> Alternative blanket cleaners have not been fully accepted, however, and printers have voiced several concerns regarding their performance. In addition, low VOC washes typically cost more than "traditional," petroleum-based cleaners due to higher ingredient costs. EPA's *Control Techniques Guideline for Offset Lithographic Printing* (CTG) estimates that lower VOC cleaners (low VOCs cleaners are defined in the CTG as products with a VOC content of less than 30% by weight as measured by EPA's test method 24) that do not contain hazardous air pollutants (HAPs) cost \$0.91 per pound versus \$0.69 per pound for a "traditional" cleaner.<sup>2</sup> Alternative washes discussed below include: water miscible solvents, vegetable oil-based cleaners, and terpene-based cleaners.

## 1.4 MARKET PROFILE

The lithographic blanket wash industry is extremely fragmented, made up of many small firms producing a host of blanket wash products, and is highly price competitive. In general, blanket wash manufacturers are chemical formulators that market a variety of pressroom products including type wash, press wash, alcohol replacers, and fountain solutions.

In response to concerns regarding the release of VOCs, blanket wash manufacturers have developed and are currently marketing low VOC alternatives to traditional, petroleum-based cleaners. For example, low VOC cleaners currently constitute a very small percentage of company sales for one of the leading producers of blanket cleaners in the United States. Their research efforts, however, are focused almost exclusively on the development of low VOC cleaners.<sup>7</sup> Small to medium size companies have had greater success in providing low VOC cleaners to the marketplace.<sup>8,9</sup>

A.F. Lewis & Company, Inc., a market research firm specializing in the graphics arts industry, has estimated the number of plants operating offset lithographic presses, and therefore the number of facilities requiring blanket wash solvents, to be 49,218 as of June 1995. A.F. Lewis also reports the total number of plants with presses (whether offset lithographic, gravure, flexographic, or letterpress) to be 53,205 plants as of June 1995.<sup>a</sup> Plants with offset lithographic presses, therefore, account for roughly 92% of printing facilities, providing some indication of the demand for blanket wash. The states with the greatest number of plants containing offset presses are: California (6,075 plants, 12.5% of the U.S. total), New York (3,617 plants, 7.4%), Illinois (3,027, 6.2%), Texas (2,947, 6.0%), Pennsylvania (2,452, 5.0%), Ohio (2,436, 5.0%), Florida (2,318, 4.8%), New Jersey (1,876, 3.9%), Michigan (1,691, 3.5%), and Massachusetts (1,388, 2.9%).<sup>10</sup>

### 1.4.2 Blanket Wash Manufacturers

Minimal documentation exists that specifically characterizes the lithographic blanket wash industry. The Standard Industrial Classification (SIC) system, established by the Bureau of the Census to track the flow of goods and services within the economy, has not assigned a specific code to the blanket wash industry, nor does the Department of Commerce specifically track the industry.<sup>11</sup> In addition, many companies that produce printing equipment also manufacture blanket washes or private label another manufacturer's wash, making it difficult to identify them specifically as blanket wash manufacturers. With multiple product lines for the industry, it is currently not possible to identify the portion of revenues attributable solely to blanket wash production.

The companies listed in Table 1-1 are known to be producers of blanket wash solvents or products based upon the input of several printing industry trade organizations. This list is not exhaustive of the total number of companies producing blanket washes. The relative market share held by each of the companies listed below is not known. Petroleum distillate producers, such as Ashland, Exxon, and Shell, also sell directly to larger printers.<sup>12</sup>

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<sup>a</sup> Plants with presses are firms that possess any printing press or duplicator/photocopier and engage in printing as their primary business.

## 1.4 MARKET PROFILE

Table 1-2. Blanket Wash and Roller Wash Components

Ranking	Chemical	CAS Number	Annual Quantity
1	Solvent Naphtha (petroleum), medium aliphatic*	64742-88-7	655,722
2	Solvent Naphtha (petroleum), light aromatic*	64742-95-6	633,000
3	Naphtha (petroleum), hydrotreated heavy*	64742-48-9	606,125
4	Solvent Naphtha (petroleum), light aliphatic*	64742-89-8	468,508
5	2-Butoxyethanol	111-76-2	288,000
6	Solvent Naphtha (petroleum), heavy aliphatic	64742-96-7	146,497
7	Mineral Spirits (straight run naphtha)*	64741-41-9	140,000
8	Methylene Chloride	75-9-2	125,003
9	Xylene*	1330-20-7	76,503
10	1,1,1-Trichloroethane	71-55-6	66,000
11	Isopropyl Alcohol	67-63-0	60,000
12	Acetone	67-64-1	55,000
13	Mineral Spirits (light hydrotreated)*	64742-47-8	51,943
14	Toluene	108-88-3	51,000
15	Solvent Naphtha (petroleum), heavy aromatic*	64742-94-5	49,815
16	Propylene Glycol Methyl Ether Acetate	108-65-6	38,000
17	2-Propoxyethanol	2807-30-9	27,932
18	d-Limonene*	5989-27-5	22,000
19	Dipropylene Glycol Methyl Ether*	3459-94-8	12,000
20	Kerosene	8008-20-6	10,000
21	Ethyl Acetate	141-78-6	2,000
22	Perchloroethylene	127-18-4	2,000
23	Diethylene Glycol Monobutyl Ether*	112-34-5	1,879

\* Indicates those chemicals found in the formulations assessed in this project.

**Note:** Information is based upon a 1992 survey of three blanket wash producers and is estimated to represent 70% of the industry.

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## 1.5 ALTERNATIVE TECHNOLOGY-AUTOMATIC BLANKET WASHERS

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*Brush roller systems*, unlike spray systems, actively scrub blanket surfaces with a rotating and oscillating brush. Two types of brush systems are available: dry-type and wet-type. Wet-type brush systems dispense a controlled quantity of solvent onto the brush. Solvent is not applied directly to the blanket. Dry-type brush systems mechanically clean the blanket surface but are not wetted with cleaning solution. Dry-type systems are used only on coldset presses.

*Cloth-based systems* operate by applying a web of cloth to the rotating blanket, depositing excess ink and debris onto the cloth. After completing the cycle, the spent cloth advances and a fresh section of cloth is left in its place. Cleaning solvents are applied to the cloth and not directly to the blanket.

### Performance Issues

Reports on the performance of automatic blanket washers run the gamut from printers who say that their automatic washers work faster and better than manual washing, to those who have given up and actually removed the blanket washers from their presses. Clearly, the type of blanket washer and the type of printing being done play large roles in determining the effectiveness of the blanket washer.

Automatic blanket washers appear to be more prevalent on web presses, where they can be used for blanket washing during a press run. Some printers report that automatic blanket washers do not clean the blankets thoroughly enough to use them for end of run washing. Blanket washers seem to be less popular for sheet-fed presses, where relatively shorter run lengths allow printers to coordinate manual blanket washing with the end of production runs.

### Economics

The potential *savings* associated with using an automatic blanket washer instead of manually cleaning blankets include the following:

- In most cases, wash for wash, automatic blanket washers reportedly use less solvent than manual washing, which translates into lower solvent costs for the printer.
- Because the automatic blanket washer allows the press operator to perform other tasks during the wash cycle, there may be significant labor savings associated with automatic blanket washing.
- Make-ready time is shortened because the press does not stop during the blanket washing process.
- Wipe rag use is reduced, which confers savings in the area of rag purchasing or in rag leasing contracts. For cloth based systems, disposal or laundering of the spent cloth may be a concern.
- Some printers claim that blanket life is prolonged through the use of automatic blanket washers.

## 1.5 ALTERNATIVE TECHNOLOGY-AUTOMATIC BLANKET WASHERS

### Health/Safety Issues

Worker safety issues associated with automatic blanket washers may include:

- Direct worker dermal exposure to solvent is reduced.
- With some systems, much of the solvent can be reclaimed for re-use.
- Diminished fugitive VOC emissions in the workplace.
- Workers can lessen exposure to potentially dangerous moving press cylinders associated with manual blanket cleaning.

### Automatic Blanket Wash System Manufacturers

Manufacturers of automatic blanket washers include: AM Multigraphics; Baldwin Technology; Oxy-Dry Corporation; Printex Products Corporation; Heidelberg Harris, Inc.; and Web Printing Controls Company Inc. This list was compiled based upon discussions with industry contacts as well as the NPES *Directory of International Suppliers of Printing & Publishing Technologies*. This list is not exhaustive.

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## **Sector Notebook Project**

## **Printing and Publishing**

This report is one in a series of volumes published by the U.S. Environmental Protection Agency (EPA) to provide information of general interest regarding environmental issues associated with specific industrial sectors. The documents were developed under contract by Abt Associates Inc. (Cambridge, MA), and Booz-Allen & Hamilton, Inc. (McLean, VA). This publication may be **purchased** from the Superintendent of Documents, U.S. Government Printing Office. A listing of available Sector Notebooks and document numbers are included on the following page.

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**EPA Office of Compliance Sector Notebook Project**  
**Profile of the Printing and Publishing Industry**

**August 1995**

Office of Compliance  
Office of Enforcement and Compliance Assurance  
U.S. Environmental Protection Agency  
401 M St., SW (MC 2221-A)  
Washington, DC 20460

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September 1995

SIC 27

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\*Spanish Translations Available

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**List of Acronyms**

AFS -	AIRS Facility Subsystem (CAA database)
AIRS -	Aerometric Information Retrieval System (CAA database)
BIFs -	Boilers and Industrial Furnaces (RCRA)
BOD -	Biochemical Oxygen Demand
CAA -	Clean Air Act
CAAA -	Clean Air Act Amendments of 1990
CERCLA -	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS -	CERCLA Information System
CFCs -	Chlorofluorocarbons
CO -	Carbon Monoxide
COD -	Chemical Oxygen Demand
CSI -	Common Sense Initiative
CWA -	Clean Water Act
D&B -	Dun and Bradstreet Marketing Index
ELP -	Environmental Leadership Program
EPA -	United States Environmental Protection Agency
EPCRA -	Emergency Planning and Community Right-to-Know Act
FIFRA -	Federal Insecticide, Fungicide, and Rodenticide Act
FINDS -	Facility Indexing System
HAPs -	Hazardous Air Pollutants (CAA)
HSDB -	Hazardous Substances Data Bank
IDEA -	Integrated Data for Enforcement Analysis
LDR -	Land Disposal Restrictions (RCRA)
LEPCs -	Local Emergency Planning Committees
MACT -	Maximum Achievable Control Technology (CAA)
MCLGs -	Maximum Contaminant Level Goals
MCLs -	Maximum Contaminant Levels
MEK -	Methyl Ethyl Ketone
MSDSs -	Material Safety Data Sheets
NAAQS -	National Ambient Air Quality Standards (CAA)
NAFTA -	North American Free Trade Agreement
NCDB -	National Compliance Database (for TSCA, FIFRA, EPCRA)
NCP -	National Oil and Hazardous Substances Pollution Contingency Plan
NEIC -	National Enforcement Investigation Center
NESHAP -	National Emission Standards for Hazardous Air Pollutants
NO <sub>2</sub> -	Nitrogen Dioxide
NOV -	Notice of Violation
NO <sub>x</sub> -	Nitrogen Oxide

**Sector Notebook Project****Printing and Publishing**

NPDES -	National Pollution Discharge Elimination System (CWA)
NPL -	National Priorities List
NRC -	National Response Center
NSPS -	New Source Performance Standards (CAA)
OAR -	Office of Air and Radiation
OECA -	Office of Enforcement and Compliance Assurance
OPA -	Oil Pollution Act
OPPTS -	Office of Prevention, Pesticides, and Toxic Substances
OSHA -	Occupational Safety and Health Administration
OSW -	Office of Solid Waste
OSWER -	Office of Solid Waste and Emergency Response
OW -	Office of Water
P2 -	Pollution Prevention
PCS -	Permit Compliance System (CWA Database)
POTW -	Publicly Owned Treatments Works
RCRA -	Resource Conservation and Recovery Act
RCRIS -	RCRA Information System
SARA -	Superfund Amendments and Reauthorization Act
SDWA -	Safe Drinking Water Act
SEPs -	Supplementary Environmental Projects
SERCs -	State Emergency Response Commissions
SIC -	Standard Industrial Classification
SO <sub>2</sub> -	Sulfur Dioxide
SO <sub>x</sub> -	Sulfur Oxides
TOC -	Total Organic Carbon
TRI -	Toxic Release Inventory
TRIS -	Toxic Release Inventory System
TCRIS -	Toxic Chemical Release Inventory System
TSCA -	Toxic Substances Control Act
TSS -	Total Suspended Solids
UIC -	Underground Injection Control (SDWA)
UST -	Underground Storage Tanks (RCRA)
VOCs -	Volatile Organic Compounds

**I. INTRODUCTION TO THE SECTOR NOTEBOOK PROJECT****I.A. Summary of the Sector Notebook Project**

Environmental policies based upon comprehensive analysis of air, water and land pollution (such as economic sector, and community-based approaches) are becoming an important supplement to traditional single-media approaches to environmental protection. Environmental regulatory agencies are beginning to embrace comprehensive, multi-statute solutions to facility permitting, compliance assurance, education/outreach, research, and regulatory development issues. The central concepts driving the new policy direction are that pollutant releases to each environmental medium (air, water and land) affect each other, and that environmental strategies must actively identify and address these inter-relationships by designing policies for the “whole” facility. One way to achieve a whole facility focus is to design environmental policies for similar industrial facilities. By doing so, environmental concerns that are common to the manufacturing of similar products can be addressed in a comprehensive manner. The desire to move forward with this “sector-based” approach within the EPA Office of Compliance led to the creation of this document.

The Sector Notebook Project was initiated by the Office of Compliance to provide its staff and managers with summary information for eighteen specific industrial sectors. As other EPA offices, states, the regulated community, and the public became interested in this project, the Office of Compliance expanded the scope of the original project. The ability to design comprehensive, common sense environmental protection measures for specific industries is dependent on knowledge of several inter-related topics. For the purposes of this project, the key elements chosen for inclusion are: general industry information (economic and geographic); a description of industrial processes; pollution outputs; pollution prevention opportunities; Federal statutory and regulatory framework; compliance history; and a description of partnerships that have been formed between regulatory agencies, the regulated community and the public.

For any given industry, each topic described above could alone be the subject of a lengthy volume. However, in order to produce a manageable document, this project focuses on providing summary information for each topic. This format provides the reader with a synopsis of each issue, and references where more in-depth information is desired. Text within each profile was researched from a variety of sources, and was usually condensed from more detailed sources pertaining to specific topics. This approach allows for a wide coverage of activities that can be further explored based upon the citations and references listed at the end of this profile. As a check on the information

included, each notebook went through an external document review process. The Office of Compliance appreciates the efforts of all those that participated in this process and enabled us to develop more complete, accurate and up-to-date summaries.

### **I.B. Additional Information**

#### Providing Comments

The Office of Compliance plans to periodically review and update notebooks and will make these updates available both in hard copy and electronically. If you have any comments on the existing notebook, or if you would like to provide additional information, please send a hard copy and computer disk to the EPA Office of Compliance, Sector Notebook Project, 401 M St., SW (2223-A), Washington, DC 20460. Comments can also be uploaded to the Enviro\$en\$e Bulletin Board or the Enviro\$en\$e World Wide Web for general access to all users of the system. Follow instructions in Appendix A for accessing these data systems. Once you have logged in, procedures for uploading text are available from the on-line Enviro\$en\$e Help System.

#### Adapting Notebooks to Particular Needs

The scope of the existing notebooks reflect an approximation of the relative national occurrence of facility types that occur within each sector. In many instances, industries within specific geographic regions or states may have unique characteristics that are not fully captured in these profiles. For this reason, the Office of Compliance encourages state and local environmental agencies and other groups to supplement or re-package the information included in this notebook to include more specific industrial and regulatory information that may be available. Additionally, interested states may want to supplement the "Summary of Applicable Federal Statutes and Regulations" section with state and local requirements. Compliance or technical assistance providers may also want to develop the "Pollution Prevention" section in more detail. Please contact the appropriate specialist listed on the opening page of this notebook if your office is interested in assisting us in the further development of the information or policies addressed within this volume.

If you are interested in assisting in the development of new notebooks for sectors not covered in the original eighteen, please contact the Office of Compliance at 202-564-2395.

**II. INTRODUCTION TO THE PRINTING AND PUBLISHING INDUSTRY**

This section provides background information on the size, geographic distribution, employment, production, sales, and economic condition of the printing and publishing industry. The type of facilities described within the document are also described in terms of their Standard Industrial Classification (SIC) codes. Additionally, this section contains a list of the largest companies in terms of sales.

**II.A. Introduction, Background, and Scope of the Notebook**

The printing and publishing industry, defined most broadly, includes firms whose business is dominated by printing operations, firms performing operations commonly associated with printing, such as platemaking or bookbinding, and publishers, whether or not they actually print their own material. This categorization corresponds to the Standard Industrial Classification (SIC) code 27 used by the Bureau of the Census to track the flow of goods and services within the economy. The Census identifies 58,000 firms and 62,000 facilities within SIC code 27.<sup>1,a</sup>

From the printing industry's perspective, the industry is organized by the type of printing process used: lithography, (roto)gravure, flexography, screen, and letterpress. Trade associations, technical foundations, suppliers, and supporting academic institutions are organized along process lines (See Section VIII.C). For example, the Screen Printing Technical Foundation supports the screen printing process and the Graphic Arts Technical Foundation supports lithographers. The Rochester Institute of Technology specifically supports gravure and flexographic printers. Facilities tend to employ one type of printing process exclusively, although some of the larger facilities may use two or more types. Based on the estimated value of shipments from the U.S. printing industry in 1990, lithography dominates the market with a 47 percent market share; gravure, 19 percent, flexography, 17 percent; letterpress, 11 percent; and screen printing, 3 percent.<sup>2</sup>

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<sup>a</sup> Variation in facility counts occur across data sources due to many factors including, reporting and definitional differences. This notebook does not attempt to reconcile these differences, but rather reports the data as they are maintained by each source.

**II.B. Characterization of the Printing and Publishing Industry**

According to 1987 Census data, the printing and publishing industry was comprised of 58,000 firms operating 62,000 facilities. This figure does not capture the large number of “in-plant” printing operations located throughout the manufacturing sectors. The total number of printing and publishing operations, therefore, could well exceed 100,000. The printing industry has a high ratio of small operations, with nearly one-half of printing facilities employing fewer than five employees. Printing operations are most often located adjacent to population and business centers and therefore their distribution closely parallels the distribution of the U.S. population.

**II.B.1. Industry Size and Geographic Distribution**

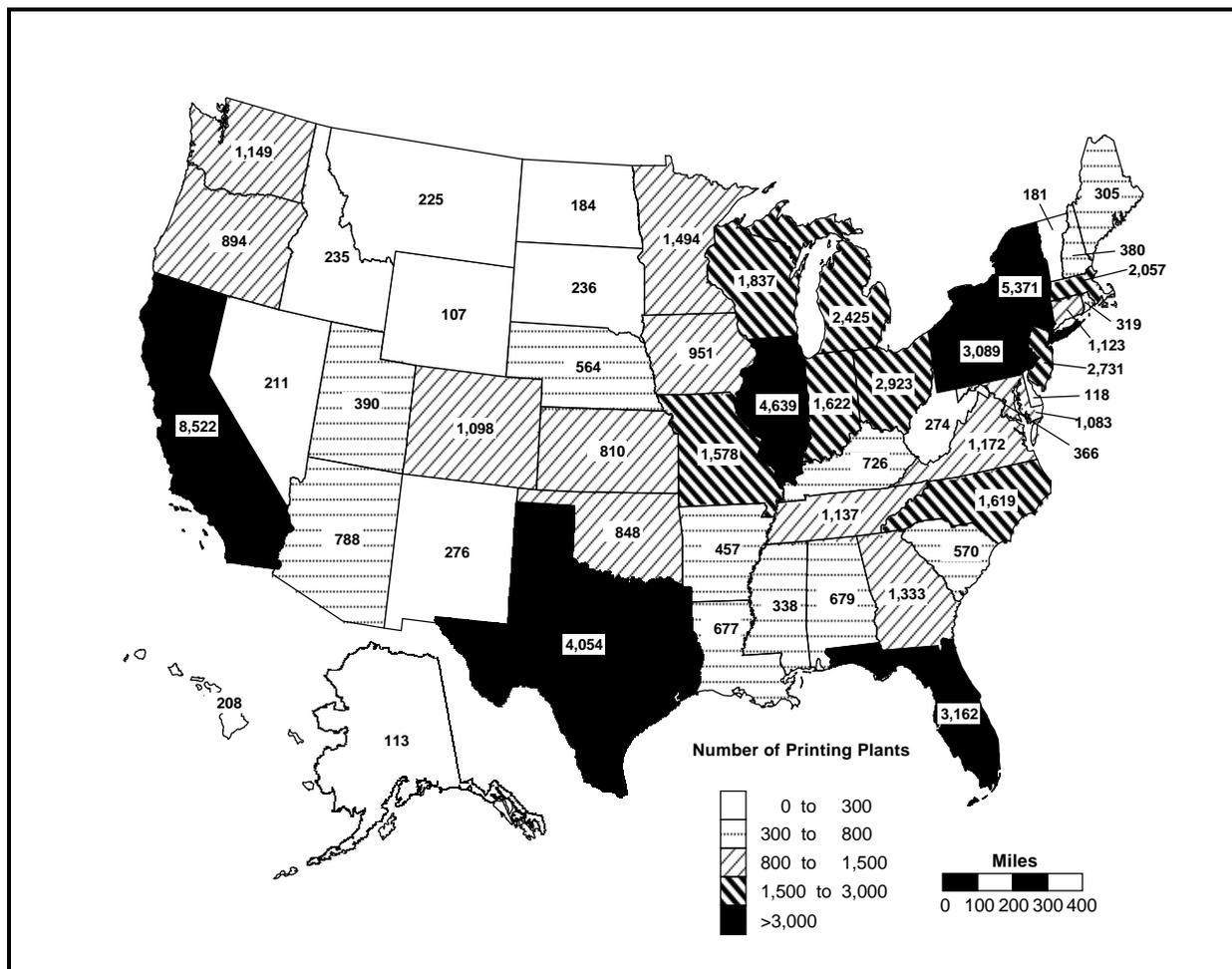
While the precise number of printing and publishing facilities is difficult to determine, 1987 Census data identified approximately 58,000 firms operating 62,000 facilities.<sup>3</sup> Other estimates of industry size are higher, in the range of 70,000, 86 percent of which are thought to have press operations, with the remainder performing printing-related operations such as publishing or platemaking.<sup>4</sup> It is important to note that because printing itself is a process used to transfer images or material to a substrate, “in-plant” printing operations are present in facilities throughout the manufacturing sectors. For example, one of the largest screen printing operations is within Boeing Corporation. Other examples include firms that print textiles, product manufacturers that print their label, and manufacturers of printed circuit boards. The number of printing and publishing operations, therefore, could well exceed 100,000.

The Bureau of the Census estimates that in 1987, 1.5 million people were employed in printing and publishing.<sup>5</sup> The value of shipments (revenue associated with product sales) generated by printing and publishing facilities totaled \$135 billion.<sup>6</sup> This value of shipments figure omits up to \$100 million associated with in-plant and quick printers (operating xerographic copiers or small lithographic presses).<sup>7</sup> Sales within the printing industry are expected to grow by 3.5 to 5.3 percent annually between 1990 and the year 2000.<sup>8</sup>

One of the most significant characteristics of the printing industry is the large proportion of very small firms. Almost one-half of all printing facilities have fewer than five employees; approximately 84 percent employ fewer than 20.<sup>9</sup> Flexographic and gravure printers, however, tend to be larger operations and to have more employees.

<b>Exhibit 1: Printing Facilities by Number of Employees</b>		
<b>Employees per Facility</b>	<b>Number of Facilities</b>	<b>Percentage of Facilities</b>
<b>1-4</b>	<b>32,158</b>	<b>46%</b>
<b>5-9</b>	<b>17,068</b>	<b>24%</b>
<b>10-19</b>	<b>9,800</b>	<b>14%</b>
<b>20-99</b>	<b>8,652</b>	<b>13%</b>
<b>100+</b>	<b>2,036</b>	<b>3%</b>
<b>Total</b>	<b>69,714</b>	<b>100%</b>
Source: U.S. Department of Commerce, Bureau of the Census. 1987 Census of Manufacturers.		

Printing facilities typically serve regional or local markets although some firms, such as those producing books and periodicals, serve national and international markets. Consequently, the geographic distribution of printing facilities closely parallels the distribution of the U.S. population. Facilities are most frequently located in light industrial areas in or adjacent to population and business centers, although smaller operations are somewhat more likely to be located in residential settings. Across the U.S., sixty percent of printing facilities are located in just ten states: California (13%), New York (8%), Illinois (7%), Texas (6%), Florida (5%), Pennsylvania (5%), Ohio (4%), New Jersey (4%), Michigan (4%), and Massachusetts (3%).<sup>10</sup>



Source: U.S. EPA, Toxics Release Inventory Database, 1993.

### Exhibit 2: Printing Facilities

*Ward's Business Directory of U.S. Private and Public Companies*, produced by Gale Research Inc., compiles financial data on U.S. companies including those operating within the printing industry. Ward's ranks U.S. companies, whether they are a parent company, subsidiary or division, by sales volume within the 4-digit SIC codes that they have been assigned as their primary activity. Readers should note that: 1) companies are assigned a 4-digit SIC that most closely resembles their principal industry; and 2) sales figures include total company sales, including subsidiaries and operations not related to printing. Additional sources of company specific financial information include Standard & Poor's Stock Report Services, Dun & Bradstreet's Million Dollar Directory, Moody's Manuals, and annual reports.

<b>Exhibit 3: Top U.S. Companies with Printing Operations</b>		
<b>Rank<sup>a</sup></b>	<b>Company<sup>b</sup></b>	<b>1993 Sales (millions of dollars)</b>
1	R.R. Donnelley & Sons Company - Chicago, IL	3,915
2	Times Mirror Company - Los Angeles, CA	3,624
3	Gannett Company, Inc. - Arlington, VA	3,382
4	Hallmark Cards, Inc. - Kansas City, MO	2,800
5	Reader's Digest Association, Inc. - Pleasantville, NY	2,345
6	Cox Enterprises, Inc. - Atlanta, GA	2,300
7	Knight-Ridder, Inc. - Miami, FL	2,237
8	Tribune Company - Chicago, IL	2,035
9	McGraw-Hill, Inc. - New York, NY	1,943
10	Dow Jones and Company, Inc.	1,725

Note: <sup>a</sup> When Ward's Business Directory lists both a parent and subsidiary in the top ten, only the parent company is presented above to avoid double counting. Not all sales can be attributed to the companies printing operations.  
<sup>b</sup> Companies shown listed SIC 2711, 2721, 2731, 2732, 2741, 2752, 2754, 2759, 2761, 2771, 2782, 2789, 2791, 2796 as primary activity.

Source: Ward's Business Directory of U.S. Private and Public Companies - 1993.

### II.B.2. Product Characterization

The printing and publishing industry produces a wide array of printed products as well as materials used in the printing process. Some of the products produced within the industry include: newspapers, books, greeting cards, checks, annual reports, magazines, and packaging. Products vary in print quality from newsprint to *National Geographic Magazine*. Also, firms performing operations commonly associated with printing, such as platemaking or bookbinding, and publishers, whether or not they actually print their own material, are included within the industry.

The SIC codes, developed by the Office of Management and Budget, divide the printing and publishing industry according to the product manufactured, such as books, newspapers, and greeting cards. Most facilities identified as

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printers by SIC code have few, if any, business lines other than those that fall within printing and publishing. However, there are tens of thousands of in-plant printing operations at facilities whose predominant lines of business are not printing. Only if data are collected for multiple SIC codes would it be evident that such facilities engaged in printing. The following list presents the three-digit SIC codes with the associated product they represent, as well as the printing process used in the product's manufacture.

- SIC 271 - Newspapers | *Processes used: lithography, flexography and letterpress*
- SIC 272 - Periodicals | *Processes used: lithography, flexography and letterpress*
- SIC 273 - Books | *Processes used: lithography, gravure and letterpress*
- SIC 274 - Miscellaneous Publishing | *Processes used: lithography, gravure, and letterpress*
- SIC 275 - Commercial Printing | *Processes used: lithography, gravure, flexography, screen and letterpress*
- SIC 276 - Manifold Business Forms | *Processes used: lithography and plateless*
- SIC 277 - Greeting Cards | *Processes used: gravure and screen*
- SIC 278 - Blankbooks, Looseleaf Binders and Bookbinding | *Primarily nonprinting*
- SIC 279 - Service Industries for the Printing Trade | *Primarily nonprinting*

Newspapers (SIC 271) and commercial printing (SIC 275) account for 57 percent of the total value of shipments for the printing and publishing industry. Newspapers (SIC 271) include establishments primarily engaged in publishing newspapers, or in publishing and printing newspapers. Newspaper printers that are not engaged in publishing are classified under Commercial Printing (SIC 275). Commercial printing products include but are not limited to the following: maps, periodicals, coupons, menus, postcards, stationary, envelopes, magazines, and custom products. Other three-digit categories comprised of firms involved primarily in printing accounted for an additional 22 percent of the value of shipments. Other SIC categories include: textile screen printing (SIC 2346) and nameplates (SIC 3993). Firms that may not be involved in printing, such as publishing of blankbooks, bookbinding and printing trade services (e.g., platemaking and typesetting), accounted for the remaining 21 percent of the value of shipments.<sup>11</sup>

**II.B.3. Economic Trends**

The following discussion has been summarized from the *U.S. Industrial Outlook*, published by the Department of Commerce, which tracks and forecasts the economic performance of most major sectors of the U.S. economy. The U.S. is the world's largest market for printed products. In aggregate, the printing and publishing industry accounts for a significant portion of the nation's goods and services; the 1991 value of shipments totaled \$161 billion with an estimated payroll of \$39 billion for 1.5 million workers. Printing and publishing is the largest conglomeration of small businesses in the domestic manufacturing sector. While the industry is large in number, many individual facilities, particularly small letterpress operations are marginally profitable. Industry growth is affected by several factors including: business formations and transactions (which drive advertising expenditures), population growth, and trends in certain characteristics of the population, such as leisure time availability and individuals' consumption patterns.<sup>12</sup>

Competitive pressures come from non-print media, such as CD-ROM, other electronic means of transferring information as well as the movement of book printing to offshore facilities where production costs are lower. In 1992, the U.S. imported \$2.1 billion worth of printed products, principally from Canada, the United Kingdom, Hong Kong, and Germany. During the same period, the U.S. exported \$3.8 billion worth of printed material. The major export markets for U.S. printed material are Canada, the United Kingdom, Japan, and Mexico.<sup>13</sup>

Once the U.S. economy emerges fully from the recession of 1990/1991, printing and publishing sales are expected to grow by 3.8 to 5.3 percent per year through the year 2000. The next five years are expected to offer printers several opportunities for business expansion due to the North American Free Trade Agreement (NAFTA) and the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) which will reduce trade barriers to U.S. exports and strengthen protection of international copyrights.<sup>14</sup>

**III. INDUSTRIAL PROCESS DESCRIPTION**

This section describes the materials and equipment used, and the processes employed within the printing and publishing industry. The section is designed for those interested in gaining a general understanding of the industry, and for those interested in the inter-relationship between the industrial process and the topics described in subsequent sections of this profile -- pollutant outputs, pollution prevention opportunities, and Federal regulations. This section does not attempt to replicate published engineering information that is available for this industry. Refer to Section IX for a list of reference documents that are available.

This section specifically contains a description of commonly used production processes, associated raw materials, the byproducts produced or released, and the materials either recycled or transferred off-site. This discussion, coupled with schematic drawings of the identified processes, provide a concise description of where wastes may be produced in the process. This section also describes the potential fate (via air, water, and soil pathways) of these waste products.

**III.A. Industrial Processes in the Printing and Publishing Industry**

The diversity of technologies and products in the printing industry makes it difficult to characterize the processes and the environmental issues facing the industry as a whole. These process differences can lead to distinct environmental concerns and are critical when developing compliance assistance programs. It is estimated that 97 percent of all printing activities can be categorized within five different printing processes: lithography, gravure, flexography, letterpress, and screen printing.<sup>15</sup> The equipment, applications, and chemicals for each of these processes differ; however, they all print an image on a substrate following the same basic sequence. The fundamental steps in printing are referred to as imaging, pre-press, printing, and post-press operations. The type of printing technology that is used depends on a variety of factors, including the substrate used (e.g., paper, plastic, metal, ceramic, etc.), the length and speed of the print run, the required print image quality, and the end product produced.

The first step in the printing process, imaging, produces an image of the material to be printed. Traditionally, this image is produced photographically, but with increasing frequency the image is produced electronically. The production of a photographic image involves a variety of chemicals similar to those used in other fields of photography. The image on the film is transferred to the image carrier or plate. In pre-press operations, an image carrier is produced that can transfer the ink in the image area and can repel the ink in

non-image areas. In printing, ink is applied to the plate and the image is transferred to the substrate. In the post-press step, the printed material may receive any one of numerous finishing operations, depending on the desired form of the final product.

Each of the five predominant printing technologies differ significantly in how the image is transferred from the image carrier to the substrate in the printing step. In general, the imaging and post-press operations are fairly similar for all printing technologies. Therefore, imaging and post-press procedures are discussed for all printing technologies, and the platemaking and press operations are discussed separately for each technology.

### **III.A.1. Imaging Operations**

Imaging operations begin with composition and typesetting, and are followed by the production of a photographic negative or positive. Composition involves the arrangement of art and text into the desired format. This composition task was performed manually. Today, however, computer systems are commonly used to accomplish the task. Computers can be equipped with both optical character recognition and photographic image scanners and digitizers so that pre-typed material and images can be incorporated into the document being composed.<sup>16</sup>

Once the desired format and images are assembled, they are photographed to produce transparencies. The printing industry photographic process uses input materials very similar to those used in other fields of photography. The purpose of this step is to produce a photographic negative (for lithography and letterpress) or a positive (for gravure, screen printing, and other lithographic processes). Input materials for the process include paper, plastic film, or a glass base covered with a light-sensitive coating called a photographic emulsion. This emulsion is usually composed of silver halide salts and gelatin. The desired image is projected onto the film to produce a film negative or a film positive. When the exposed photographic emulsion is developed, the silver halide in the emulsion is converted to metallic silver, in proportion to the amount of exposure it has received. The developing action is stopped by immersing the film in a fixing bath, which is mainly composed of sodium thiosulfate ("hypo"). The fixed photographic emulsion is then rinsed. If an image is to be printed as a color reproduction, transparencies are made for each of the colors to be used on the press. Multi-color printing is done by passing the same substrate through several single-color printing operations.<sup>17</sup> Three or four basic colors are combined on the final product to yield any color desired.

### **III.A.2. Platemaking and Printing**

From photographic negative or positive, a plate is produced that is used in each printing process to carry or transfer ink in the form of the image to the substrate. The plate must pick up ink only in the areas where ink is to be applied to the final image on the substrate. The five basic printing technologies employ five different types of plates. The platemaking step and the printing operations summaries are described below for each technology.

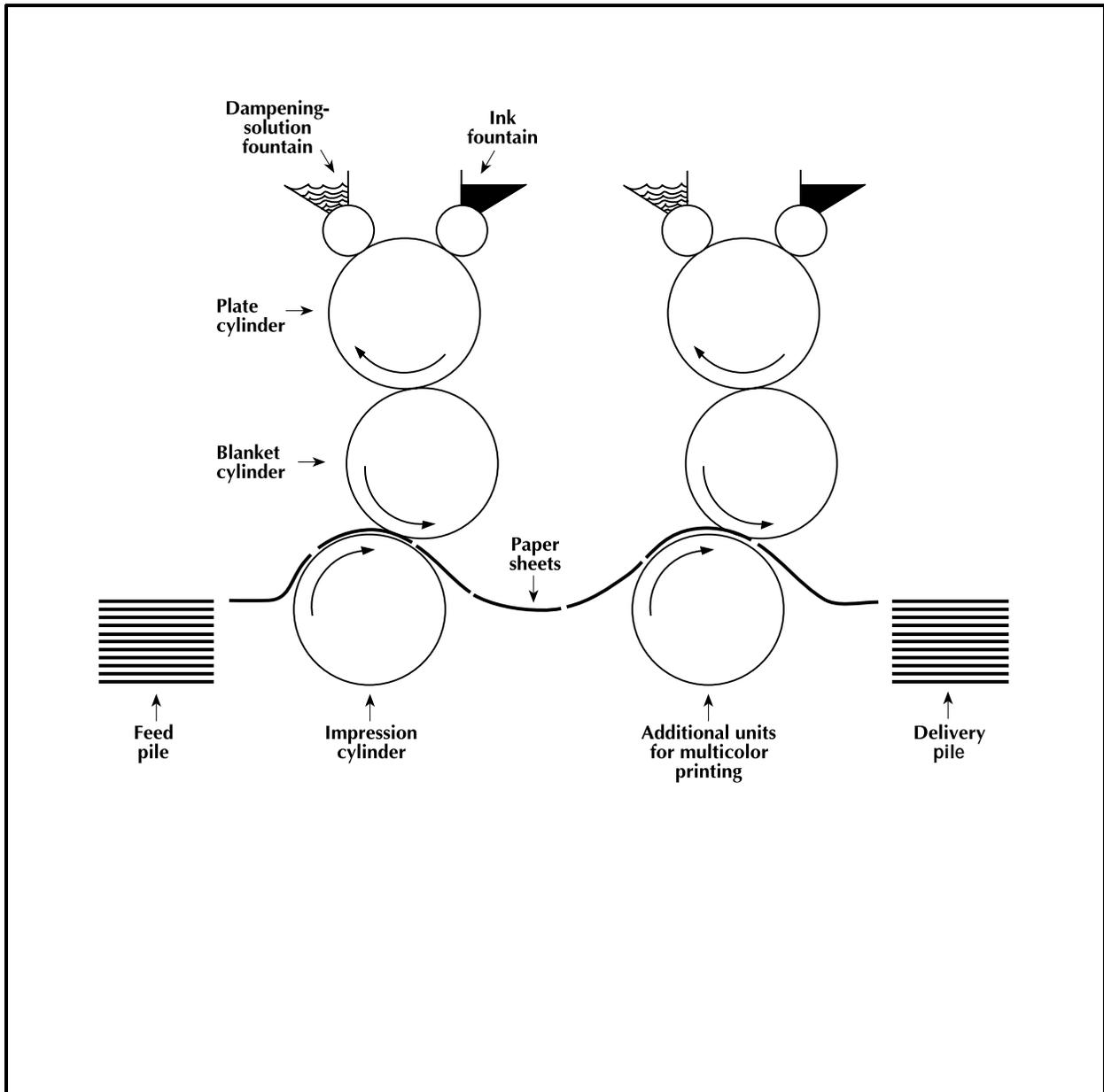
### *Lithography*

In lithography, a planographic plate is used where the image areas and the non-image areas are on the same plane (they are neither raised nor depressed) and are defined by differences in their physiochemical properties. There are several types of lithographic printing, but they all use a planographic plate and they all rely on the fundamental property that oil and water do not mix. As a result, lithographic inks are oil-based and traditionally the ink oils are petroleum based. A metal or paper or plastic printing plate is coated with a light-sensitive chemical which becomes ink receptive when exposed to light. Through the photographic negative, the coating is exposed to light chemically changing the exposed areas, making the image areas ink-receptive. The non-image areas remain water-receptive. Water-based mixtures, referred to as fountain solution, are applied to enhance the non-image area's ability to repel ink. Fountain solutions may contain five to 10 percent isopropyl alcohol or they may contain alcohol substitutes that meet the same needs but with a lower VOC content. Through the use of inking rollers, ink is applied to the plate, adhering only to the image areas. The image is transferred or offset from the plate to a rubber roller (the blanket), which then transfers the image to the substrate being printed. To accelerate drying and control ink flow characteristics, lithographic inks contain solvents. There are lithographic inks that are curable using ultraviolet energy or electron beam, and do not contain solvents.<sup>18</sup>

Depending on the type of substrate or the products printed, the lithographic process is further divided into subprocesses: sheet-fed, heatset web, and non-heatset web. In lithography, as in most printing technologies, presses are available as sheet-fed or as web-fed. On a sheet-fed press, the substrate is fed into the press one sheet at a time. A web-fed press prints on a continuous roll of substrate, known as a web, which is later cut to size. "Offset" lithography refers to the use of a rubber blanket to transfer the image from the plate to the substrate. Within the category of web offset lithography, there is heatset web offset and non-heatset web offset. In the heatset process, the ink is dried by evaporating the ink oil with indirect hot air dryers. This process is potentially the most significant source of VOC emissions in lithography.<sup>19</sup>

Sheet-fed offset lithography is typically used for printing books, posters, brochures, and artwork. Web-fed offset lithography is commonly used for high speed production of magazines, catalogs, and other periodicals, newspapers, magazines and catalogs.

**Exhibit 4: Simplified Lithographic Press Layout**



Source: EPA 1994

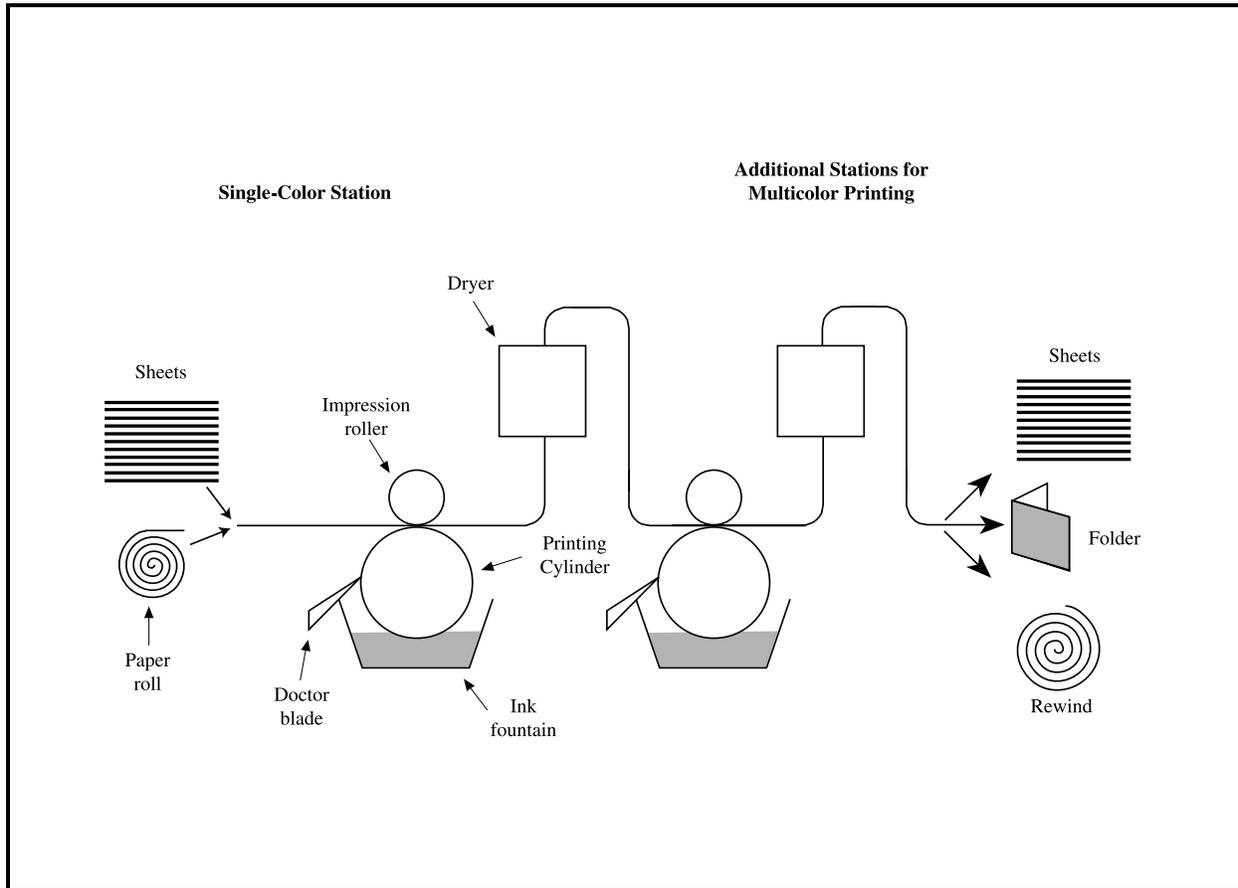
*Gravure*

Gravure printing uses almost exclusively electro-mechanically engraved copper image carriers to separate the image area from the non-image area. Typically, the gravure image carrier is a cylinder. It consists of a steel or plastic base which is plated with copper or a special alloy. The electro-mechanical engraving is accomplished by the electronic impulses driving the diamond stylus which engraves minute cells at the rate of over 3,000 per second. Today, most of the gravure cylinders are engraved directly from digital files. Chemical etching, which is a dominant technology for the gravure cylinder imaging in the past, represents a very small percentage of the total engravings done today. It is used for special applications only. Gravure was the first printing process capable of direct imaging from electronic data.

In gravure printing, ink is applied to the engraved cylinder, then wiped from the surface by the doctor blade, leaving ink only on the engraved image area. The printing substrate is brought into contact with the cylinder with sufficient pressure so that it picks up the ink left in the depressions on the cylinder. (Exhibit 5) Low viscosity inks are required for gravure printing in order to fill the tiny depressions on the plate. To dry the ink and drive off the solvents, drying ovens are placed in the paper path. The solvent-laden air can be passed through carbon beds to trap and condense the solvent. Most of the ink solvents are recaptured using this process, and can either be reused or destroyed by incineration.<sup>20</sup> Also, low VOC inks can be used making carbon beds unnecessary.

The cost of a gravure cylinder is still considered higher compared to other types of printing plates; however, today gravure is the most mature process in “digital data/direct to plate” technology. Also, gravure cylinders have a very long useful life. Several million impressions can be printed before a cylinder needs to be replaced. Gravure printing is capable of producing high-quality, continuous tone images on a variety of substrates. It is most commonly used for large circulation catalogs, magazines, Sunday supplements, and advertising inserts. Also, gravure printing is used for a variety of packaging materials, postage stamps, greeting cards, currency, resilient floor coverings, and wall paper. As in lithography, the two basic types of gravure presses are sheet-fed and web. In the US, almost all commercial gravure printing is done on web fed rotogravure presses.

**Exhibit 5: Rotogravure Press**



Source: EPA 1994

*Flexography*

Flexographic and letterpress plates are made using the same basic technologies. Both technologies employ plates with raised images and only the raised images come in contact with the substrate during printing.

The traditional method of making these plates begins with the exposure of a metal plate through a negative and processing of the exposed plate using an acid bath. The resulting metal engraving may be used directly for letterpress (flatbed), or alternatively used to mold a master using a bakelite board. The board, under pressure and heat, fills the engraving and, when cooled, becomes a master for molding a rubber plate with a raised area that will transfer the graphics. The second method of making plates employs photopolymers in either a solid or liquid state. The photopolymer sheet (consisting of monomers) is exposed to light through a negative and the unexposed areas washed out by means of a solvent or water wash. The result is the relief plate.

Typically, flexographic plates are made of plastic, rubber, or some other flexible material, which is attached to a roller or cylinder for ink application. Ink is applied to the raised image on the plate, which transfers the image to the substrate. There are three basic configurations of flexographic press -- stack, central impression and in-line. (Presses can be configured to print both sides of the web. (Exhibit 6 illustrates a three-roller webfed rotary press.)<sup>b</sup> In the typical flexographic printing sequence, the substrate is fed into the press from a roll. The image is printed as the substrate travels through a series of stations with each station printing a single color. Each station is made up of four rollers where the first roller transfers the ink from an ink pan to the second roller, the meter roller. The meter roller (also known as an Anilox Roll) meters the ink to a uniform thickness onto the third roller, the plate cylinder. The substrate moves between the plate cylinder and fourth roller. The plate is attached to the third roller (the plate cylinder) and the fourth roller (the impression cylinder) applies pressure to the plate cylinder, thereby forming the image on the substrate. The printed web proceeds through an overhead dryer section to dry the ink before the next station. Upon completion of the printing of the last color, the web may then move through an overhead tunnel dryer to remove all residual solvents. The finished product is rewound onto a roll. The width of flexography presses ranges from 4.5 inches up to 115 inches. The ink tray used on larger flexographic presses is very long, allowing for significant evaporation of ink (which may have a high alcohol content). Modern presses are now equipped with enclosed doctor

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<sup>b</sup> Information on other flexographic printing configurations, such as, the wide web common impression press and the wide web stack type press is available from the Flexographic Technical Association (Section IX).

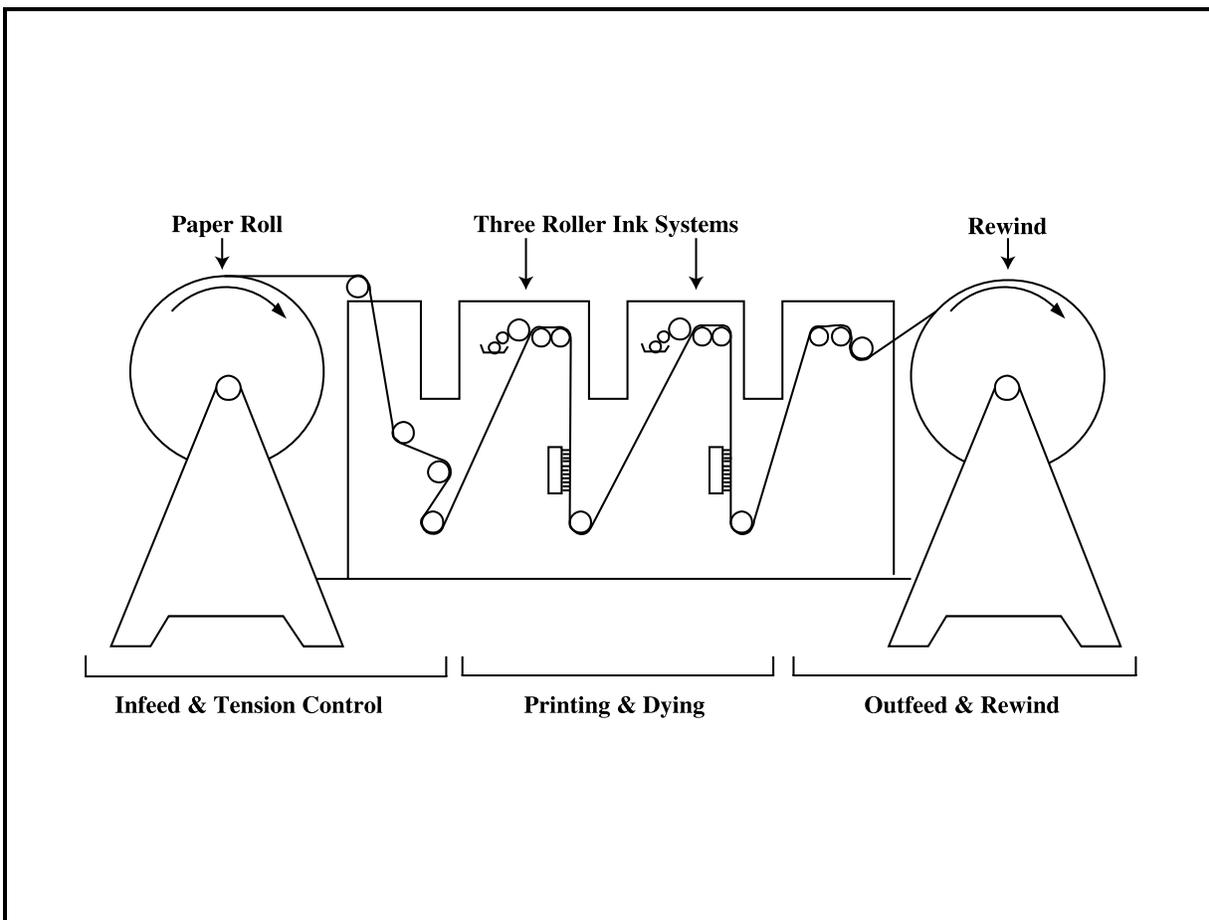
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blade systems which eliminate the fountain roller and fountain, thereby reducing evaporation losses. Printers with the more narrow presses (for tags, labels and tapes) generally use water based inks and UV coatings. Using UV inks reduces the volatility of the ink.

As in gravure, fast-drying, low-viscosity inks are used. These inks lie on the surface of nonabsorbent substrates and solidify when solvents are removed, making flexography ideal for printing on impervious materials such as polyethylene, cellophane and other plastics and metallized surfaces. The soft plates allow quality printing on compressible surfaces such as cardboard packaging.

With low cost plates and a relatively simple two roller press, flexography is one of the least expensive and fastest growing printing processes. According to the Flexographic Technical Association, 85 percent of packaging is printed with flexography.<sup>21</sup> It is used primarily for packaging, such as plastic wrappers, corrugated boxes, milk cartons, labels, and foil and paper bags.

**Exhibit 6: Webfed Rotary Flexographic Press**



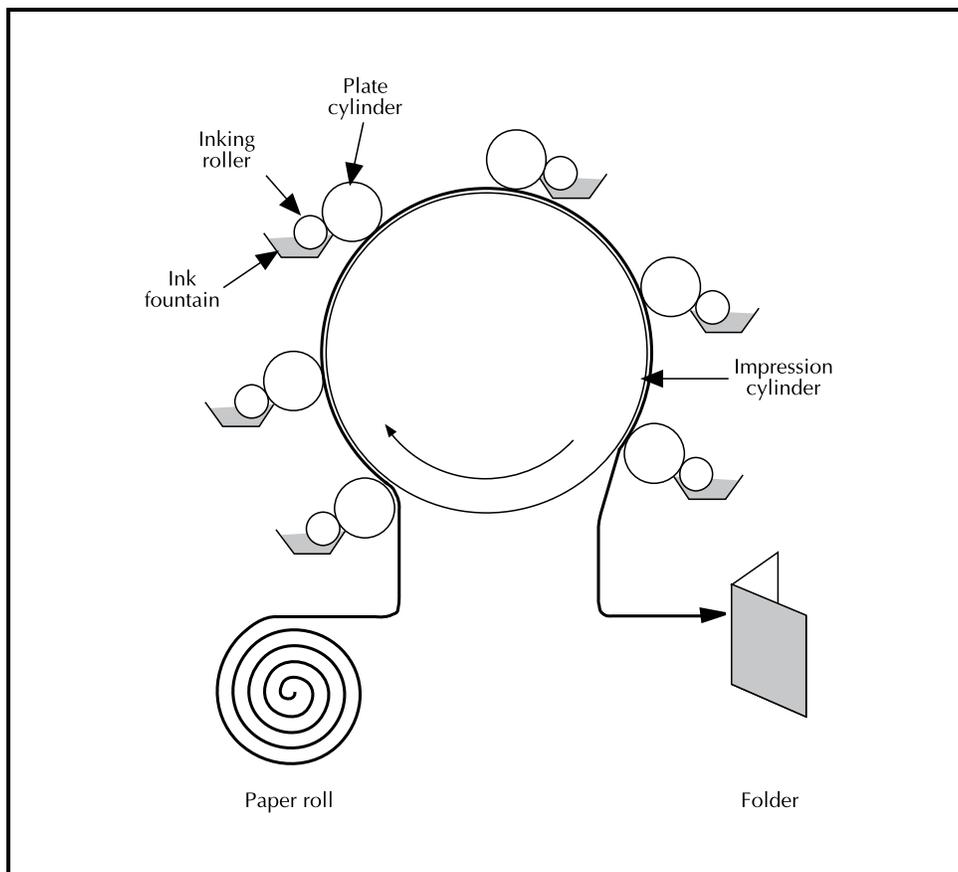
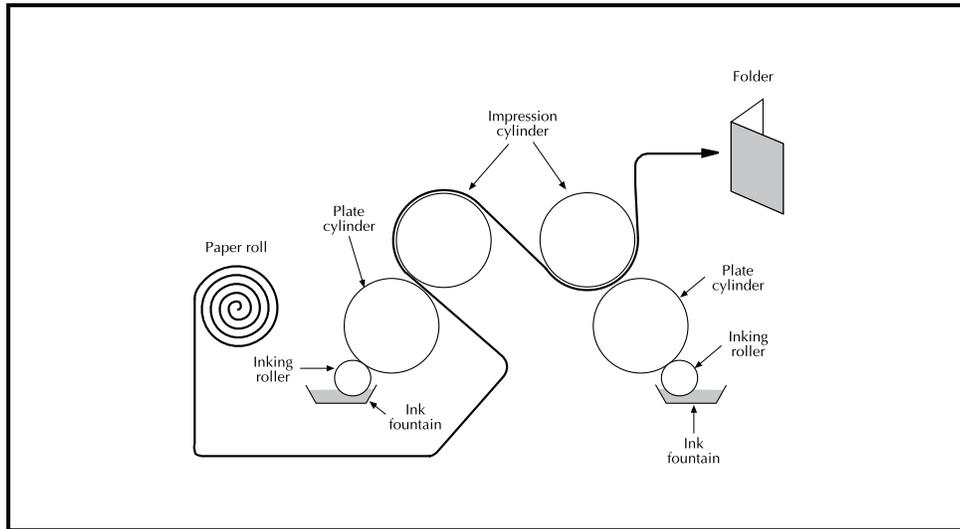
Source: EPA 1994

*Letterpress*

Like flexography, letterpress uses a plate with a raised image on a metal or plastic plate. The three types of letterpresses in use today are the platen, flat-bed, and rotary presses. On the platen press, the raised plate is locked on a flat surface. The substrate is placed on another flat surface and pressed against the inked plate. The flat-bed cylinder press prints as the substrate passes around an impression cylinder on its way from the feed stack to the delivery stack. These presses are often very slow relative to lithographic, flexographic or gravure presses. The most popular letterpress is the web-fed rotary letterpress. Designed to print both sides of the web simultaneously, these presses are used primarily for printing newspapers.

Letterpress was once the predominant printing method, but its prevalence has declined dramatically. It now accounts for an estimated 11 percent of the total value of the U.S. printing industry. Lithographic printing, gravure, and flexography have all begun to replace letterpress. Web letterpress, traditionally used to print newspapers, is being replaced by lithography and flexography. Gravure has largely replaced letterpress for printing long-run magazines and catalogs, while flexography is replacing it for printing paperbacks, labels, and business forms. Today, letterpress is primarily used for printing books, business cards, and advertising brochures.

### Exhibit 7: Rotary Letterpress Press



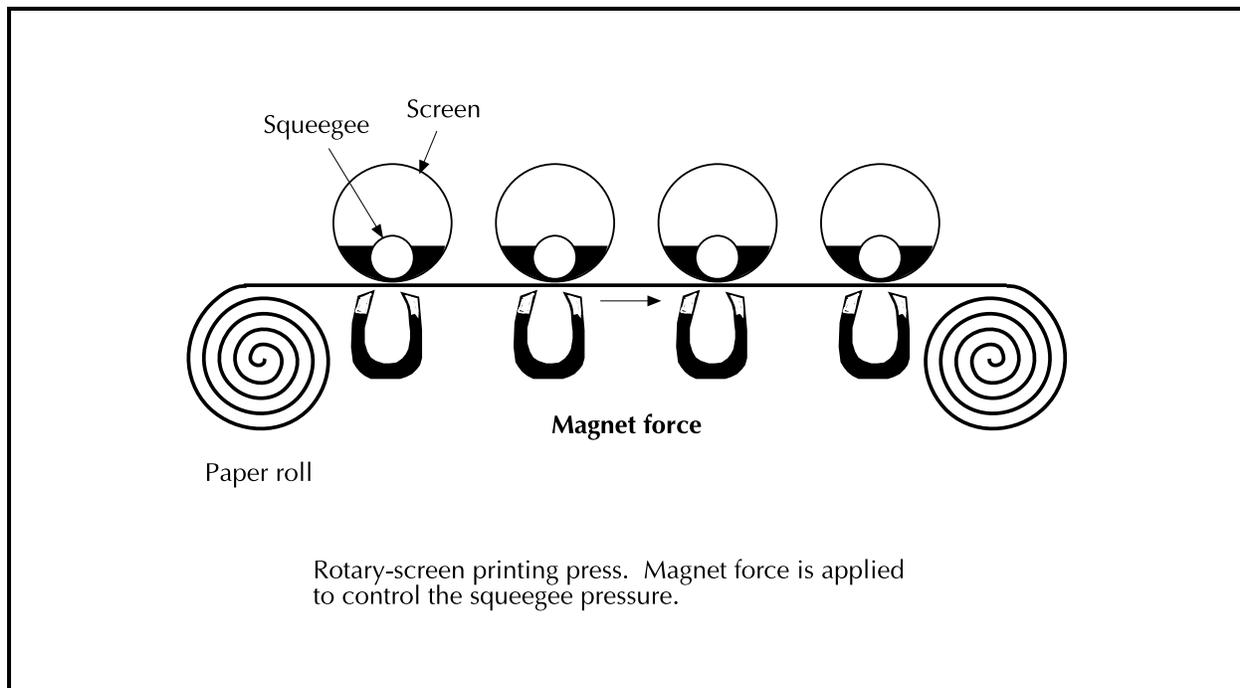
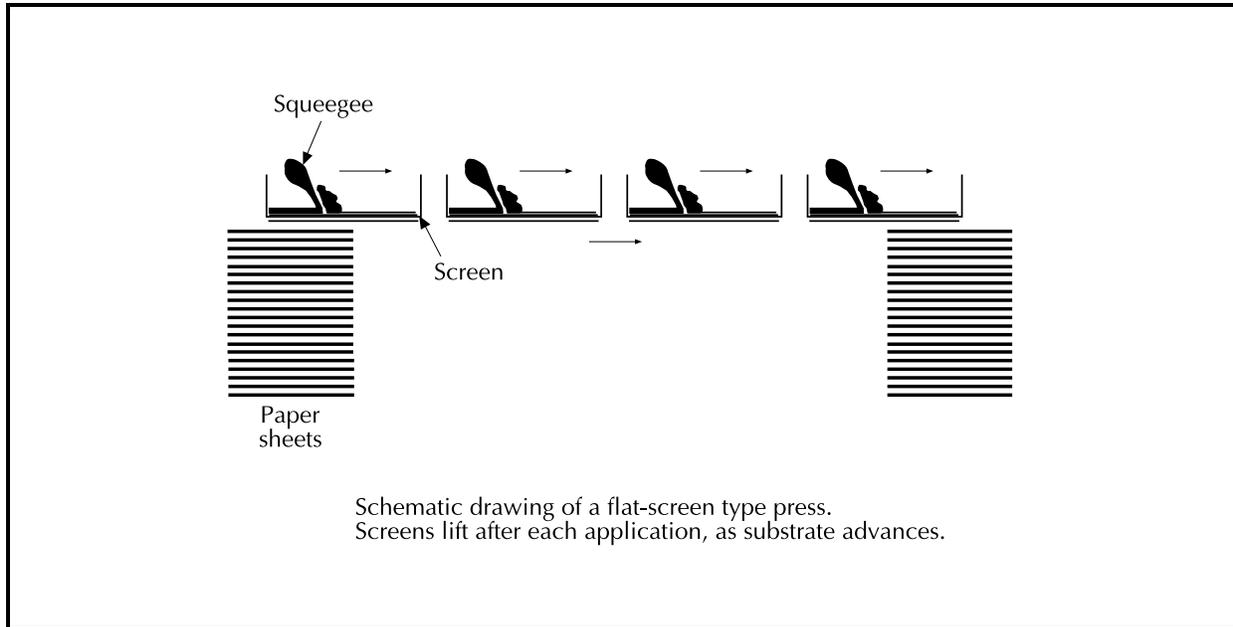
Source: EPA 1994

*Screen Printing*

Unlike the impervious plates used in the other four printing processes, the screen printing process uses a porous polyester mesh. The mesh is stretched tightly over a frame, and a stencil, which defines the image to be printed, is applied to the mesh. The squeegee applies pressure to the ink thereby forcing the ink through the open areas of the screen. The thread count and diameter determine the amount of ink deposited onto the substrate below.

The major chemicals used in screen printing process include organic solvents, adhesives and inks. The chemical composition of the ink used varies depending on the substrate printed and the end product produced. There are five main categories of inks used within the screen printing process: UV-curable, solvent-based, and water-based for graphic applications, plastisols for textile applications, and water-based for textile applications. Screen printing is an extremely versatile printing process, and can be used to print on a wide variety of substrates including paper, plastics, glass, metals, nylon and cotton to produce a wide variety of products including, but not limited to, posters, labels, fleet decals, signage, all types of textile garments and membrane circuits.<sup>22</sup>

### Exhibit 8: Two Methods of Screen Printing



Source: EPA 1994

*Plateless Technologies*

Plateless technologies include electrostatic and laser printing, and other printing methods which do not rely upon the use of a separately developed or prepared plate or screen. Although currently used primarily for low-volume applications, these methods are likely to see increased use as the technologies continue to develop.

**III.A.3. Post-press Operations**

Post-press processes include cutting, folding, collating, binding, perforating, drilling, and many others. From an environmental impact viewpoint, binding is the most significant of the post-press operations. Liquid glue used for binding is typically a water-based latex that becomes impervious to water when it dries.<sup>23</sup>

**III.B. Raw Material Inputs and Pollution Outputs in the Production Line**

Printing operations use materials that may adversely affect air, water, and land: certain chemicals involved in printing volatilize, which contributes to air emissions from the facility and to smog formation; other chemicals may be discharged to drains and impact freshwater or marine ecosystems; and solid wastes contribute to the existing local and regional disposal problems. The five printing processes outlined in the previous section have many common wastes; however, they also each have outputs that are process specific. Thus, it is important to note that wastes do differ from process to process and the solutions identified to reduce waste in one printing process do not necessarily apply to other printing processes. The following charts outline potential outputs for each of the five printing processes.

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<b>Exhibit 9: Lithography Process: Inputs, and Outputs</b>		
<b>Process</b>	<b>Inputs</b>	<b>Outputs</b>
Imaging	Film	Used film and out-of-date film.
	Paper	Scrap paper.
	Developer	May be volatile and contribute to air emissions. Spent developer (sent to POTW).
	Fixer	May be volatile and contribute to air emissions. Silver from film is often electrolytically recovered from the fixer prior to discharge of spent fixer to POTW.
	Wash Water	Used rinse water.
	Cleaning Solutions	Rags containing solvents (sent to laundry service or disposed of as hazardous waste).
	Chemical Storage Containers	Empty containers (disposed of or returned to suppliers).
Platemaking	Plates	Used plates.
	Water	Used rinse water (discharged to POTW).
	Developer	Spent developer (may contain alcohol; contributes to air emissions).
Printing	Fountain Solution	May contain VOCs and contribute to air emissions.
	Ink	Waste oil based ink disposed of as hazardous waste. Solvent-based inks contribute to air emissions.
	Paper	Waste paper from bringing press up to required print quality and from rejected prints.
	Cleaning Solutions	Solvents used to clean press and remove excess ink contribute to air emissions.
	Rags	Ink and solvent-laden rags (sent to laundry service, disposed of as hazardous waste, or treated to recover solvents).
Finishing	Paper	Reject prints and edges from trimming.
	Adhesives	Possible losses to the air.
	Shipping boxes	Waste issue.

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## Printing and Publishing

<b>Exhibit 10: Gravure Process: Inputs, and Outputs</b>		
<b>Process</b>	<b>Inputs</b>	<b>Outputs</b>
Imaging	Digital Data	Film or engraved image carrier (cylinder)
	Film	Used film and out-of-date film.
	Paper	Scrap paper.
	Photographic processing solution	May be volatile and contribute to air emissions. Waste solution.
	Wash Water	Used rinse water.
	Cleaning Solutions	Rags containing solvents (sent to laundry service, disposed of as hazardous waste, or treated to recover solvents).
	Chemical Storage Containers	Empty containers (disposed of or returned to suppliers).
Cylinder Making	Copper-clad Cylinder	Used cylinders.
	Acid etching solution	Waste solution.
Printing	Ink	Solvent-based inks (toluene-based for mass-circulation printing and alcohol-based for packaging) maintain the required low viscosity and contribute to air emissions. Waste ink disposed of as hazardous waste.
	Heat	Ovens are used to drive off the solvents to dry the ink. Ink solvents are recaptured through chillers and other equipment.
	Paper	Waste paper from bringing press up to required print quality and from rejected prints.
	Cleaning Solutions	Solvents used to remove excess ink contribute to air emissions.
Finishing	Paper	Reject prints and edges from trimming.
	Adhesives	Possible losses to the air.
	Shipping boxes	Waste issue.

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<b>Exhibit 11: Flexography Process: Inputs, and Outputs</b>		
<b>Process</b>	<b>Inputs</b>	<b>Outputs</b>
Imaging	Film	Used film and out-of-date film.
	Paper	Scrap paper.
	Developer	May be volatile and contribute to air emissions. Spent developer (to POTW).
	Fixer	May be volatile and contribute to air emissions. Silver from film is often electrolytically recovered from the fixer prior to disposal of spent fixer to POTW).
	Wash Water	Used rinse water.
	Cleaning Solutions	Rags containing solvents (sent to laundry service, disposed of as hazardous waste, or treated to recover solvents).
	Chemical Storage Containers	Empty containers (disposed of or returned to suppliers).
Platemaking	Plate mold	Used molds, engravings and washes.
	Rubber plate	Used plates, defective plates and photopolymer.
	Etching and wash-out solutions	Waste solution and spent solvents.
Printing	Ink	Waste ink disposed of as hazardous waste. Solvent-based inks contribute to air emissions.
	Paper/film	Waste paper and film from bringing press up to required print quality and from rejected prints.
	Heat	Exhaust heat and odor. High alcohol content of some inks contribute to air emissions as ink dries. Water-based inks are used for paper and some films.
	Cleaning Solutions	Solvents used to remove excess ink contribute to air emissions and hazardous wastes.
Finishing	Paper/film	Reject prints, edges from trimming, box and bag-making wastes.
	Adhesives	Possible losses to the air.
	Shipping boxes	Waste issue.

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Exhibit 12: Letterpress Process: Inputs, and Outputs		
Process	Inputs	Outputs
Imaging	Film	Used film and out-of-date film.
	Paper	Scrap paper.
	Developer	May be volatile and contribute to air emissions. Spent developer to POTW.
	Fixer	May be volatile and contribute to air emissions. Spent fixer (silver from film is often electrolytically recovered from the fixer prior to disposal of spent fixer to POTW).
	Wash Water	Used rinse water.
	Cleaning Solutions	Rags containing cleaning solvents (sent to laundry service, disposed of as hazardous waste, or treated to recover solvents).
	Chemical Storage Containers	Empty containers (disposed of or returned to suppliers).
Platemaking	Plate mold	Used molds.
	Plate	Used plates.
	Plate developer solution	Waste solution.
Printing	Ink	Waste ink disposed of as hazardous wastewater. Solvent-based inks contribute to air emissions.
	Paper	Waste paper from bringing press up to required print quality and from rejected prints.
	Cleaning Solutions	Solvents used to remove excess ink contribute to air emissions.
Finishing	Paper	Reject prints and edges from trimming.
	Adhesives	Possible losses to the air.
	Shipping boxes	Waste issue.

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<b>Exhibit 13: Screen Printing Process: Inputs, and Outputs</b>		
<b>Process</b>	<b>Inputs</b>	<b>Outputs</b>
Imaging and Screen Making	Emulsion	Waste emulsion and out-of-date product.
	Photosensitization solution (needed for unsensitized films only)	Waste solution.
	Screen (polyester, nylon or wire mesh)	Excess screen trimmings; used screens.
	Frame	Reused.
	Developer	Spent developer (sent to POTW).
	Fixer	Spent fixer.
	Chemical Storage Containers	Empty containers.
Printing	Ink	Waste ink usually disposed of as hazardous waste. Solvent-based inks contribute to air emissions.
	Paper or other printing substrate	Waste paper from bringing press up to required print quality and from rejected prints.
	Blockout	Removed during screen reclamation and disposed with screen reclaim chemicals.
	Screen Reclamation Chemicals	Screen reclamation chemicals and ink are disposed of in rags and in clean-up wastewater.
	Water	Water used for screen reclamation is discharged to POTW; sometimes it is filtered prior to discharge.
Finishing	Paper or other printing substrate	Reject prints and edges from trimming.
	Adhesives	Possible losses to the air.
	Shipping boxes	Waste issue.

**IV. CHEMICAL RELEASE AND TRANSFER PROFILE**

This section is designed to provide background information on the pollutant releases that are reported by this industry. The best source of comparative pollutant release information is the Toxic Release Inventory System (TRI). Pursuant to the Emergency Planning and Community Right-to-Know Act (EPCRA), TRI includes self-reported facility release and transfer data for over 600 toxic chemicals. Facilities within SIC Codes 20 through 39 (manufacturing industries) that have more than 10 employees, and that are above weight-based reporting thresholds are required to report TRI on-site releases and off-site transfers. The information presented within the sector notebooks is derived from the most recently available (1993) TRI reporting year (which then included 316 chemicals), and focuses primarily on the on-site releases reported by each sector. Because TRI requires consistent reporting regardless of sector, it is an excellent tool for drawing comparisons across industries.

Although this sector notebook does not present historical information regarding TRI chemical releases, please note that in general, toxic chemical releases have been declining. In fact, according to the 1993 Toxic Release Inventory Data Book, reported releases dropped by 43 percent between 1988 and 1993. Although on-site releases have decreased, the total amount of reported toxic waste has not declined because the amount of toxic chemicals transferred off-site has increased. Transfers have increased from 3.7 billion pounds in 1991 to 4.7 billion pounds in 1993. Better management practices have led to increases in off-site transfers of toxic chemicals for recycling. More detailed information can be obtained from EPA's annual Toxics Release Inventory Public Data Release book (which is available through the EPCRA Hotline at 800-535-0202), or directly from the Toxic Release Inventory System database (for user support call 202-260-1531).

Wherever possible, the sector notebooks present TRI data as the primary indicator of chemical release within each industrial category. TRI data provide the type, amount and media receptor of each chemical released or transferred. When other sources of pollutant release data have been obtained, these data have been included to augment the TRI information.

**TRI Data Limitations**

The reader should keep in mind the following limitations regarding TRI data. Within some sectors, the majority of facilities are not subject to TRI reporting because they are not considered manufacturing industries, or because they are below TRI reporting thresholds. Examples are the mining, dry cleaning,

printing, and transportation equipment cleaning sectors. For these sectors, release information from other sources has been included.

The TRI data presented here does not accurately portray the printing industry's toxic chemical outputs due to the small number of printing facilities that report under EPCRA §313. The 1992 TRI printing industry data is based on information from 374 facilities, yet the printing industry universe has been put at approximately 70,000 facilities by industry sources; the TRI data covers less than one percent of U.S. printers. Small facilities that do not report to TRI because they are below the reporting thresholds of chemical use and/or employment are also somewhat less likely to be subject to the same regulatory requirements as larger facilities. A comprehensive picture of the chemical releases and transfers for the printing industry will be difficult without a separate release and transfer profile of the non-TRI-reporting printing facilities.

The reader should also be aware that TRI "pounds released" data presented within the notebooks is not equivalent to a "risk" ranking for each industry. Weighting each pound of release equally does not factor in the relative toxicity of each chemical that is released. The Agency is in the process of developing an approach to assign toxicological weightings to each chemical released so that one can differentiate between pollutants with significant differences in toxicity. As a preliminary indicator of the environmental impact of the industry's most commonly released chemicals, the notebook briefly summarizes the toxicological properties of the top five chemicals (by weight) reported by each industry.

## **Definitions Associated with Section IV Data Tables**

### **General Definitions**

**SIC Code** -- is the Standard Industrial Classification (SIC) is a statistical classification standard used for all establishment-based Federal economic statistics. The SIC codes facilitate comparisons between facility and industry data.

**TRI Facilities** -- are manufacturing facilities that have 10 or more full-time employees and are above established chemical throughput thresholds. Manufacturing facilities are defined as facilities in Standard Industrial Classification primary codes 20 through 39. Facilities must submit estimates for all chemicals that are on the EPA's defined list and are above throughput thresholds.

**Data Table Column Heading Definitions**

The following definitions are based upon standard definitions developed by EPA's Toxic Release Inventory Program. The categories below represent the possible pollutant destinations that can be reported.

**RELEASES** -- are an on-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, as well as contained disposal into underground injection wells.

**Releases to Air (Point and Fugitive Air Emissions)** -- Include all air emissions from industry activity. Point emission occur through confined air streams as found in stacks, ducts, or pipes. Fugitive emissions include losses from equipment leaks, or evaporative losses from impoundments, spills, or leaks.

**Releases to Water (Surface Water Discharges)** -- encompass any releases going directly to streams, rivers, lakes, oceans, or other bodies of water. Any estimates for stormwater runoff and non-point losses must also be included.

**Releases to Land** -- includes disposal of toxic chemicals in waste to on-site landfills, land treated or incorporation into soil, surface impoundments, spills, leaks, or waste piles. These activities must occur within the facility's boundaries for inclusion in this category.

**Underground Injection** -- is a contained release of a fluid into a subsurface well for the purpose of waste disposal.

**TRANSFERS** -- is a transfer of toxic chemicals in wastes to a facility that is geographically or physically separate from the facility reporting under TRI. The quantities reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers for disposal, these quantities do not necessarily represent entry of the chemical into the environment.

**Transfers to POTWs** -- are wastewaters transferred through pipes or sewers to a publicly owned treatments works (POTW). Treatment and chemical removal depend on the chemical's nature and treatment methods used. Chemicals not treated or destroyed by the POTW are generally released to surface waters or landfilled within the sludge.

**Transfers to Recycling** -- are sent off-site for the purposes of regenerating or recovering still valuable materials. Once these chemicals have been recycled, they may be returned to the originating facility or sold commercially.

**Transfers to Energy Recovery** -- are wastes combusted off-site in industrial furnaces for energy recovery. Treatment of a chemical by incineration is not considered to be energy recovery.

**Transfers to Treatment** -- are wastes moved off-site for either neutralization, incineration, biological destruction, or physical separation. In some cases, the chemicals are not destroyed but prepared for further waste management.

**Transfers to Disposal** -- are wastes taken to another facility for disposal generally as a release to land or as an injection underground.

#### **IV.A. EPA Toxic Release Inventory for the Printing and Publishing Industry**

The total amount of TRI toxic chemicals generated by the printing industry is a gross profile of the types and relative amounts of chemical outputs from printing processes. Additional information which can be related back to possible compliance requirements is available from the distribution of chemical releases across specific media within the environment. The TRI data requires filers to separate the total releases for the printing industry for air, water, and land releases. This distribution across media can also be compared to the profile of other industry sectors.

The printing industry releases 99 percent of its total TRI poundage to the air, while the remaining one percent of releases are split between water and land disposal. This release profile differs significantly from other TRI industries which average approximately 60 percent to air, 30 percent to land, and 10 percent to water release respectively. Examining the printing industry's TRI reported toxic chemicals by chemical highlights the likely origins of the large air releases for the industry (see following table).

Of the top ten toxic chemicals in the list, the prevalence of volatile chemicals explains the air intensive toxic chemical loading of the printing industry. Of these ten toxic chemicals, seven are highly volatile. The four top toxic chemicals released, toluene, methyl ethyl ketone, xylene, and 1,1,1-trichloroethane, are all solvents of high volatility. By far the single largest toxic chemical used (released/transferred) by the printing industry is the solvent toluene; toluene comprises roughly 70 percent of the total chemicals released and transferred by the industry. Toluene is used heavily in the gravure printing process as an ink solvent, but is also used throughout printing

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for cleaning purposes. Metals on the other hand are typically transferred off-site, as a component of hazardous wastes or discharged to the sewer.

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**Exhibit 14: 1993 Releases for Printing Facilities in TRI, by Number of Facilities Reporting  
(Releases reported in pounds/year)**

CHEMICAL NAME	# REPORTING FACILITIES	FUGITIVE AIR	POINT AIR	WATER DISCHARGE	UNDERGROUND INJECTION	LAND DISPOSAL	TOTAL RELEASES	AVG. RELEASE PER FACILITY
TOLUENE	104	15,158.9	13,295.1	185	0	500	28,454.81	273.604
GLYCOL ETHERS	66	684,589	711,528	255	0	0	1,396,372	21,157
METHYL ETHYL	50	579,621	959,265	0	0	0	1,538,886	30,778
XYLENE (MIXED	45	741,467	839,616	105	0	0	1,581,188	35,138
1,1,1-	37	1,085.82	340,447	0	0	7,476	1,433,743	38,750
NITRIC ACID	30	6,320	7,285	0	0	0	13,605	454
SULFURIC ACID	28	1,032	2,533	0	0	0	3,565	127
ZINC COMPOUNDS	27	750	777	10	0	0	1,537	57
ACETONE	26	343,897	287,530	5	0	0	631,432	24,286
METHANOL	26	164,933	136,103	0	0	0	301,036	11,578
COPPER COMPOUNDS	24	250	1,000	23	0	0	1,273	53
BARIUM COMPOUNDS	22	1,371	1,464	0	0	0	2,835	129
COPPER	19	5	0	9	0	0	14	1
TETRACHLOROETHYLENE	16	27,948	79,692	0	0	0	107,640	6,728
METHYL ISOBUTYL	14	75,997	187,089	0	0	0	263,086	18,792
DICHLOROMETHANE	13	50,359	123,003	0	0	0	173,362	13,336
ETHYLENE GLYCOL	13	75,680	31,003	0	0	0	106,683	8,206
N-BUTYL ALCOHOL	11	36,182	22,224	0	0	0	58,406	5,310
AMMONIA	10	11,760	64,403	0	0	0	76,163	7,616
1,2,4-	7	89,733	4,870	0	0	1,083	95,686	13,669
DIBUTYL PHTHALATE	5	0	18,300	0	0	0	18,300	3,660
ISOPROPYL ALCOHOL	5	38,864	44,056	0	0	0	82,920	16,584
ETHYLBENZENE	4	6,691	44,516	0	0	0	51,207	12,802
2-METHOXYETHANOL	4	11,493	19,176	0	0	0	30,669	7,667
TRICHLOROETHYLENE	3	62,689	0	0	0	0	62,689	20,896
DI(2-ETHYLHEXYL)	2	0	8,057	0	0	0	8,057	4,029
HYDROQUINONE	2	695	0	0	0	0	695	348
NICKEL	2	0	0	0	0	0	0	0
BENZENE	1	0	0	0	0	0	0	0
CHROMIUM COMPOUNDS	1	0	250	0	0	0	250	250
CYCLOHEXANE	1	0	0	0	0	0	0	0
FORMALDEHYDE	1	160	500	0	0	0	660	660
FREON 113	1	10,691	0	0	0	0	10,691	10,691
HYDROCHLORIC ACID	1	5	0	0	0	0	5	5
LEAD	1	0	0	0	0	98	98	98
MANGANESE	1	5	0	0	0	0	5	5
NAPHTHALENE	1	19,484	2,408	0	0	0	21,892	21,892
O-XYLENE	1	881	848	0	0	0	1,729	1,729
PHENOL	1	2,200	720	0	0	0	2,920	2,920
PHOSPHORIC ACID	1	250	5	0	0	0	255	255

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**Exhibit 15: 1993 Transfers for Printing Facilities in TRI, by Number of Facilities Reporting  
(Transfers reported in pounds/year)**

H MI AL NAM	# R PORTING H MI AL	POTW IS HARG S	IS POSAL	R Y LIN G	TR ATM N T	N RGY R OV RY	TOTAL TRANSF R S	AVG. TRANSF R P R FA ILITY
TOLUENE	104	10,637	2,159	3,552.82	60,841	1,705.39	5,331.85	51.268
GLYCOL ETHERS	66	212,203	4,200	81,810	39,034	640,347	977,594	14,812
METHYL ETHYL KETONE	50	5	18,050	254,764	60,032	806,136	1,138,98	22,780
XYLENE (MIXED ISOMERS)	45	39	21,748	165,614	5,735	227,411	420,547	9,345
1,1,1-TRICHLOROETHANE	37	5	12,365	49,680	12,274	116,972	191,296	5,170
NITRIC ACID	30	68,984	0	0	28,825	0	97,809	3,260
SULFURIC ACID	28	11	0	0	340	0	351	13
ZINC COMPOUNDS	27	557	22,813	4,671	9,155	20,275	57,471	2,129
ACETONE	26	1	9,555	129,475	15,516	110,189	264,736	10,182
METHANOL	26	21,042	2,755	3,885	10	68,800	96,879	3,726
COPPER COMPOUNDS	24	2,385	3,205	395,345	12,410	50	413,395	17,225
BARIUM COMPOUNDS	22	26	64,390	4,051	1,942	566	70,975	3,226
COPPER	19	1,234	9,124	373,827	14,192	0	398,377	20,967
TETRACHLOROETHYLENE	16	0	0	199,620	36,038	1,617	237,275	14,830
METHYL ISOBUTYL KETONE	14	0	500	30,532	23,635	48,912	103,579	7,399
DICHLOROMETHANE	13	0	0	0	7,919	250	8,169	628
ETHYLENE GLYCOL	13	22,726	0	0	2,020	0	24,746	1,904
N-BUTYL ALCOHOL	11	2,060	0	12,492	4,937	44,275	63,764	5,797
AMMONIA	10	300	5	250	6,327	0	6,882	688
1,2,4-TRIMETHYLBENZENE	7	0	0	0	13,400	12,688	28,890	4,127
DIBUTYL PHTHALATE	5	0	4,100	0	3,101	15,600	22,801	4,560
ISOPROPYL ALCOHOL	5	250	0	11,850	0	20,850	32,950	6,590
ETHYLBENZENE	4	0	0	0	500	6,730	7,230	1,808
2-METHOXYETHANOL	4	0	0	0	0	93,409	93,409	23,352
TRICHLOROETHYLENE	3	0	0	9,000	0	0	9,000	3,000
DI(2-ETHYLHEXYL)	2	0	8,500	0	0	0	8,500	4,250
HYDROQUINONE	2	0	0	9,700	0	0	9,700	4,850
NICKEL	2	4	1,760	10,759	0	0	12,523	6,262
BENZENE	1	0	0	0	0	0	0	0
CHROMIUM COMPOUNDS	1	2,200	3,600	0	2,255	0	8,055	8,055
CYCLOHEXANE	1	0	0	0	0	0	0	0
FORMALDEHYDE	1	0	0	0	0	0	0	0
FREON 113	1	0	0	0	0	0	0	0
HYDROCHLORIC ACID	1	0	0	0	0	0	0	0
LEAD	1	0	0	62,770	0	0	62,770	62,770
MANGANESE COMPOUNDS	1	0	250	0	0	0	250	250
NAPHTHALENE	1	0	0	916	0	0	916	916
O-XYLENE	1	0	0	0	0	0	0	0
PHENOL	1	0	0	0	0	0	0	0
PHOSPHORIC ACID	1	0	0	0	0	0	0	0
2-ETHOXYETHANOL	1	0	0	0	0	3,000	3,000	3,000
TOTAL	318	344,669	189,079	5,363,83	360,438	3,943,46	10,204,6	32,090

Source: U.S. EPA, Toxic Release Inventory Database, 1993.

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The TRI database contains a detailed compilation of self-reported, facility-specific chemical releases. The top reporting facilities for this sector are listed below. Facilities that have reported only the SIC codes covered under this notebook appear in Exhibit 16.

<b>Exhibit 16: Top 10 TRI Releasing Printing Facilities<sup>c</sup></b>		
<b>Rank</b>	<b>Facility</b>	<b>Total TRI Releases in Pounds</b>
1	Ringier America Inc. - Corinth, MS	2,734,080
2	R. R. Donnelley & Sons Co. - Warsaw, IN	2,304,148
3	Quebecor Printing Inc. - Glen Burnie, MD	1,991,284
4	Quebecor Printing Inc. - Memphis, TN	1,741,875
5	Quebecor Printing Inc. - Dickson, TN	1,666,416
6	Brown Printing Co. - Franklin, KY	1,643,881
7	R. R. Donnelley Printing - Lynchburg, VA	1,431,502
8	Quebecor Printing Inc. - Providence, RI	1,366,140
9	R. R. Donnelley & Sons Co. - Gallatin, TN	1,193,120
10	Quebecor Printing Inc. - Mount Morris, IL	1,190,988
Source: U.S. EPA. Toxic Release Inventory Database. 1993.		

**IV.B. Summary of Selected Chemicals Released**

The brief descriptions provided below were taken from the *1993 Toxics Release Inventory Public Data Release* (EPA, 1994), and the Hazardous Substances Data Bank (HSDB), accessed via TOXNET. TOXNET is a computer system run by the National Library of Medicine. It includes a number of toxicological databases managed by EPA, National Cancer Institute, and the National Institute for Occupational Safety and Health.<sup>d</sup> HSDB contains chemical-specific information on manufacturing and use, chemical and physical properties, safety and handling, toxicity and biomedical

<sup>c</sup> Being included on this list does not mean that the release is associated with non-compliance with environmental laws.

<sup>d</sup> Databases included in TOXNET are: CCRIS (Chemical Carcinogenesis Research Information System), DART (Developmental and Reproductive Toxicity Database), DBIR (Directory of Biotechnology Information Resources), EMICBACK (Environmental Mutagen Information Center Backfile), GENE-TOX (Genetic Toxicology), HSDB (Hazardous Substances Data Bank), IRIS (Integrated Risk Information System), RTECS (Registry of Toxic Effects of Chemical Substances), and TRI (Toxic Release Inventory).

effects, pharmacology, environmental fate and exposure potential, exposure standards and regulations, monitoring and analysis methods, and additional references. The information contained below is based upon exposure assumptions that have been conducted using standard scientific procedures. The effects listed below must be taken in context of these exposure assumptions that are more fully explained within the full chemical profiles in HSDB. For more information on TOXNET, contact the TOXNET help line at 800-231-3766.

Toluene (CAS: 108-88-3)

**Toxicity.** Inhalation or ingestion of toluene can cause headaches, confusion, weakness, and memory loss. Toluene may also affect the way the kidneys and liver function.

Reactions of toluene (see environmental fate) in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Some studies have shown that unborn animals were harmed when high levels of toluene were inhaled by their mothers, although the same effects were not seen when the mothers were fed large quantities of toluene. Note that these results may reflect similar difficulties in humans.

**Carcinogenicity.** There is currently no evidence to suggest that this chemical is carcinogenic.

**Environmental Fate.** The majority of releases of toluene to land and water will evaporate. Toluene may also be degraded by microorganisms. Once volatilized, toluene in the lower atmosphere will react with other atmospheric components contributing to the formation of ground-level ozone and other air pollutants.

**Physical Properties.** Toluene is a volatile organic chemical.

Glycol Ethers

Data on ethylene glycol mono-n-butyl ether (2-butoxyethanol) are used to represent all glycol ethers because it is the most commonly used glycol ether in printing.

Ethylene Glycol Mono-n-Butyl Ether (2-Butoxyethanol)

**Toxicity.** Exposure to moderate concentrations of 2-butoxyethanol may cause central nervous system depression, including headaches, drowsiness, weakness, slurred speech, stuttering, staggering, tremors, blurred vision, and personality changes. These symptoms are such that a patient, in the absence of an accurate occupational history, may be treated for schizophrenia or narcolepsy. Other symptoms of moderate poisoning include nausea; vomiting; diarrhea; blood toxicity; abdominal and lumbar pain; and lesions in the brain, lung, liver, meninges and heart. Exposure to higher concentrations may lead to skin, respiratory, and eye irritation; kidney and liver damage; and coma.

It appears that 2-butoxyethanol is one of the few materials to which humans are more resistant than experimental animals. This appears to be at least partly due to the fact that humans are more resistant to the chemical's red blood cell-destroying properties than are most lab animals.

**Environmental fate.** The chemical 2-butoxyethanol is highly mobile in soils and should not accumulate in organic matter contained in sediments and suspended solids. Limited monitoring data has shown that it can leach to ground water. Hydrolysis, direct photolysis, volatilization, adsorption, and bioconcentration are not important fate processes for 2-butoxyethanol. Biodegradation is likely to be the most important removal mechanism of 2-butoxyethanol from aerobic soil and water. In the atmosphere, it reacts with photochemically produced hydroxyl radicals with an estimated half-life of 17 hours.

Methyl Ethyl Ketone (CAS: 78-93-3)

**Toxicity.** Breathing moderate amounts of methyl ethyl ketone (MEK) for short periods of time can cause adverse effects on the nervous system ranging from headaches, dizziness, nausea, and numbness in the fingers and toes to unconsciousness. Its vapors are irritating to the skin, eyes, nose, and throat and can damage the eyes. Repeated exposure to moderate to high amounts may cause liver and kidney effects.

**Environmental Fate.** MEK is a flammable liquid. Most of the MEK released to the environment will end up in the atmosphere. MEK can contribute to the formation of air pollutants in the lower atmosphere. It can be degraded by microorganisms living in water and soil.

1,1,1-Trichloroethane (CAS: 71-55-6)

**Toxicity.** Repeated contact of 1,1,1-trichloroethane (TCE) with skin may cause serious skin cracking and infection. Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations.

Exposure to high concentrations of TCE causes reversible mild liver and kidney dysfunction, central nervous system depression, gait disturbances, stupor, coma, respiratory depression, and even death. Exposure to lower concentrations of TCE leads to light-headedness, throat irritation, headache, disequilibrium, impaired coordination, drowsiness, convulsions and mild changes in perception.

**Carcinogenicity.** There is currently no evidence to suggest that this chemical is carcinogenic.

**Environmental Fate.** Releases of TCE to surface water or land will almost entirely volatilize. Releases to air may be transported long distances and may partially return to earth in rain. In the lower atmosphere, TCE degrades very slowly by photooxidation and slowly diffuses to the upper atmosphere where photodegradation is rapid.

Any TCE that does not evaporate from soils leaches to groundwater. Degradation in soils and water is slow. TCE does not hydrolyze in water, nor does it significantly bioconcentrate in aquatic organisms.

Xylene (Mixed Isomers) (CAS: 1330-20-7)

**Toxicity.** Xylenes are rapidly absorbed into the body after inhalation, ingestion, or skin contact. Short-term exposure of humans to high levels of xylenes can cause irritation of the skin, eyes, nose, and throat, difficulty in breathing, impaired lung function, impaired memory, and possible changes in the liver and kidneys. Both short- and long-term exposure to high concentrations can cause effects such as headaches, dizziness, confusion, and lack of muscle coordination. Reactions of xylenes (see environmental fate) in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

**Carcinogenicity.** There is currently no evidence to suggest that this chemical is carcinogenic.

**Environmental Fate.** The majority of releases to land and water will quickly evaporate, although some degradation by microorganisms will occur.

Xylenes are moderately mobile in soils and may leach into groundwater, where they may persist for several years.

Xylenes are volatile organic chemicals. As such, xylenes in the lower atmosphere will react with other atmospheric components, contributing to the formation of ground-level ozone and other air pollutants.

#### **IV.C. Other Data Sources**

The toxic chemical release data obtained from TRI allows for a comparison across years and industry sectors. Reported chemicals are limited however to the 316 reported chemicals. The EPA Office of Air Quality Planning and Standards has compiled air pollutant emission factors for determining the total air emissions of priority pollutants (e.g., total hydrocarbons, SO<sub>x</sub>, NO<sub>x</sub>, CO, particulates, etc.) from various industry sectors including printing facilities.

The Aerometric Information Retrieval System (AIRS) contains a wide range of information related to stationary sources of air pollution, including the emissions of a number of air pollutants which may be of concern within a particular industry. With the exception of volatile organic compounds (VOCs), there is little overlap with the TRI chemicals reported above. Exhibit 17 summarizes annual releases of carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), particulate matter of 10 microns or less (PM10), total particulates (PT), sulfur dioxide (SO<sub>2</sub>), and volatile organic compounds (VOCs).

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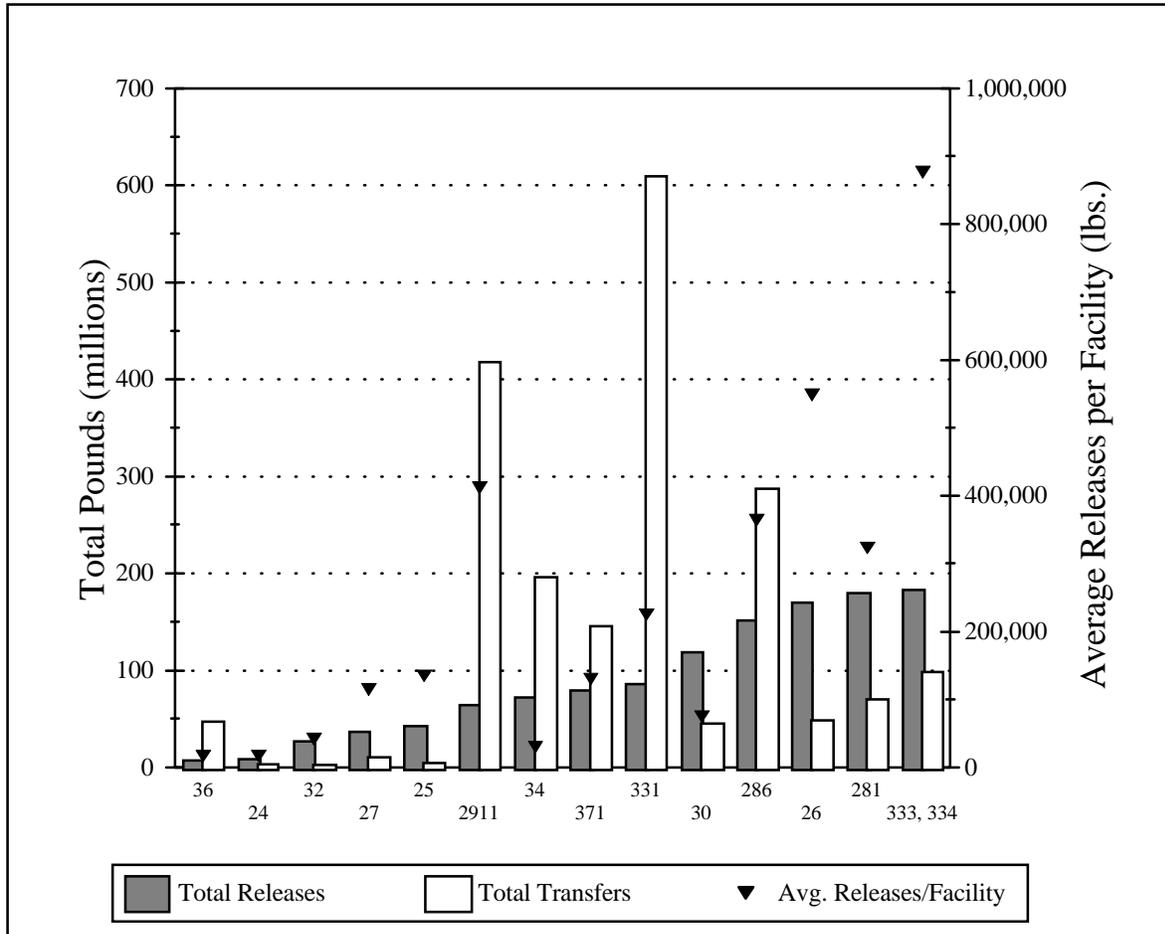
<b>Exhibit 17: Pollutant Releases (short tons/year)</b>						
<b>Industry Sector</b>	<b>CO</b>	<b>NO2</b>	<b>PM10</b>	<b>PT</b>	<b>SO2</b>	<b>VOC</b>
Metal Mining	5,391	28,583	39,359	140,052	84,222	1,283
Nonmetal Mining	4,525	28,804	59,305	167,948	24,129	1,736
Lumber and Wood Production	123,756	42,658	14,135	63,761	9,419	41,423
Furniture and Fixtures	2,069	2,981	2,165	3,178	1,606	59,426
Pulp and Paper	624,291	394,448	35,579	113,571	541,002	96,875
<b>Printing</b>	<b>8,463</b>	<b>4,915</b>	<b>399</b>	<b>1,031</b>	<b>1,728</b>	<b>101,537</b>
Inorganic Chemicals	166,147	103,575	4,107	39,062	182,189	52,091
Organic Chemicals	146,947	236,826	26,493	44,860	132,459	201,888
Petroleum Refining	419,311	380,641	18,787	36,877	648,155	369,058
Rubber and Misc. Plastics	2,090	11,914	2,407	5,355	29,364	140,741
Stone, Clay and Concrete	58,043	338,482	74,623	171,853	339,216	30,262
Iron and Steel	1,518,642	138,985	42,368	83,017	238,268	82,292
Nonferrous Metals	448,758	55,658	20,074	22,490	373,007	27,375
Fabricated Metals	3,851	16,424	1,185	3,136	4,019	102,186
Computer and Office Equipment	24	0	0	0	0	0
Electronics and Other Electrical Equipment and Components	367	1,129	207	293	453	4,854
Motor Vehicles, Bodies, Parts and Accessories	35,303	23,725	2,406	12,853	25,462	101,275
Dry Cleaning	101	179	3	28	152	7,310
Source: U.S. EPA Office of Air and Radiation, AIRS Database, May 1995.						

**IV.D. Comparison of Toxic Release Inventory Between Selected Industries**

The following information is presented as a comparison of pollutant release and transfer data cross industrial categories. It is provided to give a general sense as to the relative scale of releases and transfers within each sector profiled under this project. Please note that the following figure and table do not contain releases and transfers for industrial categories that are not included in this project, and thus cannot be used to draw conclusions regarding the total release and transfer amounts that are reported to TRI. Similar information is available within the annual TRI Public Data Release Book.

Exhibit 18 is a graphical representation of a summary of the 1993 TRI data for the Printing and Publishing and the other sectors profiled in separate notebooks. The bar graph presents the total TRI releases and total transfers on the left axis and the triangle points show the average releases per facility on the right axis. Industry sectors are presented in the order of increasing total TRI releases. The graph is based on the data shown in Exhibit 19 and is meant to facilitate comparisons between the relative amounts of releases, transfers, and releases per facility both within and between these sectors. The reader should note, however, that differences in the proportion of facilities captured by TRI exist between industry sectors. This can be a factor of poor SIC matching and relative differences in the number of facilities reporting to TRI from the various sectors. In the case of Printing and Publishing, the 1993 TRI data presented here covers 318 facilities. These facilities listed SIC 2711-2789 (Printing and Publishing) as a primary SIC code.

**Exhibit 18: Summary of 1993 TRI Data:  
Releases and Transfers by Industry**



SIC Range	Industry Sector	SIC Range	Industry Sector	SIC Range	Industry Sector
36	Electronic Equipment and Components	2911	Petroleum Refining	286	Organic Chemical Mfg.
24	Lumber and Wood Products	34	Fabricated Metals	26	Pulp and Paper
32	Stone, Clay, and Concrete	371	Motor Vehicles, Bodies, Parts, and Accessories	281	Inorganic Chemical Mfg.
27	Printing	331	Iron and Steel	333,334	Nonferrous Metals
25	Wood Furniture and Fixtures	30	Rubber and Misc. Plastics		

### Exhibit 19: Toxics Release Inventory Data for Selected Industries

Industry Sector	SIC Range	# TRI Facilities	1993 TRI Releases		1993 TRI Transfers		Total Releases + Transfers (million lbs.)	Average Releases + Transfers per Facility (pounds)	
			Total Releases (million lbs.)	Average Releases per Facility (pounds)	Total Transfers (million lbs.)	Average Transfers per Facility (pounds)			
Stone, Clay, and Concrete	32	634	26.6	42,000	2.2	4,000	28.8	46,000	
Lumber and Wood Products	24	491	8.4	17,000	3.5	7,000	11.9	24,000	
Furniture and Fixtures	25	313	42.2	135,000	4.2	13,000	46.4	148,000	
<b>Printing</b>	<b>2711-2789</b>	<b>318</b>	<b>36.5</b>	<b>115,000</b>	<b>10.2</b>	<b>32,000</b>	<b>46.7</b>	<b>147,000</b>	
Electronic Equip. and Components	36	406	6.7	17,000	47.1	116,000	53.7	133,000	
Rubber and Misc. Plastics	30	1,579	118.4	75,000	45	29,000	163.4	104,000	
Motor Vehicles, Bodies, Parts, and Accessories	371	609	79.3	130,000	145.5	239,000	224.8	369,000	
Pulp and Paper	2611-2631	309	169.7	549,000	48.4	157,000	218.1	706,000	
Inorganic Chem. Mfg.	2812-2819	555	179.6	324,000	70	126,000	249.7	450,000	
Petroleum Refining	2911	156	64.3	412,000	417.5	2,676,000	481.9	3,088,000	
Fabricated Metals	34	2,363	72	30,000	195.7	83,000	267.7	123,000	
Iron and Steel	331	381	85.8	225,000	609.5	1,600,000	695.3	1,825,000	
Nonferrous Metals	333, 334	208	182.5	877,000	98.2	472,000	280.7	1,349,000	
Organic Chemical Mfg.	2861-2869	417	151.6	364,000	286.7	688,000	438.4	1,052,000	
Metal Mining	10	Industry sector not subject to TRI reporting.							
Nonmetal Mining	14	Industry sector not subject to TRI reporting.							
Dry Cleaning	7216	Industry sector not subject to TRI reporting.							
Source: U.S. EPA, Toxics Release Inventory Database, 1993.									

**V. POLLUTION PREVENTION OPPORTUNITIES**

The best way to reduce pollution is to prevent it in the first place. Industries have creatively implemented pollution prevention techniques that improve efficiency and increase profits while at the same time minimizing environmental impacts. This can be done in many ways such as reducing material inputs, re-engineering processes to reuse by-products, improving management practices, and employing substitution of toxic chemicals. Some smaller facilities are able to actually get below regulatory thresholds just by reducing pollutant releases through aggressive pollution prevention policies.

In order to encourage these approaches, this section provides both general and company-specific descriptions of some pollution prevention advances that have been implemented within the printing and publishing industry. While the list is not exhaustive, it does provide core information that can be used as the starting point for facilities interested in beginning their own pollution prevention projects. When possible, this section provides information from real activities that can, or are being implemented by this sector -- including a discussion of associated costs, time frames, and expected rates of return. This section also provides the context (in terms of type of industry and/or type of process affected) in which the pollution prevention technique can effectively be used.

**V.A. Pollution Prevention Opportunities for the Printing and Publishing Industry**

Printers use various chemicals throughout their facilities. The payoff from many of the possible changes in the printing process or product choice is unlikely to have a significant effect on a facility's overall emissions profile because these chemicals and chemical formulations are often used in relatively small quantities. Instead, pollution prevention for printers involves a longer-term reorientation of production staff and management priorities so that opportunities are recognized and acted upon as they arise. For example, a one-time pollution prevention audit may not identify novel press technologies capable of reducing VOC emissions if the purchase is not likely to occur for several years, but the practice of on-going pollution prevention auditing, once established, will identify when the time and conditions are right.

This section is structured according to the steps within pre-press, press and post-press operations. Pollution prevention opportunities for specific printing processes (e.g., lithography) are presented separately wherever warranted.

**V.A.1. Pre-press - Image Making Operations**

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Image making most frequently involves typesetting and photodeveloping. Typical wastestreams include: photographic chemicals, paper and films, silver, and solid wastes. Pollution prevention opportunities include:

- Implementing operational and work practice changes that can extend the life of chemical baths, reduce the amount of chemicals used and reduce wastewater generation;
- Using chemical substitutes, such as non-silver photographic films (under development);
- Replacing the sometimes repetitive steps of photographing, editing, re-shooting, and the photodeveloping process with electronic imaging (including the capability to edit images on a computer)
- Developing inventory control programs that offer the advantage of reducing spoilage of photodeveloping chemicals and supplies such as paper and film.

**V.A.2. Pre-press - Plate Making/Screen Making Operations**

Typical wastestreams include: outdated material and chemicals, damaged or used plates and screens, wastewaters containing acids, alkalis, solvents, plate coatings, developers, screen emulsions, and rinse water. Pollution prevention opportunities include:

- Changing operational and work practices to reduce chemical use including recovery and recycling of spent chemicals and heavy metals, which require steps to reduce contamination of chemical baths; counter-current washing; and filtration of screen making wastewaters to remove particulates;
- Recycling plates and plate materials to the manufacturer or a metal recoverer;
- Researching and commercializing of other major changes in printing plate development, primarily related to alternative chemistries. For example, using water-developed lithographic plates and film instead of solvent processing may eliminate the need for pretreatment of wastewaters if they are being discharged to the sewer;
- Replacing ferrocyanide bleaches with iron-EDTA bleaches which eliminate certain treatment and disposal requirements;
- Reducing environmental releases related to plate-making and screen-making through new techniques. For example, laser plate making using non-silver plates is under commercial development and could replace chemical development of plates;

- Reducing wastewater through new technologies such as "washless" processing systems. While still expensive to install, these systems can reduce wastewater by as much as 97 percent.

### **V.A.3. Press Operations**

During printing, the image is transferred to a substrate of paper or some other material. Typical wastestreams include: inks, substrate, cleaning solutions, and in the case of lithography, fountain solutions. Pollution prevention opportunities include:

- Improving housekeeping and better operating practices, such as covering reservoirs and containers, scheduling jobs according to increasing darkness of ink color, using wipes as long as possible, and controlling inventory, can all minimize solvent losses from inks and cleaning solutions.
- Reducing ink vaporization by using diaphragm pumps which do not heat ink as much as mechanical vane pumps.
- Recycling waste solvents on-site or off-site. Segregating of solvents may allow a second use (e.g., for equipment cleaning or ink thinning).
- Recycling of certain waste inks where possible.
- Recycling of product rejects where possible.
- Using alternative ink and cleaning products with reduced VOC emissions. Lowering the VOC emissions from printing and press cleanup may be accomplished using vegetable oil-based inks or water-based inks (rather than solvent-based inks) where possible and using low-VOC or VOC-free cleaning solutions. A new printing system that features an oil-based lithographic ink that can be converted to a water-soluble state is currently available, allowing a water-based blanket wash to be used.
- Eliminating the use of chromium-containing fountain solutions to reduce the toxicity of spent fountain solutions.
- Installing automatic ink levelers help to keep ink conditions optimal.
- Using automatic cleaning equipment which can often be retrofitted to existing presses and operations. Typically, lower volumes of cleaning formulations are applied with such cleaning equipment, air contact, and thus volatilization, is reduced, and most are designed to include recycling and reuse of cleaning solutions.
- Minimizing finished product rejects by automating (noncontact) monitoring technologies which detect tears in web and press performance.
- Using fountain coolers to reduce evaporation from the dampening fountain.

**V.A.4. Post-Press Operations**

The final steps in making a printed product may involve folding, trimming, binding, laminating and embossing. Typical wastestreams include: scrap substrate from trimming, rejects from finishing operations, and VOCs released from adhesives. Pollution prevention opportunities include:

- Collecting and reclaiming recyclable materials is often done.
- Replacing VOC-based adhesives with water-soluble adhesives (binding adhesives that are not water-soluble may interfere with later recycling), hot-melt adhesives, or mechanical methods in binding operations.

**VI. SUMMARY OF APPLICABLE FEDERAL STATUTES AND REGULATIONS**

This section discusses the Federal statutes and regulations that may apply to this sector. The purpose of this section is to highlight, and briefly describe the applicable Federal requirements, and to provide citations for more detailed information. The three following sections are included.

- Section VI.A. contains a general overview of major statutes
- Section VI.B. contains a list of regulations specific to this industry
- Section VI.C. contains a list of pending and proposed regulations

The descriptions within Section VI are intended solely for general information. Depending upon the nature or scope of the activities at a particular facility, these summaries may or may not necessarily describe all applicable environmental requirements. Moreover, they do not constitute formal interpretations or clarifications of the statutes and regulations. For further information, readers should consult the Code of Federal Regulations and other state or local regulatory agencies. EPA Hotline contacts are also provided for each major statute.

**VI.A. General Description of Major Statutes***Resource Conservation And Recovery Act*

The Resource Conservation And Recovery Act (RCRA) of 1976 which amended the Solid Waste Disposal Act, addresses solid (Subtitle D) and hazardous (Subtitle C) waste management activities. The Hazardous and Solid Waste Amendments (HSWA) of 1984 strengthened RCRA's waste management provisions and added Subtitle I, which governs underground storage tanks (USTs).

Regulations promulgated pursuant to Subtitle C of RCRA (40 CFR Parts 260-299) establish a "cradle-to-grave" system governing hazardous waste from the point of generation to disposal. RCRA hazardous wastes include the specific materials listed in the regulations (commercial chemical products, designated with the code "P" or "U"; hazardous wastes from specific industries/sources, designated with the code "K"; or hazardous wastes from non-specific sources, designated with the code "F") or materials which exhibit a hazardous waste characteristic (ignitibility, corrosivity, reactivity, or toxicity and designated with the code "D").

Regulated entities that generate hazardous waste are subject to waste accumulation, manifesting, and record keeping standards. Facilities that treat, store, or dispose of hazardous waste must obtain a permit, either from EPA

or from a State agency which EPA has authorized to implement the permitting program. Subtitle C permits contain general facility standards such as contingency plans, emergency procedures, record keeping and reporting requirements, financial assurance mechanisms, and unit-specific standards. RCRA also contains provisions (40 CFR Part 264 Subpart S and §264.10) for conducting corrective actions which govern the cleanup of releases of hazardous waste or constituents from solid waste management units at RCRA-regulated facilities.

Although RCRA is a Federal statute, many States implement the RCRA program. Currently, EPA has delegated its authority to implement various provisions of RCRA to 46 of the 50 States.

Most RCRA requirements are not industry specific but apply to any company that generates, transports, treats, stores, or disposes of hazardous waste. Here are some important RCRA regulatory requirements:

- **Identification of Solid and Hazardous Wastes** (40 CFR Part 261) lays out the procedure every generator should follow to determine whether the material created is considered a hazardous waste, solid waste, or is exempted from regulation.
- **Standards for Generators of Hazardous Waste** (40 CFR Part 262) establishes the responsibilities of hazardous waste generators including obtaining an ID number, preparing a manifest, ensuring proper packaging and labeling, meeting standards for waste accumulation units, and record keeping and reporting requirements. Generators can accumulate hazardous waste for up to 90 days (or 180 days depending on the amount of waste generated) without obtaining a permit.
- **Land Disposal Restrictions** (LDRs) are regulations prohibiting the disposal of hazardous waste on land without prior treatment. Under the LDRs (40 CFR 268), materials must meet land disposal restriction (LDR) treatment standards prior to placement in a RCRA land disposal unit (landfill, land treatment unit, waste pile, or surface impoundment). Wastes subject to the LDRs include solvents, electroplating wastes, heavy metals, and acids. Generators of waste subject to the LDRs must provide notification of such to the designated TSD facility to ensure proper treatment prior to disposal.
- **Used Oil Management Standards** (40 CFR Part 279) impose management requirements affecting the storage, transportation, burning, processing, and re-refining of the used oil. For parties that merely generate used oil, regulations establish storage standards. For

a party considered a used oil marketer (one who generates and sells off-specification used oil directly to a used oil burner), additional tracking and paperwork requirements must be satisfied.

- **Tanks and Containers** used to store hazardous waste with a high volatile organic concentration must meet emission standards under RCRA. Regulations (40 CFR Part 264-265, Subpart CC) require generators to test the waste to determine the concentration of the waste, to satisfy tank and container emissions standards, and to inspect and monitor regulated units. These regulations apply to all facilities who store such waste, including generators operating under the 90-day accumulation rule.
- **Underground Storage Tanks (USTs)** containing petroleum and hazardous substance are regulated under Subtitle I of RCRA. Subtitle I regulations (40 CFR Part 280) contain tank design and release detection requirements, as well as financial responsibility and corrective action standards for USTs. The UST program also establishes increasingly stringent standards, including upgrade requirements for existing tanks, that must be met by 1998.
- **Boilers and Industrial Furnaces (BIFs)** that use or burn fuel containing hazardous waste must comply with strict design and operating standards. BIF regulations (40 CFR Part 266, Subpart H) address unit design, provide performance standards, require emissions monitoring, and restrict the type of waste that may be burned.

*EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, responds to questions and distributes guidance regarding all RCRA regulations. The RCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., ET, excluding Federal holidays.*

### *Comprehensive Environmental Response, Compensation, And Liability Act*

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a 1980 law commonly known as Superfund, authorizes EPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. CERCLA also enables EPA to force parties responsible for environmental contamination to clean it up or to reimburse the Superfund for response costs incurred by EPA. The Superfund Amendments and Reauthorization Act (SARA) of 1986 revised various sections of CERCLA, extended the taxing authority for the Superfund, and created a free-standing law, SARA Title III, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

The CERCLA **hazardous substance release reporting regulations** (40 CFR Part 302) direct the person in charge of a facility to report to the National Response Center (NRC) any environmental release of a hazardous substance which exceeds a reportable quantity. Reportable quantities are defined and listed in 40 CFR §302.4. A release report may trigger a response by EPA, or by one or more Federal or State emergency response authorities.

EPA implements **hazardous substance responses** according to procedures outlined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). The NCP includes provisions for permanent cleanups, known as remedial actions, and other cleanups referred to as "removals." EPA generally takes remedial actions only at sites on the National Priorities List (NPL), which currently includes approximately 1300 sites. Both EPA and states can act at other sites; however, EPA provides responsible parties the opportunity to conduct removal and remedial actions and encourages community involvement throughout the Superfund response process.

*EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, answers questions and references guidance pertaining to the Superfund program. The CERCLA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., ET, excluding Federal holidays.*

### *Emergency Planning And Community Right-To-Know Act*

The Superfund Amendments and Reauthorization Act (SARA) of 1986 created the Emergency Planning and Community Right-to-Know Act (EPCRA, also known as SARA Title III), a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by State and local governments. EPCRA required the establishment of State emergency response commissions (SERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees (LEPCs).

EPCRA and the EPCRA regulations (40 CFR Parts 350-372) establish four types of reporting obligations for facilities which store or manage specified chemicals:

- **EPCRA §302** requires facilities to notify the SERC and LEPC of the presence of any "extremely hazardous substance" (the list of such substances is in 40 CFR Part 355, Appendices A and B) if it has such substance in excess of the substance's threshold planning quantity, and directs the facility to appoint an emergency response coordinator.

- **EPCRA §304** requires the facility to notify the SERC and the LEPC in the event of a release exceeding the reportable quantity of a CERCLA hazardous substance or an EPCRA extremely hazardous substance.
- **EPCRA §311 and §312** require a facility at which a hazardous chemical, as defined by the Occupational Safety and Health Act, is present in an amount exceeding a specified threshold to submit to the SERC, LEPC and local fire department material safety data sheets (MSDSs) or lists of MSDS's and hazardous chemical inventory forms (also known as Tier I and II forms). This information helps the local government respond in the event of a spill or release of the chemical.
- **EPCRA §313** requires manufacturing facilities included in SIC codes 20 through 39, which have ten or more employees, and which manufacture, process, or use specified chemicals in amounts greater than threshold quantities, to submit an annual toxic chemical release report. This report, commonly known as the Form R, covers releases and transfers of toxic chemicals to various facilities and environmental media, and allows EPA to compile the national Toxic Release Inventory (TRI) database.

All information submitted pursuant to EPCRA regulations is publicly accessible, unless protected by a trade secret claim.

*EPA's EPCRA Hotline, at (800) 535-0202, answers questions and distributes guidance regarding the emergency planning and community right-to-know regulations. The EPCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., ET, excluding Federal holidays.*

### *Clean Water Act*

The primary objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's surface waters. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants; "conventional" pollutants, such as biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, oil and grease, and pH; and "non-conventional" pollutants, including any pollutant not identified as either conventional or priority.

The CWA regulates both direct and indirect discharges. The **National Pollutant Discharge Elimination System (NPDES)** program (CWA §402)

controls direct discharges into navigable waters. Direct discharges or "point source" discharges are from sources such as pipes and sewers. NPDES permits, issued by either EPA or an authorized State (EPA has authorized approximately forty States to administer the NPDES program), contain industry-specific, technology-based and/or water quality-based limits, and establish pollutant monitoring requirements. A facility that intends to discharge into the nation's waters must obtain a permit prior to initiating its discharge. A permit applicant must provide quantitative analytical data identifying the types of pollutants present in the facility's effluent. The permit will then set forth the conditions and effluent limitations under which a facility may make a discharge.

A NPDES permit may also include discharge limits based on Federal or State water quality criteria or standards, that were designed to protect designated uses of surface waters, such as supporting aquatic life or recreation. These standards, unlike the technological standards, generally do not take into account technological feasibility or costs. Water quality criteria and standards vary from State to State, and site to site, depending on the use classification of the receiving body of water. Most States follow EPA guidelines which propose aquatic life and human health criteria for many of the 126 priority pollutants.

#### Storm Water Discharges

In 1987 the CWA was amended to require EPA to establish a program to address **storm water discharges**. In response, EPA promulgated the NPDES storm water permit application regulations. Stormwater discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying stormwater and which is directly related to manufacturing, processing or raw material storage areas at an industrial plant (40 CFR 122.26(b)(14)). These regulations require that facilities with the following storm water discharges apply for an NPDES permit: (1) a discharge associated with industrial activity; (2) a discharge from a large or medium municipal storm sewer system; or (3) a discharge which EPA or the State determines to contribute to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

The term "storm water discharge associated with industrial activity" means a storm water discharge from one of 11 categories of industrial activity defined at 40 CFR 122.26. Six of the categories are defined by SIC codes while the other five are identified through narrative descriptions of the regulated industrial activity. If the primary SIC code of the facility is one of those identified in the regulations, the facility is subject to the storm water permit application requirements. If any activity at a facility is covered by one of the

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five narrative categories, storm water discharges from those areas where the activities occur are subject to storm water discharge permit application requirements.

Those facilities/activities that are subject to storm water discharge permit application requirements are identified below. To determine whether a particular facility falls within one of these categories, the regulation should be consulted.

**Category i:** Facilities subject to storm water effluent guidelines, new source performance standards, or toxic pollutant effluent standards.

**Category ii:** Facilities classified as SIC 24-lumber and wood products (except wood kitchen cabinets); SIC 26-paper and allied products (except paperboard containers and products); SIC 28-chemicals and allied products (except drugs and paints); SIC 229-petroleum refining; and SIC 311-leather tanning and finishing.

**Category iii:** Facilities classified as SIC 10-metal mining; SIC 12-coal mining; SIC 13-oil and gas extraction; and SIC 14-nonmetallic mineral mining.

**Category iv:** Hazardous waste treatment, storage, or disposal facilities.

**Category v:** Landfills, land application sites, and open dumps that receive or have received industrial wastes.

**Category vi:** Facilities classified as SIC 5015-used motor vehicle parts; and SIC 5093-automotive scrap and waste material recycling facilities.

**Category vii:** Steam electric power generating facilities.

**Category viii:** Facilities classified as SIC 40-railroad transportation; SIC 41-local passenger transportation; SIC 42-trucking and warehousing (except public warehousing and storage); SIC 43-U.S. Postal Service; SIC 44-water transportation; SIC 45-transportation by air; and SIC 5171-petroleum bulk storage stations and terminals.

**Category ix:** Sewage treatment works.

**Category x:** Construction activities except operations that result in the disturbance of less than five acres of total land area.

**Category xi:** Facilities classified as SIC 20-food and kindred products; SIC 21-tobacco products; SIC 22-textile mill products; SIC 23-apparel related

products; SIC 2434-wood kitchen cabinets manufacturing; SIC 25-furniture and fixtures; SIC 265-paperboard containers and boxes; SIC 267-converted paper and paperboard products; SIC 27-printing, publishing, and allied industries; SIC 283-drugs; SIC 285-paints, varnishes, lacquer, enamels, and allied products; SIC 30-rubber and plastics; SIC 31-leather and leather products (except leather and tanning and finishing); SIC 323-glass products; SIC 34-fabricated metal products (except fabricated structural metal); SIC 35-industrial and commercial machinery and computer equipment; SIC 36-electronic and other electrical equipment and components; SIC 37-transportation equipment (except ship and boat building and repairing); SIC 38-measuring, analyzing, and controlling instruments; SIC 39-miscellaneous manufacturing industries; and SIC 4221-4225-public warehousing and storage.

#### Pretreatment Program

Another type of discharge that is regulated by the CWA is one that goes to a publicly-owned treatment works (POTWs). The national **pretreatment program** (CWA §307(b)) controls the indirect discharge of pollutants to POTWs by "industrial users." Facilities regulated under §307(b) must meet certain pretreatment standards. The goal of the pretreatment program is to protect municipal wastewater treatment plants from damage that may occur when hazardous, toxic, or other wastes are discharged into a sewer system and to protect the quality of sludge generated by these plants. Discharges to a POTW are regulated primarily by the POTW itself, rather than the State or EPA.

EPA has developed technology-based standards for industrial users of POTWs. Different standards apply to existing and new sources within each category. "Categorical" pretreatment standards applicable to an industry on a nationwide basis are developed by EPA. In addition, another kind of pretreatment standard, "local limits," are developed by the POTW in order to assist the POTW in achieving the effluent limitations in its NPDES permit.

Regardless of whether a State is authorized to implement either the NPDES or the pretreatment program, if it develops its own program, it may enforce requirements more stringent than Federal standards.

*EPA's Office of Water, at (202) 260-5700, will direct callers with questions about the CWA to the appropriate EPA office. EPA also maintains a bibliographic database of Office of Water publications which can be accessed through the Ground Water and Drinking Water resource center, at (202) 260-7786.*

**Sector Notebook Project****Printing and Publishing***Safe Drinking Water Act*

The Safe Drinking Water Act (SDWA) mandates that EPA establish regulations to protect human health from contaminants in drinking water. The law authorizes EPA to develop national drinking water standards and to create a joint Federal-State system to ensure compliance with these standards. The SDWA also directs EPA to protect underground sources of drinking water through the control of underground injection of liquid wastes.

EPA has developed primary and secondary drinking water standards under its SDWA authority. EPA and authorized States enforce the primary drinking water standards, which are, contaminant-specific concentration limits that apply to certain public drinking water supplies. Primary drinking water standards consist of maximum contaminant level goals (MCLGs), which are non-enforceable health-based goals, and maximum contaminant levels (MCLs), which are enforceable limits set as close to MCLGs as possible, considering cost and feasibility of attainment.

The SDWA **Underground Injection Control** (UIC) program (40 CFR Parts 144-148) is a permit program which protects underground sources of drinking water by regulating five classes of injection wells. UIC permits include design, operating, inspection, and monitoring requirements. Wells used to inject hazardous wastes must also comply with RCRA corrective action standards in order to be granted a RCRA permit, and must meet applicable RCRA land disposal restrictions standards. The UIC permit program is primarily State-enforced, since EPA has authorized all but a few States to administer the program.

The SDWA also provides for a Federally-implemented Sole Source Aquifer program, which prohibits Federal funds from being expended on projects that may contaminate the sole or principal source of drinking water for a given area, and for a State-implemented Wellhead Protection program, designed to protect drinking water wells and drinking water recharge areas.

*EPA's Safe Drinking Water Hotline, at (800) 426-4791, answers questions and distributes guidance pertaining to SDWA standards. The Hotline operates from 9:00 a.m. through 5:30 p.m., ET, excluding Federal holidays.*

*Toxic Substances Control Act*

The Toxic Substances Control Act (TSCA) granted EPA authority to create a regulatory framework to collect data on chemicals in order to evaluate, assess, mitigate, and control risks which may be posed by their manufacture,

processing, and use. TSCA provides a variety of control methods to prevent chemicals from posing unreasonable risk.

TSCA standards may apply at any point during a chemical's life cycle. Under TSCA §5, EPA has established an inventory of chemical substances. If a chemical is not already on the inventory, and has not been excluded by TSCA, a premanufacture notice (PMN) must be submitted to EPA prior to manufacture or import. The PMN must identify the chemical and provide available information on health and environmental effects. If available data are not sufficient to evaluate the chemicals effects, EPA can impose restrictions pending the development of information on its health and environmental effects. EPA can also restrict significant new uses of chemicals based upon factors such as the projected volume and use of the chemical.

Under TSCA §6, EPA can ban the manufacture or distribution in commerce, limit the use, require labeling, or place other restrictions on chemicals that pose unreasonable risks. Among the chemicals EPA regulates under §6 authority are asbestos, chlorofluorocarbons (CFCs), and polychlorinated biphenyls (PCBs).

*EPA's TSCA Assistance Information Service, at (202) 554-1404, answers questions and distributes guidance pertaining to Toxic Substances Control Act standards. The Service operates from 8:30 a.m. through 4:30 p.m., ET, excluding Federal holidays.*

### *Clean Air Act*

The Clean Air Act (CAA) and its amendments, including the Clean Air Act Amendments (CAAA) of 1990, are designed to "protect and enhance the nation's air resources so as to promote the public health and welfare and the productive capacity of the population." The CAA consists of six sections, known as Titles, which direct EPA to establish national standards for ambient air quality and for EPA and the States to implement, maintain, and enforce these standards through a variety of mechanisms. Under the CAAA, many facilities will be required to obtain permits for the first time. State and local governments oversee, manage, and enforce many of the requirements of the CAAA. CAA regulations appear at 40 CFR Parts 50-99.

Pursuant to Title I of the CAA, EPA has established national ambient air quality standards (NAAQSs) to limit levels of "criteria pollutants," including carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide. Geographic areas that meet NAAQSs for a given pollutant are classified as attainment areas; those that do not meet NAAQSs are classified as non-attainment areas. Under §110 of the CAA, each State must develop

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a State Implementation Plan (SIP) to identify sources of air pollution and to determine what reductions are required to meet Federal air quality standards.

Title I also authorizes EPA to establish New Source Performance Standards (NSPSs), which are nationally uniform emission standards for new stationary sources falling within particular industrial categories. NSPSs are based on the pollution control technology available to that category of industrial source but allow the affected industries the flexibility to devise a cost-effective means of reducing emissions.

Under Title I, EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants (NESHAPs), nationally uniform standards oriented towards controlling particular hazardous air pollutants (HAPs). Title III of the CAAA further directed EPA to develop a list of sources that emit any of 189 HAPs, and to develop regulations for these categories of sources. To date EPA has listed 174 categories and developed a schedule for the establishment of emission standards. The emission standards will be developed for both new and existing sources based on "maximum achievable control technology" (MACT). The MACT is defined as the control technology achieving the maximum degree of reduction in the emission of the HAPs, taking into account cost and other factors.

Title II of the CAA pertains to mobile sources, such as cars, trucks, buses, and planes. Reformulated gasoline, automobile pollution control devices, and vapor recovery nozzles on gas pumps are a few of the mechanisms EPA uses to regulate mobile air emission sources.

Title IV establishes a sulfur dioxide emissions program designed to reduce the formation of acid rain. Reduction of sulfur dioxide releases will be obtained by granting to certain sources limited emissions allowances, which, beginning in 1995, will be set below previous levels of sulfur dioxide releases.

Title V of the CAAA of 1990 created a permit program for all "major sources" (and certain other sources) regulated under the CAA. One purpose of the operating permit is to include in a single document all air emissions requirements that apply to a given facility. States are developing the permit programs in accordance with guidance and regulations from EPA. Once a State program is approved by EPA, permits will be issued and monitored by that State.

Title VI is intended to protect stratospheric ozone by phasing out the manufacture of ozone-depleting chemicals and restrict their use and distribution. Production of Class I substances, including 15 kinds of

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chlorofluorocarbons (CFCs), will be phased out entirely by the year 2000, while certain hydrochlorofluorocarbons (HCFCs) will be phased out by 2030.

*EPA's Control Technology Center, at (919) 541-0800, provides general assistance and information on CAA standards. The Stratospheric Ozone Information Hotline, at (800) 296-1996, provides general information about regulations promulgated under Title VI of the CAA, and EPA's EPCRA Hotline, at (800) 535-0202, answers questions about accidental release prevention under CAA §112(r). In addition, the Technology Transfer Network Bulletin Board System (modem access (919) 541-5742)) includes recent CAA rules, EPA guidance documents, and updates of EPA activities.*

## VI.B. Industry Specific Regulatory Requirements

While the list of environmental statutes *potentially* affecting printers includes all of the major media-oriented statutes, the actual number is much smaller. In general, printers' relatively small size and lower chemical usage place them below many of the thresholds which would trigger regulatory requirements. For example, the 70 percent of printers with fewer than ten employees typically face only RCRA manifesting and discharge limits established by the local publicly owned wastewater treatment works (POTW). Larger facilities, however, may have to meet Clean Air Act requirements in ozone nonattainment areas, Emergency Planning and Community Right-to Know Act requirements, as well as state requirements established by the State Implementation Plan (SIP) process. These statutes are most frequently triggered because of solvent releases from image developing, inks and cleaning operations.

A fairly complete list of environmental regulations affecting the printing industry is available from the Agency's Design for the Environment Program or, more specifically, the document entitled *Federal Environmental Regulations Potentially Affecting the Commercial Printing Industry* (Contact: Stephanie Bergman 202-260-1821). Most importantly, it includes examples connecting chemicals used in the printing industry to applicable regulations. More accurate profiles of the regulatory requirements for printing facilities may become available in the near future as projects in support of consolidated reporting are completed.

### *Clean Air Act (CAA)*

Title I - Provisions for Attainment and Maintenance of the National Ambient Air Quality Standards (NAAQS):

- Reasonably Available Control Technologies (RACTs) as defined in State Implementation Plans (SIPs) are required at major sources in "nonattainment" areas, defined by severity of air quality problems. NAAQS have been established for six pollutants: ozone, carbon monoxide particulate matter, sulfur dioxide, nitrogen dioxide and lead. Regulations relating to ozone (VOCs react to form O<sub>3</sub>), NO<sub>x</sub> and particulates are likely to have a significant impact on the printing industry. Control Technology Guidelines (CTGs) exist for gravure and flexographic printing, and fabric and paper coating. These CTGs apply primarily in ozone nonattainment areas to sources with potential uncontrolled VOC emissions (ozone precursors) of 25 tons or more per year depending on the severity of the

non-attainment classification. (Contact: David Salman 919-541-0859)

- There are also New Source Performance Standards for the construction, operation or modification of presses, coaters, control devices, boilers, cyclones, evaporators, distillation units, and some bindery equipment.

#### Title V - Permits:

- A new permit system will require all major sources to obtain operating permits to cover all applicable control requirements. States were required to develop and implement the program in 1993 and the first permits are likely to be issued in late 1995. Although revisions to the definition of what constitutes a major source were being negotiated at the time that this document went to press, it is important to note that major source determination will likely be based on a facility's potential emissions and not its actual emissions; require emissions monitoring, and record keeping and reporting.

#### *Resource Conservation and Recovery Act (RCRA)*

Hazardous waste generators are divided in three categories: large quantity generators (1,000 kg or more/month or more than one kg/month of extremely hazardous waste); small quantity generators (100 to 1,000 kg/month and less than one kg/month of extremely hazardous waste); and conditionally exempt small generators (less than 100 kg/month and less than one kg/month of extremely hazardous waste). Each generator bears the responsibility for determining whether or not a waste is hazardous and the appropriate waste code.

- Facility Status (40 CFR Part 262) - Facilities may possibly be classified as Treatment Storage or Disposal Facilities (TSDFs) if they do not send their waste off-site before the applicable time limit (90 to 180 days depending upon the volume).
- Waste Containers (40 CFR §§262.32, 262.34, 265.171, 265.172 and 265.173) - Wastes must be properly stored to meet basic safety requirements and prevent leaks, and must be labeled as hazardous waste and dated at the time that accumulation begins.
- Hazardous Waste Shipments (40 CFR §262.20) - A Uniform Hazardous Waste Manifest must be completed and accompany the shipment. Wastes must be sent to a RCRA C permitted facility. An exception report must be filed with the relevant regulatory agency if the manifest copy is not received within 45 days of shipment. Also, an exemption is allowed for small quantity generators from the

manifest requirement if their waste is shipped under contract, records are maintained for three years, and the vehicle used to haul the waste is owned by the reclaimer.

- Land Disposal Restrictions (40 CFR §268.7) - Additional notification must be sent along with each manifest to the destination facility.
- Biennial Reporting (40 CFR §262.41) - Large quantity generators must submit a report of hazardous waste generation and management activities by March 1 of every even-numbered year.
- Record Keeping (40 CFR §268.7) - Copies of each manifest, biennial report (if a large quantity generator), exception report, test analysis, and inspection log must be kept for three years.
- Training (40 CFR §262.34 (a)(4),(d)(5)(iii)) - Facilities storing waste for longer than the 90-180 day threshold must ensure that employees are familiar with hazardous waste handling procedures or provide training.
- Release or Threat of Release Reporting (40 CFR §262.34) - In case of a release to the environment, the generator must contact the National Response Center.

*Emergency Planning and Community Right-to-Know Act (EPCRA)*

- Emergency Planning (§302(A)) - Businesses that produce, use, or store "hazardous chemicals" at or above "threshold planning quantities" must submit: 1) material safety data sheets or the equivalent and 2) Tier I/Tier II annual inventory report forms to the appropriate local emergency planning commission. Those handling "extremely hazardous substances" are also required to submit a one-time notice to the state emergency response commission.
- Emergency Notification of Extremely Hazardous Substance Release (§304) - A business that unintentionally releases a reportable quantity of an extremely hazardous substance must report that release to the state emergency planning commission and the local emergency planning commission.
- Release Reporting (§313) - Manufacturing businesses with ten or more employees that manufactured, processed, or otherwise used a listed toxic chemical in excess of the "established threshold" must file annually a Toxic Chemical Release form with EPA and the state. Approximately 318 printers nationwide submitted forms summarizing their chemical releases in 1993. Documentation supporting release estimates must be kept for three years.

*Clean Water Act (CWA)*

- Discharges to a POTW (40 Part 403) - Facilities discharging wastewater to a sewer are often subject to restrictions required under the Clean Water Act and established by the local sewerage authority to prevent significant interference with the treatment facility or pass-through of pollutants not removed by treatment. The specific requirements include: notifying the POTW of discharges that could cause problems at the POTW, monitoring and recordkeeping as established by the POTW, and a one-time notice of the discharge of hazardous waste, specifically, if more than 33 pounds/month.
- Direct discharges (40 CFR Parts 116 and 117) - Facilities discharging hazardous substances are required to notify the federal government (33 §153.203) when discharges meet or exceed the reportable quantity.
- The Storm Water Rule (40 §122.26(b)(14) subpart (xi)) requires that printing facilities falling within any of 11 categories defined in 40 CFR 122.26 is subject to storm water permit application regulations.

*Occupational Health and Safety Administration (OSHA)*

A more up-to-date summary of OSHA regulations may be available from OSHA. The following is a summary taken from industry literature.

**Exposure Monitoring** (29 CFR §1910.1045) standard requires initial and periodic monitoring when an employer suspects exposure levels could exceed Permissible Exposure Limits (PELs). Also requires employee notification and recordkeeping.

**Permissible Exposure Limits (PELs)** (29 CFR §1910.1000) for chemicals released during printing operations, such as glycol ethers, toluene and methylene chloride.

**Respiratory Protective Equipment** (29 CFR §1910.134) established new standards for protective equipment.

**Methods of Compliance** (29 CFR §1910.1000 and §1910.134) allows the use of a respirator in lieu of administrative or engineering controls during installation of engineering controls or upset conditions.

**State Statutes**

A 1992 Source Reduction Review Project (SRRP) review of state air regulations found that **thirty states** (AL, CO, CT, DE, DC, FL, GA, AL, KS,

KY, LA, MD, MA, MI, MO, NH, NJ, NY, NC, OH, OK, OR, PA, RI, SC, TN, UT, VA, WA and WI) regulate volatile organic compounds emitted from printing and publishing operations. In general, all employ the same type of standards with potential release triggers of 50,000 pounds/year to 500 pounds/day. Typical standards include: 1) specifying a maximum volatile fraction (e.g., 25 percent by volume) of ink; 2) a minimum water volume (e.g., 75 percent or a "waterborne ink"); or 3) a minimum nonvolatile fraction (e.g., "high solids inks"). In addition, control technologies (i.e., carbon adsorption, incineration, or comparable alternative) are required to reduce or destroy VOCs. Specific efficiencies are established for gravure and flexographic printing.

**Illinois**, although not included in the 1992 SRRP, is known to have air regulations similar to those described above.

**California** has emergency planning requirements similar to those established by EPCRA but the state's lower thresholds result in smaller operations being subject to the planning requirements.

California's **South Coastal Air Quality Management District** and the Air Pollution Control District for the County of San Diego have issued regulations affecting graphic arts operations. These regulations establish standards for the VOC content of inks, cleaning solvents, fountain solutions, as well as work practices and record-keeping.

### **VI.C. Pending and Proposed Regulatory Requirements**

Several regulatory requirements are currently pending that will potentially affect printers. The Clean Air Act Amendments of 1990 and RCRA are both potential sources of new regulatory requirements.

#### *Clean Air Act Amendments of 1990 (CAAA)*

The Clean Air Act Amendments of 1990 included a number of provisions for which the Agency will develop regulations likely to affect printers directly. A draft lithography Control Technology Guidance (CTG) was announced in the Federal Register in November of 1993 to be used by state and Regional air programs as the basis for controls of VOCs released from lithographic printing operations in ozone nonattainment areas. In June of 1994, a lithography Alternative Control Technology (ACT) was issued in response to the comments received regarding the CTG.

Title I - Provisions for Attainment and Maintenance of the National Ambient Air Quality Standards (NAAQS):

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- Ozone nonattainment areas are classified as: marginal, moderate, serious, severe, or extreme. "Major" stationary sources are defined as having potential emissions of 50 tons of VOCs per year in serious areas; 25 tons per year in severe areas; and 10 tons or more in extreme areas. For all other areas, a major source is one that releases 100 tons of VOCs per year.
- An Alternative Control Techniques Guideline (ACT) was developed for offset lithographic printing which will affect formulations of fountain solutions and cleaning solvents. (Contact: Dave Salman 919-541-0859)
- Printers not subject to a CTG but designated a major source are subject to Reasonably Available Control Technology (RACT) requirements. The state must develop and adopt non-CTG RACT rules for such sources.

Title III - National Emissions Standards for Hazardous Air Pollutants (NESHAP):

- Maximum Achievable Control Technology (MACT) standards are scheduled for a list of 189 Hazardous Air Pollutants (HAPs) listed in §112. MACT standards for the commercial printing industry are scheduled for 1994. The Agency is studying the feasibility and benefits of MACT standards for publication and packaging gravure and wide web flexographic sources. (Contact: Bob Blaszcak 919-541-5432)

*Resource Conservation and Recovery Act (RCRA)*

- While developed for wastes such as batteries, simplified recordkeeping and manifesting for a number of waste streams with hazardous constituents, such as rags and wipes containing inks and solvents may apply to printers. (Contact: Ronald Josephson 202-260-6715)
- Additional RCRA listings of solvents and chemicals used by printers are also under investigation.

**VII. COMPLIANCE AND ENFORCEMENT HISTORY****Background**

To date, EPA has focused much of its attention on measuring compliance with specific environmental statutes. This approach allows the Agency to track compliance with the Clean Air Act, the Resource Conservation and Recovery Act, the Clean Water Act, and other environmental statutes. Within the last several years, the Agency has begun to supplement single-media compliance indicators with facility-specific, multimedia indicators of compliance. In doing so, EPA is in a better position to track compliance with all statutes at the facility level, and within specific industrial sectors.

A major step in building the capacity to compile multimedia data for industrial sectors was the creation of EPA's Integrated Data for Enforcement Analysis (IDEA) system. IDEA has the capacity to "read into" the Agency's single-media databases, extract compliance records, and match the records to individual facilities. The IDEA system can match Air, Water, Waste, Toxics/Pesticides/EPCRA, TRI, and Enforcement Docket records for a given facility, and generate a list of historical permit, inspection, and enforcement activity. IDEA also has the capability to analyze data by geographic area and corporate holder.

**Compliance and Enforcement Profile Description**

Using inspection, violation and enforcement data from the IDEA system, this section provides information regarding the historical compliance and enforcement activity of this sector. In order to mirror the facility universe reported in the Toxic Chemical Profile, the data reported within this section consists of records only from the TRI reporting universe. With this decision, the selection criteria are consistent across sectors with certain exceptions. For the sectors that do not normally report to the TRI program, data have been provided from EPA's Facility Indexing System (FINDS) which tracks facilities in all media databases. Please note, in this section, EPA does not attempt to define the actual number of facilities that fall within each sector. Instead, the section portrays the records of a subset of facilities within the sector that are well defined within EPA databases.

As a check on the relative size of the full sector universe, most notebooks contain an estimated number of facilities within the sector according to the Bureau of Census (See Section II). With sectors dominated by small businesses, such as metal finishers and printers, the reporting universe within the EPA databases may be small in comparison to Census data. However, the

group selected for inclusion in this data analysis section should be consistent with this sector's general make-up.

Following this introduction is a list defining each data column presented within this section. These values represent a retrospective summary of inspections or enforcement actions, and solely reflect EPA, state and local compliance assurance activity that have been entered into EPA databases. To identify any changes in trends, the EPA ran two data queries, one for the past five calendar years (August 10, 1990 to August 9, 1995) and the other for the most recent twelve-month period (August 10, 1994 to August 9, 1995). The five-year analysis gives an average level of activity for that period for comparison to the more recent activity.

Because most inspections focus on single-media requirements, the data queries presented in this section are taken from single media databases. These databases do not provide data on whether inspections are state/local or EPA-led. However, the table breaking down the universe of violations does give the reader a crude measurement of the EPA's and states' efforts within each media program. The presented data illustrate the variations across regions for certain sectors.<sup>e</sup> This variation may be attributable to state/local data entry variations, specific geographic concentrations, proximity to population centers, sensitive ecosystems, highly toxic chemicals used in production, or historical noncompliance. Hence, the exhibited data do not rank regional performance or necessarily reflect which regions may have the most compliance problems.

## **Compliance and Enforcement Data Definitions**

### **General Definitions**

**Facility Indexing System (FINDS)** -- this system assigns a common facility number to EPA single-media permit records. The FINDS identification number allows EPA to compile and review all permit, compliance, enforcement and pollutant release data for any given regulated facility.

**Integrated Data for Enforcement Analysis (IDEA)** -- is a data integration system that can retrieve information from the major EPA program office databases. IDEA uses the FINDS identification number to “glue together”

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<sup>d</sup> Reg EPA ions include the following states: I (CT, MA, ME, RI, NH, VT); II (NJ, NY, PR, VI); III (DC, DE, MD, PA, VA, WV); IV (AL, FL, GA, KY, MS, NC, SC, TN); V (IL, IN, MI, MN, OH, WI); VI (AR, LA, NM, OK, TX); VII (IA, KS, MO, NE); VIII (CO, MT, ND, SD, UT, WY); IX (AZ, CA, HI, NV, Pacific Trust Territories); X (AK, ID, OR, WA).

separate data records from EPA's databases. This is done to create a "master list" of data records for any given facility. Some of the data systems accessible through IDEA are: AIRS (Air Facility Indexing and Retrieval System, Office of Air and Radiation), PCS (Permit Compliance System, Office of Water), RCRIS (Resource Conservation and Recovery Information System, Office of Solid Waste), NCDB (National Compliance Data Base, Office of Prevention, Pesticides, and Toxic Substances), CERCLIS (Comprehensive Environmental and Liability Information System, Superfund), and TRIS (Toxic Release Inventory System). IDEA also contains information from outside sources such as Dun and Bradstreet and the Occupational Safety and Health Administration (OSHA). Most data queries displayed in notebook sections IV and VII were conducted using IDEA.

### **Data Table Column Heading Definitions**

**Facilities in Search** -- are based on the universe of TRI reporters within the listed SIC code range. For industries not covered under TRI reporting requirements, the notebook uses the FINDS universe for executing data queries. The SIC code range selected for each search is defined by each notebook's selected SIC code coverage described in Section II.

**Facilities Inspected** --- indicates the level of EPA and state agency inspections for the facilities in this data search. These values show what percentage of the facility universe is inspected in a 12 or 60 month period. This column does not count non-inspectional compliance activities such as the review of facility-reported discharge reports.

**Number of Inspections** -- measures the total number of inspections conducted in this sector. An inspection event is counted each time it is entered into a single media database.

**Average Time Between Inspections** -- provides an average length of time, expressed in months, that a compliance inspection occurs at a facility within the defined universe.

**Facilities with One or More Enforcement Actions** -- expresses the number of facilities that were party to at least one enforcement action within the defined time period. This category is broken down further into federal and state actions. Data are obtained for administrative, civil/judicial, and criminal enforcement actions. Administrative actions include Notices of Violation (NOVs). A facility with multiple enforcement actions is only counted once in this column (facility with three enforcement actions counts as one). All percentages that appear are referenced to the number of facilities inspected.

**Total Enforcement Actions** -- describes the total number of enforcement actions identified for an industrial sector across all environmental statutes. A facility with multiple enforcement actions is counted multiple times (a facility with three enforcement actions counts as three).

**State Lead Actions** -- shows what percentage of the total enforcement actions are taken by state and local environmental agencies. Varying levels of use by states of EPA data systems may limit the volume of actions accorded state enforcement activity. Some states extensively report enforcement activities into EPA data systems, while other states may use their own data systems.

**Federal Lead Actions** -- shows what percentage of the total enforcement actions are taken by the United States Environmental Protection Agency. This value includes referrals from state agencies. Many of these actions result from coordinated or joint state/federal efforts.

**Enforcement to Inspection Rate** -- expresses how often enforcement actions result from inspections. This value is a ratio of enforcement actions to inspections, and is presented for comparative purposes only. This measure is a rough indicator of the relationship between inspections and enforcement. Reported inspections and enforcement actions under the Clean Water Act (CWA), the Clean Air Act (CAA) and the Resource Conservation and Recovery Act (RCRA) are included in this ratio. Inspections and actions from the TSCA/FIFRA/EPCRA database are not factored into this ratio because most of the actions taken under these programs are not the result of facility inspections. This ratio does not account for enforcement actions arising from non-inspection compliance monitoring activities (e.g., self-reported water discharges) that can result in enforcement action within the CAA, CWA and RCRA.

**Facilities with One or More Violations Identified** -- indicates the percentage of inspected facilities having a violation identified in one of the following data categories: In Violation or Significant Violation Status (CAA); Reportable Noncompliance, Current Year Noncompliance, Significant Noncompliance (CWA); Noncompliance and Significant Noncompliance (FIFRA, TSCA, and EPCRA); Unresolved Violation and Unresolved High Priority Violation (RCRA). The values presented for this column reflect the extent of noncompliance within the measured time frame, but do not distinguish between the severity of the noncompliance. Percentages within this column may exceed 100 percent because facilities can be in violation status without being inspected. Violation status may be a precursor to an enforcement action, but does not necessarily indicate that an enforcement action will occur.

**Media Breakdown of Enforcement Actions and Inspections** -- four columns identify the proportion of total inspections and enforcement actions within EPA Air, Water, Waste, and TSCA/FIFRA/EPCRA databases. Each column is a percentage of either the "Total Inspections," or the "Total Actions" column.

### **VII.A. Printing and Publishing Industry Compliance History**

Exhibit 20 provides an overview of the reported compliance and enforcement data for the printing industry over the past five years (August 1990 to August 1995). These data are also broken out by EPA Region thereby permitting geographical comparisons. A few points evident from the data are listed below.

- The number of different printing facilities inspected was only slightly more than one quarter of those identified in the IDEA search. Also, these facilities were inspected on average only every four years.
- A significantly smaller proportion of facilities had enforcement actions brought against them than were inspected. On average 17 percent of those facilities inspected faced enforcement actions.
- Those facilities with one or more enforcement actions had, on average, over the five year period, almost three enforcement actions brought against them.

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<b>Exhibit 20: Five-Year Enforcement and Compliance Summary for Printing</b>									
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>
<b>Region</b>	<b>Facilities in Search</b>	<b>Facilities Inspected</b>	<b>Number of Inspections</b>	<b>Average Months Between Inspections</b>	<b>Facilities with 1 or More Enforcement Actions</b>	<b>Total Enforcement Actions</b>	<b>Percent State Lead Actions</b>	<b>Percent Federal Lead Actions</b>	<b>Enforcement to Inspection Rate</b>
I	440	106	303	87	10	22	86%	14%	0.07
II	268	125	515	31	30	114	93%	7%	0.22
III	568	138	805	44	28	70	87%	13%	0.09
IV	1,057	262	1,569	40	36	161	96%	4%	0.10
V	369	213	796	28	30	39	74%	26%	0.05
VI	596	51	172	208	17	49	78%	22%	0.28
VII	422	81	360	70	16	36	44%	56%	0.10
VIII	36	7	17	127	2	3	67%	33%	0.18
IX	185	36	143	78	5	13	62%	38%	0.09
X	147	17	43	205	2	7	69%	31%	0.17
<b>TOTAL</b>	<b>4,106</b>	<b>1,035</b>	<b>4,723</b>	<b>52</b>	<b>176</b>	<b>514</b>	<b>85%</b>	<b>15%</b>	<b>0.11</b>

**VII.B. Comparison of Enforcement Activity Between Selected Industries**

Exhibits 21 and 22 allow the compliance history of the printing sector to be compared to the other industries covered by the industry sector notebooks. Comparisons between Exhibits 21 and 22 permit the identification of trends in compliance and enforcement records of the industry by comparing data covering the last five years to that of the past year. Some points evident from the data are listed below.

- Of those sectors listed, the printing industry has been one of the least frequently inspected industries over the past five years based upon its high number of months between inspections.
- State lead actions have dominated the total number of enforcement actions taken against the printing industry.
- Over the past five years, the printing industry has had one of the lowest rates of enforcement actions per inspection of the sectors listed, and the rate has remained constant over the past year.

Exhibits 23 and 24 provide a more in-depth comparison between the printing industry and other sectors by breaking out the compliance and enforcement data by environmental statute. As in the previous Exhibits (Exhibits 21 and 22), the data cover the last five years (Exhibit 23) and the last one year (Exhibit 24) to facilitate the identification of recent trends. A few points evident from the data are listed below.

- The number of inspections carried out under the Clean Air Act and RCRA over the past five years account for over ninety percent of inspections and of total enforcement actions within the sample. This figure has remained constant over the past year.
- Proportional to the number of inspections conducted under each statute, significantly more enforcement actions are taken under RCRA (with an enforcement to inspection rate of 0.15) than under CAA (with an enforcement to inspection rate 0.05)

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<b>Exhibit 21: Five-Year Enforcement and Compliance Summary for Selected Industries</b>									
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>
<b>Industry Sector</b>	<b>Facilities in Search</b>	<b>Facilities Inspected</b>	<b>Number of Inspections</b>	<b>Average Months Between Inspections</b>	<b>Facilities with 1 or More Enforcement Actions</b>	<b>Total Enforcement Actions</b>	<b>Percent State Lead Actions</b>	<b>Percent Federal Lead Actions</b>	<b>Enforcement to Inspection Rate</b>
Pulp and Paper	306	265	3,766	5	115	502	78%	22%	0.13
<b>Printing</b>	<b>4,106</b>	<b>1,035</b>	<b>4,723</b>	<b>52</b>	<b>176</b>	<b>514</b>	<b>85%</b>	<b>15%</b>	<b>0.11</b>
Inorganic Chemicals	548	298	3,034	11	99	402	76%	24%	0.13
Organic Chemicals	412	316	3,864	6	152	726	66%	34%	0.19
Petroleum Refining	156	145	3,257	3	110	797	66%	34%	0.25
Iron and Steel	374	275	3,555	6	115	499	72%	28%	0.14
Dry Cleaning	933	245	633	88	29	103	99%	1%	0.16
Metal Mining	873	339	1,519	34	67	155	47%	53%	0.10
Non-Metallic Mineral Mining	1,143	631	3,422	20	84	192	76%	24%	0.06
Lumber and Wood	464	301	1,891	15	78	232	79%	21%	0.12
Furniture	293	213	1,534	11	34	91	91%	9%	0.06
Rubber and Plastic	1,665	739	3,386	30	146	391	78%	22%	0.12
Stone, Clay, and Glass	468	268	2,475	11	73	301	70%	30%	0.12
Fabricated Metal	2,346	1,340	5,509	26	280	840	80%	20%	0.15
Nonferrous Metal	844	474	3,097	16	145	470	76%	24%	0.15
Electronics	405	222	777	31	68	212	79%	21%	0.27
Automobiles	598	390	2,216	16	81	240	80%	20%	0.11

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<b>Exhibit 22: One-Year Inspection and Enforcement Summary for Selected Industries</b>									
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>		<b>F</b>		<b>G</b>	<b>H</b>
				<b>Facilities with 1 or More Violations</b>	<b>Facilities with 1 or more Enforcement Actions</b>	<b>Number</b>	<b>Percent</b>		
<b>Industry Sector</b>	<b>Facilities in Search</b>	<b>Facilities Inspected</b>	<b>Number of Inspections</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>	<b>Total Enforcement Actions</b>	<b>Enforcement to Inspection Rate</b>
Pulp and Paper	306	189	576	162	86%	28	15%	88	0.15
<b>Printing</b>	<b>4,106</b>	<b>397</b>	<b>676</b>	<b>251</b>	<b>63%</b>	<b>25</b>	<b>6%</b>	<b>72</b>	<b>0.11</b>
Inorganic Chemicals	548	158	427	167	106%	19	12%	49	0.12
Organic Chemicals	412	195	545	197	101%	39	20%	118	0.22
Petroleum Refining	156	109	437	109	100%	39	36%	114	0.26
Iron and Steel	374	167	488	165	99%	20	12%	46	0.09
Dry Cleaning	933	80	111	21	26%	5	6%	11	0.10
Metal Mining	873	114	194	82	72%	16	114%	24	0.13
Non-metallic Mineral Mining	1,143	253	425	75	30%	28	11%	54	0.13
Lumber and Wood	464	142	268	109	77%	18	13%	42	0.58
Furniture	293	160	113	66	41%	3	2%	5	0.55
Rubber and Plastic	1,665	271	435	289	107%	19	7%	59	0.14
Stone, Clay, and Glass	468	146	330	116	79%	20	14%	66	0.20
Nonferrous Metals	844	202	402	282	140%	22	11%	72	0.18
Fabricated Metal	2,346	477	746	525	110%	46	10%	114	0.15
Electronics	405	60	87	80	133%	8	13%	21	0.24

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<b>Exhibit 23: Five-Year Inspection and Enforcement Summary by Statute for Selected Industries</b>											
Industry Sector	Facilities Inspected	Total Inspections	Total Enforcement Actions	Clean Air Act		Clean Water Act		Resource Conservation and Recovery Act		FIFRA/TSCA/EPCRA/Other*	
				% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions
Pulp and Paper	265	3,766	502	51%	48%	38%	30%	9%	18%	2%	3%
<b>Printing</b>	<b>1,035</b>	<b>4,723</b>	<b>514</b>	<b>49%</b>	<b>31%</b>	<b>6%</b>	<b>3%</b>	<b>43%</b>	<b>62%</b>	<b>2%</b>	<b>4%</b>
Inorganic Chemicals	298	3,034	402	29%	26%	29%	17%	39%	53%	3%	4%
Organic Chemicals	316	3,864	726	33%	30%	16%	21%	46%	44%	5%	5%
Petroleum Refining	145	3,237	797	44%	32%	19%	12%	35%	52%	2%	5%
Iron and Steel	275	3,555	499	32%	20%	30%	18%	37%	58%	2%	5%
Dry Cleaning	245	633	103	15%	1%	3%	4%	83%	93%	0%	1%
Metal Mining	339	1,519	155	35%	17%	57%	60%	6%	14%	1%	9%
Non-metallic Mineral Mining	631	3,422	192	65%	46%	31%	24%	3%	27%	0%	4%
Lumber and Wood	301	1,891	232	31%	21%	8%	7%	59%	67%	2%	5%
Furniture	293	1,534	91	52%	27%	1%	1%	45%	64%	1%	8%
Rubber and Plastic	739	3,386	391	39%	15%	13%	7%	44%	68%	3%	10%
Stone, Clay, and Glass	268	2,475	301	45%	39%	15%	5%	39%	51%	2%	5%
Nonferrous Metals	474	3,097	470	36%	22%	22%	13%	38%	54%	4%	10%
Fabricated Metal	1,340	5,509	840	25%	11%	15%	6%	56%	76%	4%	7%
Electronics	222	777	212	16%	2%	14%	3%	66%	90%	3%	5%
Automobiles	390	2,216	240	35%	15%	9%	4%	54%	75%	2%	6%

<b>Exhibit 24: One-Year Inspection and Enforcement Summary by Statute for Selected Industries</b>											
<b>Industry Sector</b>	<b>Facilities Inspected</b>	<b>Total Inspections</b>	<b>Total Enforcement Actions</b>	<b>Clean Air Act</b>		<b>Clean Water Act</b>		<b>Resource Conservation and Recovery Act</b>		<b>FIFRA/TSCA/EPCRA/Other*</b>	
				<b>% of Total Inspections</b>	<b>% of Total Actions</b>	<b>% of Total Inspections</b>	<b>% of Total Actions</b>	<b>% of Total Inspections</b>	<b>% of Total Actions</b>	<b>% of Total Inspections</b>	<b>% of Total Actions</b>
Pulp and Paper	189	576	88	56%	69%	35%	21%	10%	7%	0%	3%
<b>Printing</b>	<b>397</b>	<b>676</b>	<b>72</b>	<b>50%</b>	<b>27%</b>	<b>5%</b>	<b>3%</b>	<b>44%</b>	<b>66%</b>	<b>0%</b>	<b>4%</b>
Inorganic Chemicals	158	427	49	26%	38%	29%	21%	45%	36%	0%	6%
Organic Chemicals	195	545	118	36%	34%	13%	16%	50%	49%	1%	1%
Petroleum Refining	109	437	114	50%	31%	19%	16%	30%	47%	1%	6%
Iron and Steel	167	488	46	29%	18%	35%	26%	36%	50%	0%	6%
Dry Cleaning	80	111	11	21%	4%	1%	22%	78%	67%	0%	7%
Metal Mining	114	194	24	47%	42%	43%	34%	10%	6%	0%	19%
Non-metallic Mineral Mining	253	425	54	69%	58%	26%	16%	5%	16%	0%	11%
Lumber and Wood	142	268	42	29%	20%	8%	13%	63%	61%	0%	6%
Furniture	293	160	5	58%	67%	1%	10%	41%	10%	0%	13%
Rubber and Plastic	271	435	59	39%	14%	14%	4%	46%	71%	1%	11%
Stone, Clay, and Glass	146	330	66	45%	52%	18%	8%	38%	37%	0%	3%
Nonferrous Metals	202	402	72	33%	24%	21%	3%	44%	69%	1%	4%
Fabricated Metal	477	746	114	25%	14%	14%	8%	61%	77%	0%	2%
Electronics	60	87	21	17%	2%	14%	7%	69%	87%	0%	4%
Automobiles	169	284	28	34%	16%	10%	9%	56%	69%	1%	6%

## VII.C. Review of Major Legal Actions

This section provides summary information about major cases that have affected this sector, and a list of Supplementary Environmental Projects (SEPs). SEPs are compliance agreements that reduce a facility's stipulated penalty in return for an environmental project that exceeds the value of the reduction. Often, these projects fund pollution prevention activities that can significantly reduce the future pollutant loadings of a facility.

### VII.C.1. Review of Major Cases

The Office of Regulatory Enforcement does not regularly compile information related to major cases and pending litigation within an industry sector. The staff are willing to pass along such information to Agency staff as requests are made. (Contact: Office of Enforcement Capacity and Outreach, 202-260-4140) In addition, summaries of completed enforcement actions are published each fiscal year in the *Enforcement Accomplishments Report*; the summaries are not organized by industry sector. (Contact: Office of Enforcement Capacity and Outreach, 202-260-4140)

### VII.C.2. Supplementary Environmental Projects (SEPs)

Supplemental environmental projects (SEPs) are enforcement options that require the non-compliant facility to complete specific projects. Regional summaries of SEPs undertaken in federal fiscal year 1993 and 1994 were reviewed. Two SEPs were undertaken that involved printing facilities, as shown in the following table.

EPCRA violations engendered one SEP and RCRA violations engendered the other SEP. Due to differences in regional descriptions, the specifics of the original violations are not known. Both of the projects resulted in a reduction in the use or release of volatile organic chemicals (VOCs). Implementation costs were over \$1.7 million for one of the projects involving major process changes or capital investments in equipment. The second project cost \$26,150 and consisted of a process chemical change.

Both of the SEPs were done in Region VII. However, Region VII has only six percent of U.S. printing facilities (third lowest of all Regions) and only eight percent of all inspections (fifth in rank of all Regions). The small number of facilities and inspections suggests a possible regional priority on

**Exhibit 25: FY-1993-1994 Supplemental Environmental Projects Overview: Printing**

General SEP Information		Violation Information						Pollutant Reduction		Supplemental Environmental Project Description
FY	Company Name	State/Region	Type	Initial Penalty	Final Penalty	SEP Credit	SEP Cost to Company	Pollutant of Concern	Pollutant Reduction	Supplemental Environmental Project Description
93	Z-International	MO	EPCRA	N/A	\$7,700	N/A	\$26,150	Solvents	N/A	Solvent-based ink reduction by 50% and substitute OPTI-SOL for tetrachloroethylene in platewashing operations, also new plate de-tacking installed
93	Hallmark Cards	MO	RCRA	N/A	\$30,000	N/A	\$1,740,000	Solvents	80% reduction in VOCs and RCRA Wastes	Solvent-based inks converted to water-based inks at gravure printing facility

**Violation Information Terms**  
 Initial penalty: Initial proposed cash penalty for violation  
 Final penalty: Total penalty after SEP negotiation  
 SEP credit: Cash credit given for SEP so that, Final penalty - SEP credit = Final cash penalty  
 SEP cost to company: Actual cost to company of SEP implementation

NOTE: Due to differences in terminology and level of detail between regional SEP information, in some cases the figure listed as Final penalty may be the Final cash penalty after deduction for SEP credit

N/A: Information not available at time of printing.

**VIII. COMPLIANCE ACTIVITIES AND INITIATIVES**

This section highlights the activities undertaken by this industry sector and public agencies to voluntarily improve the sector's environmental performance. These activities include those independently initiated by industrial trade associations. In this section, the notebook also contains a listing and description of national and regional trade associations.

**VIII.A. Sector-related Environmental Programs and Activities****Design for the Environment (DfE) Printing Industry Project**

The Design for the Environment (DfE) Printing Industry Project (Contact: Stephanie Bergman 202-260-1821) is a joint and cooperative project between the EPA and participating printing industry sectors (screen, lithographic, and flexographic printing). Its purpose is to provide printers cost, risk, and performance information of various chemical, technology, and work practice substitutes to enable them to make informed decisions about incorporating lower risk chemicals into their production processes.

The draft Cleaner Technologies Substitutes Assessment (CTSA) for screen reclamation products and technologies (used in screen printing) was published in September 1994 and was circulated for comment through January 1995. It summarizes the comparative risk, performance, and costs of eleven substitute product systems used to reclaim screens as well as substitute work practices and technologies. A draft CTSA for lithographic blanket washes will be available in 1995.

Pollution prevention case studies and other outreach materials (e.g., videos, software packages, training workshops, and other information products) will be disseminated to printers by various means including a network of volunteer printers. The state of Washington is working with U.S. EPA Region X to disseminate DfE materials and integrate DfE efforts with the state's own "snapshots" initiative (Contact: U.S. EPA Region X - Jayne Carlin 206-553-4762).

*The DfE Program has also developed a number of background documents, including the following: Printing Industry and Use Cluster Profile; Federal Environmental Regulations Potentially Affecting the Commercial Printing Industry; and Summary of Focus Group Discussions with Screen Printers and Lithographers for the Design for the Environment Printing Project. For more information about these documents or to request copies of these documents, please contact the Pollution Prevention Information Clearinghouse at 202-260-1023.*

*Common Sense Initiative*

The EPA's Common Sense Initiative was formally announced by Administrator Browner in July of 1994 to encourage sector-based regulatory policy in six pilot industrial sectors including: iron and steel, electronics, metal plating and finishing, automobiles, printing, and oil refining. The program shifts regulatory focus from concentrating on individual pollutants and media, to industry-wide approaches to environmental problems. An EPA team is involved with other stakeholders from industry, environmental groups, environmental justice groups, labor, and state and local government agencies to identify opportunities to coordinate rulemaking and to streamline record-keeping and permitting requirements. The teams will also work with industry to identify innovative approaches in pollution prevention and environmental technology, and compliance and enforcement.

EPA CSI contacts for printing are as follows:

Ginger Gotliffe, Agency Lead (OECA) 202-564-7072  
 Brian Holtrop (OW) 202-260-6814  
 Dave Salman (OAR) 919-541-0859  
 Stephanie Bergman (OPPTS) 202-260-1821  
 Jim O'Leary (OSWER) 202-260-0724  
 Adam Saslow (OPPE) 202-260-2857  
 Paul Shapiro (ORD) 202-260-4969  
 Jim Curtin (OGC) 703-235-5304

*The Great Printers Project*

The Great Printers Project, co-sponsored by the Environmental Defense Fund (EDF), Printing Industries of America (PIA), and Council of Great Lakes Governors (CGLC), is investigating potential improvements in regulatory implementation and environmental protection. CGLC, PIA, U.S. EPA, Great Lakes state regulatory agencies, and EDF have examined the possibility of re-orienting both regulatory activities and technical support for lithographic printers toward a whole-facility approach. One of the first efforts was an investigation of the regulatory requirements currently facing printing facilities so that proposals for consolidated permitting can be developed. Great Printers Project participants published their first report in July 1994, "The Great Printers Project: Recommendations to Make Pollution Prevention a Standard Practice in the Printing Industry," which covers issues from regulatory design to technical outreach. (Contact: Kevin Mills 202-387-3500)

*Environmental Leadership Program*

In FY94, the Agency's Environmental Leadership Program (ELP) solicited proposals for innovative approaches to environmental management and compliance at the facility level. Forty proposals were received from companies, trade associations, and federal facilities representing many manufacturing and service sector facilities. In ELP, the EPA will work with individual facilities to study and evaluate the implementation of a variety of proposed pilot programs. The information collected from the pilot ELP programs will be used to develop a full-scale ELP program. The John Roberts Company was one of 12 proposals selected to participate in the pilot program. The John Roberts Company is a medium sized commercial lithographic printer located in Minneapolis Minnesota, who will work on developing the concept of mentoring as an environmental auditing tool to proactively and voluntarily verify compliance effectiveness. Other proposals are available for review from the Environmental Leadership Program. (Contact: Tai-ming Chang, ELP Director, 202-564-5081)

*Project XL*

Project XL was initiated in March 1995 as a part of President Clinton's *Reinventing Environmental Regulation* initiative. The projects seek to achieve cost effective environmental benefits by allowing participants to replace or modify existing regulatory requirements on the condition that they produce greater environmental benefits. EPA and program participants will negotiate and sign a Final Project Agreement, detailing specific objectives that the regulated entity shall satisfy. In exchange, EPA will allow the participant a certain degree of regulatory flexibility and may seek changes in underlying regulations or statutes. Participants are encouraged to seek stakeholder support from local governments, businesses, and environmental groups. EPA hopes to implement fifty pilot projects in four categories including facilities, sectors, communities, and government agencies regulated by EPA. Applications will be accepted on a rolling basis and projects will move to implementation within six months of their selection. For additional information regarding XL Projects, including application procedures and criteria, see the May 23, 1995 Federal Register Notice, or contact Jon Kessler at EPA's Office of Policy Analysis (202) 260-4034.

*Waste Reduction Innovation Technology Evaluation*

EPA's Office of Research and Development has supported a variety of Waste Reduction Innovative Technology Evaluation (WRITE) projects related to printing operations including evaluations of water-based inks for wide-web

**Sector Notebook Project****Printing and Publishing**

flexographic printing (Erie County, NY) and soy-based inks for lithographic printers (IL) (Contact: Paul Randall 513-569-7673)

*Region I*

Region I's Waste Management Division is giving a grant to Vermont to establish model facilities illustrating compliance and pollution prevention, which may include a printing facility. A grant to the Printing Industries of New England (PINE), also a DfE participant, provides for on-site compliance outreach, pollution prevention assistance and hazardous waste management assistance to roughly 75 facilities in the Commonwealth of Massachusetts. (Contacts: Abby Swaine - Region I, 617-565-4523 or Mark Mahoney - Region I, 617-565-1155)

*Connecticut*

The Connecticut Department of Environmental Protection has developed a site assessment tool for printers.

*Region IV*

Region IV's VOC Initiative is in the planning stages. Once developed, it may impact printers. (Contact: Bill Klutz, Air Enforcement Branch 404-347-2904)

*Region VIII*

Pollution prevention training for printing and metal finishing industries will be open to municipalities with approved pretreatment programs.

*Region IX*

Geographic Initiative focused in Southern California will target many industries.

**Sector Notebook Project****Printing and Publishing***Printing, Lithographic and Photo Processing Initiative (Washington State)*

The Washington Department of Ecology's Hazardous Waste and Toxics Reduction Program is targeting the printing and photo processing industry as one of a series of single industry initiatives. The assistance is being funded with an EPA pollution prevention grant. The assistance includes: outreach training, seminars and publications, responses to inquiries, hotline and/or on-site assistance to individual facilities. Local governments and industry trade associations in King County-Metro are participants. (Contacts: U.S. EPA Region X - Nancy Helm 206-553-8659 or Jayne Carlin 206-553-4762; WADEC - Darrin Rice 206-407-6743)

*Oregon Printing Industry Initiative*

The Oregon Department of Environmental Quality (DEQ) is providing compliance assistance to printing, lithographic, and photo processing facilities in the state. Assistance will be provided through training, seminars and publications. (Contacts: Region X - Jayne Carlin 206-553-4762 or Kris Colt 206-553-8577; Oregon DEQ - Marianne Fitzgerald 503-229-5946)

*State Pollution Prevention Roundtable*

The State Pollution Prevention Roundtable will soon be publishing a member survey which will summarize state-level expertise and initiatives according to industry.

**VIII.B. EPA Voluntary Programs***33/50 Program*

The "33/50 Program" is EPA's voluntary program to reduce toxic chemical releases and transfers of seventeen chemicals from manufacturing facilities. Participating companies pledge to reduce their toxic chemical releases and transfers by 33 percent as of 1992 and by 50 percent as of 1995 from the 1988 baseline year. Certificates of Appreciation have been given out to participants meeting their 1992 goals. The list of chemicals includes seventeen high-use chemicals reported in the Toxics Release Inventory.

Of the target chemicals, toluene, methyl ethyl ketone, xylenes, and 1,1,1-trichloroethane are released and transferred most frequently by the printing and publishing industry. These four toxic chemicals account for roughly 86 percent of TRI releases and transfers for printing facilities. Twenty-five companies listed under SIC 27 (printing and publishing) are currently participating in the 33/50 program. They account for 12 percent of the 206 TRI reporting companies under SIC 27, which is approximately the average level of participation for all industries (14 percent). (For more information, contact: Mike Burns, U.S. EPA, 202-260-6394 or 33/50 Program 202-260-6907.)

*WasteWi\$e Program*

The WasteWi\$e Program was started in 1994 by EPA's Office of Solid Waste and Emergency Response. The program is aimed at reducing municipal solid wastes by promoting waste minimization, recycling collection, and the manufacturing and purchase of recycled products. As of 1994, the program had about 300 companies as members, including a number of major corporations. Members agree to identify and implement actions to reduce their solid wastes and must provide EPA with their waste reduction goals along with yearly progress reports. EPA, in turn, provides technical assistance to member companies and allows the use of the WasteWi\$e logo for promotional purposes. (Contact: Lynda Wynn 202-260-0700 or the WasteWi\$e Hotline at 800-372-9473)

*Climate Wise Recognition Program*

The Climate Change Action Plan was initiated in response to the U.S. commitment to reduce greenhouse gas emissions in accordance with the Climate Change Convention of the 1990 Earth Summit. As part of the Climate Change Action Plan, the Climate Wise Recognition Program is a partnership initiative run jointly by EPA and the Department of Energy. The

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voluntary program is designed to reduce greenhouse gas emissions by encouraging reductions across all sectors of the economy, encouraging participation in the full range of Climate Change Action Plan initiatives, and fostering innovation. Participants in the program are required to identify and commit to actions that reduce greenhouse gas emissions. The program, in turn, gives organizations early recognition for their reduction commitments; provides technical assistance through consulting services, workshops, and guides; and provides access to the program's centralized information system. At EPA, the program is operated by the Air and Energy Policy Division within the Office of Policy Planning and Evaluation. (Contact: Pamela Herman 202-260-4407)

*NICE*<sup>3</sup>

The U.S. Department of Energy and EPA's Office of Pollution Prevention are jointly administering a grant program called The National Industrial Competitiveness through Energy, Environment, and Economics (NICE). By providing grants of up to 50 percent of the total project cost, the program encourages industry to reduce industrial waste at its source and become more energy-efficient and cost-competitive through waste minimization efforts. Grants are used by industry to design, test, demonstrate, and assess the feasibility of new processes and/or equipment with the potential to reduce pollution and increase energy efficiency. The program is open to all industries; however, priority is given to proposals from participants in the pulp and paper, chemicals, primary metals, and petroleum and coal products sectors. (Contact: DOE's Golden Field Office, 303-275-4729)

**VIII.C. Summary of Trade Associations**

The trade and professional organizations serving the printing industry are divided along printing processes as well as type of product produced. For example, there are several trade groups for lithographers as well as the American Newspaper Publishers Association, which typically print using lithographic presses. The large number of small facilities in this industry results in two important characteristics of the trade associations. First, a large number of facilities are not affiliated with any trade associations. Second, a significant portion of the industry research is conducted through trade associations and/or technical foundations which serve the needs of the many smaller members who would otherwise have limited or indirect access to research.

Printing industry membership in trade organizations is approximately 50 percent. The majority of printers not associated with trade groups are small printers with fewer than ten employees. Outreach efforts to unaffiliated small

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printing shops have been problematic for the printing industry trade associations. The In-Plant Management Association's membership, however, includes in-house operations that would otherwise be difficult to identify or contact as the main business is not printing. Industry officials reported that the trade press, which may be read by nonmembers, and suppliers of equipment and chemicals, offer two vehicles for reaching unaffiliated small printers.

**Sector Notebook Project****Printing and Publishing****LITHOGRAPHY**

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**Printing Industries of America**

100 Daingerfield Rd.

Alexandria, VA 22314

Phone: (703) 519-8100

Fax: (703) 548-3227

Members: 13,200

Staff: 70

Budget: \$12,000,000

Contact: Tom Purcell

Since its inception in 1887, Printing Industries of America (PIA) has grown to be the largest trade group for the printing sector, with the largest membership and budget. PIA focuses on lithographic printing, although their membership includes other printing processes and suppliers. Technical service and support to members occurs through more than 30 strong regional organizations. PIA publishes a variety of periodicals including *The Capital Letter*, a monthly dedicated to government regulatory issues. They are involved in the DfE Printing Industry Project, the Common Sense Initiative, and the Great Printers Project and have developed a voluntary environmental management program for printers. Affiliated trade associations are located throughout the United States.

**Graphic Arts Technical Foundation**

4615 Forbes Ave.

Pittsburgh, PA 15213

Phone: (412) 621-6941

Fax: (412) 621-3049

Members: 7,000

Staff: 72

Budget: \$6,000,000

Contact: Gary Jones

Graphic Arts Technical Foundation (GATF), established in 1924, is a scientific, technical and educational organization serving the graphic communications industries. Members represent printers, packagers, binders, publishers, design houses, and suppliers. They provide in-facility technical support and training to members as well as evaluations of and educational outreach for advancing technologies. GATF performed laboratory testing of alternative lithographic blanket washes for the DfE Printing Industry Project.

**Sector Notebook Project**

**Printing and Publishing**

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National Association of Printers and  
Lithographers

780 Palisade Ave.

Teaneck, NJ 07666

Phone: (201) 342-0700

Fax: (201) 692-0286

Members: 3,700

Staff: 38

Budget: \$5,000,000

The National Association of Printers and Lithographers (NAPL), founded in 1933, is actively engaged in presenting conferences, seminars, and workshops on management topics for lithographic printers. It holds over 50 such functions each year. NAPL focuses on business and management planning rather than technical support for the shop-level employee. They publish the *Environmental Advisor* newsletter and *Printing Manager* magazine. NAPL officials also participate in the DfE Printing Industry Project.

Printing and Graphic Communications Association

7 West Tower

1333 H Street, NW

Washington, DC 2005

Phone: (202) 682-3001

**GRAVURE**

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Gravure Association of America  
1200-A Scottsville Rd.  
Rochester, NY 14624  
Phone: (716) 436-2150

Members: 250  
Staff: 20

The Gravure Association of America (GAA), founded in 1987, promotes the use of gravure printing in publications and the general advancement of gravure printing techniques. The GAA compiles statistics about the gravure industry, collects/analyzes/disseminates current and historical information on environmental issues, government regulations, marketing, and gravure technology, and runs a seminar/lecture series. The Rochester Institute of Technology provides GAA and its members with academic research, testing facilities and personnel training. It is unique in that all types of suppliers (e.g., waste management vendors, chemical and equipment suppliers) are members and are active participants in many GAA activities. The GAA publishes *GAA Today*, which covers environmental regulations, ink and solvent testing, as well as other topics.

**FLEXOGRAPHY**

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Flexographic Technical Association  
900 Marconi Ave.  
Ronkonkoma, NY 11779  
Phone: (516) 737-6020

Members: 1,400  
Staff: 20

Founded in 1958, the Flexographic Technical Association (FTA) is the major industry trade group for the flexographic process. FTA's stated purpose is to "advance the art and science of flexographic printing and assist and recommend developments in flexography." Membership includes suppliers as well as printers. The FTA leads regional workshops for production, supervisory, and management personnel and publishes a monthly magazine entitled *Flexo*, which has a circulation of 9,200.

**SCREEN PRINTING**

---

**Screenprinting and Graphic Imaging**

Association International (SGIA)

10015 Main Street

Fairfax, VA 22031

Phone: (703) 385-1335

Fax: (703) 273-0456

Members: 3,000

Staff: 29

Budget: \$2,900,000

Contact: Marcia Kinter

Founded in 1948, the Screenprinting and Graphic Imaging Association International (SGIA) represents the interests of the screen printing industry throughout the world. SGIA offers technical assistance on all matters concerning the screen printing and graphic imaging industry; conducts educational programming for the industry; compiles industry statistics; and offers a wide variety of management and government related services.

SGIA was the industry partner in the DfE assessment of screen reclamation products. The Association is closely associated with the Screen Printing Technical Foundation (SPTF). SPTF conducts research into the screen printing process. The foundation also participated in the DfE screen printing project by providing the laboratory evaluation of alternative screen reclamation products submitted to the project.

**OTHER ASSOCIATIONS**

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**In-Plant Management Association**

1205 W. College Ave.

Liberty, MO 64068

Phone: (816) 781-1111

Members: 2,700

Staff: 5

Founded in 1964, the In-Plant Management Association represents managers of in-plant printing and graphics operations. Members are most frequently located within academic institutions (20 percent) and insurance companies (12 percent). They offer training, educational, and certification programs. IPMA conducts research, surveys and studies on industrial and technological trends.

**National Association of Quick Printers**

401 N. Michigan Ave.

Chicago, IL 60611

Phone: (312) 644-6610

Members: 3,400

Staff: 4

Founded in 1975, the National Association of Quick Printers (NAQP) serves printers that offer "printing-while-you-wait" as well as suppliers. Many of their members are franchise operators. The technology is typically turnkey, xerographic printing, but there is increased use of small lithographic presses in the industry.

**Environmental Conservation Board  
of the Graphic Communications Industries**

1899 Preston White Drive

Reston, VA 22091-4367

Phone: (703) 648-3218

Contact: Mark Nuzzaco

The Environmental Conservation Board (ECB) was founded in 1972 to provide a unified and coordinated approach to environmental issues affecting the graphic communications industry. ECB is an intra-industry organization for environmental affairs for the printing, publishing, newspaper, packaging, and metal decorating industries and their suppliers. Members are predominantly other trade associations, not individual companies. Work is conducted by subcommittees convened to address specific issues. Current projects include: review of draft CTG for lithography, participation in DfE Core Group and in the Common Sense Initiative, information dissemination at trade shows, ECB Environmental Conference, and a newsletter and information database.

**Sector Notebook Project**

**Printing and Publishing**

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National Association of Printing Ink  
Manufacturers  
47 Halstead Ave.  
Harrison, NY 10528  
Phone: (914) 835-5650

Members: 140  
Staff: 5

The National Association of Printing Ink Manufacturers (NAPIM) was founded in 1914 and represents manufacturers of all types of printing inks. NAPIM publications include *Printing Ink Handbook*, *Raw Materials Data Handbooks*, as well as bulletins and booklets.

**IX. CONTACTS/ACKNOWLEDGMENTS/RESOURCE MATERIALS/REFERENCES <sup>f</sup>**

For further information on selected topics within the petroleum refining industry a list of contacts and publications are provided below:

**Contacts**

<b>Name</b>	<b>Organization</b>	<b>Telephone</b>	<b>Subject</b>
Ginger Gotliffe	EPA/OECA	(202) 564-7072	Regulatory requirements and compliance assistance. CSI lead.
David Salman	EPA/OAR	(919) 541-0859	Industrial processes and regulatory requirements (Air)
Ron Josephson	EPA/OSW	(202) 260-6715	Industrial processes and regulatory requirements (RCRA)
Stephanie Bergman	EPA/DfE	(202) 26-1821	Nonregulatory initiatives and DfE.

OECA: Office of Enforcement and Compliance Assistance

OAR: Office of Air and Radiation

OSWER: Office of Solid Waste and Emergency Response

DfE: Design for the Environment Program

**General Profile**

*Printing Industry and Use Cluster Profile*, U.S. EPA. June 1994. EPA 744-R94-003.

*U.S. Industrial Outlook 1994*, Department of Commerce.

*Graphics Arts Monthly: The Magazine of the Printing Industry*, 249 W. 17th St. New York, NY 10011 (212) 463-6834

Bruno, Michael H. 1991. *Michael H. Bruno's Status of Printing, 1991 Update: A State of the Art Report*. Salem, NH: GAMA Communications.

Lewis, A.F. 1991. *Blue Book Marketing Information Reports: Graphic Arts Industry Analysis by Plant Size, Equipment, Product Specialties*. New York, NY: A.F. Lewis & Co., Inc.

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<sup>f</sup> Many of the contacts listed above have provided valuable background information and comments during the development of this document. EPA appreciates this support and acknowledges that the individuals listed do not necessarily endorse all statements made within this notebook.

**Sector Notebook Project****Printing and Publishing**

PIRA (Packaging, Paper, Printing and Publishing, and Nonwovens Abstracts) database, available through the DIALOG Information Retrieval Service. PIRA provides coverage of the literature of the pulp and paper, packaging, printing, publishing, and nonwovens industries.

See summary of trade associations (Section III.C.4) for periodicals targeted to establishments using specific printing processes.

**Process Descriptions and Chemical Use Profiles**

*Printing Industry and Use Cluster Profile*, U.S. EPA. June 1994. EPA 744-R94-003.

*Cleaner Technologies Substitutes Assessment for Screen Printing: Screen Reclamation*, U.S. EPA, DfE Printing Industry Project, Draft September 1994.

*Draft National Emission Standards for the Printing and Publishing Industry - Background Information Document*, U.S. EPA, OAR - OAQPS.

**Regulatory Profile**

*Federal Environmental Regulations Possibly Affecting the Commercial Printing Industry*, U.S. EPA, DfE Printing Industry Project, EPA744B-94-001, March 1994.

*The Great Printers Project: Recommendations to Make Pollution Prevention a Standard Practice in the Printing Industry*, Council of Great Lakes Governors, Printing Industries of America, and Environmental Defense Fund, July 1994.

For a listing of all state environmental agency contacts relevant to the printing industry, refer to the March, 1995 issue of *Graphic Arts Monthly*.

**Pollution Prevention**

*Guides to Pollution Prevention: The Commercial Printing Industry*, EPA/625/7-90/008, U.S. EPA, August 1990.

Technical Information Publication PRINTING, New Jersey Department of Environmental Protection.

*Blanket Wash Technology Study: An Evaluation of Commercially Available Blanket Washes*, The Massachusetts Toxics Use Reduction Institute, Technical Report No. 16, 1994.

*Cleaner Technologies Substitutes Assessment for Screen Printing: Screen Reclamation*, U.S. EPA, DfE Printing Industry Project, Draft September 1994.

**Sector Notebook Project**

**Printing and Publishing**

*Replacement of Hazardous Material in Wide Web Flexographic Printing Process*, Kranz, P., Williamson, T., and Randall, P., funded by Risk Reduction Engineering Laboratory, U.S. EPA.

*Guides to Pollution Prevention: The Photoprocessing Industry*, EPA/625/7-91/012, U.S. EPA, October 1991.

*Innovative Clean Technologies Case Studies*, EPA/600/R-93/175, U.S. EPA, August 1993.

*Innovative Clean Technologies Case Studies Second Year Project Report*, EPA/600/R-94/169, U.S. EPA, April 1994.

*Waste Reduction Evaluation of Soy-Based Ink at a Sheet-Fed Offset Printer*, EPA/600/SR-94/144, U.S. EPA, September 1994.

*On-site Waste Ink Recycling*, EPA/600/SR-92/251, U.S. EPA, February 1993.

*Ink and Cleaner Waste Reduction Evaluation for Flexographic Printers*, EPA/600/SR-93/086, U.S. EPA, July 1993.

Several of the documents listed above can be obtained from the Pollution Prevention Information Clearinghouse (PPIC) at (202) 260-1023.

**References**

1. U.S. Department of Commerce, Bureau of the Census. 1987 Census of Manufacturers.
2. Bruno, Michael H. *Michael H. Bruno's Status of Printing, 1991 Update: A State-of-the-Art Report*. Salem, NH: GAMA Communications, 1991.
3. U.S. Department of Commerce, Bureau of the Census. 1987 Census of Manufacturers.
4. Lewis A.F. *Blue Book Marketing Information Reports: Graphic Arts Industry Analysis by Plant Size, Equipment, Product Specialties*. New York, NY: A.F. Lewis & Co., Inc., 1991.
5. U.S. Department of Commerce, Bureau of the Census. 1987 Census of Manufacturers.
6. U.S. Department of Commerce, Bureau of the Census. 1987 Census of Manufacturers.
7. EPA, *Printing Industry and Use Cluster Profile*. June 1994. EPA 744-R94-003.
8. SRI. *Printing 2000*. Prepared by SRI International, Menlo Park, CA for the Printing 2000 Task Force, Printing Industries of America, Alexandria, VA. 1990.
9. U.S. Department of Commerce, Bureau of the Census. 1987 Census of Manufacturers.
10. Lewis A.F. *Blue Book Marketing Information Reports: Graphic Arts Industry Analysis by Plant Size, Equipment, Product Specialties*. New York, NY: A.F. Lewis & Co., Inc., 1991.
11. U.S. Department of Commerce, Bureau of the Census. 1987 Census of Manufacturers.
12. U.S. Department of Commerce. U.S. Industrial Outlook 1994. January 1994.
13. U.S. Department of Commerce. U.S. Industrial Outlook 1994. January 1994.
14. U.S. Department of Commerce. U.S. Industrial Outlook 1994. January 1994.
15. Bruno, Michael H. *Michael H. Bruno's Status of Printing, 1991 Update: A State-of-the-Art Report*. Salem, NH: GAMA Communications, 1991.
16. EPA, *Printing Industry and Use Cluster Profile*. June 1994. EPA 744-R94-003.
17. EPA, *Guides to Pollution Prevention: The Commercial Printing Industry*. August 1990. EPA 625-7-90-008.
18. University of Northern Iowa Waste Reduction Center. *Pollution Prevention Manual for Lithographic Printers*, 1995.

**Sector Notebook Project**

**Printing and Publishing**

19. EPA, *Control Techniques Guideline for Offset Lithographic Printing*. July 12, 1993.
20. EPA, *Printing Industry and Use Cluster Profile*. June 1994. EPA 744-R94-003.
21. Telecon. Keenan, Cheryl, Abt Associates Inc., Cambridge, MA, with Flexographic Technical Association. July 1994.
22. EPA, *Printing Industry and Use Cluster Profile*. June 1994. EPA 744-R94-003.
23. EPA, *Printing Industry and Use Cluster Profile*. June 1994. EPA 744-R94-003.

GPO Document Ordering Form

Inside back cover

**Sector Notebook Project**

**Printing and Publishing**

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Back cover will be provided by EPA.

---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: Power plant NSPS complaint  
Date: Wed Jun 12 2013 12:52:10 EDT  
Attachments:

---

Michael,

Is there any chance you could do something in the morning from 10:45-11:15am tomorrow?

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, June 12, 2013 12:01 PM  
To: Henderson, Kelly; 'Joanne.Spalding@sierraclub.org'; 'Megan Ceronsky (mceronsky@edf.org)';  
Vickie Patton; 'aweeks@catf.us'; Morgan Costello; Longstreth, Ben; Hawkins, Dave  
Subject: RE: Power plant NSPS complaint

I'm available 330-530 EST tomorrow and could do a call at 1:30 or 2 on Friday.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Henderson, Kelly [mailto:khenderson@nrdc.org]  
Sent: Wednesday, June 12, 2013 11:51 AM  
To: 'Joanne.Spalding@sierraclub.org'; 'Megan Ceronsky (mceronsky@edf.org)'; Vickie Patton;  
'aweeks@catf.us'; Morgan Costello; Michael J. Myers; Longstreth, Ben; Hawkins, Dave  
Subject: Power plant NSPS complaint

Dear all,

I would like to schedule a time tomorrow, Thursday, for a discussion of the complaint. Could folks do sometime after 3:30pm EST tomorrow for this call?

Additionally, I would like to schedule another quick call on Friday to discuss coordination for filing and/or response to potential communication with White House. Could folks do 1:30 or 2:00pm EST?

Please let me know what works best!

Thanks,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | [khenderson@nrdc.org](mailto:khenderson@nrdc.org) | [www.nrdc.org](http://www.nrdc.org)

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Henderson, Kelly <khenderson@nrdc.org>  
Cc: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Bcc:  
Subject: RE: Power plant NSPS complaint  
Date: Wed Jun 12 2013 12:53:20 EDT  
Attachments:

---

I have a 10 a.m. call but it should be done by 1045, so yes

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Henderson, Kelly [mailto:khenderson@nrdc.org]  
Sent: Wednesday, June 12, 2013 12:52 PM  
To: Michael J. Myers  
Subject: RE: Power plant NSPS complaint

Michael,

Is there any chance you could do something in the morning from 10:45-11:15am tomorrow?

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, June 12, 2013 12:01 PM  
To: Henderson, Kelly; 'Joanne.Spalding@sierraclub.org'; 'Megan Ceronsky (mceronsky@edf.org)';  
Vickie Patton; 'aweeks@catf.us'; Morgan Costello; Longstreth, Ben; Hawkins, Dave  
Subject: RE: Power plant NSPS complaint

I'm available 330-530 EST tomorrow and could do a call at 1:30 or 2 on Friday.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau

New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Henderson, Kelly [mailto:khenderson@nrdc.org]  
Sent: Wednesday, June 12, 2013 11:51 AM  
To: 'Joanne.Spalding@sierraclub.org'; 'Megan Ceronsky (mceronsky@edf.org)'; Vickie Patton;  
'aweeks@catf.us'; Morgan Costello; Michael J. Myers; Longstreth, Ben; Hawkins, Dave  
Subject: Power plant NSPS complaint

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Thanks,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | khenderson@nrdc.org | www.nrdc.org

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>

---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Bcc:  
Subject: RE: Power plant NSPS complaint  
Date: Wed Jun 12 2013 12:57:33 EDT  
Attachments:

---

Great, thanks. Let me confirm with Megan.

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, June 12, 2013 12:53 PM  
To: Henderson, Kelly  
Cc: Morgan Costello  
Subject: RE: Power plant NSPS complaint

I have a 10 a.m. call but it should be done by 1045, so yes

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Henderson, Kelly [mailto:khenderson@nrdc.org]  
Sent: Wednesday, June 12, 2013 12:52 PM  
To: Michael J. Myers  
Subject: RE: Power plant NSPS complaint

Michael,

Is there any chance you could do something in the morning from 10:45-11:15am tomorrow?

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Wednesday, June 12, 2013 12:01 PM  
To: Henderson, Kelly; 'Joanne.Spalding@sierraclub.org'; 'Megan Ceronsky (mceronsky@edf.org)';

Vickie Patton; 'aweeks@catf.us'; Morgan Costello; Longstreth, Ben; Hawkins, Dave  
Subject: RE: Power plant NSPS complaint

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Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Henderson, Kelly [mailto:khenderson@nrdc.org]  
Sent: Wednesday, June 12, 2013 11:51 AM  
To: 'Joanne.Spalding@sierraclub.org'; 'Megan Ceronsky (mceronsky@edf.org)'; Vickie Patton;  
'aweeks@catf.us'; Morgan Costello; Michael J. Myers; Longstreth, Ben; Hawkins, Dave  
Subject: Power plant NSPS complaint

Dear all,

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Thanks,

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | khenderson@nrdc.org | www.nrdc.org

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>

---

From: Kennedy, Kit <kkennedy@nrdc.org>  
To: Lemuel Srolovic </o=lawnet/ou=first administrative group/cn=recipients/cn=lsrolovi>; John J. Sipos </o=lawnet/ou=first administrative group/cn=recipients/cn=johnsipos>; Timothy L. Hoffman </o=lawnet/ou=first administrative group/cn=recipients/cn=timothyhoffman>  
Cc:  
Bcc:  
Subject: NYT article on efficiency standard delays  
Date: Wed Jun 12 2013 12:59:28 EDT  
Attachments:

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FYI.

[http://www.nytimes.com/2013/06/13/us/politics/environmental-rules-delayed-as-white-house-slows-reviews.html?hp&\\_r=0](http://www.nytimes.com/2013/06/13/us/politics/environmental-rules-delayed-as-white-house-slows-reviews.html?hp&_r=0)

---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Longstreth, Ben <blongstreth@nrdc.org>;  
Hawkins, Dave <dhawkins@nrdc.org>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; aweeks@catf.us  
<aweeks@catf.us>; Megan Ceronsky (mceronsky@edf.org)  
<mceronsky@edf.org>; Vickie Patton <vpatton@edf.org>  
Cc:  
Bcc:  
Subject: Call to coordinate for filing and/or response to potential communication with White  
House  
Date: Wed Jun 12 2013 16:02:42 EDT  
Attachments:

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---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Henderson, Kelly <khenderson@nrdc.org>;  
Longstreth, Ben <blongstreth@nrdc.org>; Hawkins, Dave  
<dhawkins@nrdc.org>; Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; aweeks@catf.us  
<aweeks@catf.us>; Megan Ceronsky (mceronsky@edf.org)  
<mceronsky@edf.org>; Vickie Patton <vpatton@edf.org>  
Cc:  
Bcc:  
Subject: Call to coordinate for filing and/or response to potential communication with White  
House  
Date: Wed Jun 12 2013 16:02:42 EDT  
Attachments:

---

StartTime: Fri Jun 14 13:30:00 Eastern Daylight Time 2013  
EndTime: Fri Jun 14 14:00:00 Eastern Daylight Time 2013  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: No

---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Henderson, Kelly <khenderson@nrdc.org>;  
Longstreth, Ben <blongstreth@nrdc.org>; Hawkins, Dave  
<dhawkins@nrdc.org>; Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; aweeks@catf.us  
<aweeks@catf.us>; Megan Ceronsky (mceronsky@edf.org)  
<mceronsky@edf.org>; Vickie Patton <vpatton@edf.org>

Cc:  
Bcc:  
Subject: Power Plant Complaint Discussion  
Date: Wed Jun 12 2013 16:02:47 EDT  
Attachments:

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StartTime: Thu Jun 13 10:45:00 Eastern Daylight Time 2013  
EndTime: Thu Jun 13 11:15:00 Eastern Daylight Time 2013  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Thu Jun 13 08:44:00 Eastern Daylight Time 2013

---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Henderson, Kelly <khenderson@nrdc.org>;  
Longstreth, Ben <blongstreth@nrdc.org>; Hawkins, Dave  
<dhawkins@nrdc.org>; Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; aweeks@catf.us  
<aweeks@catf.us>; Megan Ceronsky (mceronsky@edf.org)  
<mceronsky@edf.org>; Vickie Patton <vpatton@edf.org>

Cc:  
Bcc:  
Subject: Copy: Power Plant Complaint Discussion  
Date: Wed Jun 12 2013 16:02:47 EDT  
Attachments:

---

StartTime: Thu Jun 13 10:45:00 Eastern Daylight Time 2013  
EndTime: Thu Jun 13 11:15:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Wed Jun 12 16:10:00 Eastern Daylight Time 2013

---

From: Henderson, Kelly <khenderson@nrdc.org>  
To: Longstreth, Ben <blongstreth@nrdc.org>;  
Hawkins, Dave <dhawkins@nrdc.org>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; Michael J. Myers  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; Morgan Costello  
</o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; aweeks@catf.us  
<aweeks@catf.us>; Megan Ceronsky (mceronsky@edf.org)  
<mceronsky@edf.org>; Vickie Patton <vpattton@edf.org>;  
Henderson, Kelly <khenderson@nrdc.org>  
Cc:  
Bcc:  
Subject: Copy: Call to coordinate for filing and/or response to potential communication with  
White House  
Date: Wed Jun 12 2013 16:03:41 EDT  
Attachments:

---

StartTime: Fri Jun 14 13:30:00 Eastern Daylight Time 2013  
EndTime: Fri Jun 14 14:30:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Wed Jun 12 16:10:00 Eastern Daylight Time 2013

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Henderson, Kelly <khenderson@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Power Plant Complaint Discussion  
Date: Wed Jun 12 2013 16:10:11 EDT  
Attachments:

---

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Henderson, Kelly <khenderson@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Call to coordinate for filing and/or response to potential communication with  
White House  
Date: Wed Jun 12 2013 16:10:21 EDT  
Attachments:

---

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Massicotte, Kimberly  
<kimberly.massicotte@po.state.ct.us>; Edge, Valerie (DOJ)  
(Valerie.Edge@state.de.us) <valerie.edge@state.de.us>  
Cc:  
Bcc:  
Subject: bberry phone  
Date: Fri Jun 14 2013 12:21:49 EDT  
Attachments:

---

is 518-937-3148. I'll be in the office til about 5/530 today and reachable on the bberry after that.

Kim, if you wanted to reach out to the NGOs directly, I'd suggest calling Ben Longstreth at NRDC, Vickie Patton at EDF, and Joanne Spalding at Sierra Club. If you need any of their #s, just let me know. Thanks.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Lisa Rector <lrector@nescaum.org>  
Cc:  
Bcc:  
Subject: RE: RWH NSPS  
Date: Fri Jun 14 2013 16:41:14 EDT  
Attachments:

---

Lisa, I'm available Monday other than 9:30-10:30 and Tuesday other than 10-2:30.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Thursday, June 13, 2013 2:04 PM  
To: Lisa Rector; Jeremy Magliaro; Arthur Marin; Paul Miller; Michael J. Myers; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Subject: RE: RWH NSPS

Based on the doodle poll there was no time that worked for everyone to discuss issues related to the RWH effort. Can folks let me know their availability for a call next Monday or Tuesday? Thanks!

Lisa  
[<http://www.nescaum.org/NESCAUM-logo.gif>]<http://www.nescaum.org>  
Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org<mailto:lrector@nescaum.org>

---

From: Lisa Rector  
Sent: Thursday, May 30, 2013 6:19 AM  
Required: Jeremy.Magliaro@ag.ny.gov; Arthur Marin; Paul Miller; Michael.Myers@ag.ny.gov; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org  
Optional: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RWH NSPS  
When: Friday, May 31, 2013 1:00 PM-2:00 PM.  
Where: 877-656-1761 code 127243

Hi Everyone!

Hope you can make a call tomorrow to discuss the NSPS. I do not have David Baron's email, could someone please distribute this to him? Thanks!

gl 0601

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: mceronsky@edf.org <mceronsky@edf.org>  
Cc:  
Bcc:  
Subject: Re: Checking in  
Date: Sun Jun 16 2013 21:36:51 EDT  
Attachments:

---

Hi Megan, I spoke with Hawkins this morning. Thanks for checking in. Mike

Message sent from a Blackberry device

From: Megan Ceronsky [mailto:mceronsky@edf.org]  
Sent: Saturday, June 15, 2013 02:11 PM  
To: Michael J. Myers  
Subject: Checking in

Hi Mike--

I hope you are having a wonderful weekend. I hesitate to intrude upon it, but if you have a few minutes to talk my cell is 202-650-2277.

Best,  
Megan

Please excuse any typing mistakes or inspired word substitutions.

This e-mail and any attachments may contain confidential and privileged information. If you are not the intended recipient, please notify the sender immediately by return e-mail, delete this e-mail and destroy any copies. Any dissemination or use of this information by a person other than the intended recipient is unauthorized and may be illegal.

---

From: Lisa Rector <lrector@nescaum.org>  
To: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Arthur Marin <amarin@nescaum.org>; Paul Miller <pmiller@nescaum.org>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; tcarbonell@edf.org <tcarbonell@edf.org>; vpatton@edf.org <vpatton@edf.org>; Janice.Nolen@lung.org <janice.nolen@lung.org>; David Baron <dbaron@earthjustice.org>; Lisa Rector <lrector@nescaum.org>  
Cc: Gail Landry <glandry@nescaum.org>; arthurmarin@vzw.blackberry.net <arthurmarin@vzw.blackberry.net>  
Bcc:  
Subject: Copy: RWH call  
Date: Mon Jun 17 2013 08:49:39 EDT  
Attachments:

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StartTime: Mon Jun 17 13:30:00 Eastern Daylight Time 2013  
EndTime: Mon Jun 17 14:00:00 Eastern Daylight Time 2013  
Location:  
Invitees:  
Recurring: No  
ShowReminder: No  
Accepted: Yes  
AcceptedTime: Mon Jun 17 10:05:34 Eastern Daylight Time 2013  
  
When: Monday, June 17, 2013 1:30 PM-2:00 PM. Eastern Standard Time  
Where: 877-656-1761 code 127243

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

call to discuss issues and updates

gl 0601

---

From: Lisa Rector <lrector@nescaum.org>  
To: Lisa Rector <lrector@nescaum.org>;  
Jeremy Magliaro </o=lawnet/ou=first administrative  
group/cn=recipients/cn=jeremymagliaro>; Arthur Marin  
<amarin@nescaum.org>; Paul Miller <pmiller@nescaum.org>;  
Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>; tcarbonell@edf.org  
<tcarbonell@edf.org>; vpatton@edf.org <vpatton@edf.org>;  
Janice.Nolen@lung.org <janice.nolen@lung.org>; David Baron  
<dbaron@earthjustice.org>  
Cc: Gail Landry <glandry@nescaum.org>;  
arthurmarin@vzw.blackberry.net <arthurmarin@vzw.blackberry.net>  
Bcc:  
Subject: RE: RWH call  
Date: Mon Jun 17 2013 08:55:46 EDT  
Attachments:

---

Hi Everyone!

Please note that I changed the start time to 1:30 pm so that the entire group can participate.  
[<http://www.nescaum.org/NESCAUM-logo.gif>]<http://www.nescaum.org>  
Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org<mailto:lrector@nescaum.org>

---

From: Lisa Rector  
Sent: Friday, June 14, 2013 5:53 PM  
Required: Jeremy.Magliaro@ag.ny.gov; Arthur Marin; Paul Miller; Michael.Myers@ag.ny.gov;  
tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Optional: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RWH call  
When: Monday, June 17, 2013 1:30 PM-2:00 PM.  
Where: 877-656-1761 code 127243

call to discuss issues and updates

gl 0601

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Lisa Rector <lrector@nescaum.org>  
Cc:  
Bcc:  
Subject: RE: RWH call  
Date: Mon Jun 17 2013 14:00:21 EDT  
Attachments:

---

Let's touch base next Thursday, the 27th. My schedule's wide open if you want to call me when it's convenient. I can throw at 11 a.m. as a default time.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Monday, June 17, 2013 8:56 AM  
To: Lisa Rector; Jeremy Magliaro; Arthur Marin; Paul Miller; Michael J. Myers; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Cc: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RE: RWH call

Hi Everyone!

Please note that I changed the start time to 1:30 pm so that the entire group can participate. [<http://www.nescaum.org/NESCAUM-logo.gif>]  
Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax: 617.742.9162 | lrector@nescaum.org

---

From: Lisa Rector  
Sent: Friday, June 14, 2013 5:53 PM  
Required: Jeremy.Magliaro@ag.ny.gov; Arthur Marin; Paul Miller; Michael.Myers@ag.ny.gov; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Optional: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RWH call  
When: Monday, June 17, 2013 1:30 PM-2:00 PM.  
Where: 877-656-1761 code 127243

call to discuss issues and updates

gl 0601

---

From: Lisa Rector <lrector@nescaum.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: RWH call  
Date: Mon Jun 17 2013 14:04:55 EDT  
Attachments:

---

Any chance we could make it earlier? Say 9 or 9:30 am?

Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org

---

From: Michael J. Myers [Michael.Myers@ag.ny.gov]  
Sent: Monday, June 17, 2013 2:00 PM  
To: Lisa Rector  
Subject: RE: RWH call

Let's touch base next Thursday, the 27th. My schedule's wide open if you want to call me when it's convenient. I can throw at 11 a.m. as a default time.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Monday, June 17, 2013 8:56 AM  
To: Lisa Rector; Jeremy Magliaro; Arthur Marin; Paul Miller; Michael J. Myers; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Cc: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RE: RWH call

Hi Everyone!

Please note that I changed the start time to 1:30 pm so that the entire group can participate.  
[<http://www.nescaum.org/NESCAUM-logo.gif>]<http://www.nescaum.org>  
Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org<mailto:lrector@nescaum.org>

---

From: Lisa Rector  
Sent: Friday, June 14, 2013 5:53 PM

Required: Jeremy.Magliaro@ag.ny.gov; Arthur Marin; Paul Miller; Michael.Myers@ag.ny.gov;  
tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Optional: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RWH call  
When: Monday, June 17, 2013 1:30 PM-2:00 PM.  
Where: 877-656-1761 code 127243

call to discuss issues and updates

gl 0601

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Lisa Rector <lrector@nescaum.org>  
Cc:  
Bcc:  
Subject: RE: RWH call  
Date: Mon Jun 17 2013 14:05:50 EDT  
Attachments:

---

Sure, let's say 930

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Monday, June 17, 2013 2:05 PM  
To: Michael J. Myers  
Subject: RE: RWH call

Any chance we could make it earlier? Say 9 or 9:30 am?

Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org \_\_\_\_\_

From: Michael J. Myers [Michael.Myers@ag.ny.gov]  
Sent: Monday, June 17, 2013 2:00 PM  
To: Lisa Rector  
Subject: RE: RWH call

Let's touch base next Thursday, the 27th. My schedule's wide open if you want to call me when it's convenient. I can throw at 11 a.m. as a default time.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Monday, June 17, 2013 8:56 AM  
To: Lisa Rector; Jeremy Magliaro; Arthur Marin; Paul Miller; Michael J. Myers; tcarbonell@edf.org;

vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Cc: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RE: RWH call

Hi Everyone!

Please note that I changed the start time to 1:30 pm so that the entire group can participate.

[<http://www.nescaum.org/NESCAUM-logo.gif>]<http://www.nescaum.org>

Lisa Rector, Senior Policy Analyst at NESCAUM

89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | [lrector@nescaum.org](mailto:lrector@nescaum.org)

---

From: Lisa Rector

Sent: Friday, June 14, 2013 5:53 PM

Required: [Jeremy.Magliaro@ag.ny.gov](mailto:Jeremy.Magliaro@ag.ny.gov); Arthur Marin; Paul Miller; [Michael.Myers@ag.ny.gov](mailto:Michael.Myers@ag.ny.gov);  
[tcarbonell@edf.org](mailto:tcarbonell@edf.org); [vpatton@edf.org](mailto:vpatton@edf.org); [Janice.Nolen@lung.org](mailto:Janice.Nolen@lung.org); David Baron

Optional: Gail Landry; [arthurmarin@vzw.blackberry.net](mailto:arthurmarin@vzw.blackberry.net)

Subject: RWH call

When: Monday, June 17, 2013 1:30 PM-2:00 PM.

Where: 877-656-1761 code 127243

call to discuss issues and updates

gl 0601

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Rob Sliwinski  
(rgsliwin@gw.dec.state.ny.us) <rgsliwin@gw.dec.state.ny.us>;  
Monica Kreshik (mlkreshi@gw.dec.state.ny.us)  
<mlkreshi@gw.dec.state.ny.us>  
Cc: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Bcc:  
Subject: FW: 09-1198 Natural Resources Defense Coun, et al v. EPA "Response to Motion Filed" (EPA-70FR71612)  
Date: Fri Jun 21 2013 09:30:39 EDT  
Attachments: 27\_Joint\_Response to Motion for Remand\_06-20-2013.pdf  
image001.gif

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Here's a copy of the response filed yesterday. Thanks again for your timely input. Will keep you posted.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: David Baron [mailto:dbaron@earthjustice.org]  
Sent: Thursday, June 20, 2013 6:25 PM  
To: Michael J. Myers  
Subject: FW: 09-1198 Natural Resources Defense Coun, et al v. EPA "Response to Motion Filed" (EPA-70FR71612)

Mike,

Response as filed.

David

---

David Baron

Managing Attorney  
Earthjustice Washington, D.C. Office  
1625 Massachusetts Avenue, NW, Suite 702  
Washington, DC 20036  
(202) 667-4500 Ext. 5203 (phone)  
(202) 667-2356 (fax)  
earthjustice.org

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From: Claire Garvin  
Sent: Thursday, June 20, 2013 6:19 PM  
To: David Baron  
Subject: FW: 09-1198 Natural Resources Defense Coun, et al v. EPA "Response to Motion Filed" (EPA-70FR71612)

From: [ecfnoticing@cadc.uscourts.gov](mailto:ecfnoticing@cadc.uscourts.gov) [mailto:[ecfnoticing@cadc.uscourts.gov](mailto:ecfnoticing@cadc.uscourts.gov)]  
Sent: Thursday, June 20, 2013 6:17 PM  
To: Claire Garvin  
Subject: 09-1198 Natural Resources Defense Coun, et al v. EPA "Response to Motion Filed" (EPA-70FR71612)

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United States Court of Appeals for District of Columbia Circuit

Notice of Docket Activity

The following transaction was entered on 06/20/2013 at 6:16:35 PM EDT and filed on 06/20/2013

Case Name:

Natural Resources Defense Coun, et al v. EPA

Case Number:

09-1198

Document(s):

Document(s)

Docket Text:

RESPONSE IN SUPPORT FILED [1442452] by State of Connecticut, State of New York and Natural Resources Defense Council to motion to remand case [1440010-2], motion to vacate [1440010-3] [Service Date: 06/20/2013 by CM/ECF NDA] Pages: 11-15. [09-1198] (Baron, David)

Notice will be electronically mailed to:

Kimberly P. Massicotte, Assistant Attorney General: Kimberly.Massicotte@ct.gov  
Lucinda Minton Langworthy: clangworthy@hunton.com, UARGPleadings@hunton.com  
Ms. Shannon S. Broome, Attorney: shannon.broome@kattenlaw.com, tomika.cremer@kattenlaw.com  
Ms. Morgan Anna Costello, Assistant Attorney General: morgan.costello@ag.ny.gov  
Charles Howland Knauss: chuck.knauss@kattenlaw.com, sbroome@pacbell.net, richard.pavlak@kattenlaw.com, marla.mcdowell@kattenlaw.com  
Mr. Norman William Fichthorn: nfichthorn@hunton.com, UARGPleadings@hunton.com  
David S. Baron: dbaron@earthjustice.org, dwoodsmall@earthjustice.org, cgarvin@earthjustice.org, alin@earthjustice.org  
Mr. Brian H. Lynk, Trial Attorney: brian.lynk@usdoj.gov  
Mr. Jon C Martin, Deputy Assistant Attorney General: jon.martin@dol.lps.state.nj.us, michele.mcgahey@dol.lps.state.nj.us

Document to be served by alternative means on:

Ms. Diane E. McConkey  
U.S. Environmental Protection Agency  
(EPA) Office of General Counsel  
2344A  
1200 Pennsylvania Avenue, NW  
Ariel Rios Building  
Washington, DC 20460-0000

The following document(s) are associated with this transaction:

Document Description: Response to Motion Filed

Original Filename: Response to Motion for Remand final 6-20-2013.pdf

Electronic Document Stamp:

[STAMP acecfStamp\_ID=1109186823 [Date=06/20/2013] [FileNumber=1442452-0]

[bccdb161a2a4668357d026f8374fe8e3ecb0b4eb48d102e7e9714a858d7a89bc94d89514fdb59a4817c46dd1a0bb2ac627ecac899e25dbe759fc75293be6fb2]]



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Owner: Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>  
Filename: 27\_Joint\_Response to Motion for Remand\_06-20-2013.pdf  
Last Modified: Fri Jun 21 09:30:39 EDT 2013

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ORAL ARGUMENT NOT YET SCHEDULED

IN THE UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

_____	)	
NATURAL RESOURCES DEFENSE	)	
COUNCIL and STATE OF NEW JERSEY,	)	
	)	
Petitioners,	)	
	)	
v.	)	No. 09-1198
	)	
UNITED STATES ENVIRONMENTAL	)	
PROTECTION AGENCY,	)	
	)	
Respondent.	)	
_____	)	

**RESPONSE BY NRDC AND STATE INTERVENTOR-PETITIONERS TO  
EPA’S MOTION FOR VOLUNTARY REMAND AND PARTIAL  
VACATUR**

For the following reasons, Petitioner Natural Resources Defense Council (“NRDC”) and Intervenor-Petitioners New York and Connecticut (collectively, “Petitioners”) support EPA’s motion for vacatur of the CAIR-RACT presumption, but oppose EPA’s motion for voluntary remand of the CAIR-RACT determination unless a deadline is ordered for completion of that remand.

**Background**

Ozone, the main component of urban smog, is a corrosive air pollutant that can inflame the lungs and leave people gasping for breath. *See Am. Trucking*

*Ass'ns, Inc. v. EPA*, 283 F.3d 355, 359 (D.C. Cir. 2002). It is linked to aggravation of asthma, emergency department visits, hospitalizations for serious bronchial conditions, premature deaths, and other serious health harms. *See* 73 Fed. Reg. 16436, 16449 (Mar. 27, 2008). Ozone is formed in the air by the mixing of air pollutants – principally nitrogen oxides (“NO<sub>x</sub>”) and volatile organic compounds (“VOCs”) – in the presence of sunlight. 62 Fed. Reg. 38856, 38858 (July 18, 1997). Power plants, factories, and motor vehicles are major sources of NO<sub>x</sub> and VOCs.

The Clean Air Act (“CAA” or “the Act”) requires EPA to designate communities that violate ozone health standards as “nonattainment areas,” and requires states to adopt implementation plans to remedy the nonattainment. 42 U.S.C. §§ 7407(d), 7502, 7511-7511d. Among other things, the plans must “provide for . . . such reductions in [air pollutant] emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology.” 42 U.S.C. §7502(c)(1). *See also id.* §7511a(b)(2)(C) (requiring plans for certain ozone nonattainment areas to “require the implementation of reasonably available control technology” for “all” major stationary sources of “that are located in the area”). EPA has long defined “reasonably available control technology” (“RACT”) as “the lowest emission limitation that a particular source is capable of meeting by the application of

control technology that is reasonably available considering technological and economic feasibility.” 70 Fed. Reg. 71612, 71652 n.57 (Nov. 29, 2005) (quoting 44 Fed. Reg. 53761, 53762 (Sept. 17, 1979)).

In this suit, Petitioners challenge an EPA rule allowing participation in an interstate pollution trading program (the Clean Air Interstate Rule or “CAIR”) to substitute for installation of RACT controls at individual power plants in ozone nonattainment areas (“CAIR-RACT provision”). CAIR was adopted to address the problem of interstate transport of ozone-forming pollution. It sets statewide budgets for NO<sub>x</sub> emissions from major power plants in 25 states and the District of Columbia. States can meet their budgets by issuing limited emissions allowances to power plants, but a plant can choose to buy additional allowances from other better-controlled plants rather than limit its emissions. The plants selling these emission allowances can be located in distant states many hundreds of miles away, and the emission reductions generating the allowances need not provide any ozone control benefit in the nonattainment area of the purchasing source. 63 Fed. Reg. 57356, 57460 (Oct. 27, 1998); 72 Fed. Reg. 31727, 31732 (June 8, 2007). Although this Court held in *North Carolina v. EPA*, 531 F.3d 896 (D.C. Cir. 2008), that CAIR was legally flawed, it subsequently decided to allow the rule to remain

in place while EPA develops a replacement to address the interstate transport of pollution. *See North Carolina v. EPA*, 550 F.3d 1176 (D.C. Cir. 2008).<sup>1</sup>

As EPA notes, the CAIR-RACT provision allows CAIR to substitute for RACT in two ways. First, for a number of specific nonattainment areas and states, EPA conducted an analysis purporting to predict that CAIR would lead to greater emission reductions in the area than source-by-source RACT (“CAIR-RACT determination”). Second, for all other ozone nonattainment areas covered by CAIR, EPA adopted a general presumption that RACT requirements are satisfied by implementation of CAIR (“CAIR-RACT presumption”). Petitioners contend that both the CAIR-RACT determination and CAIR-RACT presumption illegally and arbitrarily abrogate the Act’s mandate for RACT controls at pollution sources within each nonattainment area.

**1. Vacatur of the CAIR-RACT presumption is required by this Court’s decision in *NRDC v. EPA*.**

As EPA’s motion correctly explains, this Court’s ruling in *NRDC v. EPA*, 571 F.3d 1245 (D.C. Cir. 2009), requires invalidation of EPA’s presumption that the CAIR satisfies the Act’s RACT requirement for power plants covered by CAIR. *NRDC* held that a regional emissions trading program (the NO<sub>x</sub> SIP call)

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<sup>1</sup> EPA’s replacement for CAIR, the Cross-State Air Pollution Rule, 76 Fed. Reg. 48208 (Aug. 8, 2011), was also found to be legally invalid. *EME Homer City Generation, L.P. v. EPA*, 696 F.3d 7 (D.C. Cir. 2012). Petitions for writ of certiorari of that decision are currently pending with the Supreme Court.

could not be deemed to satisfy the Act's mandate for RACT-level emissions reductions from sources "within each nonattainment area." Id. 1256. That is because the trading program allowed sources within any given nonattainment area to avoid reducing their emissions at all (much less by the level achievable with RACT controls) by purchasing emissions allowances from sources located outside that area. CAIR is the same type of trading program, and the broad presumption that CAIR satisfies RACT is therefore flatly prohibited under the rationale of *NRDC*.

**2. A voluntary remand of EPA's CAIR-RACT determination for specific nonattainment areas should be granted only if accompanied by a deadline for completing remand proceedings.**

EPA moves for voluntary remand of its CAIR-RACT determination without including any deadline for completing remand proceedings. The effect of such an open-ended remand would be to leave the CAIR-RACT determination in place indefinitely, allowing power plants in numerous nonattainment areas to avoid installing and operating the RACT-level controls mandated by the Act for protection of public health. Although Petitioners contend that EPA's CAIR-RACT determination is unlawful and arbitrary, Petitioners would not object to a remand of the CAIR-RACT determination if accompanied by a court-ordered deadline requiring expeditious completion of remand proceedings. But without such a deadline, the Act's health protection mandates and timelines would be thwarted,

and Petitioners would be denied a timely opportunity to pursue their legitimate objections to the CAIR-RACT determination, further outlined below.

EPA's CAIR-RACT determination is unlawful and arbitrary on multiple grounds.<sup>2</sup> For one, the determination merely reflects a prediction by EPA that power plants in the affected nonattainment areas will choose to comply with CAIR by installing and operating pollution controls in those areas sufficient to achieve RACT-level reductions. As noted above, however, neither CAIR nor the CAIR-RACT determination *requires* those plants to install RACT-level controls inside any nonattainment area: Instead, they can choose to avoid controlling their emissions by purchasing allowances from other sources located a thousand miles away in another state. Thus, the rule unlawfully waives the Act's express mandates for RACT controls "at a minimum" for all existing sources "in" each nonattainment area. 42 U.S.C. §§7502(c)(1); 7511a(b)(2).

Even assuming that power plants covered by CAIR will choose to install RACT controls, the determination wrongly assumes that those plants will actually operate their pollution controls continuously on the hot summer days when ozone pollution levels are at their worst. In reality, CAIR (in contrast to RACT) does not require them to do so, and New York is aware of instances in which power plants

---

<sup>2</sup> For the sake of brevity, Petitioners will not present here all of their arguments challenging the CAIR-RACT determination. Additional arguments appear in Petitioners' briefs filed in this Court in *NRDC v. EPA*, No. 06-1045.

covered by CAIR periodically shut down their NO<sub>x</sub> emission controls, including on some days when the threat of ozone violations is high. EPA also irrationally based its determination that CAIR performs better than RACT on a comparison of total annual and seasonal emissions predicted under CAIR versus RACT, when the relevant comparison is of daily and hourly emissions that impact whether an area will violate the 8-hour ozone standard. CAIR sets an emission budget for the total amount of pollution that power plants can collectively emit in the entire CAIR region over an entire year and an entire summer. In contrast, RACT limits the amount a plant can emit on any one day. Since allowance banking is permitted under CAIR, leftover allowances from previous years can be used to offset current year requirements. EPA, therefore, cannot assure that CAIR in any year will perform better than RACT. As a result, CAIR fails the RACT equivalency test on a spatial (in the area) and temporal basis. The CAIR-RACT determination also wrongly assumed that RACT would consist of weak pollution controls that would be the same at every power plant; an assumption at odds with the definition of RACT as the lowest emission limitation that a “particular source” is capable of achieving.

EPA’s proposed remand without a deadline would allow all of the above flaws in the CAIR-RACT determination to remain unaddressed indefinitely. And the absence of a deadline for completing remand proceedings would present a

significant threat to public health by allowing power plants inside numerous nonattainment areas to continue avoiding RACT-level pollution controls, thereby allowing substantially greater ozone-forming emissions than would RACT during periods when ozone violations are most likely. Moreover, the statutory deadlines for implementation of RACT controls and for attainment of the 1997 ozone standard in many areas have long since passed. *See* 70 Fed. Reg. 71617, 71658-59 (Nov. 29, 2005) (indicating that RACT must be implemented within 57 months of nonattainment designations); 69 Fed. Reg. 23858 (Apr. 30, 2004) (promulgating nonattainment designations for 1997 ozone standard effective June 15, 2004). Thus, any delay by EPA in completing remand proceedings on the CAIR-RACT determination will thwart the Act's timetables and threaten to delay timely attainment of ozone health standards both within the affected nonattainment areas and in downwind states.

In addition, the Court cannot rely on EPA to expeditiously complete remand proceedings on this issue absent a court-ordered deadline. The agency *still* has not, for example, completed a remand rulemaking to comply with this Court's decision of nearly four years ago in *NRDC*, 571 F.3d at 1258 (remanding EPA's rule treating the NO<sub>x</sub> SIP call as RACT). Given the agency's track record of delay, the passage of the Act's RACT and attainment deadlines, and the danger to public health from continued ozone violations, a court-ordered remand schedule is fully

warranted. *See Env'tl. Def. Fund v. EPA*, 852 F.2d 1316, 1331 (D.C. Cir. 1988) (setting deadline for action on remand because of “EPA’s history of delay and missed deadlines”).

Petitioners further submit that a schedule of no longer than six months would be appropriate for completion of the remand rulemaking. Such a schedule is justified not only by the urgency of the health issues at stake, but also by the fact that EPA has *already* developed a proposed rule to rescind the CAIR-RACT determination.

<http://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201110&RIN=2060-AQ07> (last visited June 20, 2013) (copy attached hereto) (“This rule will propose to withdraw any prior determination or presumption that compliance with the Clean Air Interstate Rule (CAIR) or the NO<sub>x</sub> SIP Call constitutes reasonably available control technology (RACT)....”). EPA sent the proposed rule to the Office of Management and Budget (“OMB”) on November 14, 2011.

<http://www.reginfo.gov/public/do/eoReviewSearch;jsessionid=7DDE5EB4E7E8FBAE9942A863CE66B8FA> (last visited June 20, 2013) (RIN: 2060-AQ07) (excerpt attached). As there is no statutory requirement for OMB to review the proposed rule, the only remaining steps that EPA has to take are to publish the proposal in the Federal Register, allow time for public comment, review and respond to the comments, and prepare and publish a final rule. *See* 42 U.S.C.

§7607(d)(3)-(7). That entire process can readily be completed within six months. *See, e.g.*, 78 Fed. Reg. 3086, 3094-95, 3276 (Jan. 15, 2013) (showing EPA promulgation of final revised standards for particulates within six months of proposal).

### CONCLUSION

For all the foregoing reasons, the Court should grant EPA's motion for vacatur of the CAIR-RACT presumption, and remand the CAIR-RACT determination to EPA with instructions to complete a remand rulemaking within six months of the Court's order. If the Court does not order vacatur and/or remand of all EPA actions at issue in this case, then Petitioners ask that the Court direct the parties to submit statements (jointly, if possible) within 30 days indicating: a) whether they believe supplemental briefing is warranted on the EPA actions still before the Court, and if so, a proposed schedule and format for such briefing; and/or b) whether the case should be set for oral argument.

Dated: June 20, 2013

Respectfully submitted,

/s/ David S. Baron

David S. Baron

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*Counsel for Intervenor the State of Connecticut*

## CERTIFICATE OF SERVICE

I hereby certify that on this 20<sup>th</sup> day of June 2013, I have served the foregoing **Response by NRDC and State Intervenor-Petitioners to EPA's Motion for Voluntary Remand and Partial Vacatur** on all registered counsel through the Court's electronic filing system (ECF).

/s/David S. Baron  
David S. Baron

# ATTACHMENTS

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### View Rule

[Printer-Friendly Version](#) [Download RIN Data in XML](#)

**EPA/AR**

**RIN:** 2060-AQ07

**Publication ID:** Fall 2011

**Title:** Withdr.of the Prior Deter. or Presump. That Compl. w/CAIR or the NOx SIP Call Const. RACT or RACM for the 97 8-Hr Ozone & 97Fine Part. NAAQS; & Rev. to RACT Guid. & RFP Req. for the 97Fine Part. NAAQS

**Abstract:** This rule will propose to withdraw any prior determination or presumption that compliance with the Clean Air Interstate Rule (CAIR) or the NOx SIP Call constitutes reasonably available control technology (RACT) or reasonably available control measures (RACM) for oxides of nitrogen (NOx) or sulfur dioxide (SO2) emissions from electric generating unit (EGU) sources participating in these regional cap-and-trade programs. This rule will propose revisions to preamble guidance in the final Implementation Rule for the 1997 PM2.5 national ambient air quality standard (NAAQS) concerning the economic feasibility criteria for determining RACT for sources located within nonattainment areas. The rule will also propose to clarify the situations under which emission reductions from outside of a nonattainment area can be credited toward meeting the Reasonable Further Progress (RFP) requirements for the 1997 PM2.5 NAAQS.

**Agency:** Environmental Protection Agency(EPA)

**Priority:** Other Significant

**RIN Status:** Previously published in the Unified Agenda

**Agenda Stage of Rulemaking:** Proposed Rule Stage

**Major:** No

**Unfunded Mandates:** Undetermined

**CFR Citation:** [40 CFR 51](#)

**Legal Authority:** [23 USC 101](#); [42 USC 7401 to 7671g](#)

**Legal Deadline:** None

**Timetable:**

Action	Date	FR Cite
NPRM	03/00/2012	
Final Action	To Be Determined	

**Additional Information:** SAN No. 5411

**Regulatory Flexibility Analysis Required:** No

**Government Levels Affected:** Undetermined

**Small Entities Affected:** No

**Federalism:** No

**Included in the Regulatory Plan:** No

**Sectors Affected:** 221112 Fossil Fuel Electric Power Generation

**RIN Data Printed in the FR:** No

**Agency Contact:**

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Environmental Protection Agency  
Air and Radiation  
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Research Triangle Park, NC 27711  
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## Office of Information and Regulatory Affairs (OIRA)

## Executive Order Submissions Under Review

June 20, 2013

## Environmental Protection Agency

AGENCY: EPA-AR

RIN: [2060-AQ81](#)

TITLE: Greenhouse Gas Reporting Program: Amendments to Address Input to Emission Equation Issues

STAGE: Proposed Rule

ECONOMICALLY SIGNIFICANT: No

RECEIVED DATE: [05/16/2013](#)

LEGAL DEADLINE: None

AGENCY: EPA-AR

RIN: [2060-AR41](#)

TITLE: Protection of Stratospheric Ozone: The 2013 Critical Use Exemption from the Phaseout of Methyl Bromide

STAGE: Final Rule

ECONOMICALLY SIGNIFICANT: No

RECEIVED DATE: [05/17/2013](#)

LEGAL DEADLINE: None

AGENCY: EPA-AR

RIN: [2060-AR12](#)

TITLE: Revised Regulation for Environmental Radiation Protection Standard for Nuclear Power Operations

STAGE: Prerule

ECONOMICALLY SIGNIFICANT: No

RECEIVED DATE: [05/30/2013](#)

LEGAL DEADLINE: None

AGENCY: EPA-AR

RIN: [2060-AR85](#)

TITLE: Regulation of Fuels and Fuel Additives: Additional Qualifying Renewable Fuel Pathways under Renewable Fuel Standard Program; Addressing Invasive Species Concerns for Giant Reed and Napier Grass

STAGE: Final Rule

ECONOMICALLY SIGNIFICANT: No

RECEIVED DATE: [06/04/2013](#)

LEGAL DEADLINE: None

AGENCY: EPA-AR

RIN: [2060-AP26](#)

TITLE: National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart W: Standards for Radon Emissions From Operating Uranium Mill Tailings: Review

STAGE: Proposed Rule

ECONOMICALLY SIGNIFICANT: No

RECEIVED DATE: [06/10/2013](#)

LEGAL DEADLINE: None

AGENCY: EPA-AR

RIN: [2060-AQ07](#)

TITLE: Withdr. of the Prior Deter. or Presump. That Compl. w/CAIR or the NOx SIP Call Const. RACT or RACM for the 97 8-Hr Ozone &amp; 97Fine Part. NAAQS; &amp; Rev. to RACT Guid. &amp; RFP Req. for the 97Fine Part. NAAQS

STAGE: Proposed Rule

ECONOMICALLY SIGNIFICANT: No

RECEIVED DATE: [11/14/2011](#)

LEGAL DEADLINE: None

AGENCY: EPA-OCSPP

RIN: [2070-AJ54](#)

TITLE: Nanoscale Materials; Reporting Under TSCA Section 8(a)

STAGE: Proposed Rule

ECONOMICALLY SIGNIFICANT: No

RECEIVED DATE: [11/22/2010](#)

LEGAL DEADLINE: None

AGENCY: EPA-OCSPP

RIN: [2070-ZA17](#)

TITLE: Chemical Substances and Mixtures Used in Oil and Gas Exploration or Production; TSCA Section 21 Petition; Agency Response

STAGE: Notice

ECONOMICALLY SIGNIFICANT: No

RECEIVED DATE: [12/14/2011](#)

LEGAL DEADLINE: Statutory

AGENCY: EPA-OCSPP

RIN: [2070-AJ87](#)

TITLE: CBI: PMN Amendments Claiming Chemical and Microorganism Identity as Confidential in Data From Health and Safety Studies Submitted Under TSCA Prior to the Commencement of Manufacture

STAGE: Proposed Rule

ECONOMICALLY SIGNIFICANT: No

RECEIVED DATE: [12/27/2011](#)

LEGAL DEADLINE: None

AGENCY: EPA-OECA

RIN: [2020-AA47](#)

USCA Case #09-1198

Document #1442452

Filed: 06/20/2013

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**TITLE:** NPDES Electronic Reporting Rule**STAGE:** Proposed Rule**RECEIVED DATE:** 01/20/2012**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-OEI**RIN:** [2025-AA11](#)**TITLE:** Modification of Toxics Release Inventory (TRI) Reporting Requirements Primarily Associated With Metal Mining**STAGE:** Proposed Rule**RECEIVED DATE:** 05/13/2011**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-OPPTS**RIN:** [2070-AJ70](#)**TITLE:** Chemicals of Concern List**STAGE:** Proposed Rule**RECEIVED DATE:** 05/12/2010**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**REVIEW EXTENDED****AGENCY:** EPA-SWER**RIN:** [2050-AE51](#)**TITLE:** Modifications to RCRA Rules Associated With Solvent-Contaminated Industrial Wipes**STAGE:** Final Rule**RECEIVED DATE:** 04/23/2012**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-SWER**RIN:** [2050-AE81](#)**TITLE:** Standards for the Management of Coal Combustion Residuals Generated by Commercial Electric Power Producers**STAGE:** Notice**RECEIVED DATE:** 04/23/2013**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-SWER**RIN:** [2050-AG60](#)**TITLE:** Hazardous Waste Management System: Conditional Exclusion for Carbon Dioxide (CO2) Streams in Geological Sequestration Activities**STAGE:** Final Rule**RECEIVED DATE:** 04/24/2013**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-WATER**RIN:** [2040-ZA22](#)**TITLE:** Small Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels Less than 79 Feet**STAGE:** Notice**RECEIVED DATE:** 02/08/2013**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-WATER**RIN:** [2040-ZA11](#)**TITLE:** Clean Water Protection Guidance**STAGE:** Notice**RECEIVED DATE:** 02/21/2012**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-WATER**RIN:** [2040-ZA16](#)**TITLE:** 2012 Implementation Guidance on FAFO Regulations: CAFOs that Discharge (Pork Producer Guidance)**STAGE:** Notice**RECEIVED DATE:** 03/06/2012**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-WATER**RIN:** [2040-ZA17](#)**TITLE:** Revisions to the Nov. 22, 2002 Memorandum "Establishing TMDL Wasteload Allocations (WLAs) for Stormwater Sources and NPDES Permit Requirements Based on those WLAs"**STAGE:** Notice**RECEIVED DATE:** 03/13/2012**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-WATER**RIN:** [2040-ZA21](#)**TITLE:** NPDES Stormwater Multi-Sector General Permit (MSGP)**STAGE:** Notice**RECEIVED DATE:** 04/16/2013**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-WATER**RIN:** [2040-AC84](#)**TITLE:** National Pollutant Discharge Elimination System (NPDES): Use of Sufficiently Sensitive Test Methods for Permit Applications and Reporting**STAGE:** Final Rule**RECEIVED DATE:** 08/08/2011**ECONOMICALLY SIGNIFICANT:** No**LEGAL DEADLINE:** None**AGENCY:** EPA-WATER**RIN:** [2040-AF16](#)

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Page 2511 of 2671

6/20/2013 5:00 PM

USCA Case #09-1198

Document #1442452

Filed: 06/20/2013

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**TITLE:** Water Quality Standards Regulatory Clarifications

**STAGE:** Proposed Rule

**RECEIVED DATE:** 11/30/2011

**ECONOMICALLY SIGNIFICANT:** No

**LEGAL DEADLINE:** None

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Owner: Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>  
Filename: image001.gif  
Last Modified: Fri Jun 21 09:30:39 EDT 2013

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Could not print file content for:

Document ID: 0.7.691.151385-000002

Attachment Name: image001.gif

Locator: es:\pst\\*\vm-afb-med2\med2\_E\CW-Data\foi\140072-Custodian\_em-edid-edid9296  
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:070007c52ccc4c9b5b63caa431c55e1bb8f2e551b45a8a99a02ef3433ecaa3ba9cdd

Reason: It is an unsupported file type

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From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Kennedy, Kit <kkennedy@nrdc.org>  
Cc:  
Bcc:  
Subject: RE: Congratulations! The ABA's Environment, Energy and Resource Section Government Attorney of the Year Award  
Date: Mon Jun 24 2013 21:52:35 EDT  
Attachments:

---

Thanks Kit! It all started with that law school internship at NRDC!

---

From: Kennedy, Kit [kkennedy@nrdc.org]  
Sent: Monday, June 24, 2013 5:19 PM  
To: Michael J. Myers  
Cc: Lisa M. Burianek; Lemuel Srolovic; Lehner, Peter; Bryk, Dale  
Subject: Fwd: Congratulations! The ABA's Environment, Energy and Resource Section Government Attorney of the Year Award

Mike, congratulations! This is so well deserved!!! All the best, Kit

Begin forwarded message:

From: Lisa Burianek <lisaburianek@vzw.blackberry.net<mailto:lisaburianek@vzw.blackberry.net>>  
Date: June 24, 2013, 4:59:47 PM EDT  
To: <kkennedy@nrdc.org<mailto:kkennedy@nrdc.org>>, <plehner@nrdc.org<mailto:plehner@nrdc.org>>  
Subject: Fw: Congratulations! The ABA's Environment, Energy and Resource Section Government Attorney of the Year Award  
Reply-To: <lisaburianek@vzw.blackberry.net<mailto:lisaburianek@vzw.blackberry.net>>

Yippee!

-----Original Message-----

From: Lemuel Srolovic  
To: Environmental Protection Bureau - Albany  
To: Environmental Protection Bureau - NYC  
Subject: Congratulations! The ABA's Environment, Energy and Resource Section Government Attorney of the Year Award  
Sent: Jun 24, 2013 4:55 PM

goes to our very own Mike Myers. Congratulations, Mike!  
Lemuel M. Srolovic  
Bureau Chief  
Environmental Protection Bureau  
New York State Attorney General  
212-416-8448 (o)  
917-621-6174 (m)  
lemuel.srolovic@ag.ny.gov<mailto:lemuel.srolovic@ag.ny.gov>

Sent from my Verizon Wireless BlackBerry



---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Henderson, Kelly <khenderson@nrdc.org>  
Cc:  
Bcc:  
Subject: Accepted: Next steps on complaint  
Date: Tue Jun 25 2013 09:43:49 EDT  
Attachments:

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From: Joanne Spalding  
<joanne.spalding@sierraclub.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Morgan  
Costello </o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>; Dave Hawkins  
<dhawkins@nrdc.org>; David Doniger <ddoniger@nrdc.org>;  
Longstreth, Ben <blongstreth@nrdc.org>; Vickie Patton  
<vpatton@edf.org>; Megan Ceronsky <mceronsky@edf.org>; Ann  
Weeks <aweeks@catf.us>; Darin Schroeder <dschroeder@catf.us>  
Cc:  
Bcc:  
Subject: Fwd: Presidential Memorandum -- Power Sector Carbon Pollution Standards  
Date: Tue Jun 25 2013 15:38:32 EDT  
Attachments: 2013powersector.mem.rel.pdf

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From: White House Press Office [mailto:noreply@messages.whitehouse.gov]  
Sent: Tuesday, June 25, 2013 03:04 PM  
To: Patel, Rohan  
Subject: Presidential Memorandum -- Power Sector Carbon Pollution Standards

THE WHITE HOUSE

Office of the Press Secretary

FOR IMMEDIATE RELEASE

June 25, 2013

Attached is a memorandum from the President for the Administrator of the Environmental Protection Agency regarding Power Sector Carbon Pollution Standards.

###

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Senior Managing Attorney  
Sierra Club  
85 Second Street  
San Francisco, CA 94105  
415-977-5725 (o)  
510-612-4062 (c)

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Owner: Joanne Spalding <joanne.spalding@sierraclub.org>  
Filename: 2013powersector.mem.rel.pdf  
Last Modified: Tue Jun 25 15:38:32 EDT 2013

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THE WHITE HOUSE

Office of the Press Secretary

---

For Immediate Release

June 25, 2013

June 25, 2013

MEMORANDUM FOR THE ADMINISTRATOR OF THE  
ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: Power Sector Carbon Pollution Standards

With every passing day, the urgency of addressing climate change intensifies. I made clear in my State of the Union address that my Administration is committed to reducing carbon pollution that causes climate change, preparing our communities for the consequences of climate change, and speeding the transition to more sustainable sources of energy.

The Environmental Protection Agency (EPA) has already undertaken such action with regard to carbon pollution from the transportation sector, issuing Clean Air Act standards limiting the greenhouse gas emissions of new cars and light trucks through 2025 and heavy duty trucks through 2018. The EPA standards were promulgated in conjunction with the Department of Transportation, which, at the same time, established fuel efficiency standards for cars and trucks as part of a harmonized national program. Both agencies engaged constructively with auto manufacturers, labor unions, States, and other stakeholders, and the resulting standards have received broad support. These standards will reduce the Nation's carbon pollution and dependence on oil, and also lead to greater innovation, economic growth, and cost savings for American families.

The United States now has the opportunity to address carbon pollution from the power sector, which produces nearly 40 percent of such pollution. As a country, we can continue our progress in reducing power plant pollution, thereby improving public health and protecting the environment, while supplying the reliable, affordable power needed for economic growth and advancing cleaner energy technologies, such as efficient natural gas, nuclear power, renewables such as wind and solar energy, and clean coal technology.

Investments in these technologies will also strengthen our economy, as the clean and efficient production and use of electricity will ensure that it remains reliable and affordable for American businesses and families.

By the authority vested in me as President by the Constitution and the laws of the United States of America, and in order to reduce power plant carbon pollution, building on actions already underway in States and the power sector, I hereby direct the following:

Section 1. Flexible Carbon Pollution Standards for Power Plants. (a) Carbon Pollution Standards for Future Power Plants. On April 13, 2012, the EPA published a Notice of Proposed Rulemaking entitled "Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units," 77 Fed. Reg. 22392. In light of the information conveyed in more than two million comments on that proposal and ongoing developments in the industry, you have indicated EPA's intention to issue a new proposal. I therefore direct you to issue a new proposal by no later than September 20, 2013. I further direct you to issue a final rule in a timely fashion after considering all public comments, as appropriate.

(b) Carbon Pollution Regulation for Modified, Reconstructed, and Existing Power Plants. To ensure continued progress in reducing harmful carbon pollution, I direct you to use your authority under sections 111(b) and 111(d) of the Clean Air Act to issue standards, regulations, or guidelines, as appropriate, that address carbon pollution from modified, reconstructed, and existing power plants and build on State efforts to move toward a cleaner power sector. In addition, I request that you:

(i) issue proposed carbon pollution standards, regulations, or guidelines, as appropriate, for modified, reconstructed, and existing power plants by no later than June 1, 2014;

(ii) issue final standards, regulations, or guidelines, as appropriate, for modified, reconstructed, and existing power plants by no later than June 1, 2015; and

(iii) include in the guidelines addressing existing power plants a requirement that States submit to EPA the implementation plans required under section 111(d) of the Clean Air Act and its implementing regulations by no later than June 30, 2016.

(c) Development of Standards, Regulations, or Guidelines for Power Plants. In developing standards, regulations, or guidelines pursuant to subsection (b) of this section, and consistent with Executive Orders 12866 of September 30, 1993, as amended, and 13563 of January 18, 2011, you shall ensure, to the greatest extent possible, that you:

(i) launch this effort through direct engagement with States, as they will play a central role in establishing and implementing standards for existing power plants, and, at the same time, with leaders in the power sector, labor leaders, non-governmental organizations, other experts, tribal officials, other stakeholders, and members of the public, on issues informing the design of the program;

(ii) consistent with achieving regulatory objectives and taking into account other relevant environmental regulations and policies that affect the power sector, tailor regulations and guidelines to reduce costs;

(iii) develop approaches that allow the use of market-based instruments, performance standards, and other regulatory flexibilities;

(iv) ensure that the standards enable continued reliance on a range of energy sources and technologies;

(v) ensure that the standards are developed and implemented in a manner consistent with the continued provision of reliable and affordable electric power for consumers and businesses; and

(vi) work with the Department of Energy and other Federal and State agencies to promote the reliable and affordable provision of electric power through the continued development and deployment of cleaner technologies and by increasing energy efficiency, including through stronger appliance efficiency standards and other measures.

Sec. 2. General Provisions. (a) This memorandum shall be implemented consistent with applicable law, including international trade obligations, and subject to the availability of appropriations.

(b) Nothing in this memorandum shall be construed to impair or otherwise affect:

(i) the authority granted by law to a department, agency, or the head thereof; or

(ii) the functions of the Director of the Office of Management and Budget relating to budgetary, administrative, or legislative proposals.

(c) This memorandum is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

(d) You are hereby authorized and directed to publish this memorandum in the *Federal Register*.

BARACK OBAMA

# # #

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Joanne Spalding  
<joanne.spalding@sierraclub.org>  
Cc:  
Bcc:  
Subject: RE: Presidential Memorandum -- Power Sector Carbon Pollution Standards  
Date: Tue Jun 25 2013 15:43:10 EDT  
Attachments:

---

Thanks Joanne

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Joanne Spalding [mailto:joanne.spalding@sierraclub.org]  
Sent: Tuesday, June 25, 2013 3:39 PM  
To: Michael J. Myers; Morgan Costello; Dave Hawkins; David Doniger; Longstreth, Ben; Vickie Patton;  
Megan Ceronsky; Ann Weeks; Darin Schroeder  
Subject: Fwd: Presidential Memorandum -- Power Sector Carbon Pollution Standards

From: White House Press Office [mailto:noreply@messages.whitehouse.gov]  
Sent: Tuesday, June 25, 2013 03:04 PM  
To: Patel, Rohan  
Subject: Presidential Memorandum -- Power Sector Carbon Pollution Standards

THE WHITE HOUSE

Office of the Press Secretary

FOR IMMEDIATE RELEASE

June 25, 2013

Attached is a memorandum from the President for the Administrator of the Environmental Protection Agency regarding Power Sector Carbon Pollution Standards.

###

-----

Unsubscribe

The White House · 1600 Pennsylvania Avenue, NW · Washington DC 20500 · 202-456-1111

--

Joanne Spalding

Senior Managing Attorney

Sierra Club

85 Second Street

San Francisco, CA 94105

415-977-5725 (o)

510-612-4062 (c)

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From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Lisa Rector <lrector@nescaum.org>  
Cc:  
Bcc:  
Subject: RE: RWH call  
Date: Wed Jun 26 2013 15:18:24 EDT  
Attachments:

---

Can you call me at 9 instead? I now have a 9:30 mandatory staff meeting, which I will need to leave here at 9:20 for. Alternatively, we could talk at 10:30 or sometime in the afternoon.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Monday, June 17, 2013 2:05 PM  
To: Michael J. Myers  
Subject: RE: RWH call

Any chance we could make it earlier? Say 9 or 9:30 am?

Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org \_\_\_\_\_  
From: Michael J. Myers [Michael.Myers@ag.ny.gov]  
Sent: Monday, June 17, 2013 2:00 PM  
To: Lisa Rector  
Subject: RE: RWH call

Let's touch base next Thursday, the 27th. My schedule's wide open if you want to call me when it's convenient. I can throw at 11 a.m. as a default time.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Monday, June 17, 2013 8:56 AM

To: Lisa Rector; Jeremy Magliaro; Arthur Marin; Paul Miller; Michael J. Myers; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Cc: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RE: RWH call

Hi Everyone!

Please note that I changed the start time to 1:30 pm so that the entire group can participate.  
[<http://www.nescaum.org/NESCAUM-logo.gif>]<http://www.nescaum.org>  
Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org<mailto:lrector@nescaum.org>

---

From: Lisa Rector  
Sent: Friday, June 14, 2013 5:53 PM  
Required: Jeremy.Magliaro@ag.ny.gov; Arthur Marin; Paul Miller; Michael.Myers@ag.ny.gov; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Optional: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RWH call  
When: Monday, June 17, 2013 1:30 PM-2:00 PM.  
Where: 877-656-1761 code 127243

call to discuss issues and updates

gl 0601

---

From: Lisa Rector <lrector@nescaum.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: RWH call  
Date: Wed Jun 26 2013 21:28:22 EDT  
Attachments:

---

9 am is fine!

Lisa Rector, Senior Policy Analyst at NESCAUM  
89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306| 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org

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From: Michael J. Myers [Michael.Myers@ag.ny.gov]  
Sent: Wednesday, June 26, 2013 3:18 PM  
To: Lisa Rector  
Subject: RE: RWH call

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To: Lisa Rector  
Subject: RE: RWH call

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From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Monday, June 17, 2013 8:56 AM  
To: Lisa Rector; Jeremy Magliaro; Arthur Marin; Paul Miller; Michael J. Myers; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Cc: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RE: RWH call

Hi Everyone!

Please note that I changed the start time to 1:30 pm so that the entire group can participate.

[<http://www.nescaum.org/NESCAUM-logo.gif>]<<http://www.nescaum.org>>

Lisa Rector, Senior Policy Analyst at NESCAUM

89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax:  
617.742.9162 | lrector@nescaum.org<mailto:lrector@nescaum.org>

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From: Lisa Rector  
Sent: Friday, June 14, 2013 5:53 PM  
Required: Jeremy.Magliaro@ag.ny.gov; Arthur Marin; Paul Miller; Michael.Myers@ag.ny.gov; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Optional: Gail Landry; arthurmarin@vzw.blackberry.net  
Subject: RWH call  
When: Monday, June 17, 2013 1:30 PM-2:00 PM.  
Where: 877-656-1761 code 127243

call to discuss issues and updates

gl 0601

---

From: Joanne Spalding  
<joanne.spalding@sierraclub.org>  
To: David Doniger <ddoniger@nrdc.org>; Dave  
Hawkins <dhawkins@nrdc.org>; Megan Ceronsky  
<mceronsky@edf.org>; Vickie Patton <vpatton@edf.org>;  
Longstreth, Ben <blongstreth@nrdc.org>; Ann Weeks  
<aweeks@catf.us>; Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Morgan  
Costello </o=lawnet/ou=first administrative  
group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: Fwd: Van Ness letter  
Date: Mon Jul 01 2013 02:07:58 EDT  
Attachments: VanNess June 27 analysis.pdf

---

FYI

--

Joanne Spalding  
Senior Managing Attorney  
Sierra Club  
85 Second Street  
San Francisco, CA 94105  
415-977-5725 (o)  
510-612-4062 (c)

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Owner: Joanne Spalding <joanne.spalding@sierraclub.org>  
Filename: VanNess June 27 analysis.pdf  
Last Modified: Mon Jul 01 02:07:58 EDT 2013

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**Alert**

| JUNE 27, 2013

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Feldman**

## EPA Regulation of Greenhouse Gas Emissions from Existing Power Plants: Issues and Options

*Kyle Danish, Stephen Fotis, Doug Smith, and Ilan Gutherz*

In his June 25<sup>th</sup> speech on climate policy, President Obama announced that he will direct the Environmental Protection Agency (EPA) to use its existing authorities under the Clean Air Act to develop greenhouse gas (GHG) emission standards for power plants.

The President described this regulation as one plank in an overall plan to meet a commitment made by his administration in international climate negotiations: a reduction in U.S. GHG emissions of 17 percent from 2005 levels by 2020.

Given that existing power plants account for approximately a third of U.S. GHG emissions, it would be difficult to meet the Obama Administration's objective without addressing power sector emissions in some way. However, setting GHG emission standards for existing power plants under the Clean Air Act is far from straightforward. What follows is a review of some of the key issues and options for setting these regulations.

### REGULATION OF POWER PLANTS UNDER SECTION 111 OF THE CLEAN AIR ACT

The EPA is expected to regulate power plant GHG emissions under section 111 of the Clean Air Act, which authorizes EPA and the States to set "standards of performance" for emissions from major emitting facilities. Indeed, EPA has already proposed GHG performance standards for *new* power plants under section 111(b). (See our March 2012 issue alert: <http://www.vnf.com/news-alerts-696.html>.) A Presidential Memorandum issued concurrently with the President's speech (see <http://www.whitehouse.gov/the-press-office/2013/06/25/presidential-memorandum-power-sector-carbon-pollution-standards>) directs EPA to *revise* its proposed rule for new power plants in light of the comments received and to issue a new proposal by September 20, 2013.

The Presidential Memorandum further directs EPA to develop GHG emission standards for *existing* power plants, and for modified and reconstructed power plants, on a more extended schedule, with EPA issuance of proposed rules by June 1, 2014, and issuance of final rules by June 1, 2015.

Section 111(d) authorizes EPA to regulate existing sources of certain air pollutants that are not regulated under other sections of the Clean Air Act. Section 111(d) directs EPA to require States to develop plans that establish performance standards for such sources. The State plans are subject to approval by EPA.

Previously, EPA established a generic procedure to carry out this Federal-State regulatory process. Under this procedure, EPA develops an "emission guideline," which sets a benchmark for State performance standards. State plans generally must be "no less stringent" than the EPA-set emission guideline, but States have some



leeway to tailor their plans to in-State conditions.

The EPA procedure establishes a multi-year process under which the agency develops the emission guidelines, States develop and submit plans, EPA reviews and approves the plans, and regulated sources comply with approved State plans by certain deadlines. The President’s June 25<sup>th</sup> Memorandum calls for EPA to finalize the guidelines by June 1, 2015 and to require States to submit plans for implementing the federal guidelines by June 30, 2016. The Memorandum does not specify a deadline by which regulated power plants must comply with the standards.

### ISSUES WITH SECTION 111 REGULATION OF EXISTING POWER PLANTS

**Authority to Regulate.** EPA faces a threshold issue: Can the agency even regulate existing power plants under section 111(d)?

During amendments to the Clean Air Act in 1990, the Senate and the House of Representatives passed different versions of amendments to section 111(d). In the rush to finalize the massive bill, the House-Senate conference did not reconcile the two versions, and – in an unusual outcome – both became part of the bill that was signed into law.

The Senate language alone would allow EPA to regulate GHGs from existing power plants. The House language, on the other hand, prohibits EPA from regulating a category of facilities that EPA already is regulating under section 112 of the statute, which addresses air toxic emissions. Because EPA has issued a final rule regulating toxic emissions from power plants – the Mercury and Air Toxics Standards Rule (*see our December 2011 issue alert: <http://www.vnf.com/news-alerts-661.html>*) – the House language, if read literally, would preclude section 111(d) regulation of power plants.

Lacking clear guidance from Congress, EPA has interpreted the House and Senate amendments to section 111(d) in a manner that allows EPA to regulate GHGs from existing power plants and other existing stationary sources. The extent to which a court would defer to this interpretation is a question the agency will face if it moves forward on regulation under section 111(d).

**Setting the “Emission Guideline.”** Assuming that EPA may regulate under section 111(d), it faces another set of questions in setting the “emission guideline” for State plans. EPA regulations provide for setting a guideline that “reflects the application of the best system of emission reduction (considering the cost of such reduction) that has been adequately demonstrated” for sources within the regulated category.

EPA’s conventional approach to setting emission guidelines and performance standards under section 111 has been to look at systems of emission control technologies that can be implemented *at the facility*. However, that approach is complicated in the context of GHG emissions because direct control technology for GHG emissions (such as carbon capture and sequestration) is not now commercially viable. Some units may be able to reduce emissions with plant efficiency improvements, co-firing with natural gas or biomass, or fuel switching, but others may lack any



feasible at-the-plant options. Given these constraints, emission guidelines developed based solely on consideration of at-the-plant measures may produce limited emission reductions.

Some environmental groups are advocating that the EPA take a different and more ambitious approach to setting the emission guideline for existing plants. Under this alternative approach, the benchmark would be based on a “system of emission reduction” that not only considers measures that can be implemented at an individual plants, but also considers offsite measures that can be implemented *across the entire power sector*. These other measures could include, for instance, additions of renewable or possibly nuclear generation resources, as well as programs that promote more efficient use of energy in homes, buildings, and manufacturing.

By assuming the availability of a much broader range of “beyond the fence” measures, some environmental groups have urged the adoption of stringent GHG emission guidelines that fossil-fueled plants may not be able to achieve through improved efficiency or other on-site measures alone. For example, the Natural Resources Defense Council (NRDC) has published one such proposal (*see <http://www.nrdc.org/air/pollution-standards/files/pollution-standards-report.pdf>*).

**Means of Compliance.** In addition to establishing GHG emission guidelines, EPA will likely need to provide guidance on the range of measures States may allow power plants to use in order to demonstrate compliance. For instance, could a State permit use of “beyond the fence” measures to establish compliance even if such measures were not the basis for the EPA-set emission guideline? Could a State provide for market-based compliance mechanisms such as inter-unit averaging, trading, and banking? Could a State with a pre-existing GHG regulatory program for power plants rely on that program for compliance, provided it is “no less stringent” than the EPA-set guideline?

The June 25<sup>th</sup> Presidential Memorandum does not identify a clear preference for one policy approach or another. The Memorandum does direct EPA to “develop approaches that allow the use of market-based instruments, performance standards, and other regulatory flexibilities” and “ensure that the rules enable continued reliance on a range of energy sources and technologies.” However, the Memorandum does not make clear whether EPA should consider the availability of market-based measures in determining the stringency of the emission guideline (potentially resulting in a much more stringent guideline) or should simply consider allowing States the flexibility to adopt such approaches in meeting a guideline otherwise based on systems of emission reductions that can be implemented directly at the plant (implying a relatively less stringent guideline).

Virtually any program EPA adopts will be subject to legal uncertainty. There is little or no instructive judicial precedent on implementation of section 111(d). The extent to which a court would defer to EPA on its interpretations of the key statutory terms is unclear.

The various regulatory approaches also raise a host of design questions. For example, how can energy efficiency program activities be translated into GHG emission reductions for purposes of supporting a Clean Air Act



compliance determination? Many end-use energy efficiency programs are in operation throughout the country, but adapting these program structures to be part of an enforceable GHG regulatory regime could involve significant work.

***Regulation of Modified and Reconstructed Plants.*** GHG emissions from existing power plants that are modified or reconstructed would be regulated by EPA under section 111(b), not section 111(d). The standards of performance adopted for modified or reconstructed plants may be different from those promulgated for either new or existing units. The schedule of rulemakings for addressing modified sources is the same as that for the rulemakings on existing sources – with a proposed rule by June 2014, and a final rule by June 2015.

The performance standards to be established for modified and reconstructed power plants will become applicable to those existing plants that undertake major construction projects after the date that the EPA issues its proposal to establish those standards (which could be as early as June 2014). It may be necessary for companies undertaking major projects at existing power plants after June 2014 to document that those projects do not result in a GHG emissions increase that would trigger the application of new GHG performance standards for those plants.

## CONCLUSION

Because GHG emissions from power plants represent a major portion of U.S. emissions, pursuing regulation of the electric power sector is likely to be a significant part of the President's new climate policy. However, EPA will have to resolve a number of legal and policy design issues as it moves forward with GHG performance standards for existing power plants. The Presidential Memorandum directs EPA to conduct a rigorous process to engage with States, the power sector, labor and other stakeholders in designing these policies.

## FOR MORE INFORMATION

For more information on the issue of GHG standards for power plants or for assistance in engaging in these forthcoming regulatory processes, please contact [Kyle Danish](#), [Stephen Fotis](#) or any member of the firm's [Environment](#) or [Climate Change](#) practices at (202) 298-1800. Van Ness Feldman is active on the range of Federal and State activities relating to climate change, air quality, and energy policy. Van Ness Feldman has been recognized by *Chambers USA*, *Chambers Global*, *Legal 500*, and *U.S. News / Best Lawyers* for its Energy, Environment, Government Relations, and other related practice areas. The firm's Climate Change practice has received *Chambers USA's* Band One recognition, one of only five firms in the country to receive this honor.

*In February 2012, Van Ness Feldman expanded its capabilities by combining practices with the Seattle law firm of GordonDerr LLP, a preeminent real estate, land use, water law, and civil litigation firm in the Pacific Northwest. Learn more at [www.vnf.com](http://www.vnf.com).*

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: joanne.spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>  
Cc:  
Bcc:  
Subject: Accepted: Invitation: Power plant NSPS call @ Tue Jul 2, 2013 1pm - 1:30pm (joanne.  
spalding@sierraclub.org)  
Date: Tue Jul 02 2013 13:04:24 EDT  
Attachments:

---

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Peter Iwanowicz  
<peter.iwanowicz@lung.org>  
Cc: Vickie Patton (vpatton@edf.org)  
<vpatton@edf.org>  
Bcc:  
Subject: RE: AGs' Tier 3 letter  
Date: Tue Jul 02 2013 14:41:54 EDT  
Attachments:

---

Thanks. Here's the link to our press release:

<http://www.ag.ny.gov/press-release/ag-schneiderman-and-city-and-state-coalition-urge-adoption-national-air-pollution>

cc'ing Vickie so she's aware also.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Peter Iwanowicz [mailto:Peter.Iwanowicz@lung.org]  
Sent: Tuesday, July 02, 2013 1:44 PM  
To: Michael J. Myers  
Subject: Re: Tier 3 letter

Great letter. Send along links so that we can amplify through social media.

Peter

Sent from my iPad

On Jul 2, 2013, at 11:30 AM, "Michael J. Myers" <Michael.Myers@ag.ny.gov> wrote:

Attached. On behalf of 13 AGs and 2 corp. counsels. We're issuing a release in a few minutes. Hope your summer's going well.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

<AG Tier 3 Letter final.pdf>

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Vickie Patton <vpatton@edf.org>; Peter  
Iwanowicz <peter.iwanowicz@lung.org>  
Cc:  
Bcc:  
Subject: RE: Cleaner Cars for America  
Date: Tue Jul 02 2013 14:54:41 EDT  
Attachments:

---

Great stuff, thanks both

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Vickie Patton [mailto:vpatton@edf.org]  
Sent: Tuesday, July 02, 2013 2:45 PM  
To: Michael J. Myers; 'Peter Iwanowicz'  
Subject: FW: Cleaner Cars for America

Hi Mike, Peter – Thank you both. EDF submitted technical comments last night, issued this backgrounder this morning, and our members submitted over 45,000 supportive comments. Best wishes, Vickie

From: Vickie Patton  
Sent: Tuesday, July 02, 2013 8:55 AM  
To: Vickie Patton  
Subject: Cleaner Cars for America

Dear Journalist,

As we approach the Fourth of July weekend, our nation is moving forward in advancing energy security through cleaner cars that will double our fleetwide fuel economy by model year 2025 and cut carbon pollution by 6 billion tons, break our dependence on oil, and save families hard-earned money at the gas pump while protecting our children from particulate and smog-forming pollution.

The public comment period closed yesterday on the final pillar of the nation's integrated multipollutant clean car standards that protect human health through a "systems" approach of cleaner vehicles and cleaner fuels: EPA's "tier 3" emission standards for particulates and smog-forming emissions and cleaner low sulfur gasoline.

There is extensive, broad support for EPA's clean air standards.

In yesterday's public comments – pertinent excerpts below –the Alliance of Automobile Manufacturers, the United Auto Workers, leading public health organizations, and a coalition of businesses expressed their strong support for EPA's clean air standards, as did tens of thousands of concerned citizens. Indeed, as noted below, the automakers highlighted the "Day One" clean air benefits of cleaner low sulfur gasoline "immediately reducing emissions from every gasoline-powered vehicle on our roads, no matter how old."

The diverse interests that are working together to achieve cleaner cars for a healthier and stronger America provide much to celebrate this Fourth of July.

Best wishes,

Vickie Patton

General Counsel

Environmental Defense Fund, 720-837-6239

Alliance of Automobile Manufacturers and Association of Global Automakers

"Sulfur inhibits the catalytic converter's ability to reduce vehicle emissions, so lower sulfur at the pump means fewer exhaust emissions in the air. And because lower sulfur reduces emissions from all vehicles, the proposed sulfur reductions would achieve Day One benefits, immediately reducing emissions from every gasoline-powered vehicle on our roads, no matter how old."

<http://www.autoalliance.org/index.cfm?objectid=359B3CB0-E285-11E2-8898000C296BA163>.

United Auto Workers (UAW)

"[Tier 3] standards will create jobs and are estimated to prevent thousands of deaths each year, in turn

providing billions of dollars in public healthcare savings.”

“We call for an immediate finalization of the proposed Tier 3 rules and the use of similar widely-beneficial regulations to ensure our commitment to creating the next generation of clean and efficient vehicles.”

<http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2011-0135-2184>

The American Academy of Pediatrics, the American Heart Association, the American Lung Association, the American Public Health Association, the American Thoracic Society, the Asthma and Allergy Foundation of America, Trust for America’s Health, Healthcare Without Harm, and the National Association of City and County Health Officials

“These standards are urgently needed and will help protect the health of millions of Americans who continue to breathe unsafe air.”

“Abundant scientific evidence exists on the health effects of ozone, particulate matter and other pollutants from tailpipe exhaust. Tier 3 standards will be effective tools to reduce such pollution and improve air quality.”

American Lung Association (ALA)

“We applaud the Environmental Protection Agency for proposing cleaner gasoline and vehicle standards, also known as Tier 3, that will cut life-threatening tailpipe pollution from cars, light trucks and SUVs..”

<http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2011-0135-4177>

Business for Innovative Climate and Energy Policy (BICEP)

“As major U.S. businesses, we are writing to voice our strong support for the proposed Tier 3 Motor Vehicle Emission and Fuel Standards. These standards are the most cost effective way to reduce harmful emissions of carbon monoxide, nitrogen oxide, and volatile organic compounds, which contribute to smog and soot, cause respiratory and heart disease, and drive up healthcare costs. Furthermore, Tier 3 will result in net economic gains and job growth, and reduce health care costs.”

<http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2011-0135-3467>

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---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Sean Donahue <sean@donahuegoldberg.com>; Andrew G. Frank </o=lawnet/ou=first administrative group/cn=recipients/cn=andrewfrank>; Simon Heller </o=lawnet/ou=first administrative group/cn=recipients/cn=sheller>  
Cc:  
Bcc:  
Subject: RE: CSAPR Cert -- Call with DOJ proposed -- Tuesday, July 9 2 PM Eastern Work  
Date: Wed Jul 03 2013 09:37:53 EDT  
Attachments:

---

I'm available then.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Sean Donahue [mailto:sean@donahuegoldberg.com]  
Sent: Tuesday, July 02, 2013 6:20 PM  
To: Brendan Collins; McKinstry, Robert (Phila); james.rubin@snrdenton.com; Michael J. Myers; Andrew G. Frank; George Hays; Josh Stebbins; Graham McCahan; ddoniger@nrdc.org; Davis, Emily; dmarshall@catf.us  
Subject: CSAPR Cert -- Call with DOJ proposed -- Tuesday, July 9 2 PM Eastern Work

Hi All,

Joe indicates that Tuesday, July 9 at 2 PM Eastern would work for him and the ENDR attorneys as a time to discuss merits briefing. Does that work for those of you interested in participating in such a preliminary discussion?

-Sean

--  
Sean H. Donahue  
Donahue & Goldberg, LLP  
2000 L St., NW Suite 808  
Washington, DC 20036  
Tel: (202) 277-7085  
Fax: (202) 315-3582

NOTICE

This e-mail message is intended only for the named recipient(s) above. It may contain confidential information that is privileged or that constitutes attorney work product. If you are not the intended recipient, any dissemination, distribution or copying of this e-mail and any attachments is prohibited. If you have received this e-mail in error, please immediately notify me at (202) 277-7085 or by replying to this e-mail and delete the message and any attachment(s) from your system.

Thank you.

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Lisa Rector <lrector@nescaum.org>  
Cc:  
Bcc:  
Subject: RE: call tomorrow at 1 pm EDT?  
Date: Mon Jul 08 2013 13:15:46 EDT  
Attachments:

---

I am as well

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Jeremy Magliaro  
Sent: Monday, July 08, 2013 1:10 PM  
To: 'Lisa Rector'  
Cc: Michael J. Myers  
Subject: RE: call tomorrow at 1 pm EDT?

I'm available, Lisa.

-----Original Message-----

From: Lisa Rector [mailto:lrector@nescaum.org]  
Sent: Monday, July 08, 2013 10:48 AM  
To: Jeremy Magliaro; Arthur Marin; Paul Miller; Michael J. Myers; tcarbonell@edf.org; vpatton@edf.org; Janice.Nolen@lung.org; David Baron  
Subject: call tomorrow at 1 pm EDT?

Are folks available for a call tomorrow (Tues, 7/9) at 1 pm EDT to discuss the NSPS?

[<http://www.nescaum.org/NESCAUM-logo.gif>]<http://www.nescaum.org>

Lisa Rector, Senior Policy Analyst at NESCAUM

89 South Street, Suite 602, Boston, Massachusetts, 02111 | 802.899.5306 | 617.259.2095 | Fax: 617.742.9162 | [lrector@nescaum.org](mailto:lrector@nescaum.org)<<mailto:lrector@nescaum.org>>

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: BACT GHG call with interns and EDF  
Date: Fri Jul 12 2013 14:01:50 EDT  
Attachments:

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StartTime: Mon Jul 15 15:00:00 Eastern Daylight Time 2013  
EndTime: Mon Jul 15 15:30:00 Eastern Daylight Time 2013  
Location:  
Recurring: No  
ShowReminder: No  
Accepted: No

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Ann Weeks <aweeks@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>; Doniger, David <ddoniger@nrdc.org>; Craig Segall - Sierra <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben <blongstreth@nrdc.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; Darin Schroeder <dschroeder@catf.us>; David McCabe <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; Peter Zalzal <pzalzal@edf.org>; Tomas Carbonell <tcarbonell@edf.org>; Mordick, Briana <bmordick@nrdc.org>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; Timothy Ballo <tballo@earthjustice.org>; Hoffer, Melissa (AGO) <melissa.hoffer@state.ma.us>  
Bcc:  
Subject: Oil and Gas NSPS/Meeting Reschedule  
Date: Mon Jul 15 2013 10:59:11 EDT  
Attachments:

---

All, I've heard back from Joe that they won't be ready to meet with us on the 29th and need until the week of Aug. 5 to be in position to have a productive discussion. I know that means that several of us will be unable to participate, but we should try and push this forward with whomever is available. Meleah said that she could probably do a meeting (at least by phone) on Aug. 8 or 9, so why don't folks let me know their availabilities for those days and we can go from there. Thanks.--Mike

---

From: Alan Belenz </o=lawnet/ou=first  
administrative group/cn=recipients/cn=abelenz>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Mon Jul 15 2013 11:00:13 EDT  
Attachments:

---

Open both dates oh greater scheduler

-----Original Message-----

From: Michael J. Myers  
Sent: Monday, July 15, 2013 10:59 AM  
To: 'Ann Weeks'; 'Geertsma, Meleah'; 'Doniger, David'; 'Craig Segall - Sierra'  
Cc: 'Longstreth, Ben'; Joanne.Spalding@sierraclub.org; 'Darin Schroeder'; 'David McCabe'; dlyon@edf.org; 'Peter Zalzal'; 'Tomas Carbonell'; 'Mordick, Briana'; Morgan Costello; Alan Belenz; 'Timothy Ballo'; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us)  
Subject: Oil and Gas NSPS/Meeting Reschedule

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---

From: Longstreth, Ben <blongstreth@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Mon Jul 15 2013 11:02:08 EDT  
Attachments:

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Hi Mike, I'll be up in Maine but can probably participate by phone. - Ben

-----Original Message-----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, July 15, 2013 10:59 AM  
To: 'Ann Weeks'; Geertsma, Meleah; Doniger, David; 'Craig Segall - Sierra'  
Cc: Longstreth, Ben; Joanne.Spalding@sierraclub.org; 'Darin Schroeder'; 'David McCabe'; dlyon@edf.org; 'Peter Zalzal'; 'Tomas Carbonell'; Mordick, Briana; Morgan Costello; Alan Belenz; 'Timothy Ballo'; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us)  
Subject: Oil and Gas NSPS/Meeting Reschedule

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---

From: Timothy Ballo <tballo@earthjustice.org>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Mon Jul 15 2013 11:04:19 EDT  
Attachments:

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Mike,

I'm available anytime on the 9th, but could only do 4pm or later on the 8th. Thanks for coordinating this.

-Tim

-----Original Message-----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, July 15, 2013 10:59 AM  
To: 'Ann Weeks'; 'Geertsma, Meleah'; 'Doniger, David'; 'Craig Segall - Sierra'  
Cc: 'Longstreth, Ben'; Joanne.Spalding@sierraclub.org; 'Darin Schroeder'; 'David McCabe'; dlyon@edf.org; 'Peter Zalzal'; 'Tomas Carbonell'; 'Mordick, Briana'; Morgan Costello; Alan Belenzs; Timothy Ballo; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us)  
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---

From: Doniger, David <ddoniger@nrdc.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; aweeks@catf.us <aweeks@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>; craig.segall@sierraclub.org <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben <blongstreth@nrdc.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; dschroeder@catf.us <dschroeder@catf.us>; dmccabe@catf.us <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; pzalzal@edf.org <pzalzal@edf.org>; tcarbonell@edf.org <tcarbonell@edf.org>; Mordick, Briana <bmordick@nrdc.org>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; tballo@earthjustice.org <tballo@earthjustice.org>; melissa.hoffer@state.ma.us <melissa.hoffer@state.ma.us>  
Bcc:  
Subject: Re: Oil and Gas NSPS/Meeting Reschedule  
Date: Mon Jul 15 2013 11:39:09 EDT  
Attachments:

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I will probably be able to phone in also, from MN.  
David Doniger  
NRDC  
202 321-3435

----- Original Message -----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, July 15, 2013 07:59 AM  
To: 'Ann Weeks' <aweeks@catf.us>; Geertsma, Meleah; Doniger, David; 'Craig Segall - Sierra' <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben; Joanne.Spalding@sierraclub.org <Joanne.Spalding@sierraclub.org>; 'Darin Schroeder' <dschroeder@catf.us>; 'David McCabe' <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; 'Peter Zalzal' <pzalzal@edf.org>; 'Tomas Carbonell' <tcarbonell@edf.org>; Mordick, Briana; Morgan Costello <Morgan.Costello@ag.ny.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; 'Timothy Ballo' <tballo@earthjustice.org>; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us) <melissa.hoffer@state.ma.us>  
Subject: Oil and Gas NSPS/Meeting Reschedule

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---

From: Hoffer, Melissa (AGO)  
<melissa.hoffer@state.ma.us>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Mon Jul 15 2013 16:59:43 EDT  
Attachments:

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Both of those dates work for me, Mike. Thanks.

Melissa

-----Original Message-----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, July 15, 2013 10:59 AM  
To: 'Ann Weeks'; 'Geertsma, Meleah'; 'Doniger, David'; 'Craig Segall - Sierra'  
Cc: 'Longstreth, Ben'; Joanne.Spalding@sierraclub.org; 'Darin Schroeder'; 'David McCabe'; dlyon@edf.org; 'Peter Zalzal'; 'Tomas Carbonell'; 'Mordick, Briana'; Morgan Costello; Alan Belenz; 'Timothy Ballo'; Hoffer, Melissa (AGO)  
Subject: Oil and Gas NSPS/Meeting Reschedule

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---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>;  
aweeks@catf.us <aweeks@catf.us>; Geertsma, Meleah  
<mgeertsma@nrdc.org>; craig.segall@sierraclub.org  
<craig.segall@sierraclub.org>  
Cc: Longstreth, Ben <blongstreth@nrdc.org>;  
Joanne.Spalding@sierraclub.org  
<joanne.spalding@sierraclub.org>; dschroeder@catf.us  
<dschroeder@catf.us>; dmccabe@catf.us <dmccabe@catf.us>;  
dlyon@edf.org <dlyon@edf.org>; pzalzal@edf.org  
<pzalzal@edf.org>; tcarbonell@edf.org <tcarbonell@edf.org>;  
Mordick, Briana <bmordick@nrdc.org>; Morgan Costello  
</o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz  
</o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; tballo@earthjustice.org  
<tballo@earthjustice.org>; melissa.hoffer@state.ma.us  
<melissa.hoffer@state.ma.us>  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Thu Jul 18 2013 12:10:45 EDT  
Attachments:

---

Joe and company have suggested 2-3 pm eastern on the 8th or 9th. Can folks weigh in with which date works better. I'll be out for a couple of days, so will ask Morgan to circle back to Joe's secretary when the votes are in. Thanks.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Doniger, David [mailto:ddoniger@nrdc.org]  
Sent: Monday, July 15, 2013 11:39 AM  
To: Michael J. Myers; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us';  
'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan  
Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
Subject: Re: Oil and Gas NSPS/Meeting Reschedule

I will probably be able to phone in also, from MN.  
David Doniger  
NRDC  
202 321-3435

----- Original Message -----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, July 15, 2013 07:59 AM  
To: 'Ann Weeks' <aweeks@catf.us>; Geertsma, Meleah; Doniger, David; 'Craig Segall - Sierra' <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben; Joanne.Spalding@sierraclub.org <Joanne.Spalding@sierraclub.org>; 'Darin Schroeder' <dschroeder@catf.us>; 'David McCabe' <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; 'Peter Zalzal' <pzalzal@edf.org>; 'Tomas Carbonell' <tcarbonell@edf.org>; Mordick, Briana; Morgan Costello <Morgan.Costello@ag.ny.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; 'Timothy Ballo' <tballo@earthjustice.org>; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us) <melissa.hoffer@state.ma.us>  
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To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; aweeks@catf.us <aweeks@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>; craig.segall@sierraclub.org <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben <blongstreth@nrdc.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; dschroeder@catf.us <dschroeder@catf.us>; dmccabe@catf.us <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; pzalzal@edf.org <pzalzal@edf.org>; tcarbonell@edf.org <tcarbonell@edf.org>; Mordick, Briana <bmordick@nrdc.org>; Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; tballo@earthjustice.org <tballo@earthjustice.org>; melissa.hoffer@state.ma.us <melissa.hoffer@state.ma.us>  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Thu Jul 18 2013 12:37:15 EDT  
Attachments:

---

I will be out of town, but can call in.

David D. Doniger  
Policy Director, Climate and Clean Air Program  
Natural Resources Defense Council  
1152 15th Street, NW, Suite 300  
Washington, DC 20005

Phone: (202) 289-2403  
Cell: (202) 321-3435  
Fax: (202) 289-1060  
ddoniger@nrdc.org  
on the web at [www.nrdc.org](http://www.nrdc.org)  
read my blog: <http://switchboard.nrdc.org/blogs/ddoniger/>

-----Original Message-----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Thursday, July 18, 2013 12:11 PM  
To: Doniger, David; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; 'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
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Michael J. Myers

Chief, Affirmative Litigation Section  
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Sent: Monday, July 15, 2013 11:39 AM  
To: Michael J. Myers; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
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Subject: Re: Oil and Gas NSPS/Meeting Reschedule

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202 321-3435

----- Original Message -----

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Sent: Monday, July 15, 2013 07:59 AM  
To: 'Ann Weeks' <aweeks@catf.us>; Geertsma, Meleah; Doniger, David; 'Craig Segall - Sierra' <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben; Joanne.Spalding@sierraclub.org <Joanne.Spalding@sierraclub.org>; 'Darin Schroeder' <dschroeder@catf.us>; 'David McCabe' <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; 'Peter Zalzal' <pzalzal@edf.org>; 'Tomas Carbonell' <tcarbonell@edf.org>; Mordick, Briana; Morgan Costello <Morgan.Costello@ag.ny.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; 'Timothy Ballo' <tballo@earthjustice.org>; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us) <melissa.hoffer@state.ma.us>  
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---

From: Timothy Ballo <tballo@earthjustice.org>  
To: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Fri Jul 19 2013 12:00:20 EDT  
Attachments:

---

Morgan,

I'm free 2-3 on the 9th, but in a meeting then on the 8th. Thanks.

-Tim

-----Original Message-----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Thursday, July 18, 2013 12:11 PM  
To: 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us';  
'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan  
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Environmental Protection Bureau  
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Sent: Monday, July 15, 2013 07:59 AM  
To: 'Ann Weeks' <aweeks@catf.us>; Geertsma, Meleah; Doniger, David; 'Craig Segall - Sierra' <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben; Joanne.Spalding@sierraclub.org <Joanne.Spalding@sierraclub.org>; 'Darin Schroeder' <dschroeder@catf.us>; 'David McCabe' <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; 'Peter Zalzal' <pzalzal@edf.org>; 'Tomas Carbonell' <tcarbonell@edf.org>; Mordick, Briana; Morgan Costello <Morgan.Costello@ag.ny.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; 'Timothy Ballo' <tballo@earthjustice.org>; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us) <melissa.hoffer@state.ma.us>  
Subject: Oil and Gas NSPS/Meeting Reschedule

All, I've heard back from Joe that they won't be ready to meet with us on the 29th and need until the week of Aug. 5 to be in position to have a productive discussion. I know that means that several of us will be unable to participate, but we should try and push this forward with whomever is available. Meleah said that she could probably do a meeting (at least by phone) on Aug. 8 or 9, so why don't folks let me know their availabilities for those days and we can go from there. Thanks.--Mike

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From: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Doniger, David <dtoniger@nrdc.org>; aweeks@catf.us <aweeks@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>; craig.segall@sierraclub.org <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben <blongstreth@nrdc.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; dschroeder@catf.us <dschroeder@catf.us>; dmccabe@catf.us <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; pzalzal@edf.org <pzalzal@edf.org>; tcarbonell@edf.org <tcarbonell@edf.org>; Mordick, Briana <bmordick@nrdc.org>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; tballo@earthjustice.org <tballo@earthjustice.org>; melissa.hoffer@state.ma.us <melissa.hoffer@state.ma.us>  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Fri Jul 19 2013 12:44:50 EDT  
Attachments:

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Morgan A. Costello  
Assistant Attorney General  
New York State Office of the Attorney General  
Environmental Protection Bureau  
The Capitol  
Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

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Sent: Thursday, July 18, 2013 12:11 PM  
To: 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; 'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
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Environmental Protection Bureau

New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

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Sent: Monday, July 15, 2013 11:39 AM  
To: Michael J. Myers; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; 'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
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David Doniger  
NRDC  
202 321-3435

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From: Joanne Spalding  
<joanne.spalding@sierraclub.org>  
To: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Cc: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>; Doniger,  
David <ddoniger@nrdc.org>; aweeks@catf.us <aweeks@catf.us>;  
Geertsma, Meleah <mgeertsma@nrdc.org>;  
craig.segall@sierraclub.org <craig.segall@sierraclub.org>;  
Longstreth, Ben <blongstreth@nrdc.org>; dschroeder@catf.us  
<dschroeder@catf.us>; dmccabe@catf.us <dmccabe@catf.us>;  
dlyon@edf.org <dlyon@edf.org>; pzalzal@edf.org  
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Mordick, Briana <bmordick@nrdc.org>; Alan Belenz  
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group/cn=recipients/cn=abelenz>; tballo@earthjustice.org  
<tballo@earthjustice.org>; melissa.hoffer@state.ma.us  
<melissa.hoffer@state.ma.us>  
Bcc:  
Subject: Re: Oil and Gas NSPS/Meeting Reschedule  
Date: Fri Jul 19 2013 13:27:06 EDT  
Attachments:

---

I'm available by phone.

On Fri, Jul 19, 2013 at 9:44 AM, Morgan Costello <Morgan.Costello@ag.ny.gov> wrote:

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michael.myers@ag.ny.gov

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Joanne Spalding  
Senior Managing Attorney  
Sierra Club

85 Second Street  
San Francisco, CA 94105  
415-977-5725 (o)  
510-612-4062 (c)

CONFIDENTIAL LEGAL COMMUNICATION/WORK PRODUCT

This e-mail may contain privileged and confidential attorney-client communications and/or confidential attorney work product. If you receive this e-mail inadvertently, please reply and notify the sender and delete all versions on your system. Thank you.

---

From: Geertsma, Meleah <mgeertsma@nrdc.org>  
To: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Fri Jul 19 2013 13:27:33 EDT  
Attachments:

---

I'm still available on the 9th, likely by phone.

---

From: Morgan Costello [Morgan.Costello@ag.ny.gov]  
Sent: Friday, July 19, 2013 11:44 AM  
To: Michael J. Myers; Doniger, David; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; 'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
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To: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Doniger, David <ddoniger@nrdc.org>; aweeks@catf.us <aweeks@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>; craig.segall@sierraclub.org <craig.segall@sierraclub.org>  
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Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Fri Jul 19 2013 14:42:57 EDT  
Attachments:

---

Thanks Morgan, that time works for Peter Zalzal and me. Best,

Tomás

-----Original Message-----

From: Morgan Costello [mailto:Morgan.Costello@ag.ny.gov]  
Sent: Friday, July 19, 2013 12:45 PM  
To: Michael J. Myers; 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; David Lyon; Peter Zalzal; Tomas Carbonell; Mordick, Briana; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
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unauthorized and may be illegal.

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Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Fri Jul 19 2013 14:48:23 EDT  
Attachments:

---

Ok, I have confirmed with EPA that we are available on Aug. 9 from 2-3 pm eastern time.

Morgan A. Costello  
Assistant Attorney General  
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Assistant Attorney General  
New York State Office of the Attorney General Environmental Protection Bureau The Capitol Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

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Sent: Thursday, July 18, 2013 12:11 PM  
To: 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; 'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
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New York State Attorney General  
The Capitol  
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(518) 402-2594  
michael.myers@ag.ny.gov

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To: Michael J. Myers; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
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Cc: Longstreth, Ben; Joanne.Spalding@sierraclub.org <Joanne.Spalding@sierraclub.org>; 'Darin Schroeder' <dschroeder@catf.us>; 'David McCabe' <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; 'Peter Zalzal' <pzalzal@edf.org>; 'Tomas Carbonell' <tcarbonell@edf.org>; Mordick, Briana; Morgan Costello <Morgan.Costello@ag.ny.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; 'Timothy Ballo' <tballo@earthjustice.org>; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us) <melissa.hoffer@state.ma.us>

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---

From: Hoffer, Melissa (AGO)  
<melissa.hoffer@state.ma.us>  
To: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Fri Jul 19 2013 16:47:48 EDT  
Attachments:

---

Many thanks, and for your good work on the brief, as well.

Melissa

From: Morgan Costello [mailto:Morgan.Costello@ag.ny.gov]  
Sent: Friday, July 19, 2013 2:48 PM  
To: 'Tomas Carbonell'; Michael J. Myers; 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
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To: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>; tcarbonell@edf.org <tcarbonell@edf.org>; Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; aweeks@catf.us <aweeks@catf.us>; Geertsma, Meleah <mgeertsma@nrdc.org>; craig.segall@sierraclub.org <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben <blongstreth@nrdc.org>; Joanne.Spalding@sierraclub.org <joanne.spalding@sierraclub.org>; dschroeder@catf.us <dschroeder@catf.us>; dmccabe@catf.us <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; pzalzal@edf.org <pzalzal@edf.org>; Mordick, Briana <bmordick@nrdc.org>; Alan Belenz </o=lawnet/ou=first administrative group/cn=recipients/cn=abelenz>; tballo@earthjustice.org <tballo@earthjustice.org>; melissa.hoffer@state.ma.us <melissa.hoffer@state.ma.us>  
Bcc:  
Subject: Re: Oil and Gas NSPS/Meeting Reschedule  
Date: Fri Jul 19 2013 18:37:35 EDT  
Attachments:

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Do we need a pre-call in the weeks beforehand?  
David Doniger  
NRDC  
202 321-3435

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Sent: Friday, July 19, 2013 02:48 PM  
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From: Henderson, Kelly <khenderson@nrdc.org>  
To: Morgan Costello </o=lawnet/ou=first  
administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Mon Jul 22 2013 09:36:30 EDT  
Attachments:

---

Hi Morgan,

David will be on vacation on this date, but could you please send me a dial-in that he could use when you get one from EPA?

Thanks!

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401| khenderson@nrdc.org| www.nrdc.org

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>

From: Doniger, David  
Sent: Friday, July 19, 2013 6:36 PM  
To: Henderson, Kelly  
Subject: Fw: Oil and Gas NSPS/Meeting Reschedule

Please make sure this is on my calendar. I will do from vacation.  
David Doniger  
NRDC  
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Cc: Longstreth, Ben; Joanne.Spalding@sierraclub.org <Joanne.Spalding@sierraclub.org>; 'Darin Schroeder' <dschroeder@catf.us>; 'David McCabe' <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; 'Peter Zalzal' <pzalzal@edf.org>; 'Tomas Carbonell' <tcarbonell@edf.org>; Mordick, Briana; Morgan Costello <Morgan.Costello@ag.ny.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; 'Timothy Ballo' <tballo@earthjustice.org>; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us) <melissa.hoffer@state.ma.us>  
Subject: Oil and Gas NSPS/Meeting Reschedule

All, I've heard back from Joe that they won't be ready to meet with us on the 29th and need until the week of Aug. 5 to be in position to have a productive discussion. I know that means that several of us

will be unable to participate, but we should try and push this forward with whomever is available. Meleah said that she could probably do a meeting (at least by phone) on Aug. 8 or 9, so why don't folks let me know their availabilities for those days and we can go from there. Thanks.--Mike

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---

From: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
To: Henderson, Kelly <khenderson@nrdc.org>  
Cc:  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Mon Jul 22 2013 09:37:50 EDT  
Attachments:

---

Will do.

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Assistant Attorney General  
New York State Office of the Attorney General  
Environmental Protection Bureau  
The Capitol  
Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

From: Henderson, Kelly [mailto:khenderson@nrdc.org]  
Sent: Monday, July 22, 2013 9:37 AM  
To: Morgan Costello  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule

Hi Morgan,

David will be on vacation on this date, but could you please send me a dial-in that he could use when you get one from EPA?

Thanks!

Kelly

Kelly Henderson | Program Assistant- Climate & Clean Air Program

Natural Resources Defense Council | 1152 15th St. N.W. Suite 300, Washington, DC 20005

202. 289. 2401 | khenderson@nrdc.org | www.nrdc.org

Blog: <http://switchboard.nrdc.org/blogs/khenderson/>

From: Doniger, David  
Sent: Friday, July 19, 2013 6:36 PM  
To: Henderson, Kelly  
Subject: Fw: Oil and Gas NSPS/Meeting Reschedule

Please make sure this is on my calendar. I will do from vacation.  
David Doniger  
NRDC  
202 321-3435

From: Morgan Costello [mailto:Morgan.Costello@ag.ny.gov]  
Sent: Friday, July 19, 2013 02:48 PM  
To: 'Tomas Carbonell' <tcarbonell@edf.org>; Michael J. Myers <Michael.Myers@ag.ny.gov>; Doniger, David; 'aweeks@catf.us' <aweeks@catf.us>; Geertsma, Meleah; 'craig.segall@sierraclub.org' <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org' <Joanne.Spalding@sierraclub.org>; 'dschroeder@catf.us' <dschroeder@catf.us>; 'dmccabe@catf.us' <dmccabe@catf.us>; David Lyon <dlyon@edf.org>; Peter Zalzal <pzalzal@edf.org>; Mordick, Briana; Alan Belenz <Alan.Belenz@ag.ny.gov>; 'tballo@earthjustice.org' <tballo@earthjustice.org>; 'melissa.hoffer@state.ma.us' <melissa.hoffer@state.ma.us>  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule

Ok, I have confirmed with EPA that we are available on Aug. 9 from 2-3 pm eastern time.

Morgan A. Costello  
Assistant Attorney General  
New York State Office of the Attorney General  
Environmental Protection Bureau  
The Capitol  
Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

From: Tomas Carbonell [mailto:tcarbonell@edf.org]  
Sent: Friday, July 19, 2013 2:43 PM  
To: Morgan Costello; Michael J. Myers; 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; David Lyon; Peter Zalzal; Mordick, Briana; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule

Thanks Morgan, that time works for Peter Zalzal and me. Best,

Tomás

-----Original Message-----

From: Morgan Costello [mailto:Morgan.Costello@ag.ny.gov]  
Sent: Friday, July 19, 2013 12:45 PM  
To: Michael J. Myers; 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; David Lyon; Peter Zalzal; Tomas Carbonell; Mordick, Briana; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule

So far I've heard availability from some folks at NRDC, Earthjustice, and CATF and it looks like Aug. 9 is the better of the 2 days. Is someone from Sierra Club and EDF available that day from 2-3 pm eastern time?

Morgan A. Costello  
Assistant Attorney General  
New York State Office of the Attorney General Environmental Protection Bureau The Capitol Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

-----Original Message-----

From: Michael J. Myers  
Sent: Thursday, July 18, 2013 12:11 PM  
To: 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; 'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule

Joe and company have suggested 2-3 pm eastern on the 8th or 9th. Can folks weigh in with which date works better. I'll be out for a couple of days, so will ask Morgan to circle back to Joe's secretary when the votes are in. Thanks.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Doniger, David [mailto:ddoniger@nrdc.org]  
Sent: Monday, July 15, 2013 11:39 AM  
To: Michael J. Myers; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; 'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
Subject: Re: Oil and Gas NSPS/Meeting Reschedule

I will probably be able to phone in also, from MN.

David Doniger

NRDC

202 321-3435

----- Original Message -----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]

Sent: Monday, July 15, 2013 07:59 AM

To: 'Ann Weeks' <aweeks@catf.us>; Geertsma, Meleah; Doniger, David; 'Craig Segall - Sierra' <craig.segall@sierraclub.org>

Cc: Longstreth, Ben; Joanne.Spalding@sierraclub.org <Joanne.Spalding@sierraclub.org>; 'Darin Schroeder' <dschroeder@catf.us>; 'David McCabe' <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; 'Peter Zalzal' <pzalzal@edf.org>; 'Tomas Carbonell' <tcarbonell@edf.org>; Mordick, Briana; Morgan Costello <Morgan.Costello@ag.ny.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; 'Timothy Ballo' <tballo@earthjustice.org>; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us) <melissa.hoffer@state.ma.us>

Subject: Oil and Gas NSPS/Meeting Reschedule

All, I've heard back from Joe that they won't be ready to meet with us on the 29th and need until the week of Aug. 5 to be in position to have a productive discussion. I know that means that several of us will be unable to participate, but we should try and push this forward with whomever is available. Meleah said that she could probably do a meeting (at least by phone) on Aug. 8 or 9, so why don't folks let me know their availabilities for those days and we can go from there. Thanks.--Mike

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From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Steven Wu </o=lawnet/ou=first administrative group/cn=recipients/cn=stevenwu>; Bethany Davis Noll </o=lawnet/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=bdavisno>  
Cc:  
Bcc:  
Subject: FW: UARG v. EPA, S. Ct. No. 12-1146 & related greenhouse gas cases  
Date: Mon Jul 22 2013 17:05:58 EDT  
Attachments: 12-1146, et al. Consolidated Brief in Opposition of Environmental Organization Respondents.pdf

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FYI (upon quick read I didn't see your names in Sean's list below)

Michael J. Myers  
Chief, Affirmative Litigation Section  
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New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Sean Donahue [mailto:sean@donahuegoldberg.com]  
Sent: Monday, July 22, 2013 4:43 PM  
To: Shannon@southeasternlegal.org; mbrady@oag.state.va.us; jeff.rosen@kirkland.com; Jeffrey Clark; Bamzai, Aditya; Burgess, William H.; John Bursch; Michael J. Myers; Morgan Costello; Monica Wagner; Cecelia Chang; Joe Barbieri; Raissa Lerner; Daniel Lucas; Gavin McCabe; Janill.Richards@doj.ca.gov; Massicotte, Kimberly; Matthew.Levine@po.state.ct.us; Scott N. Koschwitz; Satterfield, Valerie (DOJ); MDunn@atg.state.il.us; jgignac@atg.state.il.us; gkarr@atg.state.il.us; dsherid@ag.state.ia.us; TORMIST@ag.state.ia.us; jerry.reid@maine.gov; Hoffer, Melissa (AGO); lancu, Carol (AGO); Tracy Triplett; Roberta James; Mary Raivel; Karen D. Olson; K. Allen Brooks; sfarris@nmag.gov; tfox@nmag.gov; amoore@nmag.gov; Marc Bernstein; Garrahan Paul; Gregory Schultz; Thea Schwartz; JayG@atg.wa.gov; leslies@atg.wa.gov; MarySueW@ATG.WA.GOV; King, Christopher; Noteboom, Carrie; john.west@ky.gov; katie.spohn@nebraska.gov; esmith@scag.gov; Peter Douglas Keisler; Sorenson, Quin; Webster, Timothy K.; Roger Martella; Henderson, Douglas A.; Martin, Jesse K.; rtambling@ago.state.al.us; bbrownell@hunton.com; nfichthorn@hunton.com; Nickel, Henry; awood@hunton.com; Barbara Baird; Kirkpatrick, Byron W.; CHaake@gibsondunn.com; clayton.eubanks@oag.ok.gov; cthompson@crowell.com; egroten@velaw.com; John Bryson; Elwood, John P.; Kathleen Sullivan; lsritts@gmail.com; Kirkpatrick, Byron W. Campbell, Margaret C.; Terrell, Megan K.; rtenpas@morganlewis.com; tom.fisher@atg.in.gov; maiolson@nd.gov; Murphy, Michael P.; roxanne.giedd@state.sd.us; Lipshultz, Jon (ENRD); Purdy, Angeline (ENRD); Rosen, Perry (ENRD); Hostetler, Eric (ENRD); Yelin, Lewis (OSG)  
Subject: UARG v. EPA, S. Ct. No. 12-1146 & related greenhouse gas cases

Dear Counsel:

Here is the environmental organization respondents' brief in opposition.

Best,

Sean

--

Sean H. Donahue  
Donahue & Goldberg, LLP  
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Owner: Michael J. Myers </o=lawnet/ou=first administrative  
group/cn=recipients/cn=michaelmyers>  
Filename: 12-1146, et al. Consolidated Brief in Opposition of Environmental Organization  
Respondents.pdf  
Last Modified: Mon Jul 22 17:05:58 EDT 2013

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Nos. 12-1146, 12-1152, 12-1153, 12-1248,  
12-1253, 12-1254, 12-1268, 12-1269, 12-1272

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IN THE  
**Supreme Court of the United States**

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UTILITY AIR REGULATORY GROUP,  
*Petitioner,*

*v.*

ENVIRONMENTAL PROTECTION AGENCY,  
*Respondent,*  
and eight related cases.

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ON PETITIONS FOR WRITS OF CERTIORARI TO THE UNITED STATES  
COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

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**CONSOLIDATED BRIEF IN OPPOSITION OF  
ENVIRONMENTAL ORGANIZATION  
RESPONDENTS**

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## QUESTIONS PRESENTED

Nine petitions for certiorari challenge some or all of four actions of the Environmental Protection Agency concerning the regulation of greenhouse gases under the Clean Air Act, 42 U.S.C. 7401, *et seq.*: (1) a finding under Section 202(a)(1) of the Act, 42 U.S.C. 7421(a)(1), that greenhouse gas pollution may reasonably be anticipated to endanger public health or welfare (Endangerment Finding); (2) regulations establishing greenhouse gas emissions standards for new light-duty motor vehicles for model years 2012–2016 under Section 202(a)(2), 42 U.S.C. 7421(a)(2) (Tailpipe Rule); (3) an agency interpretation identifying the time at which greenhouse gases would become “subject to regulation” under the Act (Timing Decision), and (4) regulations phasing in the application of the Act’s Title I, Part C, Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs to stationary sources of greenhouse gas emissions (Tailoring Rule). In addition, certain petitioners challenge regulations promulgated by EPA in 1978, 1980, and 2002 interpreting the Act’s PSD permitting requirements, 42 U.S.C. 7475(a), 7479(1).

The questions presented are:

1. Whether the Endangerment Finding complied with Section 202(a)(1), was supported by the record, and satisfied applicable procedural requirements.

2. Whether the Tailpipe Rule is consistent with Section 202(a)(2) and supported by the record.
3. Whether the statutory requirement to obtain a PSD construction permit applies to sources that emit sufficient amounts of any regulated air pollutant, including greenhouse gases.
4. Whether petitioners lacked Article III standing to challenge the Timing Decision and Tailoring Rule.

## **RULE 29.6 STATEMENT**

Respondents Conservation Law Foundation; Environmental Defense Fund; Georgia ForestWatch; Indiana Wildlife Federation; Michigan Environmental Council; National Wildlife Federation; Natural Resources Council of Maine; Natural Resources Defense Council; Ohio Environmental Council; Sierra Club; Wetlands Watch, and Wild Virginia (Environmental Organization Respondents), all respondent-intervenors in the court of appeals, are nonprofit environmental organizations. The Environmental Organization Respondents have no corporate parents and no publicly held corporation owns an interest in any of them.

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## INTRODUCTION

In *Massachusetts v. EPA*, 549 U.S. 497 (2007), this Court held that greenhouse gases “unambiguous[ly]” fall within the Clean Air Act’s definition of “air pollutant,” and that the Environmental Protection Agency has a duty under the Act to curb the emissions of these pollutants if it finds that they contribute to pollution that endangers public health or welfare. Responding to this Court’s mandate, EPA has taken a series of carefully considered actions addressing greenhouse gas pollution.

Nine petitions for certiorari raise a variety of challenges to a D.C. Circuit decision upholding EPA’s actions. Legal merit is not measured by “pages of briefing,” see *Whitman v. American Trucking Ass’ns, Inc.*, 531 U.S. 457, 465 (2001), and the many petitions and supporting briefs raise no issue worthy of this Court’s review.

EPA’s endangerment and contribution findings and emissions standards for motor vehicles simply implement *Massachusetts*’ mandate. The D.C. Circuit correctly determined that these agency actions satisfied all requirements of Section 202(a) of the Act as interpreted by this Court in *Massachusetts*, and reflected EPA’s careful, candid, and reasonable assessment of the “ocean” (Pet.App. 46a) of scientific evidence concerning climate change, its causes, and its effects.<sup>1</sup> No petitioner challenges the motor vehicle emissions standards, which EPA

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<sup>1</sup> We cite to the Petition Appendix in *Utility Air Regulatory Group v. EPA*, No. 12-1146. The appendix to this brief contains a glossary of abbreviations.

established in coordination with the Department of Transportation as this Court contemplated in *Massachusetts*. These standards are delivering significant emissions reductions, and enjoy the automobile industry's support. None of the challenges to the endangerment finding and vehicle standards remotely warrants certiorari.

Nor is review warranted of the D.C. Circuit's ruling that EPA was "unambiguously correct" (Pet.App. 24a), in regulations promulgated in 1978, 1980, and 2002, that the Act's Prevention of Significant Deterioration (PSD) permitting provisions apply to major sources of any air pollutant regulated under the Act. (As the D.C. Circuit found, petitioners forfeited any challenge as to Title V's operating permit requirements.) The D.C. Circuit applied orthodox rules of statutory interpretation and held EPA's construction to be "statutorily compelled." Pet.App. 94a. Petitioners' varied and conflicting arguments persistently ignore plain statutory language—including the "air pollutant" definition this Court in *Massachusetts* held "unambiguous[ly]" (549 U.S. at 529) covers greenhouse gases.

The D.C. Circuit also correctly concluded that petitioners lacked Article III standing to challenge EPA's Timing Decision and Tailoring Rule, because these actions benefited rather than harmed petitioners. The petitions that challenge this ruling only confirm the marked departures from settled Article III principles that would be required to reach any different conclusion.

Although many petitions disregard or slight *Massachusetts'* holdings and reasoning, only that of

Texas, *et al.*, explicitly calls for this Court to reconsider and overrule its holding in *Massachusetts* that greenhouse gases are an “air pollutant” under the Act’s statute-wide definition. The strong version of *stare decisis* that applies in statutory cases requires rejection of that request under any circumstances, and the request should be especially unwelcome given that just two years ago this Court relied squarely upon *Massachusetts* in holding that “the Clean Air Act and the EPA actions it authorizes” displace federal common law abatement actions against carbon dioxide-emitting power plants. *American Electric Power Co. v. Connecticut*, 131 S. Ct. 2527, 2537 (2011). *Massachusetts*, this Court explained, “made plain that emissions of carbon dioxide qualify as air pollution subject to regulation under the Act.” *Id.* (citing 549 U.S. at 528–29).

Finally, any suggestions of dire practical impacts from the PSD permitting requirements are simply unfounded. In contrast with petitioners’ implications that tens of thousands of sources are being affected, fewer than 200 sources, all of them large emitters, applied for PSD permits for greenhouse gas emissions in the first two years of the program. See *infra*, pp. 44 & nn.21–22. In short, there is no practical issue warranting the Court’s intervention.

The petitions should all be denied.

## STATEMENT

**A. Statutory Background.** The Clean Air Act establishes a comprehensive suite of programs “to promote the public health and welfare.” 42 U.S.C. 7401(b)(1). For purposes of the Act, “air pollutant” means any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive ... substance or matter which is emitted into or otherwise enters the ambient air.” 42 U.S.C. 7602(g).

Section 202(a)(1) of the Act requires the EPA Administrator to determine whether, “in [her] judgment,” “the emission of any air pollutant” from new motor vehicles “cause[s], or contribute[s] to, air pollution” that “may reasonably be anticipated to endanger public health or welfare.” *Id.* 7521(a)(1). If the Administrator answers these questions affirmatively, then she “shall” promulgate vehicle emission standards “in accordance with the provisions of” Section 202. *Id.* Standards for passenger vehicles are governed by Section 202(a)(2), which provides that the standards “shall take effect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.” 42 U.S.C. 7521(a)(2). See generally *Massachusetts*, 549 U.S. at 506, 532–35.

The Prevention of Significant Deterioration (PSD) program requires new and modified “major emitting facilities” to obtain preconstruction permits. 42 U.S.C. 7475. Covered facilities are those located in “attainment” areas (areas meeting at least one national ambient air quality standard (NAAQS)), 42 U.S.C. 7407(d)(1), 7471, 7475(a),<sup>2</sup> and which emit or have the potential to emit more than 100 or 250 tons per year of “any air pollutant.” 42 U.S.C. 7479(1). The PSD program requires a preconstruction permit that includes, *inter alia*, emission limitations reflecting the best available control technology (BACT) for each pollutant “subject to regulation under the [Act].” 42 U.S.C. 7475(a)(1), (a)(4), 7479(3). For decades, EPA regulations have provided that, once an air pollutant becomes subject to regulation under any provision of the Act, emissions of that pollutant trigger application of PSD and Title V permitting—so that “the PSD program applies automatically to newly regulated ... pollutants.” 67 Fed. Reg. 80,186, 80,240 (Dec. 31, 2002). See also 43 Fed. Reg. 26,380, 26,397 (June 19, 1978); 45 Fed. Reg. 52,676, 52,711 (Aug. 7, 1980); *Alabama Power v. Costle*, 636 F.2d 323, 352 (D.C. Cir. 1979) (observing that, under the statute, PSD permit applicability is not limited to NAAQS pollutants).

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<sup>2</sup> NAAQSs have been established for six pollutants: lead, ozone, carbon monoxide, two forms of particulate matter, sulfur dioxide, and nitrogen dioxide. 40 C.F.R. 50.4–50.18. Dozens of other air pollutants are regulated under the Act. See *infra*, p. 34 n.17.

The Title V operating permit program does not impose substantive requirements, but requires “major sources” (any source that emits or has the potential to emit one hundred tons per year of any air pollutant) to have operating permits that collect in one place all applicable emissions standards. 42 U.S.C. 7661a(a), 7661(2), 7602(j). 57 Fed. Reg. 32,250, 32,251 (July 21, 1992).

**B. Regulatory Background.** In *Massachusetts*, this Court held that greenhouse gases “without a doubt” and “unambiguous[ly]” fall within “the Act’s sweeping definition of ‘air pollutant,’” 549 U.S. at 528–29 (citing and discussing 42 U.S.C. 7602(g)). The Court also held that Section 202(a)’s “clear ... command” required EPA to make a “scientific judgment” as to “whether greenhouse gas emissions contribute to climate change,” unless it found the science too profoundly uncertain to permit such a judgment. *Id.* at 533–34.

*Endangerment Finding.* On remand from *Massachusetts*, EPA determined that greenhouse gas pollution may reasonably be anticipated to endanger public health and welfare, and that vehicular greenhouse gas emissions contribute to that pollution. 74 Fed. Reg. 66,496, 66,499 (Dec. 15, 2009). See also 74 Fed. Reg. 18,886 (Apr. 24, 2009) (proposed finding). The Endangerment Finding rested on a massive foundation of scientific evidence developed over decades by thousands of scientists in a range of fields, and reflected in tens of thousands of peer-reviewed publications. EPA prepared a detailed technical support document (TSD) relying in part on comprehensive analyses incorporating thousands of peer-reviewed studies of current

climate change research developed by the Intergovernmental Panel on Climate Change, the United States Global Change Research Program (USGCRP), and the National Research Council (NRC)—each of which was in turn subject to further peer review. TSD 6, D.C. Cir. Endangerment Joint Appendix (End.JA) 3354. The agency then put the TSD through “three rounds of technical review by ... 12 federal experts,” “three rounds of internal EPA review,” and “two rounds of public comment,” and prepared an 11-volume response to the thousands of written comments it received. See Response to Comments (RTC) 1–10, End.JA 3566.

EPA found that:

- Atmospheric carbon dioxide (CO<sub>2</sub>) and methane concentrations have increased by approximately 38% and 149%, respectively, since the Industrial Revolution, “almost all” due to anthropogenic emissions, and these concentrations are significantly higher than they have been for at least 650,000 years. 74 Fed. Reg. at 66,517.
- Warming of the climate system “is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.” *Id.*
- Average surface temperatures have risen by  $1.3 \pm 0.32^\circ$  F over the past century (1906–2005), with the greatest warming occurring during the past 30 years, and the 20 warmest years on record all occurring since 1981. *Id.*
- Anthropogenic greenhouse gas emissions very

likely caused most of the warming that occurred over the past 50 years. *Id.* at 66,517–18, 66,522–23.

- Climate models project an increase in global average temperatures of 2.0–11.5° F during the twenty-first century. *Id.* at 66,519; see also TSD 69, End.JA 3417 (citing projections for 2030 of between 2°–4° F).
- Reducing greenhouse gas emissions would reduce the pace and magnitude of the temperature rise. TSD 66, End.JA 3414.

Based on copious record evidence that warming temperatures will cause (and in some cases are already causing) increased risks of mortality and illness from reduced air quality, intensified heat waves, and more frequent and more intense storms, see 74 Fed. Reg. 66,497–99, 66,516–36; see also TSD ES4, 89–93, End.JA 3345, 3437–3441, the Administrator found that greenhouse gas pollution is “reasonably anticipated to endanger public health, for both current and future generations.” 74 Fed. Reg. at 66,524.<sup>3</sup> The Administrator also found that climate change poses a variety of risks to public welfare, including increased droughts, sea level rise, harms to agriculture, more severe storms, and increased storm surge damage and flooding in coastal communities, *id.* at 66,497–99, 66,525,

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<sup>3</sup> The Administrator recognized that climate change will have some positive effects on health and welfare, but explained why adverse effects are likely to be preponderant. See, *e.g.*, 74 Fed. Reg. at 66,525 (increase in heat-related deaths, which already exceed cold-related deaths, likely to overwhelm reductions in cold-related deaths).

66,530–36, and will “fundamentally rearrange U.S. ecosystems,” *id.* at 66,498. In addition to the harmful effects from greenhouse gases’ heat-trapping characteristics and the resulting climate changes, increased atmospheric concentrations of CO<sub>2</sub> have already caused a marked increase in the acidity of ocean water, with potentially serious implications for coral reefs, shellfish and other aquatic life. TSD 38, 134, End.JA 3386, 3482.

*Contribution Finding.* The Administrator also found that emissions from new motor vehicles “cause or contribute” to greenhouse gas pollution. See 74 Fed. Reg. 66,537–41. In making this determination, the Administrator considered, among other things, motor vehicles’ large share of both global and domestic greenhouse gas emissions. *Id.* at 66,539.

*Administrative Reconsideration.* EPA denied ten petitions seeking administrative reconsideration of the Endangerment Finding, and issued a 360-page response addressing the petitions’ claims that the science underlying the finding was flawed. 75 Fed. Reg. 49,556 (Aug. 13, 2010).

*Tailpipe Rule.* Explaining that once an endangerment finding is made, “section 202(a) requires EPA to issue standards,” EPA promulgated greenhouse gas emissions standards for light-duty motor vehicles on May 7, 2010. 75 Fed. Reg. 25,324, 25,398 (Tailpipe Rule). In developing the standards, EPA considered the range of statutory factors set out in Section 202(a)(2), including available technology, cost of compliance, and the time period necessary to implement the standards. *Id.* at 25,403–04. EPA found that the Rule would prevent emissions of nearly one billion metric tons of CO<sub>2</sub> equivalent

(CO<sub>2</sub>e). *Id.* at 25,404, 25,519–20.<sup>4</sup>

*EPA's Actions Regarding Stationary Sources.* Recognizing that regulating greenhouse gas emissions from motor vehicles would by operation of law trigger PSD and Title V permitting, *supra* p. 5, EPA initiated two proceedings to address the application of those programs. First, in the Timing Decision, the agency determined that a pollutant is “subject to regulation” (and thus covered by the PSD and Title V requirements) when compliance with emission limitations for that pollutant is first required—in the case of greenhouse gases, January 2, 2011, the date that the first 2012 model year vehicles would be subject to greenhouse-gas emission standards under the Tailpipe Rule. 75 Fed. Reg. 17,004, 17,004–07 (Apr. 2, 2010). Second, in the Tailoring Rule, EPA phased in the permitting requirements starting with the largest greenhouse gas emitting sources, commencing with sources that have the potential to emit 100,000 tons CO<sub>2</sub>e per year of greenhouse gases. 75 Fed. Reg. 31,514, 31,522–23 (June 3, 2010). EPA determined that these measures were necessary to avoid unworkable administrative burdens that would result from immediately subjecting smaller sources to permitting requirements, and would still cover sources responsible for the vast majority (about 86

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<sup>4</sup> Carbon dioxide equivalent units (CO<sub>2</sub>e) take account of greenhouse gases’ differing heat-trapping potencies; for example, methane is 25 times more potent than carbon dioxide over a 100-year time-scale, and nitrous oxide is 298 times more potent. See, *e.g.*, 75 Fed. Reg. at 25,421. EPA defined the pollutant “greenhouse gases” to include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. 74 Fed. Reg. at 66,497.

percent) of stationary source greenhouse gas emissions. *Id.* at 31,543–45, 31,556, 31,571.

**C. This Litigation.** Numerous parties petitioned the D.C. Circuit to review the Endangerment Finding, Tailpipe Rule, Timing Decision, and Tailoring Rule, and some also filed actions seeking review of EPA’s 1978, 1980, and 2002 regulations confirming that the Act’s PSD permit program applies to sources emitting any regulated air pollutant, not just sources emitting NAAQS pollutants. Petitioners in the latter proceeding argued that the advent of greenhouse gas regulation constituted new grounds authorizing belated judicial review of the old regulations, notwithstanding the Act’s 60-day review period, 42 U.S.C. 7607(b)(1); *American Chemistry Council v. EPA*, D.C. Cir. No. 10-1167. The D.C. Circuit organized the petitions into four sets of consolidated cases, and heard oral argument over two days in February 2012.

A unanimous D.C. Circuit panel (Sentelle, C.J., and Rogers and Tatel, JJ.) denied the petitions challenging the Endangerment Finding, the Tailpipe Rule, and the 1978–2002 PSD regulations. The panel dismissed for lack of Article III standing the petitions challenging the Timing Decision and Tailoring Rule.

The court rejected arguments that EPA was obligated to consider various “policy concerns and regulatory consequences” before making an Endangerment Finding, reasoning that Section 202(a)(1) “requires EPA to answer only two questions: whether particular ‘air pollution’—here, greenhouse gases—‘may reasonably be anticipated to endanger public health or welfare,’ and whether

motor-vehicle emissions ‘cause, or contribute to’ that endangerment.” Pet.App. 32a–33a. The court concluded that the agency had properly confined itself to the statutorily-required “scientific judgment’ about the potential risks greenhouse gas emissions pose to public health or welfare.” *Id.* 33a (quoting *Massachusetts*, 549 U.S. at 534). The court rejected requests to “re-weigh the scientific evidence,” *id.* 44a, and concluded that parties seeking administrative reconsideration had not “provided substantial support for their argument that the Endangerment Finding should be revised,” *id.* 51a.

The D.C. Circuit next upheld the Tailpipe Rule. The court noted that petitioners did “not challenge the substantive standards,” but focused “principally on EPA’s failure to consider the cost of stationary-source permitting requirements triggered by the Rule.” *Id.* 53a. It concluded that “plain text of Section 202(a) and precedent refute Petitioners’ contentions.” *Id.*

Turning to the challenges to the PSD permitting provisions, the court first addressed a jurisdictional question: whether petitioners could challenge EPA’s decades-old interpretation that PSD applies to all regulated pollutants in light of the 60-day review limit in Section 307(b)(1) of the Act, 42 U.S.C. 7607(b)(1). The court noted that EPA’s interpretation actually had been challenged in petitions for review of the 1978 regulations, see Pet.App. 61a (citing industry briefs in *Alabama Power*), and that EPA had “highlighted” (*id.*) its longstanding interpretation in regulations promulgated in 1980 and 2002. The court

determined, however, that two petitioners—the National Association of Homebuilders (NAHB) and the National Oilseed Processors Association (NOPA)—could invoke Section 307(b)’s exemption for “grounds arising after” the 60-day period because, unlike “other Industry petitioners[],” at least some of their members would not have had ripe challenges to EPA’s interpretation earlier. Pet.App. 66a.

On the merits, the D.C. Circuit found EPA’s interpretation of the PSD permitting trigger to be “unambiguously correct” and “statutorily compelled.” *Id.* 24a, 72a. The court explained that “given both the statute’s plain language and the Supreme Court’s decision in *Massachusetts*,” it had “little trouble concluding that the phrase ‘any air pollutant’ includes *all* regulated air pollutants, including greenhouse gases.” *Id.* 73a.

The court considered the “alternative interpretations of the PSD permitting triggers” offered by the challengers, but concluded that none “cast[s] doubt on the unambiguous nature of the statute.” *Id.* 77a. The court rejected, as inconsistent with statutory text, arguments that the PSD program is “focused solely on localized air pollution” (*id.* 81a–83a); that the phrase “any area to which this Part applies” in Section 165(a) imposes a “pollutant-specific situs requirement” limiting PSD permitting triggering solely to NAAQS pollutants (*id.* 83a–94a); and a third proposed interpretation, not pressed in the present petitions, based upon 42 U.S.C. 7476(a) (Pet.App. 94a–95a).

While the challengers advocated at length various theories by which the PSD program might be “construed” to exclude greenhouse gases, they

advanced no arguments as to the Title V operating permit program. Observing that “none of petitioners’ alternative interpretations applies to Title V,” the D.C. Circuit held that they had “forfeited any challenges to EPA’s greenhouse gas-inclusive interpretation of Title V.” Pet.App. 78a.

The court next rejected the challenges to the Timing Decision and Tailoring Rule, holding that petitioners had “fall[en] far short” of demonstrating any of the three elements of standing under Article III. *Id.* 100a. The court explained that “neither the Timing nor Tailoring Rules caused the injury Petitioners allege: having to comply with PSD and Title V for greenhouse gases,” and that both Rules “actually mitigate Petitioners’ purported injuries.” *Id.* 100a–101a.

The full D.C. Circuit denied petitions for rehearing en banc. Judge Brown dissented, expressing her view that *Massachusetts* was wrongly decided. *Id.* 615a–625a. Judge Kavanaugh, also in dissent but focusing on the PSD provisions, argued that “any air pollutant” in Section 169(1) should be read to mean only NAAQS pollutants. *Id.* 638a–661a. The panel members filed a joint concurrence responding to the dissenters’ arguments, concluding that: “Here, Congress spoke clearly, EPA fulfilled its statutory responsibilities, and the panel, playing its limited role, gave effect to the statute’s plain meaning.” *Id.* 612a.

## REASONS FOR DENYING THE PETITIONS

### I. PETITIONERS' CHALLENGES TO THE ENDANGERMENT FINDING AND TAILPIPE RULE LACK MERIT AND ARE UNWORTHY OF FURTHER REVIEW

The D.C. Circuit's unanimous decision sustaining EPA's interpretation of Section 202(a) is unassailably correct, anchored in the plain language of that provision and this Court's *Massachusetts* ruling. So too is the court's disposition of challenges to the scientific record on which EPA based its actions. Petitioners' arguments graft requirements onto Section 202 that are not part of the statute Congress enacted, and their arguments concerning EPA's analysis of the record fail to establish that the agency or the D.C. Circuit committed any error, let alone error warranting this Court's review. No member of the full court, including the two judges who dissented from rehearing en banc, suggested that petitioners' attacks on the Endangerment Finding or Tailpipe Rule warranted further review. (Judge Brown's criticism on those points was based on her view that *Massachusetts* itself was wrongly decided. Pet.App. 615a–625a). Texas's request to overrule *Massachusetts* disregards core *stare decisis* principles.

#### A. Petitioners' Challenges to EPA's Interpretation of Section 202(a)(1) Are Unworthy of Further Review.

The Chamber of Commerce's argument that Section 202(a)(1) requires a "particular type of causal connection between air pollutants and endangerment"—one that "calls to mind" common-

law foreseeability tests, Pet. 21, 23 (citing *Palsgraf v. Long Island R.R.*, 162 N.E. 99 (N.Y. 1928)), was not raised before the agency or the D.C. Circuit and is therefore forfeited. See *U.S. v. Jones*, 132 S. Ct. 945, 954 (2012). Regardless, this insubstantial argument is unworthy of review. Section 202(a) requires promulgation of standards when vehicle emissions “cause, or contribute to” air pollution which, in the Administrator’s “judgment,” “may reasonably be anticipated to endanger public health or welfare.” This language would be a startlingly improbable way to codify common law concepts. To the contrary, Congress adopted the Section 202(a)(1) endangerment formulation to emphasize and reinforce the Administrator’s duty to take precautionary action to prevent harm before it occurs, on the basis of probative but still uncertain scientific evidence. See *Ethyl Corp. v. EPA*, 541 F.2d 1, 24–25 (D.C. Cir. 1976) (en banc); *Massachusetts*, 549 U.S. at 506 n.7.

The Chamber’s related suggestions that the impacts of climate change are too “remote” to constitute “public health” effects (Pet. 23–25) or that only “inhalational” effects can qualify as such (Pet. 17, 24; see also Pet.App. 622a–623a (Brown, J., dissenting)) are likewise meritless. Increased greenhouse gas concentrations result in warming and produce, among other things, intensified heat waves, exacerbated smog, exacerbated disease vectors, and more frequent and intense storms—all of which can cause death or illness. 74 Fed. Reg. at 66,497–99, 66,516–36. Other familiar forms of Clean Air Act-regulated pollution endanger public health by non-“inhalational” routes. For example, chlorofluorocarbons harm public health by depleting

the ozone layer in the stratosphere, allowing cancer- and cataract-causing radiation from the sun to reach the Earth's surface. The most urgent human health effects from mercury emissions occur as a result of consuming fish contaminated by mercury emitted from smokestacks, transported through the air and deposited in water bodies, where it is transformed by microorganisms into methylmercury and concentrated through bioaccumulation in the aquatic food chain. See also *Ethyl Corp.*, 541 F.2d at 9, 45–46 (upholding regulation of fuel additives based in part on evidence of possible harms to health of children who ingest dust containing lead originating from auto emissions). The Chamber's assertion that the serious risks amply documented in the record are "beyond the bounds of what Congress intended for the agency to address" (Pet. 24) is forcefully contradicted by the Act's "broad language." See *Massachusetts*, 539 U.S. at 532. See also *id.* at 529 n.26 (greenhouse gases are "unquestionably" air pollution "agents" notwithstanding their characteristics as atmospheric pollutants).<sup>5</sup>

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<sup>5</sup> The "indirectness" argument is the opposite of one the Chamber urged—successfully—in previous Clean Air Act litigation: In a challenge to EPA's 1997 ozone NAAQS, the Chamber faulted the agency for failing to account for the (claimed) benefits of ground-level ozone in blocking ultraviolet (UVB) radiation, which causes skin cancer and cataracts. The Chamber characterized these UVB-shielding effects of ozone pollution as "direct health effects of ground-level ozone in the ambient air," Small Business Reply Br., D.C. Cir. No. 97-1441 at 7 (filed Aug. 6, 1998), and dismissed as "desperate" the contention that those effects were "too indirect to be counted." Small Business Opening Br., D.C. Cir. No. 97-1441 at 23 (filed March 23, 1998). The D.C. Circuit unanimously ruled that EPA must consider these UVB effects, *American Trucking*

The Chamber's labored argument (Pet. 26–27) that EPA erred by treating harms flowing from climate change as “health” dangers rather than “welfare” effects is particularly specious.<sup>6</sup> The premise that Section 202(a) contemplates some strict dichotomy is facially implausible, given that it mandates regulation when air pollution endangers “public health *or* welfare.” In any event, it was plainly reasonable for EPA to consider effects such as death and illness from heat waves, increased smog, and new or exacerbated disease vectors as “health” risks. The Chamber's complaint does not warrant this Court's attention.

The Coalition for Responsible Regulation (CRR) insists (Pet. 7, 24–29) that EPA's Endangerment Finding and vehicle standards should be vacated based on the standards' supposed “futility” (or the absence of a rigorous “demonstration” of their “efficacy”). Yet it is not CRR's position that EPA should have promulgated *more* effective tailpipe standards (*no* party actually challenges the substance of EPA's emission standards). Nor is CRR a regulated party: none of the petitioners is regulated by the Tailpipe Rule (and the auto manufacturers support it).

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*Ass'n. v. EPA*, 175 F.3d 1027, 1051–53 (D.C. Cir. 1999), *rehearing denied in relevant part*, 195 F.3d 4, 10 (D.C. Cir. 1999), *rev'd in part on other grounds*, 531 U.S. 457 (2001).

<sup>6</sup> This contention is forfeited. It appeared below in a single, opaque sentence on page 58 of industry petitioners' lengthy opening brief, and the D.C. Circuit did not address it. See *Mogenhan v. Napolitano*, 613 F.3d 1162, 1165 n.1 (D.C. Cir. 2010) (“skeletal” arguments forfeited).

Contrary to CRR’s suggestion, the emission reductions resulting from the vehicle standards are manifestly substantial: EPA projected the standards will reduce greenhouse gases by 962 million metric tons of over the lifetime of model year 2012–2016 vehicles. 75 Fed. Reg. at 25,490, Table III.F.1-2. Even if the standards had not been strengthened for later model years,<sup>7</sup> by 2050 they would have resulted in an estimated 22.8 percent emission reduction from the U.S. transportation sector and a 6 percent reduction in emissions from *all domestic sources* over that period. *Id.* at 25,489. “Judged by any standard, U.S. motor-vehicle emissions make a meaningful contribution to greenhouse gas concentrations.” *Massachusetts*, 549 U.S. at 525.

CRR advances an “interpretation” of Section 202 whereby endangerment may be found only if the air pollution problem in question is due *solely* to the vehicle emissions and can be *entirely* resolved by vehicle standards. This bears no resemblance to the provision Congress enacted. Section 202(a)(1) states that EPA “shall” promulgate emissions standards (a) if air pollution may reasonably be anticipated to endanger public health or welfare and (b) if new vehicle emissions “contribute” to that pollution. See *Massachusetts*, 549 U.S. at 533–34.<sup>8</sup> The *content* of

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<sup>7</sup> In 2012, EPA and DOT issued more advanced standards for model years 2017–25, also with the auto industry’s support, that will further reduce greenhouse gas emissions from vehicles sold in those years. See 77 Fed. Reg. 62,624 (Oct. 15, 2012).

<sup>8</sup> CRR’s theories are at odds with the statutory text. Compare Pet. 20 (“Only an interpretation that requires a contribution to ‘endangerment’ is faithful to the Act’s text and structure.”) with Section 202(a)(1) (EPA “shall” prescribe standards when it finds that vehicle emissions “cause, or

the vehicle standards is determined in accordance with Section 202(a)(2), which mandates emission reductions that are achievable considering manufacturers' need for lead time, the availability of technology, and compliance costs. Thus, Section 202(a) does not require that vehicle emissions must be the sole cause of the pollution problem, or that abatement of those emissions must fully cure it. The statutory criteria for endangerment and for the vehicle standards readily dispose of CRR's claims that the D.C. Circuit's construction affords EPA "unconstrained" discretion (Pet. 35) or precludes "meaningful" judicial review (Pet. 34–36).

The Section 202(a) framework—endangerment and contribution findings triggering a duty to regulate, and standards turning on cost and feasibility rather than on achieving a specific risk-reduction or health-based goal—is common in other key provisions of the Act, including the Section 111 new source performance standards. See *American Electric Power*, 131 S. Ct. at 2537–38. Such provisions rest on the perfectly rational *congressional* premise that reducing emissions that “contribute” to dangerous air pollution will reduce the danger.<sup>9</sup>

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contribute to, *air pollution* which may reasonably be anticipated to endanger public health or welfare.”) (emphasis added).

<sup>9</sup> CRR claims the emissions reductions “would largely occur anyway as a result of the NHTSA fuel economy standards.” Pet. 14; see Pet. 27 & n.5. But Section 202(a) imposes legal obligations “independent” from those under the fuel economy statute, see *Massachusetts*, 549 U.S. at 532, and the fact that EPA and NHTSA coordinated to make compliance easier is

EPA followed these statutory commands in all respects. First, EPA determined that greenhouse gas air pollution endangers the public health and welfare of present and future generations. Second, EPA determined that emissions of greenhouse gases from motor vehicles contribute to greenhouse gas air pollution, a finding that considered factors such as vehicles' "relative importance" as pollution sources. See 74 Fed. Reg. 66,537–41. (No party challenged that contribution finding in the D.C. Circuit.) Third, EPA determined the level of emissions reductions achievable in light of available automotive technology, lead-time, and manufacturers' compliance costs. See 75 Fed. Reg. at 25,403–04, 25,463, 24,519–20.

In an effort to rewrite Section 202(a), CRR (Pet. 17–18) misapplies the administrative law principle of reasoned explanation articulated in *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29 (1983). That principle requires an agency to consider relevant factors, but "the determination of what is relevant" comes from the statute. *Motor & Equip. Mfrs. Ass'n v. EPA*, 627 F.2d 1095, 1116 (D.C. Cir. 1979). Thus, *State Farm* explains that "an agency rule would be arbitrary and capricious if the agency has relied on factors which Congress has not intended it to consider." 463 U.S. at 43. See also *American Trucking Ass'ns*, 531 U.S. at 465–68

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hardly a mark against them. Furthermore, EPA's vehicle standards are projected to result in 47 percent greater greenhouse gas reductions than projected under the NHTSA fuel economy standards over the lives of model year 2012–2016 vehicles. 75 Fed. Reg. at 25,490, Table III.F.1-2; *id.* at 25,635–36, Table IV.G.1-4.

(holding the Act did not permit EPA to consider costs in setting NAAQS, despite arguments that such consideration was not only “relevant,” but vitally important to the national economy). Indeed, in *Massachusetts* this Court emphasized this very point, rejecting a “laundry list” of “policy” reasons as “divorced from the statutory text.” 549 U.S. at 532–33. Nothing in Section 202(a)(2) permits EPA to withhold motor vehicle emissions standards because they alone will not fully solve the pollution problem, or requires the agency to measure the efficacy of potential standards before deciding whether endangerment exists.

CRR repeatedly invokes the D.C. Circuit’s decision in *Ethyl*, but, as the panel noted, “[n]othing in *Ethyl* implied that EPA’s authority to regulate was conditioned on evidence of a particular level of mitigation; only a showing of significant *contribution* was required.” Pet.App. 57a. Indeed, *Ethyl* rejected arguments very like CRR’s, holding that EPA had properly regulated lead from motor vehicles even though lead comes from “multiple sources” and airborne lead from automobiles “in and of itself, may not be a threat,” and explaining that “no regulation could ever be justified” if the agency were barred from attacking cumulative harms incrementally. 541 F.2d at 30. See also *Massachusetts*, 549 U.S. at 524 (agencies generally approach “massive problems” by “whittl[ing] away at them over time”); 42 U.S.C. 7421(a)(1) (providing for revision of emissions standards “from time to time”). CRR’s challenges are unworthy of further review.

**B. Petitioners' Attacks on EPA's Analysis of the Scientific Record Lack Merit And Are Unworthy of Review.**

Southeastern Legal Foundation asks the Court (Pet. 10–17) to review EPA's analysis of the climate science. Notwithstanding its high rhetorical pitch, SLF's attack is, in substance, tellingly indirect and circumscribed. Citing a few passages in the vast record, SLF asks the Court to brand "irrational" (Pet. 10) EPA's assignment of a 90–99 percent confidence level to the finding that human activities caused most of the warming that occurred in the second half of the twentieth century.<sup>10</sup>

EPA dealt candidly with uncertainties in the massive scientific record addressing the causes and effects of climate change. EPA's finding was based on a consideration of "the totality of scientific evidence, some of which was assessed as being virtually certain ... while other evidence was less

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<sup>10</sup> SLF (Pet. 12 & n.8) cites post-decisional materials to suggest that subsequent developments have cast doubt upon the scientific basis for EPA's finding. Besides being improper in a record review case, see 42 U.S.C. 7607(d)(7), the claim is patently untrue. See, e.g., NRC, *America's Climate Choices* at 17 (2011) (finding that increased concentrations of greenhouse gases "definitively" cause global warming); *id.* at 19 (confirming that United States is experiencing the impacts of climate change, including sea level rise and increasing frequency and severity of heavy rainfall, drought, and wildfires across multiple regions of the country), *available at* [https://download.nap.edu/catalog.php?record\\_id=12781](https://download.nap.edu/catalog.php?record_id=12781); NRC, *Advancing the Science of Climate Change* (2010) ("[C]limate change is occurring, is caused largely by human activities, and poses significant risks for—and in many cases is already affecting—a broad range of human and natural systems.") (quoted in 75 Fed. Reg. at 49,558).

certain.” RTC 1-35, End.JA 3593; see also 74 Fed. Reg. at 66,497, 66,506. The appeals court carefully reviewed the scientific record, Pet.App. 39a–45a, and examined the few marginal objections petitioners did raise (mostly abandoned in SLF’s petition here). See *id.* 42a (observing that “Industry Petitioners do not find fault with much of the substantial record EPA amassed in support of the Endangerment Finding”).

The issues SLF does raise are unworthy of further review. For example, SLF’s claim (Pet. 13) to have “refut[ed]” EPA’s physical understanding of climate change—based on the absence of a predicted “hot spot’ in the tropical upper troposphere”—was not timely raised in Petitioners’ opening briefs below and was thereby forfeited. See *Catawba County v. EPA*, 571 F.3d 20, 38 (D.C. Cir. 2009). In any event, SLF’s arguments disregard EPA’s explanation that more recent and accurate data demonstrate warming consistent with modeled predictions. RTC 3-7, End.JA 3815–16. Similarly, SLF is wrong in arguing (Pet. 14–15) that short-term and regional climate variability (driven by complex but familiar climate dynamics) casts doubt on science’s understanding of long-term, documented warming trends or on the models that predict them. Both basic principles of physics and climate models project long-term, large-scale responses of average global temperature to rising greenhouse gas concentrations—precisely what has been observed. See RTC 3-6, End.JA 3814–15. Further review is unnecessary.

Virginia’s assertion (Pet. 27) that EPA “impermissibly delegated” its responsibility under Section 202(a)(1) to form its own “judgment” on endangerment is likewise unworthy of further

review. The D.C. Circuit explained, Pet.App. 38a–39a, that the Administrator exercised her independent judgment and appropriately reviewed and referenced both primary scientific sources and syntheses of those sources. See, *e.g.*, 74 Fed. Reg. at 66,497, 66,510–12, 66,517–19. As the court observed: “This is how science works. EPA is not required to re-prove the existence of the atom every time it approaches a scientific question.” Pet.App. 38a–39a.

Nor need this Court review the D.C. Circuit’s unanimous rejection of Virginia’s claim (Pet. 16) that EPA “misapplied” 42 U.S.C. 7607(d)(7)(B), which requires EPA to initiate a reconsideration proceeding if the objection a party raises could not have been raised during the public comment period and the objection is “of central relevance to the outcome of the rule.” The reconsideration petitions principally claimed that the IPCC assessment report contained several items of flawed and unreliable information. EPA examined these claims carefully, see Pet.App. 50a, and the D.C. Circuit observed that the reconsideration petitions demonstrated no “pattern of flawed science,” that only a few of the alleged IPCC shortcomings really were errors, and that EPA had not relied on them. *Id.* 51a–52a. The court also sensibly rejected Virginia’s argument (Pet. 15–17) that EPA’s detailed explanation for denying reconsideration was itself proof that reconsideration was required. *Id.* 52a–53a.

The Pacific Legal Foundation’s contention that EPA was required to make the proposed Endangerment Finding available to the Science Advisory Board (SAB) faces fatal procedural

barriers. This statutory objection was not timely raised during the public comment period, End.JA 4843, see 42 U.S.C. 7607(d)(7)(B), and improperly relies on non-record assertions in a declaration submitted with PLF's en banc petition. See *id.* 7607(d)(7)(A), 7607(e). In any event, the contention is plainly unworthy of this Court's review. The provision on SAB review is, by its terms, limited to instances in which (1) a "proposed criteria document, standard, limitation, or regulation" (2) "is provided to any other Federal agency for formal review and comment." See *id.* 4365(c)(1). The panel found that PLF "failed to respond" to EPA's demonstration, during the rulemaking, that the Endangerment Finding was not subject to interagency "formal review and comment" within the meaning of the SAB statute, see Pet.App. 49a; see also RTP 3-7, End.JA 4842-44. PLF now advances a strained and unsupported argument (Pet. 15) that the public comment process under the Clean Air Act itself constitutes a "formal" interagency review that triggers SAB review.<sup>11</sup> Its allegations of intra-circuit conflicts (*e.g.*, Pet. 23-25) were not persuasive to any member of full D.C. Circuit; PLF's en banc petition was denied without a recorded vote. Pet.App. 663a.

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<sup>11</sup> The D.C. Circuit's alternative conclusion (Pet.App. 48a-49a) that any error concerning the SAB provision was harmless under the Act's "substantial likelihood" standard for "alleged procedural errors," 42 U.S.C. 7607(d)(8), does not merit review either. Although PLF protests (Pet. 21-23) that that provision applies only to certain Clean Air Act violations, its text contains no such limitation, and the APA's "prejudicial error" standard, 5 U.S.C. 706, would apply in any event.

**C. Pleas to Reconsider *Massachusetts* Ignore Statutory *Stare Decisis* and the *American Electric Power* Decision.**

Texas’s petition explicitly—albeit half-heartedly—asks the Court “to reconsider *Massachusetts*’s holding that carbon dioxide and other greenhouse gases unambiguously qualify as ‘air pollutant[s]’ within the meaning of the Act.” Pet. 31. The Court should reject this plea under “[b]asic principles of *stare decisis*.” See *U.S. v. Home Concrete & Supply, LLC*, 132 S. Ct. 1836, 1841 (2012).

“[A] difference of opinion within the Court ... does not keep the door open for another try at statutory construction,” *Watson v. U.S.*, 552 U.S. 74, 82 (2007), and no intervening fact or legal development undermines this Court’s decision. On the contrary, the body of scientific evidence of anthropogenic climate change and its harms has become even more robust since 2007, see, *e.g., supra*, p. 23 n.10, and all three branches of the federal government, as well as States and regulated parties, have acted in reliance upon *Massachusetts*.

Indeed, while Texas insists (Pet. 31) that the Court did not foresee how *Massachusetts* would resonate beyond the Act’s vehicle standards provision, Texas does not even cite the Court’s unanimous 2011 decision in *American Electric Power* that power plant greenhouse gas emissions are also subject to regulation under Clean Air Act provisions such as Section 111. See 131 S. Ct. at 2537 (“[T]he Clean Air Act and the EPA actions it authorizes displace any federal common law right to seek abatement of carbon-dioxide emissions from

fossil-fuel fired power plants.”). As *American Electric Power* explained, “*Massachusetts* made plain that emissions of carbon dioxide qualify as air pollution subject to regulation under the Act.” *Id.* (citing 549 U.S., at 528–529). The Court accepted arguments by major electric utilities (members of trade associations before the Court here) that power plants’ greenhouse gas emissions are indeed subject to regulation under the Act. See, e.g., AEP Pet’r Br. in No. 10-174, at 46 (“[T]he Clean Air Act delegates regulatory authority over carbon dioxide emissions to EPA, and thus displaces federal common law claims.”); *id.* at 43 (maintaining that Act “speaks directly” to carbon pollution from stationary sources) (internal quotation marks and citations omitted).

Texas’s desultory argument based on two constitutional decisions (Pet. 33) ignores this Court’s longstanding emphasis that “*stare decisis* in respect to statutory interpretation has special force, for Congress remains free to alter what we have done.” *Home Concrete & Supply*, 132 S. Ct. at 1841. Accord *John R. Sand & Gravel Co. v. U.S.*, 552 U.S. 130, 139 (2008); *Hohn v. U.S.*, 524 U.S. 236, 251 (1998); *Patterson v. McLean Credit Union*, 491 U.S. 164, 172–73 (1989). Indeed, since *Massachusetts*, Congress has considered but declined to adopt scores of legislative proposals that would have repealed, deferred, or otherwise curtailed EPA’s authority to regulate greenhouse gas emissions.<sup>12</sup> Texas’s plea to

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<sup>12</sup> At least sixty-one such bills or resolutions have been introduced in Congress—and none has been enacted into law. See, e.g., S. Amdt. 359 to S. Con. Res. 8, 113th Cong. (2013); H.R. 2081, 113th Cong. (2013); S.2365, 112th Cong. (2012); H.R. 3409, 112th Cong. (2012); S.J. Res. 26, 111th

strip EPA of the statutory authority recognized in *Massachusetts* and recently reaffirmed in *AEP* cannot be reconciled with the values of stability and separation of powers that statutory *stare decisis* serves.

## II. EPA'S CONSTRUCTION OF THE PSD APPLICABILITY PROVISIONS WAS CORRECT AND DOES NOT MERIT FURTHER REVIEW

Many petitioners challenge the D.C. Circuit's ruling upholding EPA's long-standing interpretation that the PSD construction permit program applies to sources emitting threshold quantities of any regulated air pollutant.<sup>13</sup> There are substantial differences among their various theories, some of which have shifted even since the decision below. Some petitioners seek to exclude greenhouse gases entirely from the PSD program (*e.g.*, Texas Pet. 30; Chamber Pet. 28–29), while the ACC petitioners (Pet. 24 n.12) and Judge Kavanaugh's dissent (Pet.App. 646a) acknowledge that sources subject to PSD permitting because they emit other pollutants

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Cong. (2010); S. 1622, 111th Cong. (2009); H.R. 2846, 111th Cong. (2009); S. 570, 111th Cong. (2009).

<sup>13</sup> Whether EPA's decades-old interpretation is still open to challenge despite the 60-day limitation in 42 U.S.C. 7607(b)(1) turns on (1) whether the D.C. Circuit correctly ruled (Pet.App. 62a–67a) that the two trade associations, NAHB and NOPA, could avoid the statutory bar, and (2) whether that ruling also allows *other* parties to assert distinct challenges to the long-standing interpretation. *Cf.* EIMWG Pet. at ii (Question Presented No. 3). See *NRDC v. EPA*, 571 F.3d 1245, 1265 (D.C. Cir. 2009) (holding that the restriction is jurisdictional); *Motor & Equip. Mfrs. Ass'n v. Nichols*, 142 F.3d 449, 460 (D.C. Cir. 1998) (same).

must control their greenhouse gas emissions using the “best available control technology.” Below, the ACC petitioners argued for a greenhouse gas-excluding interpretation based upon what they called a “pollutant-specific situs requirement” ostensibly flowing from the phrase “in any area to which this part applies” in Section 165(a). See Pet.App. 83a; Petitioners’ Opening Br. in D.C. Cir. No. 10-1166 at 29–31. But now they refer to “the alternative interpretation advanced by this petition and Judge Kavanaugh,” see ACC Pet. 24 n.12, even though Judge Kavanaugh did not even cite the statutory phrase ACC previously highlighted as operative and crucial.

None of petitioners’ protean arguments warrants further review. As the D.C. Circuit held, EPA’s decades-old reading of the Act is “unambiguously correct” and “statutorily compelled” (Pet.App. 24a, 72a) by the plain text of the PSD applicability provisions: Section 165(a) requires any “major emitting facility” being constructed in a PSD area to obtain a permit, 42 U.S.C. 7475(a), and Section 169(1) defines “major emitting facility” as a stationary source emitting 100 or 250 tons or more per year of “*any* air pollutant.” *Id.* 7479(1) (emphasis added). Under Section 302(g), “air pollutant,” “when used in this [Act] ... means *any* air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive ... substance or matter which is emitted into or otherwise enters the ambient air,” *id.* 7602(g) (emphasis added). That language cannot reasonably be limited to the six NAAQS pollutants. Moreover, this Court held in *Massachusetts* that the definition “without a doubt” and “unambiguous[ly]” includes

greenhouse gases. 549 U.S. at 529. “Given all this,” the appeals court had “little trouble concluding that ‘any air pollutant’ in the definition of ‘major emitting facility’ unambiguously means ‘any air pollutant regulated under the [Act],’” including greenhouse gases. Pet.App. 77a.

The D.C. Circuit explained in careful detail why the various “alternative” interpretations of the PSD trigger offered by petitioners and Judge Kavanaugh are inconsistent with the statute. *Id.* 77a–95a. Each involves untenable departures from the text of the statute.<sup>14</sup> ACC and other petitioners now argue, in reliance on Judge Kavanaugh’s dissent, that EPA *must* adopt different regulatory definitions of the statutory term “air pollutant” depending on the program at issue, and that “any air pollutant” in Section 169(1) *must* be read to mean “any NAAQS pollutant.” See, *e.g.*, ACC Pet. 19–25; Pet.App.

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<sup>14</sup> Petitioners contend that the D.C. Circuit mistakenly assumed that *Massachusetts*, which involved only mobile sources, had resolved PSD’s application to stationary sources of greenhouse gases. See, *e.g.*, UARG Pet. 18–20. That charge is unfounded. The D.C. Circuit recognized that the PSD coverage issue was separate and unaddressed by *Massachusetts*, and it entertained the possibility that the PSD provisions could be read to exclude regulated air pollutants such as greenhouse gases, notwithstanding 35 years of EPA regulations. Ultimately, however, the court found that the statutory text precluded that approach. In construing the PSD program, the D.C. Circuit properly took account of *Massachusetts*’s holding as to the “unambiguous” meaning of the Act’s “air pollutant” definition, just as this Court did in *American Electric Power*, 131 S. Ct. at 2537 (Section 111 applies to greenhouse gases because “*Massachusetts* made plain that emissions of carbon dioxide qualify as air pollution subject to regulation under the Act.” (citing 549 U.S. at 528–29)).

640a–643a, 648a. But this argument violates basic principles of statutory construction. “Air pollutant” is a defined term expressly applicable *throughout the Act*. See 42 U.S.C. 7602 (“When used in this chapter”); *Massachusetts*, 549 U.S. at 532 (referring to “*the Clean Air Act’s* capacious definition of air pollutant”) (emphasis added); *American Electric Power*, 131 S. Ct. at 2537 (“[E]missions of carbon dioxide qualify as air pollution subject to regulation under the Act.”). “Statutory definitions control the meaning of statutory words.” *Burgess v. United States*, 553 U.S. 124, 129–30 (2008) (quoting *Lawson v. Suwannee Fruit & S.S. Co.*, 336 U.S. 198, 201 (1949)). See also *Bilski v. Kappos*, 130 S. Ct. 3218, 3226 (2010) (“When a statute includes an explicit definition, we must follow that definition.”) (citation and internal quotation marks omitted). As the Court concluded in *Massachusetts*, Congress would not have defined “air pollutant” in Section 302(g) “so carefully and so broadly, yet confer[red] on EPA the authority to narrow that definition whenever expedient.” 549 U.S. at 529, n.26.

Contrary to petitioners’ careful efforts to bury it, *e.g.*, UARG Pet. 20–21, Congress’s use of the defined term “air pollutant” in Section 169(1)’s designation of PSD sources was no accident: Congress amended and expanded the definition of “air pollutant” to its current, broad form as part of the same 1977 legislation by which it enacted the PSD program. Pub. L. No. 95-95, § 301, 91 Stat. 685, 770 (1977).<sup>15</sup>

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<sup>15</sup> Prior to the 1977 amendments, Section 302(g) had defined “air pollutant” to mean “an air pollution agent or combination of such agents.” Pub. L. No. 91-604, § 16(g), 84 Stat. 1676, 1710 (1970).

And in 1990, when Congress established a separate permitting program for hazardous air pollutants (which are non-NAAQS pollutants), Congress enacted a specific provision exempting these pollutants from PSD permitting. 104 Stat. 2399, 2537 (1990), codified at 42 U.S.C. 7412(b)(6) (PSD “shall not apply” to hazardous air pollutants); see also 42 U.S.C. 7412(g)(2). This exemption would have been unnecessary if PSD had been limited to NAAQS pollutants all along.

Although the appeals court did not—and did not need to—go beyond statutory text, the legislative history shows with exceptional clarity that Congress intended PSD permitting to apply to the full range of air pollutants, specifically including those that threatened to cause, to quote the committee that authored the provisions, “[w]orldwide weather modification.” H.R. Rep. No. 95-294, at 138 (1977). The committee “recognized the strong need for a policy of preventing significant deterioration of air quality” for, among other reasons, “avoidance of unnecessary stratospheric and atmospheric modifications due to air pollution,” *id.* at 105, and extensively quoted from a path-breaking National Academy of Sciences study of global warming, *Understanding Climate Change. Id.* at 138.

Judge Kavanaugh relied upon *Environmental Defense v. Duke Energy Corp.*, 549 U.S. 561 (2007), for the proposition that an agency may interpret a recurring statutory term differently depending on the context. Pet.App. 652a–653a; see also UARG Pet. 21. But that modest principle is not a license to ignore an unambiguous definition that expressly applies across a statute based upon generalized

appeals to context. On the contrary, *Duke Energy* explained that any interpretive differentiation must stay “within the limits of what is reasonable, as set by the Act’s common definition.” 549 U.S. at 576.<sup>16</sup> Neither Judge Kavanaugh’s dissent nor any of the petitions even attempts to show how the text of the Section 302(g) definition may “reasonably” be read to exclude numerous non-NAAQS pollutants that have long been regulated under the Act,<sup>17</sup> or how, notwithstanding this Court’s parsing of the very same “unambiguous” definition in *Massachusetts*, the same text may now be read as excluding

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<sup>16</sup> *Duke Energy* approved EPA’s use of different regulatory definitions of the common, statutorily defined term “modification” employed in two different Clean Air Act programs (NSPS and PSD). The regulations provided different methods of measuring an emissions “increase,” an undefined word within the common statutory term. The argument the Court rejected was that EPA’s use of an hourly test for measuring an NSPS “increase” precluded the agency, in subsequent PSD rulemaking, from using an annual test for a PSD “increase.” See 549 U.S. at 567–59, 574–76. There was no claim in *Duke Energy* that the text of the relevant statutory definition precluded the annual approach, and nothing in the Court’s opinion (or any of petitioners’ other cases) suggests that an agency, in interpreting an iterated statutory term to fit differing contexts, may stray from the boundaries fixed by the text of the term.

<sup>17</sup> A wide variety of regulated, non-NAAQS pollutants have been subject to PSD for decades. See, e.g., 40 C.F.R. 51.166(b)(23)(i) (PSD applicability regulations for fluorides; sulfuric acid mist; hydrogen sulfide; total reduced sulfur; municipal waste combustor organics, metals and acid gases; and solid waste landfill emissions). Judge Kavanaugh’s NAAQS-only gloss on “any air pollutant” would exclude all these pollutants, which fall into the category “any air pollutant” just as clearly as do greenhouse gases.

greenhouse gases. Congress's decision, in Section 169(1), to modify "air pollutant" with the "expansive" term "any," see *U.S. v. Gonzales*, 520 U.S. 1, 5 (1997), further emphasizes the intended breadth of the definition.

Petitioners (ACC Pet. 9, 24) and Judge Kavanaugh (Pet.App. 647a) wrongly conclude that Section 169(1) can be limited to NAAQS pollutants because the PSD program, they contend, is focused singularly on NAAQS attainment. The statute says otherwise. As the panel observed (Pet.App. 90a), Title I, Part C, Subpart 1, of the Act, containing the PSD provisions, is entitled "Clean Air," and opens with an expansive statutory statement of purpose: "to protect public health and welfare from any actual or potential adverse effect which in the Administrator's judgment may reasonably be anticipate[d] to result from air pollution." 42 U.S.C. 7470(1). See also *Massachusetts*, 549 U.S. at 506 (under the Act effects on welfare include "effects on ... weather ... and climate" (quoting 42 U.S.C. 7602(h))).

Furthermore, the PSD permit program's central substantive provision, the requirement in Section 165(a)(4) to install BACT, expressly applies to "each pollutant subject to regulation under this" Act, 42 U.S.C. 7475(a)(4), as ACC (Pet. 8, 24 nn.11 & 12) and Judge Kavanaugh (Pet.App. 646a) both acknowledge. If PSD really had the claimed "NAAQS-only" mission, Congress would hardly have required sources to install controls for all regulated pollutants.

The Section 165(a)(4) BACT provision highlights one of the more emphatic ways in which the

statutory text refutes the NAAQS-only theory: As a matter of logic and ordinary understanding, if a “pollutant” is “subject to regulation under the [Clean Air Act],” it is necessarily included in the broader phrase “any air pollutant” in Section 169(1). See *City of Arlington v. FCC*, 133 S. Ct. 1863, 1874 (2013) (adhering to “the theorem that the whole includes all of its parts”). Judge Kavanaugh’s analysis specifically depends upon the clearly untenable proposition that the category “each pollutant subject to regulation” in Section 165(a)(4) is “broader” (Pet.App. 646a) than “any air pollutant” in Section 169(1)—and that the former, but not the latter, includes greenhouse gases. Both ordinary meaning and the D.C. Circuit’s canonical early decision construing the PSD provisions say the opposite: “that the § 169(1) definition of major emitting facility refers to a broader category of pollutants than does that of § 165.” *Alabama Power*, 636 F.2d at 352 n.60.

But the flaws in the “NAAQS-only” theory do not end there: Section 165(a)(3) requires that PSD permittees demonstrate compliance not only with the NAAQS, but also with “*any other* applicable emission standard or standard of performance under” the Act. 42 U.S.C. 7475(a)(3) (emphasis added). These “other” emissions standards include new source performance standards, 42 U.S.C. 7411, which indisputably apply to non-NAAQS air pollutants, including greenhouse gases, as this Court recognized in *American Electric Power*, 131 S. Ct. at 2537. See also Pet.App. 612a.

The NAAQS-only arguments are marred by other logic errors. Petitioners and Judge Kavanaugh

emphasize that while the Act's visibility provision defines "major stationary sources" by reference to threshold amounts of "any pollutant," 42 U.S.C. 7491(g), EPA's regulatory guidance limits the program to "visibility-impairing" pollutants. See Pet.App. 654a; UARG Pet. 22. But this merely reflects explicit statutory text limiting the scope of the visibility provisions to "any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any such area." 42 U.S.C. 7491(b)(2)(A); see also *id.* 7491(c)(1)–(2). No similar limitation on the term "any air pollutant" is found in Section 169(1). *Some* PSD provisions are expressly linked to the NAAQS (*e.g.*, Section 163(b)(4), cited by Judge Kavanaugh, Pet.App. 645a, specifying maximum allowable increases of NAAQS pollutants); however, numerous *other* pivotal PSD provisions (including Sections 160(1), 165(a)(3)(C), and 165(a)(4)) expressly apply to non-NAAQS pollutants.<sup>18</sup>

The three D.C. Circuit panel judges also correctly rejected (Pet.App. 610a–611a) Judge Kavanaugh's argument (Pet.App. 641a–642a) that a "NAAQS-pollutant-only" interpretation was justified by the interest in avoiding "absurd results" in the form of an unexpectedly large number of PSD permits. As the concurring judges explained, that

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<sup>18</sup> EPA *has* interpreted the Section 169(1) source definition to reach no more broadly than the substantive requirements of the PSD program. See Pet.App. 73a–74a (discussing EPA's longstanding regulatory limitation of the PSD program to regulated air pollutants, *i.e.*, those subject to substantive limitations under PSD provisions such as Section 165(a)(4)'s BACT requirement).

argument depends on the plainly incorrect premise that “NAAQS pollutant” is a “plausible interpretation” of “any air pollutant.” See Pet.App. 611a. Moreover, EPA found only that the administrative demands created by immediate application of PSD to a large number of sources led to absurd results; the agency never concluded that it would be absurd to apply PSD to non-NAAQS pollutants generally, or greenhouse gases in particular. To the contrary, EPA found that Congress clearly intended PSD to apply to all regulated pollutants, including greenhouse gases. See, *e.g.*, 75 Fed. Reg. at 31,517. In the Tailoring Rule, EPA responded to well-documented administrative issues by phasing in PSD and Title V permitting, focusing first on the largest industrial sources and committing to future evaluations of the permitting process before potentially extending permitting to smaller sources. *Id.* at 31,514–17, 31,535–40.

No party that sought to challenge EPA’s authority to adopt the Tailoring Rule had standing to do so, and the D.C. Circuit thus did not reach the question of EPA’s phase-in authority. See Pet.App. 106a. Even if that merits question were somehow before this Court (and if all of the reasons the agency gave for the Tailoring Rule were held invalid), the correct response would not be to read a textually unsupported “NAAQS-only” limitation into Section 169(1), but to enforce the statute as written. See, *e.g.*, *American Trucking Ass’ns*, 531 U.S. at 466, 471 (rejecting an invitation to read ambiguity into the Act to avoid assertedly extreme economic burdens, because the statute “unambiguously” settled the matter); *Union Elec. Co. v. EPA*, 427 U.S. 246, 265–

66 (1976) (similar); *Griffin v. Oceanic Contractors Inc.*, 458 U.S. 564, 575 (1982) (even when an unambiguous statute might produce “mischievous, absurd or otherwise objectionable” consequences, the remedy is with Congress) (quoting *Crooks v. Harrelson*, 282 U.S. 55, 60 (1930)).

In sum, the D.C. Circuit correctly ruled that EPA’s longstanding construction of the PSD applicability provisions was statutorily compelled, and further review is unwarranted.

Several petitioners seek review of EPA’s interpretation that Title V applies to sources of greenhouse gas emissions. See Texas Pet. 28; SLF Pet. 20–21; Chamber Pet. i (Question Presented No. 3). However, as the D.C. Circuit correctly found, petitioners failed to advance any “alternative interpretations” regarding Title V and thus had “forfeited any challenges to EPA’s greenhouse-gas inclusive interpretation” of that program’s scope. Pet.App. 78a. Tellingly, the one petition that attempts to contest this finding is only able to cite arguments belatedly presented in reply briefs. SLF Pet. 21 & n.13. Judge Kavanaugh’s dissenting opinion nowhere even mentions Title V. Review is unwarranted here as well.

### III. THE D.C. CIRCUIT'S RULING THAT NO PETITIONER HAS STANDING TO CHALLENGE THE TAILORING RULE WAS CORRECT AND IS UNWORTHY OF REVIEW

Three petitions urge the Court to review the D.C. Circuit's ruling that no challenger to EPA's Tailoring Rule had Article III standing. Texas Pet. at 20–28; UARG Pet. 28–32; SLF Pet. 27–29.<sup>19</sup> But the D.C. Circuit's unanimous conclusion that these challenges fell “far short” of Article III's requirements rests on a straightforward and entirely correct application of familiar standing principles, and does not warrant review by this Court. Pet.App. 100a (citing *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560 (1992)). The court explained, correctly, that “neither the Timing nor Tailoring Rules caused the injury Petitioners allege: having to comply with PSD and Title V for greenhouse gases.” *Id.* 101a. That obligation, the court had explained already, stems directly from the statute. The Tailoring Rule, by restricting the number of sources subject to PSD and Title V, *eases* burdens on both regulated entities and permitting authorities. As a result, the court recognized that setting aside the Tailoring Rule would, “if anything,” “significantly exacerbate Petitioners' injuries.” *Id.* See *Gonzales v. Gorsuch*, 688 F.2d 1263, 1267 (9th Cir. 1982) (Kennedy, J.) (denying standing where “the requested relief will actually worsen the plaintiff's position”).

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<sup>19</sup> Texas (Pet. 20) urges the Court to review the merits of the Tailoring Rule, which the D.C. Circuit did not reach. But see *Decker v. Nw. Env'tl. Def. Ctr.*, 133 S. Ct. 1326, 1335 (2013) (“[W]e are a court of review, not of first view.”) (internal quotation marks and citations omitted).

Petitioners suggest that they satisfy Article III requirements “when EPA’s GHG program is considered as a whole.” SLF Pet. 29. See also UARG Pet. 28–32. But such arguments ignore the principle that “[s]tanding is not dispensed in gross. Rather, a plaintiff must demonstrate standing for each claim he seeks to press.” *Davis v. FEC*, 554 U.S. 724, 734 (2008) (citations and internal quotation marks omitted); see also *DaimlerChrysler Corp. v. Cuno*, 547 U.S. 332, 352 (2006); *FW/PBS, Inc. v. City of Dallas*, 493 U.S. 215, 235 (1990). Here, the D.C. Circuit heard and decided each of the claims for which petitioners established their standing to sue (including the claim that the issuance of vehicle standards does not trigger PSD permitting for major sources of greenhouse gas emissions). But no petitioner demonstrated an injury caused by the Tailoring Rule or redressable by its *vacatur*, and the court was therefore right to hold that petitioners lacked standing to challenge it.

Texas’s standing theories (Pet. 22–23, 26) are utterly without merit. Texas appears to have largely abandoned its theory that vacating the Tailoring Rule would prompt congressional repeal. See Pet.App. 101a–103a. Texas now makes an unexplained assertion (Pet. 22) that vacating rules that *relax* regulatory burdens would somehow “redress the injury of onerous regulation.” Alternatively, Texas claims (Pet. 23–26) that, although it *opposes* action to mitigate climate change, Texas has standing to seek *vacatur* of the Tailoring Rule based on the same loss of coastline that the Commonwealth of Massachusetts established in *Massachusetts v. EPA*. The D.C. Circuit held that this argument had not been

properly presented under circuit precedent and court rule, see *Sierra Club v. EPA*, 292 F.3d 895, 901 (D.C. Cir. 2002); D.C. Cir. R. 28(a)(7), Pet.App. 104a–105a, and that Texas had failed to introduce any supporting evidence for it, Pet.App. 105a–106a.

Texas’s plea for standing based on an injury it does not believe it is suffering and does not want to remedy shows scant respect for the “integrity of the judicial process,” *New Hampshire v. Maine*, 532 U.S. 742, 749 (2001) (internal quotation marks and citation omitted), and is not worthy of discretionary jurisdiction. See *id.* (discussing rules prohibiting litigants from playing “fast and loose with the courts” or using “self-contradiction ... as a means of obtaining unfair advantage” (internal quotation marks and citations omitted)).

The D.C. Circuit’s standing ruling represented the straightforward application of settled Article III requirements. No further review is required.

#### **IV. THE CASE DOES NOT PRESENT LEGAL ISSUES WORTHY OF REVIEW, AND PETITIONERS’ ASSERTIONS REGARDING ITS PRACTICAL IMPACT ARE UNFOUNDED**

Attempting to compensate for the absence of legal issues warranting review, petitioners resort to magniloquent assertions (*e.g.*, Chamber Pet. 1) about the importance of the cases and the supposed practical effects of EPA’s actions. But as the members of the D.C. Circuit panel put it, while “[t]he underlying policy questions and the outcome of this case are undoubtedly matters of exceptional importance,” “the legal issues presented ... are straightforward, requiring no more than the

application of clear statutes and binding Supreme Court precedent.” Pet.App. 612a.<sup>20</sup>

Indeed, the relatively few challenges to the Endangerment Finding and Tailpipe Rule—to the extent they raise legal issues at all—are strained efforts that run directly against the plain language of Section 202(a) and this Court’s interpretation of that provision in *Massachusetts*. Petitioners’ few glancing criticisms of EPA’s exercise of its “scientific judgment,” *Massachusetts*, 549 U.S. at 533–34, are paradigms of uncertworthiness. Petitioners, moreover, do not direct any serious attack on the regulations actually before the Court, the motor vehicle emissions standards. No party challenged the substance of those standards, which have enormous environmental and consumer benefits. These issues clearly do not warrant further review.

Petitioners’ various challenges to EPA’s construction of the PSD applicability provisions all depend upon denying effect to the Clean Air Act’s unambiguous text. The D.C. Circuit’s reaffirmation of a longstanding, plain language interpretation of the PSD provisions does not merit this Court’s review. Petitioners failed to present any challenge to EPA’s construction of Title V below. Many of the

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<sup>20</sup> This distinction is a longstanding one. Discussing certiorari jurisdiction before the House Judiciary Committee in 1922, Chief Justice Taft explained that a case that is “very important ... financially” or otherwise “important to the parties,” may turn on a “principle of law ... which is not important because it is well settled,” and that “[i]n such cases we reject the petition.” *Jurisdiction of Circuit Courts of Appeals and United States Supreme Court: Hearing on H.R. 10479 Before the House Comm. on the Judiciary*, 67th Cong. 2 (1922).

petitions attempt indirectly to attack (gross mischaracterizations of) the Tailoring Rule, without attempting to show that the D.C. Circuit erred in ruling that no one had standing to challenge it.

With respect to stationary sources, no petitioner can credibly contend that the impact of greenhouse gas regulation as actually implemented is unreasonable or oppressive. Permitting is proceeding at a reasonable pace across the country and across industrial sectors. In the first two years of the program, fewer than 200 greenhouse gas-emitting sources, all of them large emitters, applied for PSD permits.<sup>21</sup> The majority of the PSD permits issued have been for industrial sources such as electric generating units and natural gas processing plants.<sup>22</sup> As with any PSD permit, each determination of BACT by state or federal permitting authorities requires consideration of cost, 42 U.S.C. 7479(3), and is subject to judicial review. EPA's actions on greenhouse gas permitting have been fact-based and measured, with careful attention to preserving administrability for permitting agencies. See, *e.g.*, 77 Fed. Reg. at

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<sup>21</sup> U.S. EPA, Greenhouse Gas Permitting Update, Office of Air Quality Planning and Standards, National Association of Clean Air Agencies Meeting, at 5 (Dec. 12, 2012), available at <http://www.4cleanair.org/Documents/NACAADecember12MeetingGHGPermittingUpdate.pdf> (GHG Permitting Update); *id.* at 6 (28 applications for Title V permits filed between July 1 and December 10, 2012). See also 77 Fed. Reg. 41,051, 41,058 (July 12, 2012) (44 greenhouse gas permits issued during first 15 months of program).

<sup>22</sup> GHG Permitting Update at 5.

41,053-59. No practical issue warrants intervention by this Court.

EPA, in short, is properly moving forward with the work of applying the Act to a dangerous form of air pollution. None of the issues raised in the petitions warrants further review.

### **CONCLUSION**

The nine petitions should be denied.

Respectfully submitted.

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*Attorneys for Georgia  
ForestWatch, Wetlands Watch,  
and Wild Virginia*

July 22, 2013

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(802) 552-4325  
*Attorney for National Wildlife  
Federation*

## **Appendix: Glossary of Abbreviations**

## GLOSSARY OF ABBREVIATIONS

AEP:	American Electric Power
ACC:	American Chemistry Council
Act:	Clean Air Act, 42 U.S.C. 7401-7671q
APA:	Administrative Procedure Act, 5 U.S.C. 551, <i>et seq.</i>
BACT:	Best available control technology
CAA:	Clean Air Act, 42 U.S.C. 7401-7671q
Chamber:	Chamber of Commerce of the United States of America
CO <sub>2</sub> :	Carbon dioxide
CO <sub>2</sub> e:	Carbon dioxide equivalent
Contribution Finding:	Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009)
CRR:	Coalition for Responsible for Regulation

DOT: Department of Transportation

EIMWG: Energy-Intensive Manufacturers Working Group on Greenhouse Gas Regulation

Endangerment Finding: Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009)

End.JA: Joint Appendix in D.C. Cir. No. 09-1322 (Endangerment)

EPA: Environmental Protection Agency

GHG: Greenhouse gases

IPCC: Intergovernmental Panel on Climate Change

NAAQS: National ambient air quality standards

NAHB: National Association of Homebuilders

NHTSA: National Highway Traffic Safety Administration

NOPA: National Oilseed Processors Association

NRC: National Research Council

NSPS: New source performance standards

Pet.App.: Petition Appendix in *Utility Air  
Regulatory Group v. EPA*, No  
12-1146

PLF: Pacific Legal Foundation

PSD: Prevention of Significant  
Deterioration

RTC: Response to Comments

RTP: Response to Petitions

SAB: Scientific Advisory Board

Section 111: 42 U.S.C. 7411

Section 165: 42 U.S.C. 7475

Section 169: 42 U.S.C. 7479

Section 202: 42 U.S.C. 7521

Section 302: 42 U.S.C. 7602

Section 307: 42 U.S.C. 7607

SLF: Southeastern Legal Foundation

Tailoring  
Rule: Prevention of Significant  
Deterioration and Title V  
Greenhouse Gas Tailoring Rule, 75  
Fed. Reg. 31,514 (June 3, 2010)

Tailpipe  
Rule: Light-Duty Vehicle Greenhouse Gas  
Emission Standards and Corporate  
Average Fuel Economy Standards  
Final Rule, 75 Fed. Reg. 25,324  
(May 7, 2010)

Timing  
Decision: Reconsideration of Interpretation of  
Regulations That Determine  
Pollutants Covered by Clean Air Act  
Permitting Programs, 75 Fed. Reg.  
17,004 (Apr. 2, 2010)

TSD: Technical Support Document for  
Endangerment and Cause or  
Contribute Findings for Greenhouse  
Gases under Section 202(a) of the  
Clean Air Act

UARG: Utility Air Regulatory Group

USGCRP: United States Global Change  
Research Program

---

From: Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
To: Darin Schroeder <dschroeder@catf.us>  
Cc: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
Bcc:  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule  
Date: Tue Jul 23 2013 08:25:08 EDT  
Attachments:

---

Yes. The meeting is confirmed for Aug. 9 starting at 2 pm.

Morgan A. Costello  
Assistant Attorney General  
New York State Office of the Attorney General  
Environmental Protection Bureau  
The Capitol  
Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

From: Darin Schroeder [mailto:dschroeder@catf.us]  
Sent: Monday, July 22, 2013 4:18 PM  
To: Morgan Costello  
Subject: Re: Oil and Gas NSPS/Meeting Reschedule

Hi Morgan- is this meeting confirmed by EPA yet? I'm planning on being there in person, but holding off on buying the ticket until we have the date/time set. Thanks!

-darin

From: Morgan Costello <Morgan.Costello@ag.ny.gov>  
Date: Friday, July 19, 2013 2:48 PM  
To: 'Tomas Carbonell' <tcarbonell@edf.org>, "Michael J. Myers" <Michael.Myers@ag.ny.gov>, "Doniger, David" <ddoniger@nrdc.org>, Ann Weeks <aweeks@catf.us>, "Geertsma, Meleah" <mgeertsma@nrdc.org>, "craig.segall@sierraclub.org" <craig.segall@sierraclub.org>  
Cc: "Longstreth, Ben" <blongstreth@nrdc.org>, "Joanne.Spalding@sierraclub.org" <Joanne.Spalding@sierraclub.org>, Darin Schroeder <dschroeder@catf.us>, "dmccabe@catf.us" <dmccabe@catf.us>, David Lyon <dlyon@edf.org>, Peter Zalzal <pzalzal@edf.org>, "Mordick, Briana" <bmordick@nrdc.org>, Alan Belenz <Alan.Belenz@ag.ny.gov>, "tballo@earthjustice.org" <tballo@earthjustice.org>, "melissa.hoffer@state.ma.us" <melissa.hoffer@state.ma.us>  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule

Ok, I have confirmed with EPA that we are available on Aug. 9 from 2-3 pm eastern time.

Morgan A. Costello  
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New York State Office of the Attorney General  
Environmental Protection Bureau  
The Capitol  
Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

From: Tomas Carbonell [mailto:tcarbonell@edf.org]  
Sent: Friday, July 19, 2013 2:43 PM  
To: Morgan Costello; Michael J. Myers; 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; David Lyon; Peter Zalzal; Mordick, Briana; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule

Thanks Morgan, that time works for Peter Zalzal and me. Best,

Tomás

-----Original Message-----

From: Morgan Costello [mailto:Morgan.Costello@ag.ny.gov]  
Sent: Friday, July 19, 2013 12:45 PM  
To: Michael J. Myers; 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; David Lyon; Peter Zalzal; Tomas Carbonell; Mordick, Briana; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule

So far I've heard availability from some folks at NRDC, Earthjustice, and CATF and it looks like Aug. 9 is the better of the 2 days. Is someone from Sierra Club and EDF available that day from 2-3 pm eastern time?

Morgan A. Costello  
Assistant Attorney General  
New York State Office of the Attorney General Environmental Protection Bureau The Capitol Albany, NY 12224  
(518) 473-5843  
morgan.costello@ag.ny.gov

-----Original Message-----

From: Michael J. Myers  
Sent: Thursday, July 18, 2013 12:11 PM  
To: 'Doniger, David'; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us';

'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
Subject: RE: Oil and Gas NSPS/Meeting Reschedule

Joe and company have suggested 2-3 pm eastern on the 8th or 9th. Can folks weigh in with which date works better. I'll be out for a couple of days, so will ask Morgan to circle back to Joe's secretary when the votes are in. Thanks.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

-----Original Message-----

From: Doniger, David [mailto:ddoniger@nrdc.org]  
Sent: Monday, July 15, 2013 11:39 AM  
To: Michael J. Myers; 'aweeks@catf.us'; Geertsma, Meleah; 'craig.segall@sierraclub.org'  
Cc: Longstreth, Ben; 'Joanne.Spalding@sierraclub.org'; 'dschroeder@catf.us'; 'dmccabe@catf.us'; 'dlyon@edf.org'; 'pzalzal@edf.org'; 'tcarbonell@edf.org'; Mordick, Briana; Morgan Costello; Alan Belenz; 'tballo@earthjustice.org'; 'melissa.hoffer@state.ma.us'  
Subject: Re: Oil and Gas NSPS/Meeting Reschedule

I will probably be able to phone in also, from MN.

David Doniger  
NRDC  
202 321-3435

----- Original Message -----

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, July 15, 2013 07:59 AM  
To: 'Ann Weeks' <aweeks@catf.us>; Geertsma, Meleah; Doniger, David; 'Craig Segall - Sierra' <craig.segall@sierraclub.org>  
Cc: Longstreth, Ben; Joanne.Spalding@sierraclub.org <Joanne.Spalding@sierraclub.org>; 'Darin Schroeder' <dschroeder@catf.us>; 'David McCabe' <dmccabe@catf.us>; dlyon@edf.org <dlyon@edf.org>; 'Peter Zalzal' <pzalzal@edf.org>; 'Tomas Carbonell' <tcarbonell@edf.org>; Mordick, Briana; Morgan Costello <Morgan.Costello@ag.ny.gov>; Alan Belenz <Alan.Belenz@ag.ny.gov>; 'Timothy Ballo' <tballo@earthjustice.org>; Hoffer, Melissa (AGO) (melissa.hoffer@state.ma.us) <melissa.hoffer@state.ma.us>  
Subject: Oil and Gas NSPS/Meeting Reschedule

All, I've heard back from Joe that they won't be ready to meet with us on the 29th and need until the week of Aug. 5 to be in position to have a productive discussion. I know that means that several of us will be unable to participate, but we should try and push this forward with whomever is available. Meleah said that she could probably do a meeting (at least by phone) on Aug. 8 or 9, so why don't folks let me know their availabilities for those days and we can go from there. Thanks.--Mike

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From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Doniger, David <ddoniger@nrdc.org>;  
Morgan Costello </o=lawnet/ou=first administrative group/cn=recipients/cn=morgancostello>  
Cc:  
Bcc:  
Subject: RE: nice brief!  
Date: Tue Jul 23 2013 14:41:44 EDT  
Attachments:

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Thanks David. I'm looking forward to reading your final brief, which hopefully will do later today or tomorrow.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
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The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Doniger, David [mailto:ddoniger@nrdc.org]  
Sent: Monday, July 22, 2013 11:18 PM  
To: Michael J. Myers; Morgan Costello  
Subject: nice brief!

Mike, Morgan,

Nice work. Your brief came out very well.

David

David D. Doniger  
Policy Director, Climate and Clean Air Program  
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ddoniger@nrdc.org

on the web at [www.nrdc.org](http://www.nrdc.org)

read my blog: <http://switchboard.nrdc.org/blogs/ddoniger/>

---

From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Hollinger, Jacob  
<hollinger.jacob@epa.gov>  
Cc:  
Bcc:  
Subject: RE: career change  
Date: Fri Jul 26 2013 14:23:20 EDT  
Attachments:

---

Jacob, congratulations on your new position, sounds exciting. Please keep in touch. Enjoy your vacation.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
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(518) 402-2594  
michael.myers@ag.ny.gov

From: Hollinger, Jacob [mailto:Hollinger.Jacob@epa.gov]  
Sent: Friday, July 26, 2013 11:35 AM  
To: Andrew G. Frank; Andrew Gershon; Lisa Feiner; Lemuel Srolovic; Michael J. Myers; Joseph Kowalczyk; plehner@nrdc.org; kkennedy@nrdc.org; wdornbos@gmail.com; jjsnyder@gw.dec.state.ny.us; macrew@gw.dec.state.ny.us; 'John Urda'; gojohnso@mtahq.org; rehjms@earthlink.net; dam@nyserda.org; djp@myserda.org; Linda M. Wilson; Jodi Feld; william.sharp@dos.state.ny.us; clelgut@gw.dec.state.ny.us; Gregory J. Nolan; greg.nolan@ag.ny.gov; John J. Sipos; swinn@empire.state.ny.us; cstrickland@dep.nyc.gov; tommen@weitzlux.com; robert.rosenthal@ny.exec.gov; richard.grimm@ag.ny.gov; john.davis@gw.state.ny.gov; tomcookcurtis@gmail.com; Kevin Olson; Pedro Medina; norm.spiegel@ag.ny.gov; Yueh-Ru Chu; Isaac Cheng; mylan.denerstein@ny.exec.gov  
Cc: jacob.hollinger@verizon.net  
Subject: career change

Friends...

Big news on my end, unless Janice Dean has already spilled the beans (which would be ok). I'm leaving EPA to become a partner at McDermott Will & Emery, an American Lawyer 100 firm. I'll be in the NY office, in the Energy Advisory Group. It means switching sides a bit, since they have a lot of clients who need Clean Air Act assistance (mostly merchant power generators, not utilities), but also the opportunity to build a litigation and counseling practice for renewable energy companies (because they also have a lot of renewable energy clients).

It has been great to work at EPA, of course, but after nearly 10 years in the public sector and with EPA

facing pay freezes and unpaid furloughs for the indefinite future, it is time for me to move on. I'll be officially employed at EPA for a few more weeks, and will start at MWE the week of August 19, with a short vacation starting August 5. I'll circulate my new work email and phone number once I have them, but you can always reach me at [Jacob.Hollinger@verizon.net](mailto:Jacob.Hollinger@verizon.net) or (917) 331-6509. And I'll still have this EPA email address for one more week.

I hope to catch up with each of you in person sometime soon!

- Jacob

---

From: Hollinger, Jacob  
<hollinger.jacob@epa.gov>  
To: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
Cc:  
Bcc:  
Subject: RE: career change  
Date: Fri Jul 26 2013 14:34:23 EDT  
Attachments:

---

Thanks Mike. If it doesn't work out I'm sure I'll be applying to join the AG's office again in 5 years!

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Friday, July 26, 2013 2:23 PM  
To: Hollinger, Jacob  
Subject: RE: career change

Jacob, congratulations on your new position, sounds exciting. Please keep in touch. Enjoy your vacation.--Mike

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Chief, Affirmative Litigation Section  
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From: Hollinger, Jacob [mailto:Hollinger.Jacob@epa.gov]  
Sent: Friday, July 26, 2013 11:35 AM  
To: Andrew G. Frank; Andrew Gershon; Lisa Feiner; Lemuel Srolovic; Michael J. Myers; Joseph Kowalczyk; plehner@nrdc.org; kkennedy@nrdc.org; wdornbos@gmail.com; jjsnyder@gw.dec.state.ny.us; macrew@gw.dec.state.ny.us; 'John Urda'; gojohnso@mtahq.org; rehjms@earthlink.net; dam@nyserda.org; djp@myserda.org; Linda M. Wilson; Jodi Feld; william.sharp@dos.state.ny.us; clelgut@gw.dec.state.ny.us; Gregory J. Nolan; greg.nolan@ag.ny.gov; John J. Sipos; swinn@empire.state.ny.us; cstrickland@dep.nyc.gov; tommen@weitzlux.com; robert.rosenthal@ny.exec.gov; richard.grimm@ag.ny.gov; john.davis@gw.state.ny.gov; tomcookcurtis@gmail.com; Kevin Olson; Pedro Medina; norm.spiegel@ag.ny.gov; Yueh-Ru Chu; Isaac Cheng; mylan.denerstein@ny.exec.gov  
Cc: jacob.hollinger@verizon.net  
Subject: career change

Friends...

Big news on my end, unless Janice Dean has already spilled the beans (which would be ok). I'm leaving EPA to become a partner at McDermott Will & Emery, an American Lawyer 100 firm. I'll be in the NY office, in the Energy Advisory Group. It means switching sides a bit, since they have a lot of clients who need Clean Air Act assistance (mostly merchant power generators, not utilities), but also the opportunity to build a litigation and counseling practice for renewable energy companies (because they also have a lot of renewable energy clients).

It has been great to work at EPA, of course, but after nearly 10 years in the public sector and with EPA facing pay freezes and unpaid furloughs for the indefinite future, it is time for me to move on. I'll be officially employed at EPA for a few more weeks, and will start at MWE the week of August 19, with a short vacation starting August 5. I'll circulate my new work email and phone number once I have them, but you can always reach me at [Jacob.Hollinger@verizon.net](mailto:Jacob.Hollinger@verizon.net) or (917) 331-6509. And I'll still have this EPA email address for one more week.

I hope to catch up with each of you in person sometime soon!

- Jacob

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From: Michael J. Myers </o=lawnet/ou=first  
administrative group/cn=recipients/cn=michaelmyers>  
To: Hollinger, Jacob  
<hollinger.jacob@epa.gov>  
Cc:  
Bcc:  
Subject: RE: career change  
Date: Fri Jul 26 2013 14:55:45 EDT  
Attachments:

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Am marking my calendar now! J

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Hollinger, Jacob [mailto:Hollinger.Jacob@epa.gov]  
Sent: Friday, July 26, 2013 2:34 PM  
To: Michael J. Myers  
Subject: RE: career change

Thanks Mike. If it doesn't work out I'm sure I'll be applying to join the AG's office again in 5 years!

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Friday, July 26, 2013 2:23 PM  
To: Hollinger, Jacob  
Subject: RE: career change

Jacob, congratulations on your new position, sounds exciting. Please keep in touch. Enjoy your vacation.--Mike

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594

michael.myers@ag.ny.gov

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Sent: Friday, July 26, 2013 11:35 AM

To: Andrew G. Frank; Andrew Gershon; Lisa Feiner; Lemuel Srolovic; Michael J. Myers; Joseph Kowalczyk; plehner@nrdc.org; kkennedy@nrdc.org; wdornbos@gmail.com; jjsnyder@gw.dec.state.ny.us; macrew@gw.dec.state.ny.us; 'John Urda'; gojohnso@mtahq.org; rehjms@earthlink.net; dam@nyserda.org; djp@myserda.org; Linda M. Wilson; Jodi Feld; william.sharp@dos.state.ny.us; clelgut@gw.dec.state.ny.us; Gregory J. Nolan; greg.nolan@ag.ny.gov; John J. Sipos; swinn@empire.state.ny.us; cstrickland@dep.nyc.gov; tommen@weitzlux.com; robert.rosenthal@ny.exec.gov; richard.grimm@ag.ny.gov; john.davis@gw.state.ny.gov; tomcookcurtis@gmail.com; Kevin Olson; Pedro Medina; norm.spiegel@ag.ny.gov; Yueh-Ru Chu; Isaac Cheng; mylan.denerstein@ny.exec.gov

Cc: jacob.hollinger@verizon.net

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- Jacob

---

From: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>  
To: Janice Nolen <janice.nolen@lung.org>; Arthur Marin <amarin@nescaum.org>; Lisa Rector <lrector@nescaum.org>; Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Paul Miller <pmiller@nescaum.org>; tcarbonell@edf.org <tcarbonell@edf.org>; vpatton@edf.org <vpattton@edf.org>; David Baron <dbaron@earthjustice.org>; tballo@earthjustice.org <tballo@earthjustice.org>; David Presley <dpresley@cleanair.org>; Paul Billings <paul.billings@lung.org>  
Cc:  
Bcc:  
Subject: RE: OMB has Formally Accepted the NSPS Rule  
Date: Mon Jul 29 2013 11:47:21 EDT  
Attachments:

---

I suggested in an email I sent to Lisa late last week that we should set up another call for this Wed. 1030 is okay by me.

Michael J. Myers  
Chief, Affirmative Litigation Section  
Environmental Protection Bureau  
New York State Attorney General  
The Capitol  
Albany, NY 12224  
(518) 402-2594  
michael.myers@ag.ny.gov

From: Janice Nolen [mailto:Janice.Nolen@lung.org]  
Sent: Monday, July 29, 2013 11:30 AM  
To: Arthur Marin; Lisa Rector; Jeremy Magliaro; Paul Miller; Michael J. Myers; tcarbonell@edf.org; vpatton@edf.org; David Baron; tballo@earthjustice.org; David Presley; Paul Billings  
Subject: RE: OMB has Formally Accepted the NSPS Rule

This is now posted as accepted on OMB's website. Are we talking on Wednesday again? If we are, could we shift to 10:30? We have a call at 9:30 that conflicts.

Thanks,

Janice

Janice E. Nolen

American Lung Association

Janice.Nolen@Lung.org

From: Arthur Marin [mailto:amarin@nescaum.org]

Sent: Thursday, July 25, 2013 2:13 PM

To: Lisa Rector; Jeremy.Magliaro@ag.ny.gov; Paul Miller; Michael.Myers@ag.ny.gov; tcarbonell@edf.org; vpatton@edf.org; Janice Nolen; David Baron; tballo@earthjustice.org; David Presley; Paul Billings

Subject: OMB has Formally Accepted the NSPS Rule

Good news from Greg Green at EPA!

Arthur N. Marin

Executive Director

NESCAUM

617 259-2017

amarin@nescaum.org

---

From: Timothy Ballo <tballo@earthjustice.org>  
To: Michael J. Myers </o=lawnet/ou=first administrative group/cn=recipients/cn=michaelmyers>; Janice Nolen <janice.nolen@lung.org>; Arthur Marin <amarin@nescaum.org>; Lisa Rector <lrector@nescaum.org>; Jeremy Magliaro </o=lawnet/ou=first administrative group/cn=recipients/cn=jeremymagliaro>; Paul Miller <pmiller@nescaum.org>; tcarbonell@edf.org <tcarbonell@edf.org>; vpatton@edf.org <vpatton@edf.org>; David Baron <dbaron@earthjustice.org>; David Presley <dpresley@cleanair.org>; Paul Billings <paul.billings@lung.org>  
Cc:  
Bcc:  
Subject: RE: OMB has Formally Accepted the NSPS Rule  
Date: Mon Jul 29 2013 12:21:05 EDT  
Attachments:

---

All,

I can't make 10:30 this Wednesday, but David Baron is available then. Thanks.

-Tim

From: Michael J. Myers [mailto:Michael.Myers@ag.ny.gov]  
Sent: Monday, July 29, 2013 11:47 AM  
To: 'Janice Nolen'; Arthur Marin; Lisa Rector; Jeremy Magliaro; Paul Miller; tcarbonell@edf.org; vpatton@edf.org; David Baron; Timothy Ballo; David Presley; Paul Billings  
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