March 25, 2015

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Honorable Michael Boots
Chairman
Council on Environmental Quality

Dear Chairman Boots:

Thank you for the opportunity to comment on the Council on Environmental Quality's Revised Draft Guidance on consideration of greenhouse gas emissions and climate change effects in NEPA Reviews.[1] The individuals listed above respectfully present our views in this joint letter. Please direct inquiries about ideas and information discussed herein to Marlo Lewis, Senior Fellow, Competitive Enterprise Institute, 1899 L Street NW, Washington, DC 20036, 202-331-2267, marlo.lewis@cei.org.

I. Summary

National Environmental Policy Act (NEPA) review is an inappropriate framework for making climate policy. Project-related greenhouse gas (GHG) emissions should not be a factor determining whether agencies grant or deny permits for individual projects. The Guidance endorses the alarmist perspective of EPA's GHG endangerment finding, instructs agencies to quantify indirect (upstream and downstream) as well as direct emissions of individual projects, and recommends the use of social cost of carbon (SCC) calculations in cost-benefit analysis of projects. Each of those elements separately, and especially all in combination, will embolden anti-development groups and politicize rather than improve agency decisions. The Draft Guidance should be withdrawn. A summary of key points follows.

1. EPA's greenhouse gas endangerment finding is an inappropriate starting point for project-related environmental risk assessments.

- The Guidance presents EPA's endangerment finding, or the science embodied in it, as the touchstone and overarching justification for NEPA review of GHG emissions and climate effects. That is unwise.
- EPA's endangerment rule misses the big picture. Our predominantly fossil-fueled civilization did not take a safe climate and make it dangerous. Rather, households and industries empowered with cheap, plentiful, reliable fossil energy took a naturally dangerous climate and made it dramatically safer.
- Because affordable energy and economic growth are the keys to human mastery of climate-related risks, blocking energy-related development projects will do more harm than good to public health and welfare.
- EPA's endangerment rule exaggerates the health- and welfare-impacts of GHG emissions on droughts, storms, floods, heat waves, air pollution, wild fires, crop-yields, sea-level rise, and biodiversity.

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[1] Council on Environmental Quality, *Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews*, December 2014, http://www.whitehouse.gov/sites/default/files/docs/nepa_revised_draft_ghg_guidance_searchable.pdf (hereafter "Guidance")

- The Guidance strangely overlooks the endangerment rule's heavy reliance on the 2007 Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC).
- AR4 did not anticipate important developments undermining the climate alarm narrative: the 18-year-plus warming 'pause'; the growing divergence between climate model predictions and observations; studies finding lower climate sensitivity; studies finding no global trends in the behavior of tropical storms, floods, and droughts; and studies rendering climate catastrophe scenarios implausible for the 21st century.
- AR4 claimed that climate models match observations only when 'forced' with both natural variability and GHG emissions. Data in the IPCC's 2013 Fifth Assessment Report (AR5), buried without comment in "supplementary material," reveal that models match observations in the bulk tropical atmosphere only when models are 'forced' with natural variability alone.

2. NEPA review of project-related GHG emissions will politicize, not improve, agency decisions.

- The Guidance hints at the epistemological futility of analyzing the climate change impacts of particular projects only to pretend it doesn't matter.
- Individual projects contribute less than a drop in the bucket of the global GHG emissions pool. Mitigating the "climate change challenge" one project at a time is a fool's errand and bound to impose real costs out of all proportion to the speculative benefits.
- Thus, extending NEPA review to GHG emissions cannot lead to "better decisions." It can only provide new pretexts for anti-growth groups to delay and block economic development.
- Including "indirect" GHG emissions from "upstream" and "downstream" market interactions over the lifetime of proposed projects will encourage anti-development groups to falsely claim significant climate impacts from individual projects.
- The Guidance will make the pointless *sturm und drang* over the Keystone XL Pipeline the 'new normal' for NEPA review, denying lawful industries the right to invest their own resources to cut costs, create jobs, and grow.
- The Guidance will feed the hubris of those who believe government exists to bankrupt industries they dislike.

3. Incorporating social cost of carbon (SCC) analysis will turn NEPA review into a pseudo-science.

- The social cost of carbon is an unknown quantity, discernible neither in economic nor meteorological data.
- By fiddling with non-validated climate parameters, made-up damage functions, and below-market discount rates, SCC analysts can get just about any result they desire.
- Recent studies put the SCC as high as $266 per ton. The point of such computer-aided sophistry is to make fossil fuels look unaffordable no matter how cheap and anti-carbon taxes or regulation look like a bargain at any price.
- Because infrastructure is built to last, opponents can multiply the presumed SCC by the estimated direct and indirect emissions over decades, and plausibly assert that the project's social costs (although utterly unverifiable) vastly outweigh its manifest economic benefits.

- In addition to the generic flaws of SCC analysis, specific defects also render the administration's 2010 and 2013 Technical Support Documents (TSDs) unfit for use in agency cost-benefit analyses.

II. EPA's greenhouse gas endangerment finding is an inappropriate starting point for project-related environmental risk assessments.

The Guidance presents EPA's endangerment finding,[2] or the science embodied in it, as the touchstone and overarching justification for NEPA review of GHG emissions and climate effects. The Guidance explains:

> Based primarily on the scientific assessments of the USGCRP [U.S. Global Change Research Program] and the National Research Council, the Environmental Protection Agency (EPA) has issued a finding that the changes in our climate caused by increased concentrations of atmospheric GHG emissions endanger public health and welfare. Adverse health effects and other impacts caused by elevated atmospheric concentrations of GHGs occur via climate change. Broadly stated, the effects of climate change observed to date and projected to occur in the future include more frequent and intense heat waves, more severe wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea-level rise, more intense storms, harm to water resources, harm to agriculture, and harm to wildlife and ecosystems.[3]

Although some of the foregoing assertions have a basis in real-world data, others are speculative, and the whole is a fabrication of tortured logic.

A. Missing the Big Picture

Carbon dioxide (CO_2), the chief anthropogenic greenhouse gas, is the inescapable combustion byproduct of carbon-based ("fossil") energy use. People using CO_2-emitting fossil energy did not take a safe climate and make it dangerous. Rather, human beings empowered with cheap, plentiful, reliable fossil energy took a naturally dangerous climate and made it much safer.[4] The evidence of decreasing climate-related risk is overwhelming.

Consider drought, historically the leading source of climate-related deaths. Drought can decrease the two most essential commodities of human life – water and food. Affordable energy, which chiefly comes from fossil fuels, reduces drought risk in manifold ways.

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[2] EPA, 74 FR 66496, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, December 15, 2009, http://www.epa.gov/climatechange/Downloads/endangerment/Federal_Register-EPA-HQ-OAR-2009-0171-Dec.15-09.pdf

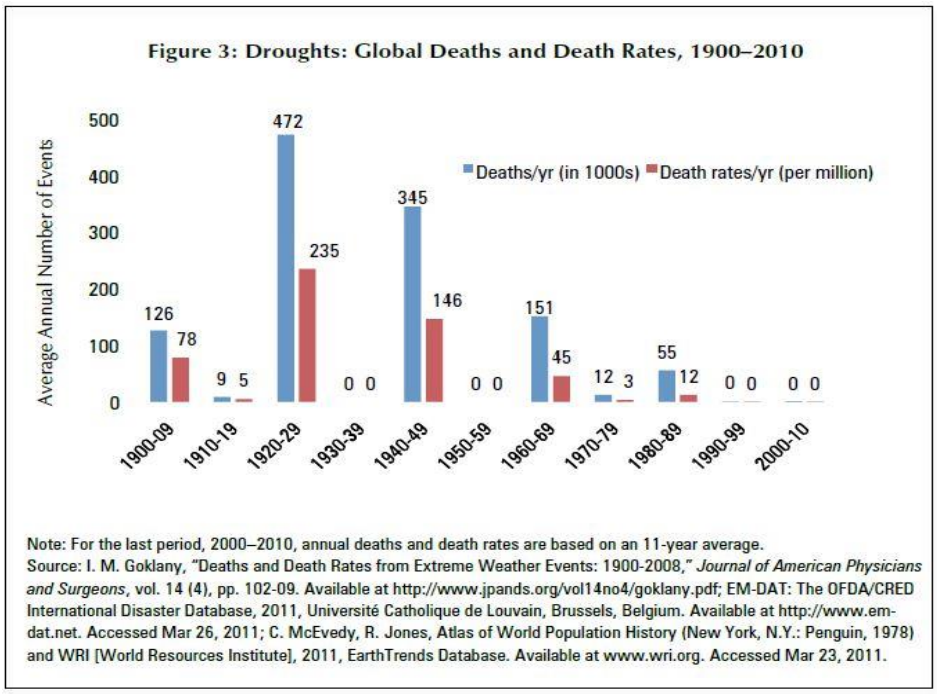
[3] Guidance, pp. 6-8

[4] Alex Epstein, *The Moral Case for Fossil Fuels* (New York: Portfolio/Penguin, 2014), pp. 119-140.

First and foremost, mankind's use of fossil energy dramatically increases the productivity of food production, transport, and storage. As climate economist Indur Goklany observes, every critical input of modern agriculture depends to some extent on fossil fuels:

> Fossil fuels provide both the raw materials and the energy for the manufacture of fertilizers and pesticides; farm machinery is generally run on diesel or another fossil fuel; and irrigation, where it is employed, often requires large amounts of energy to operate pumps to move water.[5]

Fossil fuels provide energy for refrigeration and raw material for plastic packaging — technologies critical to limiting food spoilage and waste. Fossil fuels are essential for exporting agricultural technology and improved cultivars from factories and research centers to farms, and for transporting food from farms to population centers and from surplus to deficit regions. More broadly, fossil-fueled economies create the wealth, physical assets, and expertise required for effective emergency relief programs. Finally, CO_2 emissions boost crop yields, in part by enabling water-stressed plants to retain moisture.[6]



As the above chart shows, drought killed approximately 472,000 people in the 1920s. What happened since then? Fossil-fuel consumption soared, global CO_2 concentrations increased by almost one-third,[7]

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[5] Indur M. Goklany, *Humanity Unbound: How Fossil Fuels Saved Humanity from Nature and Nature from Humanity*, Cato Institute Policy Analysis No. 715, p. 9, December 20, 2012, http://www.cato.org/sites/cato.org/files/pubs/pdf/pa715.pdf

[6] Center for the Study of Carbon Dioxide and Global Change, C4 Plants (Water Use Efficiency), http://www.co2science.org/subject/c/c4plantwue.php

[7] NASA, Global CO2 Mean Mixing Ratios (ppm): Observations, http://data.giss.nasa.gov/modelforce/ghgases/Fig1A.ext.txt

and the Earth warmed about 0.8°C.[8] Yet annual global drought-related deaths declined by 99.8% (from 130,000 to 200) between the 1920s and recent decades. Drought-related death rates (per million population) declined by 99.9%.[9]

CO_2-emitting technologies have made indispensable contributions to similarly remarkable declines in deaths and death rates related to floods and storms.[10]

Carbon-based fuels make humanity dramatically wealthier, better fed, and safer – and the climate far more livable – than would otherwise be the case. If CO_2 emissions have an adverse impact on droughts, storms, or floods (none is detectable so far, as discussed in subsection B), the societal impacts are so tiny compared to the immense long-term improvements that it is impossible to discern a climate signal in indices of health and welfare.

Only those who ignore this big picture could possibly imagine that regulating or taxing away mankind's chief source of cheap, reliable, scalable energy would make us safer or the climate more livable. Alas, using EPA's endangerment finding to frame NEPA reviews is bound to promote such myopia.

B. Bungling the Details

EPA's endangerment rule is not only wrong about the big picture; it is also mistaken or misleading about many details. As summarized in the Guidance, the endangerment rule warns of "more frequent and intense heat waves, more severe wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea-level rise, more intense storms, harm to water resources, harm to agriculture, and harm to wildlife and ecosystems."

As the world warms, heat waves will become more frequent and intense. That is a given – a virtual tautology. However, that does not mean the climate is becoming more dangerous. People aren't dumb. When intense heat becomes more frequent, people adapt – or at least they do in energy-rich societies. As a result, heat-related mortality declines, and more people vote with their feet to live in warmer climates.

The chart below, from Davis et al. (2003), shows that as U.S. urban air temperatures increased during the 1960s through the 1990s, heat-related mortality declined. Cities with the most frequent hot weather – Phoenix, Arizona and Tampa, Florida, for example – have practically zero heat-related mortality.[11]

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[8] NASA, GISS Surface Temperature Analysis, http://data.giss.nasa.gov/gistemp/graphs_v3/

[9] Indur M. Goklany, *Wealth and Safety: The Amazing Decline in Deaths from Extreme Weather in an Era of Global Warming, 1900-2010*, Reason Foundation, Policy Study 393, September 2011, p. 15, https://reason.org/files/deaths_from_extreme_weather_1900_2010.pdf

[10] Ibid., pp. 8-9

[11] Robert E. Davis, Paul C. Knappenberger, Patrick J. Michaels, Wendy M. Novicoff, *Changing Heat-Related Mortality in the United States, Environmental Health Perspectives*. 2003. 111(14): 1712-1718, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241712/

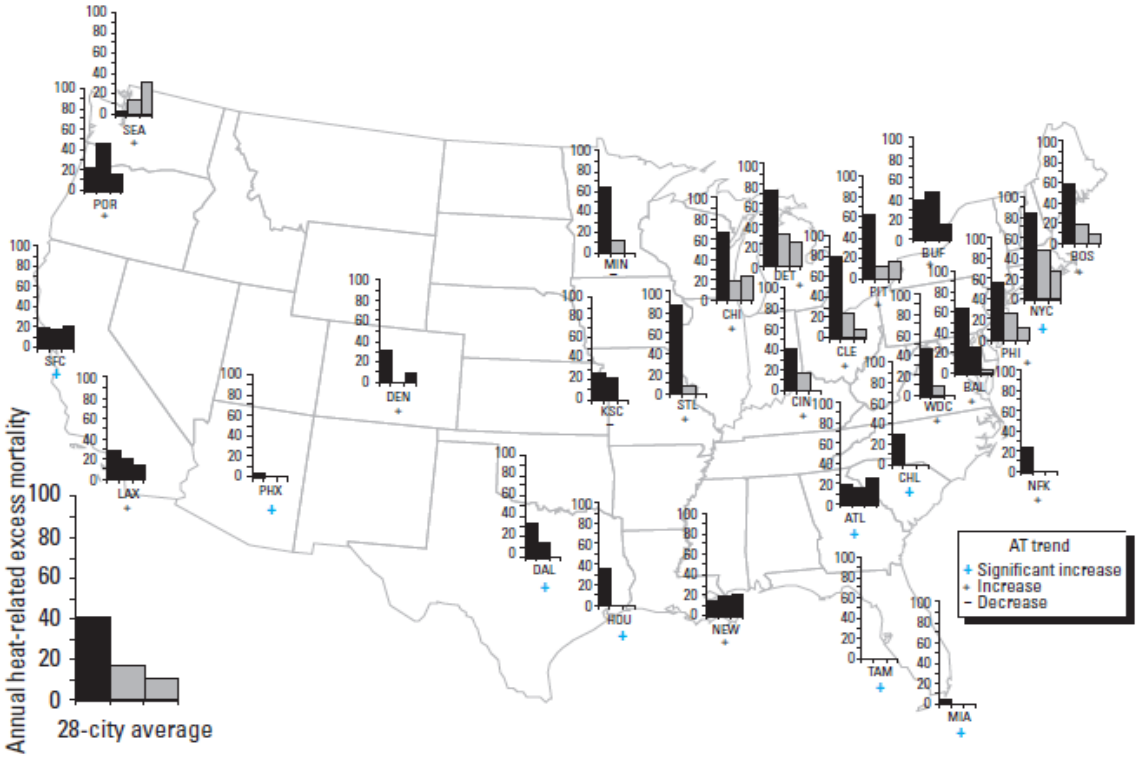


Figure 2. Annual heat-related mortality rates (excess deaths per standard million population on days in which the decadal-varying threshold AT is equaled or exceeded) by city and decade, and long-term trend in summer afternoon AT. Each histogram bar indicates a different decade: from left to right, 1960s–1970s, 1980–1989, and 1990–1998. Decades without histogram bars exhibit no threshold ATs and no heat-related mortality. Decades with gray bars have mortality rates that are statistically significantly different from the decades indicated by black bars. The average excess deaths across all 28 cities is shown at the lower left. AT trends (Figure 3) are indicated beneath each city abbreviation (defined in Table 1).

Heat-related mortality continued to decline in the 2000s. Bobb et al. (2014) examined summer temperature data and all-cause mortality in 105 U.S. cities during 1987-2005. They found that the heat-mortality risk of elderly people declined to levels about the same as people in middle age: "While heat-related mortality risk for the ≥75 age group was greater than for the <65 group at the beginning of the study period, by 2005 they had converged to similar levels."[12]

Due to the increasing safety of hot weather, millions of American seniors elect to experience about four times more warming in their golden years than rising GHG concentrations potentially caused since the turn of the last century. The maps below show population growth rates by state and average temperature by state from 1900 to 2010.

[12] Jennifer F. Bobb, Roger D. Peng, Michelle L. Bell, and Francesca Dominici, Heat-Related Mortality and Adaptation to Heat in the United States. Environmental Health Perspectives, Volume 122, Issue 8, August 2014, http://ehp.niehs.nih.gov/1307392/

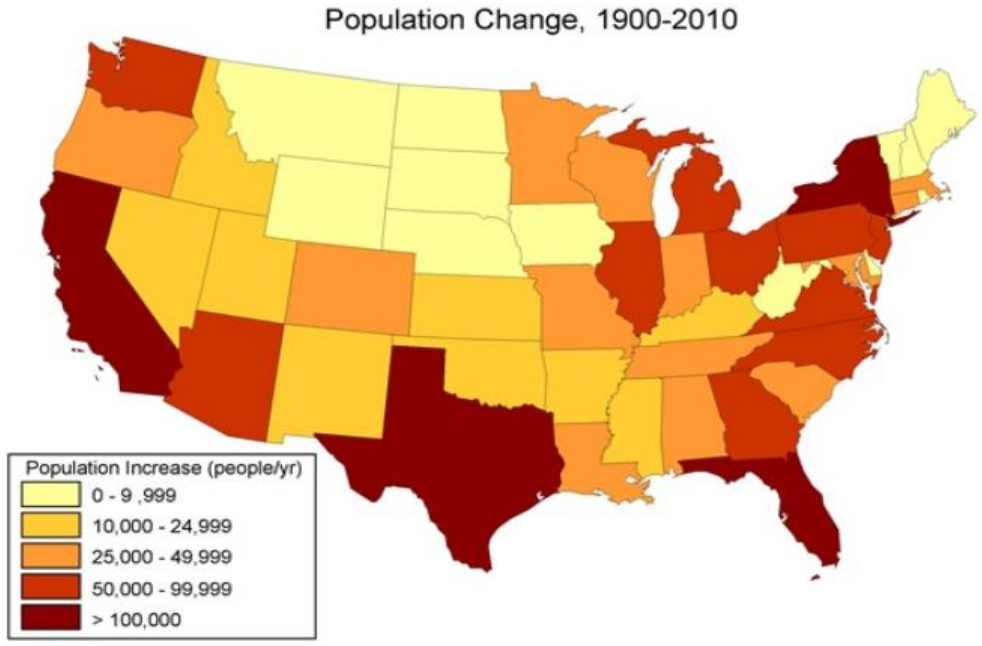


Figure 1. The state-by-state population trend (people/year) from 1900 to 2010 (data from U.S. Census Bureau).

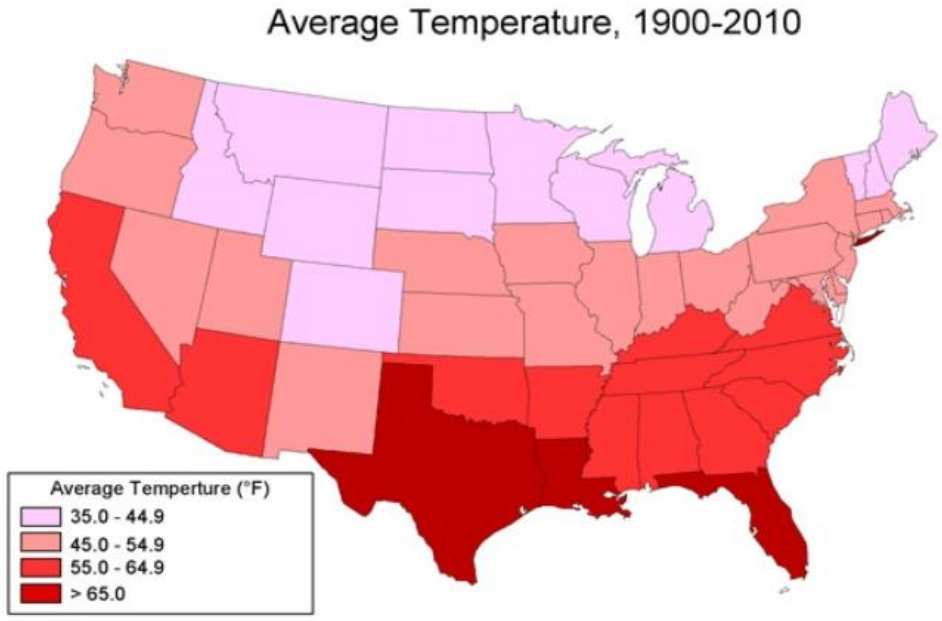


Figure 2. The state-by-state average annual temperature for the period 1900-2010 (statewide temperture data available from the U.S. National Climatic Data Center).

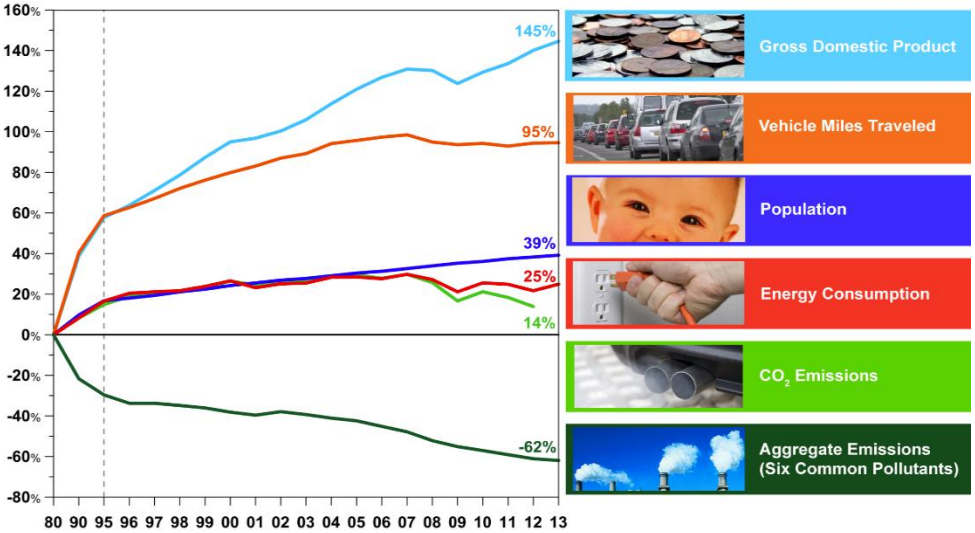
Cato Institute scientists Patrick Michaels and Paul C. "Chip" Knappenberger calculate that the "experiential temperature" of the average person living in the U.S. has increased by about "3.85°F over the course of the last 114 years (a rate of 0.34°F per decade)." Only a small portion of that increase is due to the long-term increase in U.S. average temperature. Most of it is due to people moving from cooler states to warmer states. As should go without saying, millions of Americans move to warmer climates precisely to enhance their health and welfare.

The two maps together reveal a striking demographic "consensus" on climate change. In the words of the two Cato scientists:

> Apparently, people – or Americans at least – seem to prefer a warmer climate to a cooler one. Next time climate prognosticators warn of the perils of rising temperatures, remember this: when given the means and a choice, some (or rather, most) like it hot![13]

In light of the increasing safety of hot weather and Americans' revealed preference for climatic warmth, it makes no sense at all to deny anyone permission to build a project at his own financial risk because of the project's hypothetical and undetectably small impact on heat waves.

The Guidance refers to "degraded air quality" as a potential climate change impact. Does EPA read its own analyses? As urban air temperatures warmed, U.S. air quality improved. Between 1980 and 2013, gross domestic product increased 145%, vehicle miles traveled increased 95%, energy consumption increased 25%, and U.S. population increased 39%. Yet during the same period, total emissions of the six principal air pollutants decreased by 62%.[14]



[13] Patrick J. Michaels and Paul C. "Chip" Knappenberger, "Some Like It Hot," Cato at Liberty, February 28, 2014, http://www.cato.org/blog/some-it-hot

[14] EPA, Air Quality Trends, http://www.epa.gov/airtrends/aqtrends.html#comparison

Those emission reductions translate into reductions in emission concentrations, which means reduced risk to public health.

Percent Change in Air Quality

	1980 vs 2013	1990 vs 2013	2000 vs 2013
Carbon Monoxide (CO)	-84	-76	-59
Ozone (O_3) (8-hr)	-33	-23	-18
Lead (Pb)	-92	-87	-60
Nitrogen Dioxide (NO_2) (annual)	-58	-50	-40
Nitrogen Dioxide (NO_2) (1-hour)	-60	-46	-29
PM_{10} (24-hr)	---	-34	-30
$PM_{2.5}$ (annual)	---	---	-34
$PM_{2.5}$ (24-hr)	---	---	-34
Sulfur Dioxide (SO_2) (1-hour)	-81	-76	-62

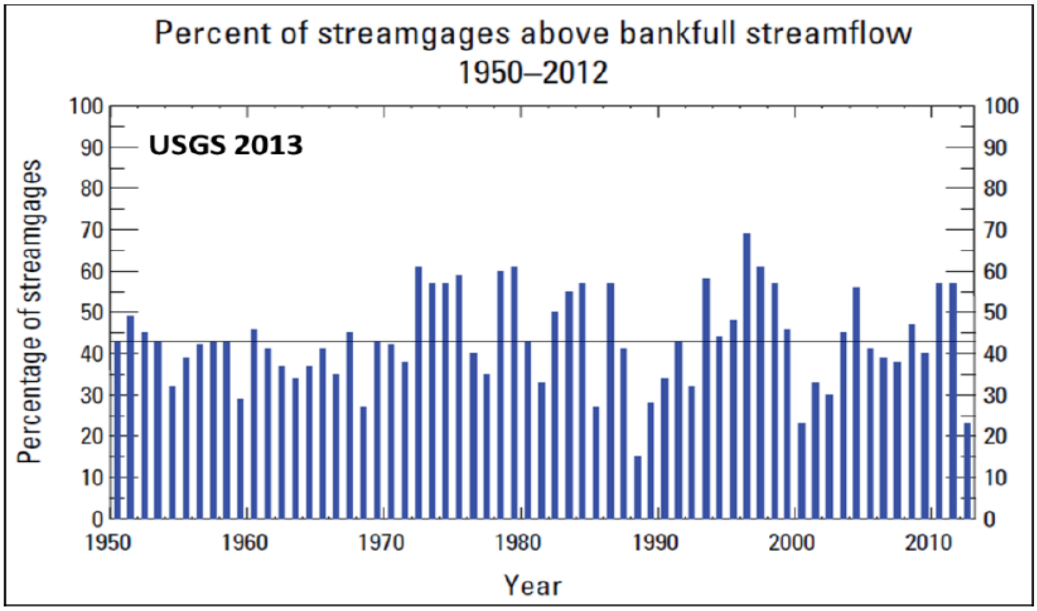
Notes:
1. --- Trend data not available
2. Negative numbers indicate improvements in air quality
3. In 2010, EPA established new 1-hour average National Ambient Air Quality Standards for NO2 and SO2

Note that between 1980 and 2012, CO_2 emissions increased by 14%. That means CO_2 emissions are positively correlated with increases in wealth, mobility, super-human power at the beck and call of ordinary mortals (i.e. energy consumption), *and air quality improvement*. Those who argue or imply that federal agencies must deny permission to build CO_2-emitting projects to prevent "degraded air quality" don't know what they are talking about.

The Guidance cites "more heavy downpours and flooding" as a concern that should inform NEPA reviews. There has been a statistically significant increase since 1910 in the frequency of U.S. rainfall events exceeding 2 inches.[15] However, this has not had a discernible impact on flood frequency or intensity. A study by the U.S. Geological Survey found no significant association between rising CO_2 concentrations and stream gauge records going back 85-127 years.[16] Another excuse to block wealth-creating projects goes down the drain.

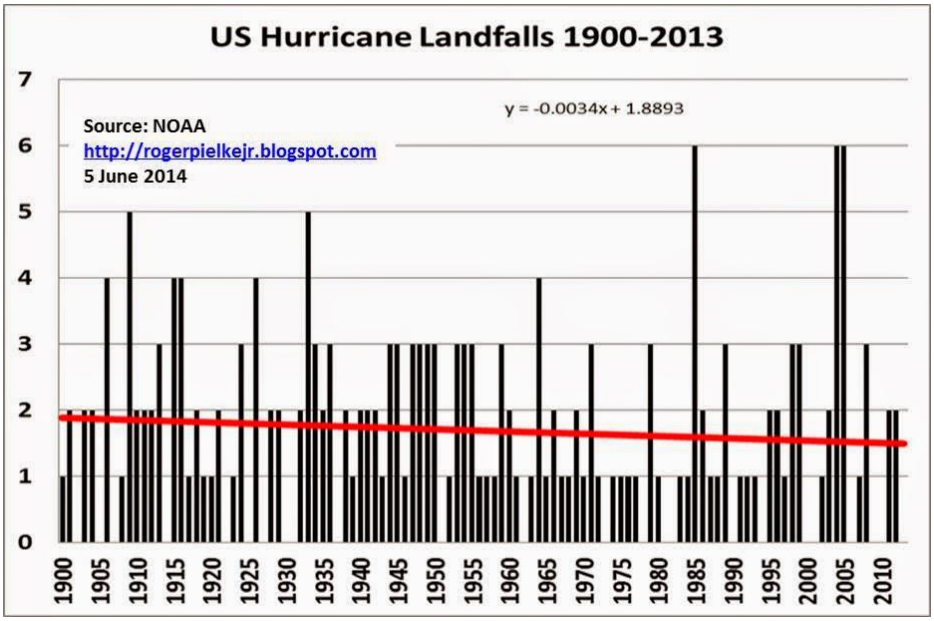
[15] Karl, T.R., and R.W. Knight, 1998: Secular trends of precipitation amount, frequency, and intensity in the United States. *Bulletin of the American Meteorological Society*, 79, 231-241

[16] R.M. Hirsch and K.R. Ryberg. 2012. Has the magnitude of floods across the USA changed with global CO_2 levels? *Hydrological Sciences Journal* vol. 57, issue 1, pp. 1-9, http://www.tandfonline.com/doi/abs/10.1080/02626667.2011.621895#.UvFekJ0o4Sk

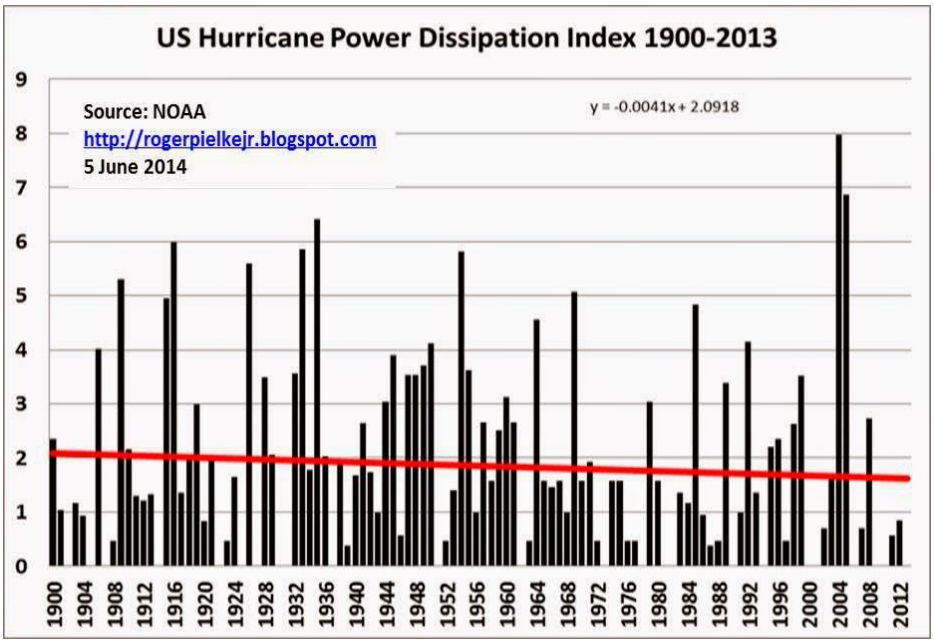


The Guidance cites "more intense storms" as a concern that should inform NEPA reviews. Changes in storm frequency and intensity are projected in some climate models. But predictions about what might happen by 2080 are hypotheses, not evidence. Real-world data so far provide no solid evidence for such claims.

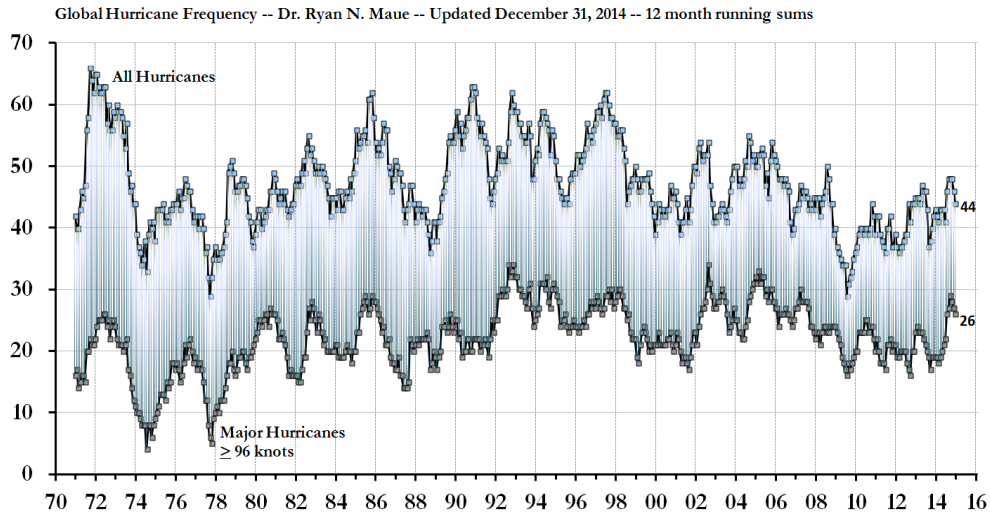
Since 1900, there been about a *20% decline* in both the frequency of U.S. hurricane landfalls and the strength U.S. hurricanes as measured by the power dissipation index.[17]



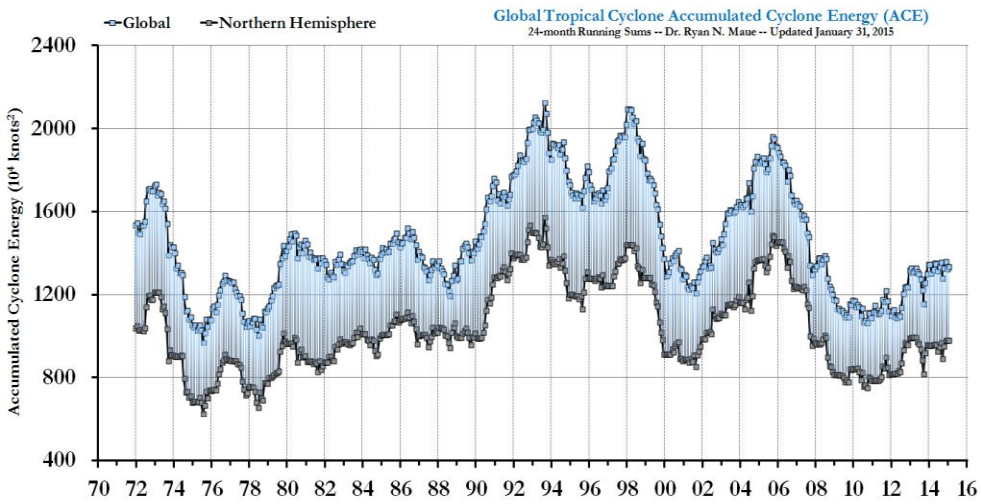
[17] Roger Pielke, Jr. "Hurricane Drought in USA Today," June 4, 2014, http://rogerpielkejr.blogspot.com/2014/06/the-us-hurricane-drought-in-usa-today.html



Globally, there has been considerable inter-decadal variability but no long-term trend in hurricane frequency or strength (measured in Accumulated Cyclone Energy) since 1970.[18]



[18] Dr. Ryan Maue, Global Tropical Cyclone Activity, WeatherBell Models, Updated February 19, 2015, http://models.weatherbell.com/tropical.php#!prettyPhoto



Another excuse to block wealth-creating projects is blown away.

The Guidance cites "increased drought" as a concern that should inform NEPA reviews. There's not much convincing real-world evidence that global drought frequency or severity is increasing. A 2012 study in *Nature* found "Little change in global drought over the past 60 years."[19] A 2014 study in *Theoretical and Applied Climatology* found that "the area of global land under drought conditions does not show a significant trend over the past three decades."[20] The IPCC's Fifth Assessment Report (AR5) similarly found "there is low confidence in detection and attribution of changes in drought over global land areas since the mid-20th century."[21]

DDWW – dry gets drier, wet gets wetter – is a longstanding prediction of "consensus" climatology. Supposedly, global warming will reduce rainfall in areas that are already dry and increase rainfall in areas that are already moist, resulting in a planet more prone to droughts and floods – a less livable climate.

A recent study in *Nature Geoscience* found that during 1948-2005 about 10.8% of global land area exhibited the DDWW pattern, but 9.5% of global land area showed "the opposite pattern, that is, dry gets wetter and wet gets drier."[22] In sum, essentially no trend overall. Another excuse to block wealth-creating projects runs dry.

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[19] Justin Sheffield, Eric F. Wood & Michael L. Roderick. Little change in global drought over the past 60 years. 2012. *Nature* 491, 435-438, http://www.nature.com/nature/journal/v491/n7424/pdf/nature11575.pdf

[20] Damberg, L. and AghaKouchak, A. 2014. Global trends and patterns of drought from space. *Theoretical and Applied Climatology* 117: 441-448, https://www.deepdyve.com/lp/springer-journals/global-trends-and-patterns-of-drought-from-space-O26sYJGefa

[21] IPCC, *Climate Science 2013: The Physical Science Basis*, "Detection and Attribution of Climate Change: from Global to Regional," Chapter 10, p. 913, http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter10_FINAL.pdf

[22] Peter Greve, Boris Orlowsky, Brigitte Mueller, Justin Sheffield, Markus Reichstein & Sonia I. Seneviratne. 2014. Global assessment of trends in wetting and drying over land. *Nature Geoscience* 7, 716–721, http://www.nature.com/ngeo/journal/v7/n10/full/ngeo2247.html

One clear global trend related to drought indicates the benefits of the CO_2 fertilization effect. Satellite observations reveal an 11% increase in green foliage cover in warm, arid environments since 1982. This global phenomenon has no known explanation except the long-term rise in atmospheric CO_2 concentration.[23]

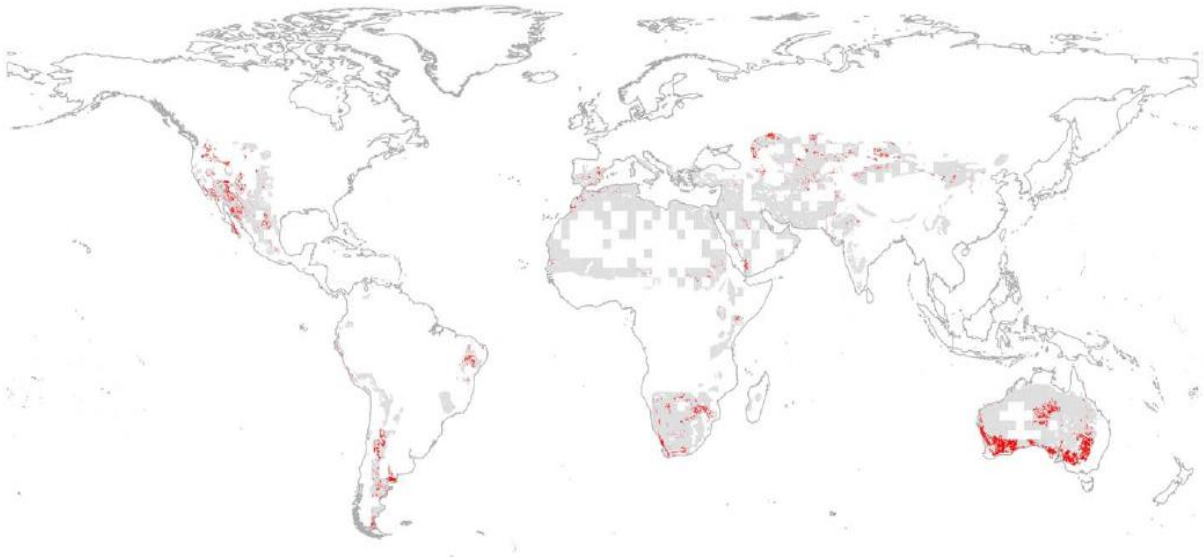

Figure explanation: Red areas mark the increase in green foliage cover in warm, arid climates.

The Guidance cites "more severe wildfires" as a concern that should inform NEPA reviews. While longer hotter summers are strongly associated with increased forest fire activity,[24] both natural variability[25] and non-GHG 'anthropogenic' factors such as forestry practices also affect wildfire activity.[26] There has been no trend in U.S. wildfire frequency over the past three decades.[27]

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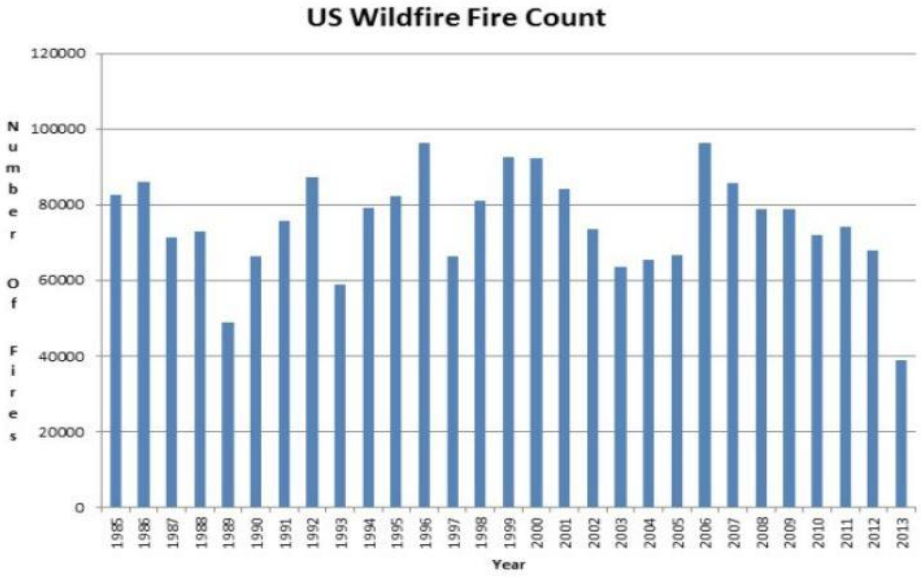
[23] Randall J. Donahue, Michael L. Roderick, Tim R. McIver, and Graham D. Farquhar. 2013. Impact of CO2 fertilization on maximum foliage cover across the globe's warm, arid environments. *Geophysical Research Letters*, Volume 40, Issue 12, pp. 3031–3035, http://onlinelibrary.wiley.com/doi/10.1002/grl.50563/abstract

[24] Westerling, A.L., Hidalgo, H.G., Cayan, D.R. and Swetnam, T.W. 2006. Warming and earlier spring increases western U.S. Forest wildfire activity. Scienc*express* 6 July 2006 10.1126/science.1128834, http://www.sciencemag.org/content/313/5789/940.short

[25] Brian Beckage, William J. Platt, Matthew G. Slocum, and Bob Panko 2003. INFLUENCE OF THE EL NIÑO SOUTHERN OSCILLATION ON FIRE REGIMES IN THE FLORIDA EVERGLADES. Ecology 84:3124–3130. http://dx.doi.org/10.1890/02-0183

[26] Alison Berry, *Forest Policy Up in Smoke: Fire Suppression in the United States*, Property and Environment Research Center, 2007, http://perc.org/sites/default/files/Forest%20Policy%20Up%20in%20Smoke.pdf

[27] Testimony of John Christy, A Factual Look at the Relationship between Climate and Weather, Subcommittee on Environment, Committee on Science, Space and Technology, 11 December 2013, p. 3, http://docs.house.gov/meetings/SY/SY18/20131211/101589/HHRG-113-SY18-Wstate-ChristyJ-20131211.pdf. The chart is based on National Interagency Fire Center data (http://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html).



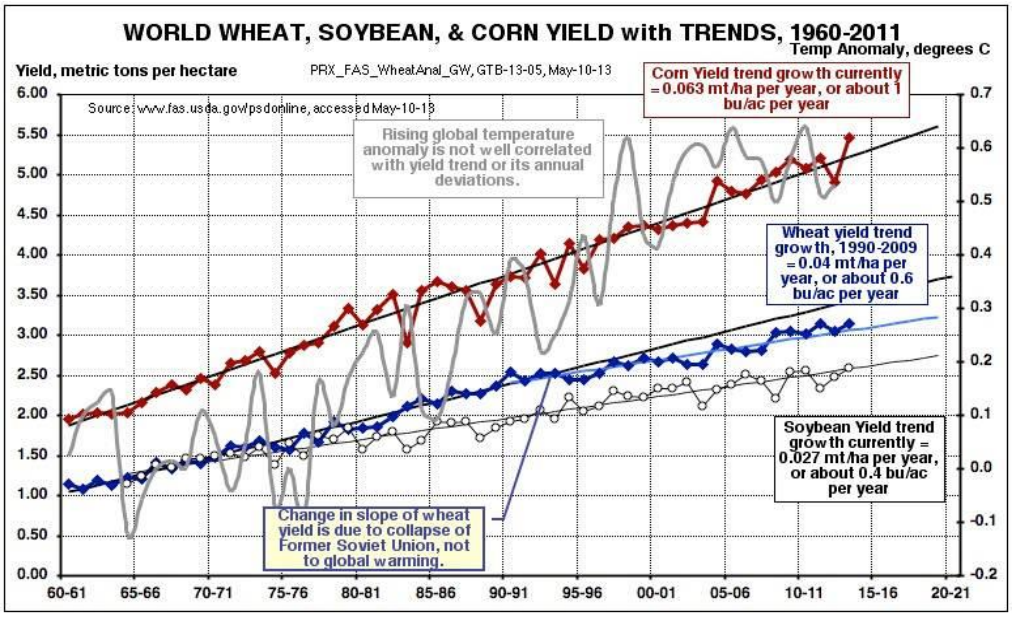
In any case, since even total elimination of U.S. CO_2 emissions would, according to EPA climate modeling, reduce global temperatures by less than 0.2°C in 2100,[28] no particular project or even several hundred projects combined would detectably affect wildfire activity in the foreseeable future. Another excuse to block wealth-creating projects goes up in smoke.

The Guidance cites "harm to agriculture" as a concern that should inform NEPA reviews. As noted above, CO_2-emitting fossil fuels are the chief energy source of global food production, transport, and storage. Any policies that increase the cost and/or restrict the supply of fossil fuels have an obvious potential to harm consumers, hunger-stricken communities, and global food security.

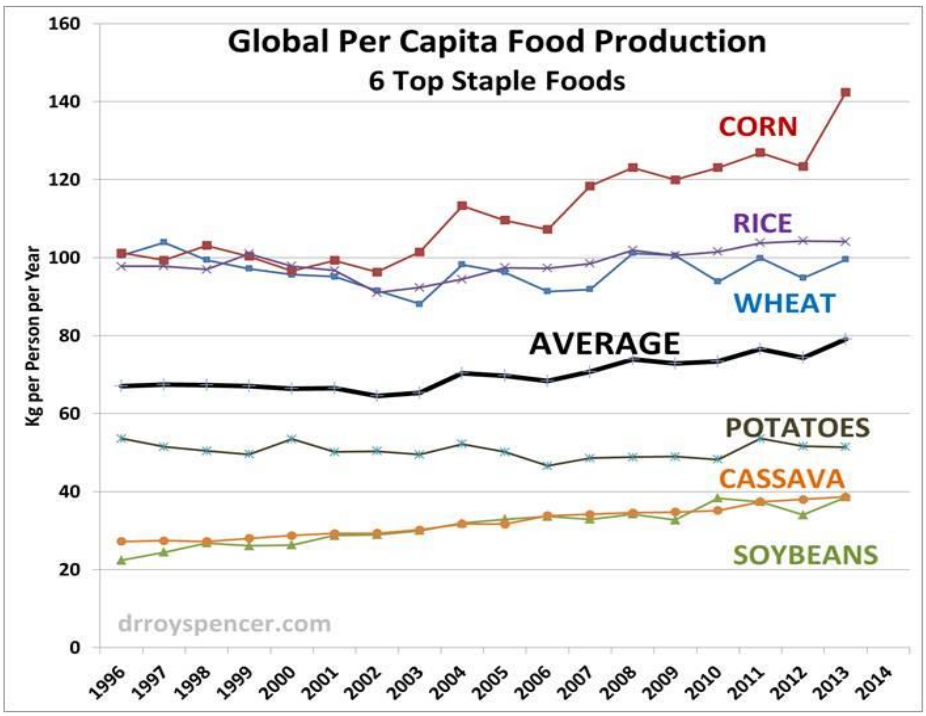
Although climate change could potentially offset agricultural gains from technological innovation in the future, there is little evidence of harm to date. For example, global soybean, wheat, and corn yields each increased by well over 100% since 1960.[29]

[28] The calculation is based on EPA's Model for the Assessment of Greenhouse Gas-Induced Climate Change (MAGICC) assuming mid-range climate sensitivity. See Paul C. "Chip" Knappenberger, "Carbon Tax: Climatologically Useless," MasterResource.Org, December 3, 2012, https://www.masterresource.org/carbon-tax/carbon-tax-climatically-useless/

[29] Roy Spencer, "The Next Great Famine . . . or Age of Abundance?" DrRoySpencer.Com, March 18, 2014, http://www.drroyspencer.com/2014/03/the-next-great-famineor-age-of-abundance/



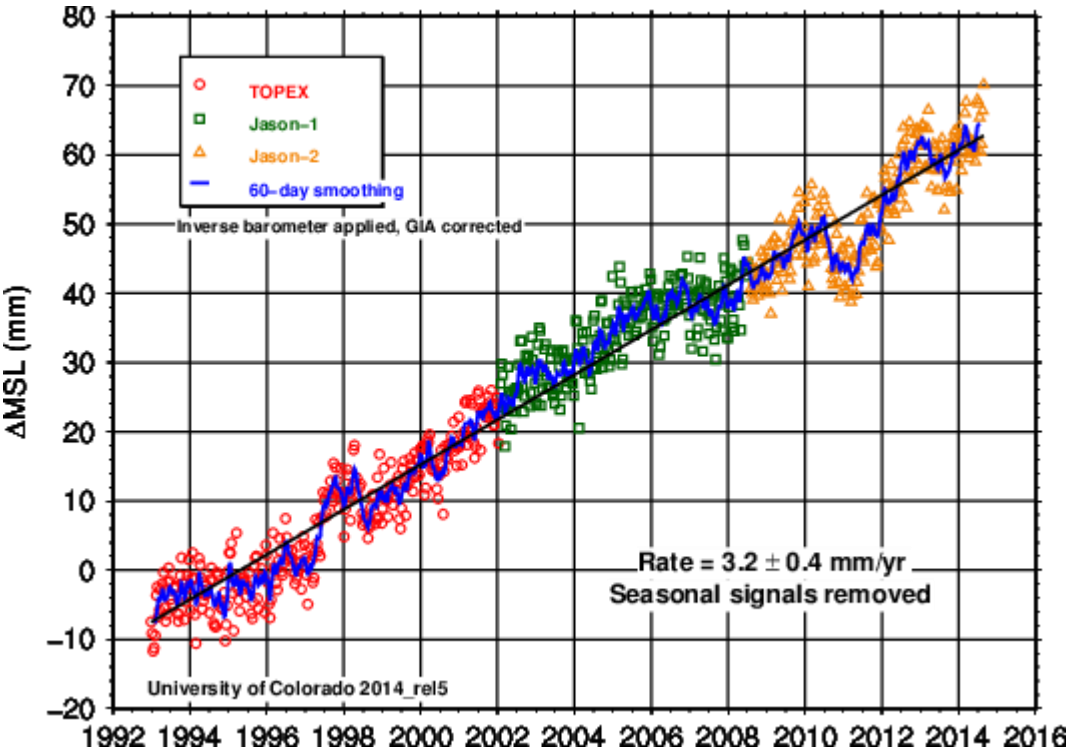
Global per capita production of the top six staple foods has increased since the mid-1990s.[30]



Another excuse to block wealth-creating projects bites the dust.

[30] Roy Spencer, "Peak Food? No the Average Person Has More to Eat," DrRoySpencer.Com, January 29, 2015, http://www.drroyspencer.com/2015/01/now-its-peak-food-give-me-a-break/

The Guidance mentions "greater sea-level rise" as a concern that should inform NEPA reviews. The rate of sea-level rise has held fairly steady over the past 22 years (3.2 mm/yr).[31] That works out to an additional 10.7 inches between now and 2100. For perspective, sea-level rose about 6.7 inches in the 20th century.[32] The costs were miniscule compared to the dramatic rise in coastal development and real estate values. Far more damage would have been done by prohibiting critical infrastructure in the name of climate change than by the ~7 inches of sea level rise that actually occurred.



Although an additional 10-12 inches of sea-level rise by 2100 would require significant investment to harden and protect coastal assets, it is a challenge that a wealthy society can meet over the course of a century. Much of the built environment will have to be replaced anyway, and urban planners and real estate markets will respond to credible sea-level rise projections when and as such information becomes available.

As with other climate change-related impacts, blocking economic development is not a reasonable strategy to mitigate sea-level rise. Even complete cessation of all U.S. CO_2 emissions starting tomorrow would reduce projected sea level rise only 6 mm by 2050 and 18 mm (less than one inch) by 2100.[33]

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[31] University of Colorado CU Sea Level Research Group, accessed February 20, 2015, http://sealevel.colorado.edu/

[32] Simon Holgate, Proudman Oceanographic Laboratory, Decadal rates of sea level change during the 20th century, http://wcrp.ipsl.jussieu.fr/Workshops/SeaLevel/Posters/2_3_Holgate.pdf

[33] The calculation is based on MAGICC, EPA's climate model simulator. Paul C. "Chip" Knappenberger, *Carbon Dioxide Emissions and Potential "Savings" in Future Global Temperature and Global Sea Level Rise*, Science and

To the extent that NEPA review of GHG emissions suppresses development, it could actually hinder adaptation to sea-level rise by limiting economic growth.

The Guidance cites GHG-related "harm to wildlife and ecosystems" as a concern that should inform NEPA project reviews. Again, there is little empirical evidence for that concern.

A major literature review reports that "Over the past century and a half of increasing air temperature and CO_2 concentration, many species of [plants and] animals have significantly extended the cold-limited boundaries of their ranges, both poleward in latitude and upward in elevation, while they have maintained the locations of the heat-limited boundaries of their ranges." The study finds that plant and animal species "have measurably increased the areas of the planet's surface that they occupy, creating more overlapping of ranges, greater local species richness, and an improved ability to avoid extinction."[34]

C. Hidden Reliance on AR4

To explain why NEPA review of GHG emissions is appropriate, the Guidance states: "Based primarily on the scientific assessments of the USGCRP and the National Research Council, the Environmental Protection Agency (EPA) has issued a finding that the changes in our climate caused by increased concentrations of atmospheric GHG emissions endanger public health and welfare."[35]

That is not accurate. EPA's endangerment rule repeatedly cites the U.N. Intergovernmental Panel on Climate Change (IPCC) 2007 Fourth Assessment Report (AR4) along with the USGCRP and National Research Council as its primary scientific basis:

> The Administrator has determined that the body of scientific evidence compellingly supports this finding. The major assessments by the U.S. Global Climate Research Program (USGCRP), the Intergovernmental Panel on Climate Change (IPCC), and the National Research Council (NRC) serve as the primary scientific basis supporting the Administrator's endangerment finding. 74 FR 66497
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> * * *
>
> EPA is giving careful consideration to all of the scientific and technical information in the record, as discussed below. However, the Administrator is relying on the major assessments of the

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Public Policy Institute, April 8, 2013, http://scienceandpublicpolicy.org/images/stories/papers/originals/state_by_state.pdf

[34] Sherwood B. Idso, Craig D. Idso, and Keith E. Idso, *The Specter of Species Extinction: Will Global Warming Decimate Earth's Biosphere*, George C. Marshall Institute, 2003, pp. 1-2, http://www.co2science.org/images/pdf/extinction.pdf

[35] Guidance, p. 7

> USGCRP, IPCC, and NRC as the primary scientific and technical basis of her endangerment decision for a number of reasons. FR 66510
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> * * *
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> It is worth noting that the June 2009 assessment of the USGCRP incorporates a number of key findings from the 2007 IPCC Fourth Assessment Report; such findings include 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. 74 FR 66511
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> * * *
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> It is EPA's view that the scientific assessments of the IPCC, USGRCP, and the NRC represent the best reference materials for determining the general state of knowledge on the scientific and technical issues before the agency in making an endangerment decision. 74 FR 66511
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> * * *
>
> EPA was also involved in review of the IPCC Fourth Assessment Report, and in particular took part in the approval of the summary for policymakers for the Working Group II Volume, Impacts, Adaptation and Vulnerability. The USGCRP, IPCC, and NRC assessments have been reviewed and formally accepted by, commissioned by, or in some cases authored by, U.S. government agencies and individual government scientists. 74 FR 66511
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> * * *
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> These assessments therefore essentially represent the U.S. government's view of the state of knowledge on greenhouse gases and climate change. For example, with regard to government acceptance and approval of IPCC assessment reports, the USGCRP Web site states that: ''When governments accept the IPCC reports and approve their Summary for Policymakers, they acknowledge the legitimacy of their scientific content." 74 FR 66511

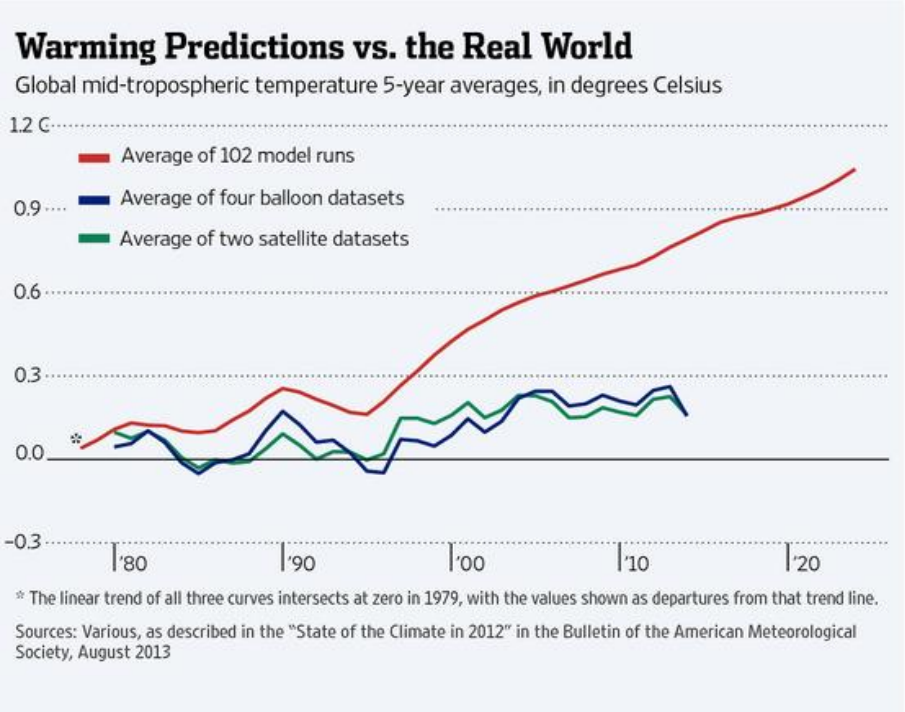
The endangerment rule's Technical Support Document (TSD) also gives the IPCC equal billing with the USGCRP and NRC:

> This document relies most heavily on existing, and in most cases very recent, synthesis reports of climate change science and potential impacts, which have gone through their own peer-review processes including review by the U.S. Government. . . .These core reference (Table 1.1) documents include the 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), Synthesis and Assessment Products of the U.S. Climate Change Science Program (CCSP), National Research Council (NRC) reports under the U.S. National Academy of

Sciences (NAS), the EPA annual report on U.S. greenhouse gas emission inventories and the EPA assessment of the impacts of global change on regional U.S. air quality.[36]

Indeed, the endangerment rule arguably gives the IPCC pride of place, stating that "the June 2009 assessment of the USGCRP incorporates a number of key findings from the 2007 IPCC Fourth Assessment Report; such findings include 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." 74 FR 66511

Seven years later, those "key findings" are in disarray. "Future projected scenarios" refer to global warming forecasts from climate model ensembles. As is widely known, model projections increasingly diverge from observed temperatures. The chart below is by Richard McKnider and John Christy of the University of Alabama in Huntsville atmospheric sciences department.[37]



[36] EPA, Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gas Emissions under Section 202(a) of the Clean Air Act, December 7, 2009, p. 4 (Hereafter EPA Endangerment TSD), http://www.epa.gov/climatechange/Downloads/endangerment/Endangerment_TSD.pdf

[37] Richard McKnider and John Christy, "Why Kerry Is Flat Wrong on Climate Change," *Wall Street Journal*, February 19, 2014, http://www.wsj.com/news/articles/SB10001424052702303945704579391611041331266?mod=WSJ_Opinion_LEADTo

The next chart shows that observations are not only below the model mean but also below the model range.[38]

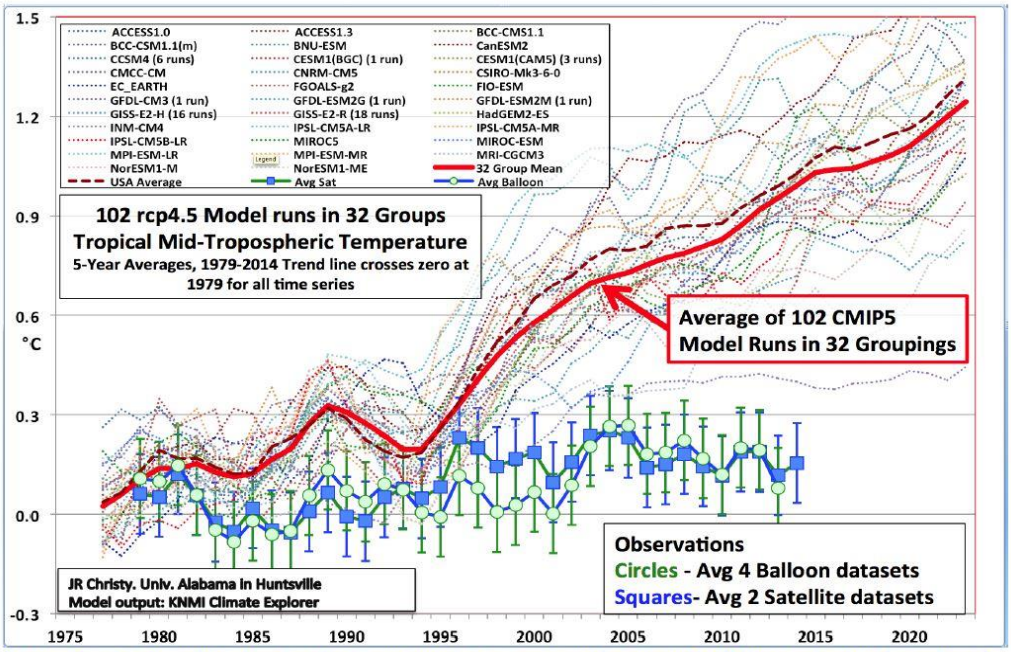


Figure 1b. As above but showing the 5-year running averages and again with all time series trends anchored to a common point, 1979. The 102 runs have been combined into the 32 model types. The average of the U.S. model runs is shown in the thicker dashed line. Error bars for estimating the accuracy of the observations have been included, and in all cases there is considerable overlap of the two independent types of measurements (balloons and satellites.)

Because the foregoing charts cover the 'satellite era' (1979 to present), it is tempting to discount the divergence as a short-term fluke of natural variability. But the satellite era is now in its 35th year and "climate" is typically defined as average weather over a period of at least 30 years.[39]

One possible reason IPCC models overshoot observations is that they overestimate climate sensitivity – the equilibrium global mean surface temperature change following a doubling of atmospheric CO_2 concentration. AR4 gave a best estimate for climate sensitivity of 3°C.[40] More than a dozen peer-reviewed studies published since 2011 estimate lower climate sensitivities.[41] Lower sensitivity means less warming and, other things being equal, smaller climate impacts.

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[38] Public Comment on EPA proposed rule for existing carbon-burning power plants, EPA-HQ-OAR-2013-0602-0001, John R. Christy, Department of Atmospheric Science, University of Alabama in Huntsville, http://www.globalwarming.org/wp-content/uploads/2014/12/ChristyJR_EPA_2014_PublicComment.pdf

[39] World Meteorological Organization, Frequently Asked Questions, http://www.wmo.int/pages/prog/wcp/ccl/faqs.php

[40] IPCC, Climate Change 2007, *Synthesis Report*, 2.3 Climate Sensitivity and Feedbacks, http://www.ipcc.ch/publications_and_data/ar4/syr/en/mains2-3.html

[41] Patrick J. Michaels and Paul C. "Chip" Knappenberger, "More Evidence for a Low Climate Sensitivity," Cato at Liberty, February 28, 2014, http://www.cato.org/blog/more-evidence-low-climate-sensitivity; Nicholas Lewis and Judith Curry, The Implications of climate sensitivity for AR5 forcing and heat uptake estimates, *Climate Dynamics*, September 2014, http://link.springer.com/article/10.1007%2Fs00382-014-2342-y

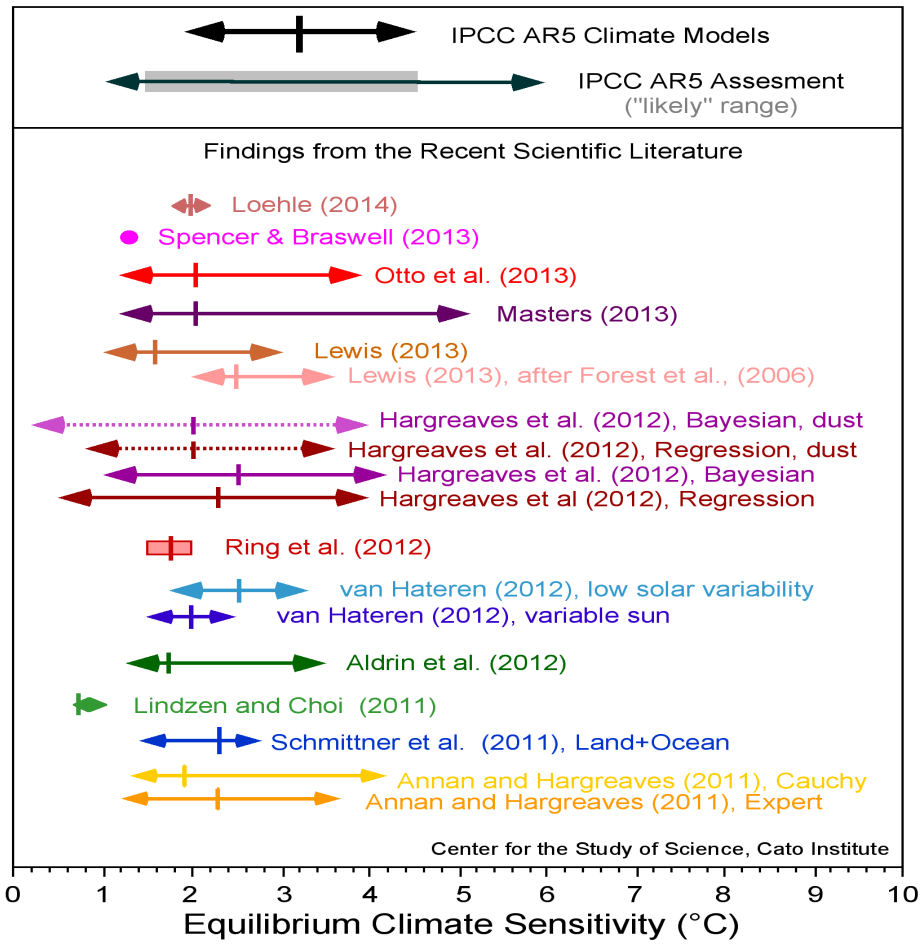


Figure explanation: The gray bar indicates the "likely" range (> 66% probability) in the IPCC AR5 climate sensitivity assessment. The black vertical line is the average climate sensitivity of AR5 models. The arrows indicate the 5 to 95 percent confidence bounds for each estimate. The colored vertical lines indicate the best estimates (median of each probability density function, or the mean of multiple estimates) of recent studies.

The endangerment rule also stated that the USGCRP relied on IPCC AR4 for its key finding on climate change attribution. The TSD states that attribution of observed climate change to anthropogenic activities is based on three main lines of evidence: the basic physical understanding of the climate system, the warmth of recent decades compared to estimates of past climate changes, and the agreement between model projections and observed climate patterns.[42]

With the global warming 'pause,' 'hiatus,' or 'plateau' now in its 18th year,[43] the second line of evidence, based on the comparative extent or rate of recent warming, is less clear than it appeared to be in 2007. It was always a weak link, since reconstruction of past temperatures from proxy data is more art than science,[44] and numerous studies indicate the Medieval Warm Period was as warm as or warmer than the

[42] EPA Endangerment TSD, p. 59
[43] Christopher Monckton of Brenchley, "The Great Pause Lengthens Again," Watts Up With That, January 3, 2015, http://wattsupwiththat.com/2015/01/03/the-great-pause-lengthens-again/
[44] Steve McIntyre, Hockey Stick Studies, Climate Audit, http://climateaudit.org/multiproxy-pdfs/

current warm period. The following charts are from the Medieval Warm Period Project of the Center for the Study of Carbon Dioxide and Global Change.[45]

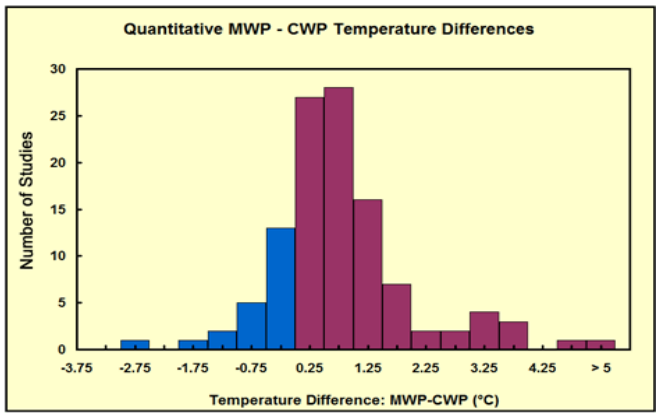


Figure explanation: Distribution, in 0.5°C increments, of studies that allow one to identify the degree by which peak Medieval Warm Period temperatures either exceeded (positive values, red) or fell short of (negative values, blue) peak Current Warm Period temperatures.

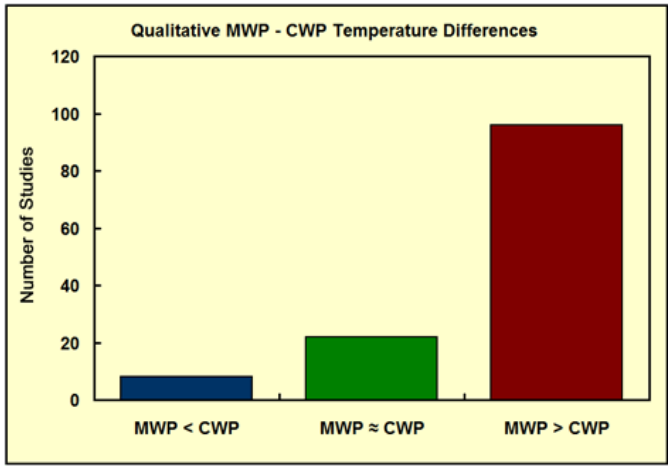


Figure explanation: Distribution of studies that allow one to determine whether peak Medieval Warm Period temperatures were warmer than (red), equivalent to (green), or cooler than (blue), peak Current Warm Period temperatures.

Although the first and third lines of evidence are distinguishable, the third implicates the first, because climate models supposedly incorporate the best physical understanding of the climate system. Yet even today's IPCC models do not provide unambiguous evidence of anthropogenic warming.

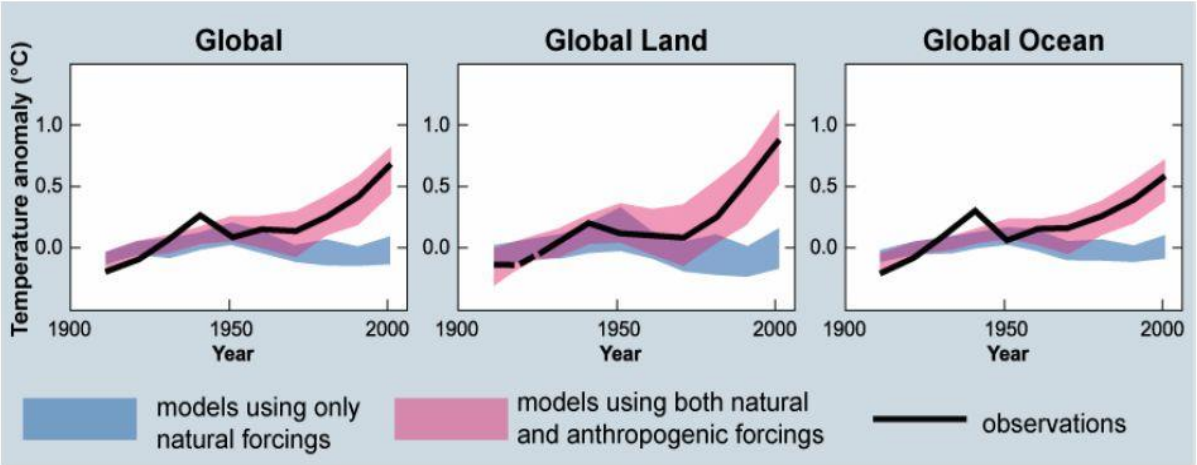
AR4 concluded that most of the warming since the mid-20th century is anthropogenic because the observed increases in global temperature "can only be reproduced with models that contain both

[45] Center for the Study of Carbon Dioxide and Global Change, Medieval Warm Period Project, http://www.co2science.org/data/mwp/mwpp.php

natural and anthropogenic forcings."[46] The endangerment rule makes the identical argument: "Climate model simulations suggest natural forcing alone (e.g., changes in solar irradiance) cannot explain the observed warming." 74 FR 66518

To illustrate the point, the endangerment rule TSD excerpts a chart from AR4:

Figure 5.1: Comparison of observed global-scale changes in surface temperature with results simulated by climate models using natural and anthropogenic forcings.



Source: IPCC (2007d). Decadal averages of observations are shown for the period 1906 to 2005 (black line) plotted against the centre of the decade and relative to the corresponding average for 1901–1950. Lines are dashed where spatial coverage is less than 50%. Blue shaded bands show the 5–95% range for 19 simulations from five climate models using only the natural forcings due to solar activity and volcanoes. Red shaded bands show the 5–95% range for 58 simulations from 14 climate models using both natural and anthropogenic forcings.

The situation is less clear today. In a comment letter on EPA's proposed Clean Power Plan rule, atmospheric scientist John Christy magnifies and analyzes[47] a section of a chart (Figure 10.SM.1) "buried . . . without comment" in Supplementary Material for the IPCC Fifth Assessment Report chapter on climate change detection and attribution.[48]

[46] EPA, Endangerment TSD, pp. 47, 49

[47] Public Comment on EPA proposed rule for existing carbon-burning power plants, EPA-HQ-OAR-2013-0602-0001, John R. Christy, Department of Atmospheric Science, University of Alabama in Huntsville, http://www.globalwarming.org/wp-content/uploads/2014/12/ChristyJR_EPA_2014_PublicComment.pdf

[48] IPCC, *Climate 2013: The Physical Science Basis*, 10SM, Detection and Attribution of Climate Change: Global and Regional, Supplementary Material, http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/supplementary/WG1AR5_Ch10SM_FINAL.pdf

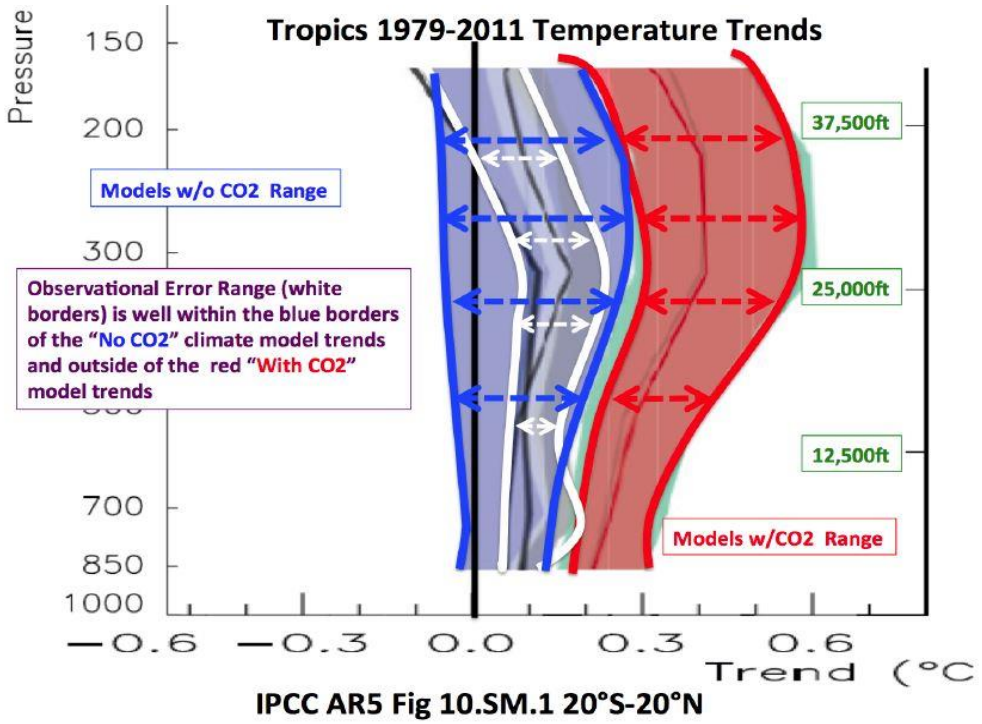


Figure 3. From Fig. 10.SM.1 (tropics) of the IPCC AR5 Supplementary Material, magnified and annotated from Fig. 2 above. The envelop of white-bordered observations falls within the blue envelop of no anthropogenic greenhouse gas increases and completely disjoint from the model runs with anthropogenic greenhouse gases.

The chart reveals that, during 1979-2011, the range of observed temperatures in the tropical troposphere (the area between the white lines) falls within the range of climate simulations from models forced with natural variability only (the blue area) and outside the range of simulations from models forced with both natural variability and greenhouse gas emissions (the red area). Christy comments:

> This IPCC figure shows that the white-bordered observational envelope lies completely within the blue envelope of models which have no extra greenhouse gas forcing. Thus, the proper scientific conclusion here is that the models demonstrate that CO_2 has had no discernable impact in the atmospheric region where models assert greenhouse gas impacts should be largest.

Remarkably, the IPCC chart as analyzed by Christy implies that natural variability accounts for all warming of the bulk tropical atmosphere since the start of the satellite record (1979).

Whereas AR4 deemed it "very likely" (>90% probability) that most of the warming since the mid-20th century is due to GHG emissions,[49] the IPCC's Fifth Assessment Report (AR5) deems it "extremely likely"

[49] IPCC, *Climate Change 2007: The Physical Science Basis*, Summary for Policymakers, p. 10, https://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf

(>95% probability). AR5 explains: "The best estimate of the human-induced contribution to warming is similar to the observed warming over this period."[50]

However, Christy's analysis exposes a hitherto unknown (and still unacknowledged) model-observation mismatch. In the tropical troposphere, the best estimate of the human-induced contribution to warming *significantly exceeds* observed temperatures during 1979-2011. Models jibe with observations only when not forced with anthropogenic GHG emissions.

To sum up, not only is the issue of climate sensitivity less certain or 'settled' than it appeared to be when EPA issued its endangerment rule, but so even is the issue of climate change attribution. We strongly caution against basing project-related NEPA review on what increasingly looks like a greenhouse of cards.

III. NEPA review of project-related GHG emissions will politicize, not improve, agency decisions.

A. Climate Change Differs from Other Environmental Stressors

While recognizing that climate change is a "particularly complex challenge given its global nature and inherent interrelationships among its sources, causation, mechanisms of action, and impacts," the Guidance nonetheless avers that analyzing a proposed action's climate impacts "can provide useful information to decision makers and the public and should be very similar to considering the impacts of other environmental stressors under NEPA."[51]

That is incorrect. In NEPA reviews of other environmental stressors, a proposed project may have discernible and even measurable effects on air quality, water quality, species habitat, or biological productivity within or near the locale where construction and operation would occur. In addition, although some potential impacts may be long-lasting or even irreversible, we would expect significant harms to be detectable in the near future.

Climate change differs in three critical respects. First, some supposed harms, such as adverse impacts on crop yields, disease vectors, storm behavior, air quality, and biodiversity raise daunting signal-to-noise issues. Such harms cannot be unambiguously detected in available data, hence 'exist' only in the virtual world of computer modeling.

Second, the biggest potential harms – collapse of the great sheets, shutdown of the Atlantic Ocean overturning circulation, catastrophic release of methane hydrates – are not anticipated during the 21st Century,[52] making such risks and the associated science inherently speculative.

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[50] IPCC, *Climate Change 2013: The Physical Science Basis*, Summary for Policymakers, p. 17, http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf

[51] Guidance, p. 2

[52] Intergovernmental Panel on Climate Change, *Fifth Assessment Report*, Working Group I, Chapter 12, Table 12.4, p. 1115, http://www.climatechange2013.org/images/report/WG1AR5_Chapter12_FINAL.pdf

Third, anthropogenic climate change impacts are assumed to result from the cumulative aggregate emissions of all sources everywhere since the dawn of the Industrial Revolution. It is not possible even in principle to attribute any observable climate change to the GHG emissions of a particular project or group of projects.

Those factors render GHG emissions fundamentally dissimilar to project-related environmental stressors traditionally analyzed in NEPA reviews.

The Guidance hints at the epistemological futility of assigning climate change damages to particular projects, only to pretend it doesn't matter:

> Government action occurs incrementally, program-by-program and step-by-step, and climate impacts are not attributable to any single action, but are exacerbated by a series of smaller decisions, including decisions made by the government. Therefore, the statement that emissions from a government action or approval represent only a small fraction of global emissions is more a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether to consider climate impacts under NEPA.[53]

That is a non-sequitur. Individual projects generate tiny fractions of cumulative, global GHG emissions because carbon-based fuels are the most plentiful, affordable, and scalable energy sources on the planet. We know CEQ does not share our view that a political program to tax, regulate, and mandate America 'beyond' fossil fuels is unsustainable. But there should be no dispute among experts that mitigating climate change one project at a time is a fool's errand, or that the economic losses from blocking individual projects would greatly exceed the hypothetical climate benefits.

The Guidance argues that NEPA review of GHG emissions is useful because it will encourage emission reductions through consideration of "reasonable alternatives" and "mitigations."[54] But the climatological value of such project-level modifications is intangibly small, considering that "reasonable alternatives" and "mitigations" would decrease U.S. emissions only at the margins, and that, as noted above, elimination of all U.S. CO_2 emissions would hypothetically avert less than 0.2°C of warming by 2100.[55]

B. Two, Three, Many Anti-Keystone Campaigns

So why bother scrutinizing the GHG effects of particular projects? The value of such reviews can only be political. NEPA review of climate effects will embolden NIMBY (not in my backyard) and climate activists,

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[53] Guidance, p. 9

[54] Guidance, pp. 8-13

[55] The calculation is based on EPA's Model for the Assessment of Greenhouse Gas-Induced Climate Change (MAGICC) assuming mid-range climate sensitivity. See Paul C. "Chip" Knappenberger, "Carbon Tax: Climatologically Useless," MasterResource.Org, December 3, 2012, https://www.masterresource.org/carbon-tax/carbon-tax-climatically-useless/

who already delay and block numerous infrastructure, land-use, and energy-related projects.[56] NEPA review of GHG emissions will promote politicized, monomaniacal decisions, not better decisions.

The Guidance will make the pointless *sturm und drang* over the Keystone XL Pipeline (KXL) the 'new normal' in NEPA reviews. Although Canada is our closest ally, biggest trading partner, and largest supplier of imported oil, and even though pipelines are more efficient, less liable to oil spill risk, and safer than alternative routes of delivery,[57] President Obama reduced the "national interest determination" on Keystone to a single factor: Whether the project would "significantly exacerbate the problem of carbon pollution."[58]

Actually, it is impossible for any infrastructure project to "significantly exacerbate" climate change. Even under the unrealistic assumption that the KXL runs at full capacity (830,000 barrels per day) year-round and each barrel is additional oil produced solely to meet demand induced by the pipeline, the project would add less than 0.01°C of warming to global temperatures between now and 2100, according to MAGICC, EPA's climate change simulator.[59]

Ironically, State's NEPA review concluded that the KXL is less carbon-intensive than the 'reasonable alternatives,' principally crude-by-rail, which would emit 28% to 42% more CO_2 than the proposed project.[60] The KXL is the 'climate-friendly' option. That should have been the end of the controversy.

It wasn't, for an obvious reason. For climate activists, the real point of conducting NEPA review of Keystone-related GHG emissions was not to provide scientific input to agency decisions but to fuel political opposition.

Consider EPA's latest action in the controversy. To challenge State's conclusion that the KXL is the low-carbon alternative, EPA argues that in an era of low oil prices, the higher cost of rail transport could make new oil sands projects unprofitable. Thus, by cutting transport costs, EPA speculates, the KXL could "result in increased oil sands production, and the accompanying GHG emissions, over what would

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[56] The U.S. Chamber of Commerce has identified 351 recent energy projects blocked by NIMBY activism. A study commissioned by the Chamber estimates that successful construction of those projects could give a $1.1 trillion short-term boost to the economy and create 1.9 million jobs. See Steve Pocsiask and Joseph P. Fuhr, Jr., *Progress Denied: A Study on the Potential Economic Impact of Permitting Challenges Facing Proposed Energy Projects*, U.S. Chamber of Commerce, March 10, 2011, http://www.projectnoproject.com/wp-content/uploads/2011/03/PNP_EconomicStudy.pdf

[57] State Department, *Final Supplemental Environmental Impact Assessment for the Keystone XL Pipeline Project*, Executive Summary, January 2014, http://keystonepipeline-xl.state.gov/documents/organization/221135.pdf (hereafter FSEIS ES); Errata Sheet, June 2014, http://keystonepipeline-xl.state.gov/documents/organization/227464.pdf

[58] Remarks by the President on Climate Change, Georgetown University, June 25, 2013, http://www.whitehouse.gov/the-press-office/2013/06/25/remarks-president-climate-change

[59] Testimony of Paul C. "Chip" Knappenberger before the Subcommittees on Energy and Environment of the House Committee on Science, Space, and Technology, hearing on "Keystone XL Pipeline: Examination of the Scientific and Environmental Issues," May 7, 2013, http://www.cato.org/publications/testimony/keystone-xl-pipeline-examination-scientific-environmental-issues

[60] State Department, FSEIS ES-34

otherwise occur."[61] Conveniently, EPA does not estimate how much additional oil would be developed, and how much warming would occur as a result.[62] No matter. Environmental groups instantly endorsed EPA's speculation as proof that the pipeline flunks Obama's single-factor national interest test.[63]

Lest anyone doubt EPA's analysis is agenda-driven, Administrator Gina McCarthy recently described current oil prices as a short-term blip: "We don't think that this small timeline, where there is this extreme fluctuation, is going to continue."[64] She then concluded that today's oil prices will not influence consumer buying habits and do not justify any relaxation of federal fuel-economy standards. If EPA were consistent, it would also conclude that the decline in oil prices is unlikely to change the long-term economics of oil sands development and should not affect State's national interest determination.

EPA's rank inconsistency has only one plausible explanation. The agency opposes the KXL precisely because it would increase the efficiency of an industry (oil sands) that green activists believe should not exist.

The Guidance will foster this mindset, inviting anti-development groups to "Keystone" hundreds or thousands of other projects with no measurable climate effects. It will feed the hubris of those who believe government exists to bankrupt industries they don't like.

C. Anti-Development 'Logic'

According to the Guidance, "individual sources of emissions each make relatively small additions to global atmospheric GHG concentrations" but "collectively have huge impact."[65] The policy implication is not spelled out but is not hard to fathom. If thousands of individual projects collectively have a "huge impact," then permission must be denied to as many projects as possible.

Some such imperative may also be divined in Secretary of State John Kerry's view that climate change is "perhaps the world's most fearsome weapon of mass destruction,"[66] and in President Obama's view that climate change poses a greater threat to Americans than terrorism.[67] Such rhetoric implies that

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[61] Letter of Cynthia Giles, Assistant Administrator for Enforcement and Compliance Assurance, U.S. Environmental Protection Agency, to Mr. Amos Hochstein, Special Envoy and Coordinator for International Energy Affairs, Bureau of Energy Resources, and Ms. Judith G. Garber, Acting Assistant Secretary, Oceans and International Environmental Affairs, U.S. Department of State, February 2, 2015, http://www.globalwarming.org/wp-content/uploads/2015/02/EPA-Letter-on-State-Department-FSEIS-Feb-2015.pdf

[62] Ben Zycher, "The EPA on Keystone XL: Ideology trumps analysis," American Enterprise Institute, January 5, 2015, https://www.aei.org/publication/epa-keystone-xl-ideology-trumps-analysis/

[63] Sierra Club, "Don't Sweat It Mr. President! Your decision is easy: The Keystone XL pipeline will make carbon pollution worse," http://vault.sierraclub.org/sierra/201309/grapple-keystone-pipeline-carbon-pollution.aspx

[64] Valerie Volcovici, "Low oil prices will not affect U.S. environmental rules: EPA chief," Reuters, January 16, 2015, http://www.reuters.com/article/2015/01/16/us-usa-climatechange-epa-idUSKBN0KP26J20150116

[65] Guidance, p. 9

[66] Secretary of State John Kerry, "Remarks on Climate Change," Jakarta, Indonesia, February 16, 2014, http://www.state.gov/secretary/remarks/2014/02/221704.htm

[67] Laura Baron-Lopez, "WH: Climate change directly impacts more Americans than terrorism," *The Hill*, February 10, 2015, http://thehill.com/policy/energy-environment/232310-wh-more-americans-directly-affected-by-climate-change-than. President Obama stated that climate "directly affects" more Americans than do terror organizations

climate change is the moral (or even literal) equivalent of war. It thus also implies that agencies should stop 'development as usual' and reject any project deemed to "exacerbate the problem of carbon pollution."

Further stacking the decks against development is the Guidance's instruction that agencies consider the "indirect" emissions of market activities linked to a proposed project, whether as "a predicate for the agency action (often referred to as upstream emissions)" or "as a consequence of the agency action (often referred to as downstream emissions)."[68]

For example, agencies should consider not just the direct emissions from construction and operation of a proposed coal export terminal, but, in addition, the upstream emissions from coal mining and rail transport and the downstream emissions of coal combustion in China. By analogy, agencies considering an application to build a bridge should assess the downstream emissions of all motorized transport across the bridge during its lifetime, the upstream emissions from the associated oil production and refining, and perhaps other indirect emissions from commercial and residential development facilitated by the project.

In short, just about any infrastructure project may be deemed illegitimate due to the "nature" of the climate change challenge (many individual sources = "huge impact"), the inclusion of indirect emissions, and official reports or speeches declaring climate change a national security threat.

NEPA was not intended to suppress development, only to ensure that permitting agencies consider significant environmental impacts. Include GHG emissions in project-level reviews, however, and anti-development factions will demand that agencies block major wealth-creating projects that have no discernible climate change effects.

IV. Incorporating social cost of carbon (SCC) analysis will turn NEPA review into a pseudo-science.

The Guidance encourages agencies to use social cost of carbon analysis when estimating the monetary costs and benefits of proposed projects:

> When an agency determines it appropriate to monetize costs and benefits, then, although developed specifically for regulatory impact analyses, the Federal social cost of carbon, which multiple Federal agencies have developed and used to assess the costs and benefits of alternatives in rulemakings, offers a harmonized, interagency metric that can provide decision makers and the public with some context for meaningful NEPA review.[69]

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such as the Islamic State in Iraq and Syria. That is literally true, but the same can be said of many mundane conditions and events including taxes, the common cold, and Super Bowl Sunday. Apparently, the President wanted to imply without actually stating that climate change is among the most urgent national security threats. For a meticulous critique of such thinking, see Jeff Kueter, *Climate and National Security: Exploring the Connection*, George C. Marshall Institute, 2012, http://marshall.org/wp-content/uploads/2012/09/Climate-and-National-Security-Exploring-the-Connection.pdf

[68] Guidance, p. 11

[69] Guidance, p. 16

That is bad advice. SCC analysis will only compound the mischief inherent in NEPA reviews of project-related GHG emissions.

The social cost of carbon is the discounted present value of damage allegedly imposed on society by an incremental ton of CO_2. By fiddling with non-validated climate parameters (such as climate sensitivity and the hypothetical impacts of warming on weather patterns, ice sheet dynamics, hydrology, the carbon cycle, and eco-system services), made-up damage functions (the hypothetical impacts of warming on GDP growth based on speculation about the cost-effectiveness of future adaptive technologies), and below-market discount rates, SCC analysts can get just about any result they desire.[70]

In addition, because infrastructure is built to last, opponents can multiply the presumed SCC by the estimated direct and indirect emissions over decades, and plausibly assert that the project's social costs (although utterly unverifiable) outweigh its manifest economic benefits.

In reality, the SCC is an unknown quantity, discernible in neither economic nor meteorological data. Try, for example, to infer carbon's social cost from the following information (some of which appears in section I above):

- There has been no trend in the strength or frequency of land-falling hurricanes in the world's five main hurricane basins during the past 50-70 years.[71]
- The U.S. is currently enjoying the longest period on record without a major (category 3-5) hurricane landfall.[72]
- There has been no trend in the strength or frequency of tropical cyclones in the main Atlantic hurricane development region during the past 370 years.[73]
- There has been no trend in global accumulated cyclone energy since 1970.[74]
- There has been no trend in U.S. hurricane-related damages since 1900 once economic losses are adjusted ("normalized") for changes in population, wealth, and the consumer price index.[75]

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[70] For a general critique of SCC analysis, see Robert S. Pindyck, *Climate Change Policy: What Do the Models Tell Us?* Working Paper 19244, National Bureau of Economic Research, July 2013, http://www.globalwarming.org/wp-content/uploads/2013/10/Pindyk-Climate-Change-Policy-What-Do-the-Models-Tell-Us.pdf

[71] Jessica Weinkle, Ryan Maue, and Roger Pielke, Jr. 2012. Historical Global Tropical Landfalls. *Journal of Climate*, vol. 25, issue 13, pp. 4729-4735, http://sciencepolicy.colorado.edu/admin/publication_files/2012.04.pdf

[72] Roger Pielke, Jr., Graphs of the Day: Major US Hurricane Drought Continues, *Roger Pielke, Jr.'s Blog*, 22 November 2013, http://rogerpielkejr.blogspot.com/2013/11/graphs-of-day-major-us-hurricane.html

[73] Michael Chenoweth and Dmitry Divine. 2012. Tropical cyclones in the Lesser Antilles: descriptive statistics and historical variability in cyclone energy, 1638–2009. *Climatic Change*, vol. 113, issue 3, pp. 583-598, http://econpapers.repec.org/article/sprclimat/v_3a113_3ay_3a2012_3ai_3a3_3ap_3a583-598.htm

[74] Ryan Maue, Policlimate: Global Tropical Cyclone Activity Update, http://policlimate.com/tropical/http://policlimate.com/tropical/

[75] Laurens M. Bauer. 2011. Have disaster losses increased due to anthropogenic climate change? *Bulletin of the American Meteorological Society*, http://www.ivm.vu.nl/en/Images/bouwer2011_BAMS_tcm53-210701.pdf

- There has been no trend in global normalized weather-related losses since 1960.[76]
- As a proportion of GDP, normalized global weather-related losses since 1990 declined by 25%.[77]
- There has been no trend since 1950 in the strength or frequency of tornadoes in the U.S.[78]
- There is low confidence in detection and attribution of changes in drought over global land areas since the mid-20th century.[79]
- There has been no trend in U.S. flood magnitudes in records extending back 85-127 years.[80]
- There continues to be a lack of evidence and thus low confidence regarding the sign of trend in the magnitude and/or frequency of floods on a global scale.[81]
- As U.S. urban air temperatures increased, heat-related mortality declined.[82]
- Since the 1920s, global deaths and death rates related to extreme weather declined by 93% and 98%, respectively.[83]
- During the past century of global warming, economic development and disease control have dramatically contracted the geographic range of malaria, and further contraction is expected as African, Latin American, and Asian nations industrialize.[84]
- During 1982-2010, a period of allegedly unprecedented warming, CO_2 fertilization increased green foliage cover by 11% in warm, arid areas on all continents.[85]

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[76] Aon Benfield, *Reinsurance Market Outlook: Reinsurance Capacity Growth Continues to Outpace Demand*, July 2013, http://thoughtleadership.aonbenfield.com/Documents/20130103_reinsurance_market_outlook_external.pdf

[77] Statement of Dr. Roger Pielke, Jr. to the Committee on Environment and Public Works of the United States Senate, Hearing on Climate Change: It's Happening Now, July 18, 2013, p. 3, http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=a6df9665-e8c8-4b0f-a550-07669df48b15

[78] National Oceanic and Atmospheric Administration (NOAA), National Climate Data Center, U.S. Tornado Climatology, http://www.ncdc.noaa.gov/climate-information/extreme-events/us-tornado-climatology/trends

[79] IPCC, *Climate Science 2013: The Physical Science Basis*, "Detection and Attribution of Climate Change: from Global to Regional," Chapter 10, p. 913, http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter10_FINAL.pdf

[80] R.M. Hirsch and K.R. Ryberg. 2012. Has the magnitude of floods across the USA changed with global CO_2 levels? *Hydrological Sciences Journal* vol. 57, issue 1, pp. 1-9, http://www.tandfonline.com/doi/abs/10.1080/02626667.2011.621895#.UvFekJ0o4Sk

[81] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2013: The Physical Science Basis*, "Observations: Atmosphere and Surface," Chapter 2, p. 214, http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter02_FINAL.pdf

[82] Robert E. Davis, Paul C. Knappenberger, Patrick J. Michaels, Wendy M. Novicoff. 2003. Changing heat-related mortality in the United States. *Environmental Health Perspectives*, vol. 111, issue 14, pp. 1712-18, http://www.ncbi.nlm.nih.gov/pubmed/14594620

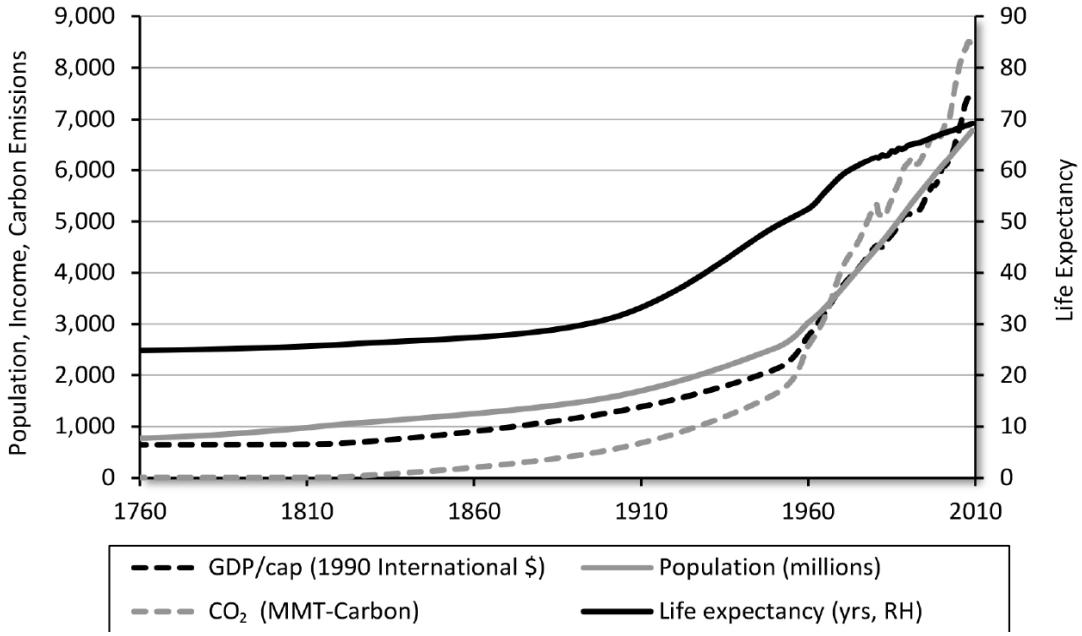
[83] Indur M. Goklany. 2009. Death and Death Rates Related to Extreme Weather Events: 1900 – 2008. *Journal of American Physicians and Surgeons*, vol. 14, no. 4, pp. 102-109, http://www.jpands.org/vol14no4/goklany.pdf

[84] Peter W. Gething, David L. Smith, Anand P. Patil, Andrew J. Tatem, Robert W. Snow, and Simon I. Hay. 2010. Climate change and the global malaria recession. *Nature* 465: 342-345, http://www.nature.com/nature/journal/v465/n7296/full/nature09098.html

[85] Randall J. Donohue, Michael L. Roderick, Tim L. McVicar, Graham D. Farquhar. 2013. Impact of CO2 fertilization on maximum foliage cover across the globe's warm, arid environments. *Geophysical Research Letters*, vol. 40, issue 12, pp. 3031-35, http://onlinelibrary.wiley.com/doi/10.1002/grl.50563/abstract

- Based on extensive empirical science and FAO market data, climate researcher Craig D. Idso estimates that CO_2 fertilization added $3.5 trillion dollars to global agricultural output during 1961-2011, and will increase output by another $11.6 trillion during 2011-2050.[86]
- The climatic warmth of the Holocene Optimum, Roman Warm Period, and Medieval Warm Period contributed to improvements in human health and welfare.[87]
- Historically, rising CO_2 emissions and concentrations are strongly correlated with improvements in per capita income, per capita food production, population, average lifespan, and public health.[88]

Global Progress, 1760–2009 (as indicated by trends in world population, GDP per capita, life expectancy, and carbon dioxide (CO_2) emissions from fossil fuels)



Whatever its value as an academic exercise, when used to influence public policy, SCC analysis is computer-aided sophistry. Its political function is to make fossil energy look unaffordable no matter how cheap and make carbon-reduction policy look like a bargain at any price. For example, a recent study using 1.5% and 1% discount rates estimates that the SCC is $122 per ton or $266 per ton. From those

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[86] Craig D. Idso, *The Positive Externalities of Carbon Dioxide: Estimating the Monetary Benefits of Rising Atmospheric CO2 Concentrations on Global Food Production*, Center for the Study of Carbon Dioxide and Global Change, 21 October 2013, http://www.co2science.org/education/reports/co2benefits/MonetaryBenefitsofRisingCO2onGlobalFoodProduction.pdf

[87] Thomas Gale Moore, *Climate of Fear: Why We Shouldn't Worry about Global Warming* (Washington, D.C. Cato Institute, 1998), http://www.stanford.edu/~moore/Climate_of_Fear.pdf

[88] Indur M. Goklany, *Humanity Unbound: How Fossil Fuels Saved Mankind from Nature and Nature from Humanity*. Cato Institute Policy Analysis No. 715, December 20, 2012, http://www.cato.org/sites/cato.org/files/pubs/pdf/pa715.pdf

estimates the study concludes that renewable energies are "always" more efficient than new coal generation, and "usually" more efficient than new gas generation. It further concludes that switching from coal to solar or installing carbon capture and storage is more "efficient" than maintaining existing coal power plants.[89]

Were we to act on this 'efficiency' theory and "re-power America in 10 years" with wind and solar power, as former Vice President Al Gore urges,[90] the economy would crash.

In addition to the generic flaws of SCC analysis, specific defects also render the administration's 2010 and 2013 Technical Support Documents (TSDs)[91] unfit for use in agency cost-benefit analyses:

1. DICE (Dynamic Integrated Climate Economy) and PAGE (Policy Analysis of the Greenhouse Effect) – two of the three integrated assessment models (IAMs) underpinning the TSDs – contain no CO_2 fertilization benefit. As noted above, one recent study estimates a CO_2 fertilization benefit of $3.5 trillion during 1960-2011 and projects an additional $11.6 trillion benefit during 2011-2050. It is one thing to dispute those estimates, another to pretend the CO_2 fertilization effect does not exist. The DICE and PAGE models are biased by design. As such, they flout federal information quality standards.[92] Those models have no proper place in either regulatory analysis or NEPA review.
2. The Interagency Working Group chose not to use a 7% discount rate to calculate the present value of future CO_2 emission reductions, and not to report separate SCC values for the U.S. domestic economy. Both choices inflate[93] the hypothetical value of CO_2 emission reductions and conflict with OMB Circular A-4.[94]

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[89] Laurie T. Johnson, Starla Yeh, Chris Hope. 2013. The social cost of carbon: implications for modernizing our electricity system. *Journal of Environmental Science Studies*, DOI 10.1007/s13412-013-0149-5, http://www.globalwarming.org/wp-content/uploads/2013/10/Johnson-J-Environ-Stud-Sci-2013.pdf

[90] Andrew C. Revkin, "The (Annotated) Al Gore Energy Speech," Dot Earth, *The New York Times*, July 17, 2008, http://dotearth.blogs.nytimes.com/2008/07/17/the-annotated-gore-climate-speech/?_r=0

[91] Interagency Working Group on the Social Cost of Carbon, *Appendix 15A: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*, February 2010, http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/sem_finalrule_appendix15a.pdf; *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*, May 2013, http://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf

[92] Office of Management and Budget, *Guidelines for Ensuring the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*, https://www.whitehouse.gov/omb/fedreg_final_information_quality_guidelines/: "'Objectivity' focuses on whether the disseminated information is being presented in an accurate, clear, complete, and unbiased manner, and as a matter of substance, is accurate, reliable, and unbiased."

[93] Testimony of Robert Murphy, Senior Economist, Institute for Energy Research, before the Senate Committee on Environment and Public Works, hearing on the Social Cost of Carbon, July 18, 2013, http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=d74255e9-6a8a-473f-82a3-ff19921798ef

[94] Office of Management and Budget, Circular A-4, Regulatory Analysis, September 17, 2003, http://www.whitehouse.gov/sites/default/files/omb/assets/regulatory_matters_pdf/a-4.pdf

3. The 2013 TSD does not reassess the 2010 TSD's climate sensitivity assumptions, borrowed from IPCC AR4. It does not question the DICE model's revised (lower) estimate of ocean CO_2 uptake. Nor does it question the PAGE model's revised (higher) probability estimate of catastrophic impacts. Recent science indicates that climate sensitivity is lower[95] and catastrophic scenarios less plausible than earlier assessments assumed,[96] and that ocean CO_2 uptake is not decreasing.[97]
4. The 2013 TSD does not question the PAGE model's implausible assumption that adaptation cannot limit climate change damages once warming exceeds 2°C. A little common sense here would go a long way. As climate economist Richard Tol wrote after withdrawing his name from the AR5 climate change impacts report: "Humans are a tough and adaptable species. People live on the equator and in the Arctic, in the desert and in the rainforest. We survived ice ages with primitive technologies. The idea that climate change poses an existential threat to humankind is laughable."[98]

One might object that even if SCC values are guesstimates, we at least know that the monetary sign of an incremental ton of CO_2. Not so. The third IAM agencies use to estimate SCC values is the FUND (Climate Framework for Uncertainty, Negotiation, and Distribution) model. It is the only IAM with a CO_2 fertilization benefit, although likely smaller than the benefit calculated by Idso. Heritage Foundation economists David Kreutzer and Kevin Dayaratna ran the FUND model using a 7% discount rate and two updated climate sensitivity distributions from the peer-reviewed literature. They found a nearly 70% chance the SCC in 2020 is negative – i.e. CO_2 emissions yield a net benefit.[99]

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[95] Patrick J. Michaels and Paul C. "Chip" Knappenberger, "More Evidence for a Low Climate Sensitivity," Cato at Liberty, February 28, 2014, http://www.cato.org/blog/more-evidence-low-climate-sensitivity; Nicholas Lewis and Judith Curry, The Implications of climate sensitivity for AR5 forcing and heat uptake estimates, *Climate Dynamics*, September 2014, http://link.springer.com/article/10.1007%2Fs00382-014-2342-y

[96] Climate literature in the mid-2000s featured a trilogy of terror composed of runaway warming from melting of frozen methane deposits, collapse of the great ice sheets, and shutdown of the Atlantic Ocean meridional overturning circulation. See, e.g., Al Gore, *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do about It* (Emmaus, Pa: Rodale, 2006); Fred Pearce, *With Speed and Violence: Why Scientists Fear Tipping Points in Climate Change* (Boston: Beacon Press, 2007); and Joseph Romm, *Hell and High Water: Global Warming – the Solution and the Politics – and What We Should Do* (New York: William Morrow, 2007). Even "consensus" climatology now regards such scenarios as implausible during the 21st century. See IPCC, *Climate Change 2013: The Physical Science Basis*, Chapter 12, Table 12.4, p. 1115, http://www.climatechange2013.org/images/report/WG1AR5_Chapter12_FINAL.pdf

[97] Center for the Study of Carbon Dioxide and Global Change, "The Airborne Fraction of Anthropogenic CO_2 Emissions," review of W. Knorr. 2009. Is the airborne fraction of anthropogenic CO2 emissions increasing? *Geophysical Research Letters* 36: 10.1029/2009GL040613, http://co2science.org/articles/V12/N48/B1.php; AP Ballantyne, CB Alden CB, JB Mille, PP Tans PP, and JMC White JWC. 2012. Increase in observed net carbon dioxide uptake by land and oceans. *Nature* 488: 70-72, http://www.nature.com/nature/journal/v488/n7409/full/nature11299.html; Global Carbon Project, *Increase in observed net carbon dioxide uptake by land and oceans during the past 50 years*, August 2012, http://www.globalcarbonproject.org/news/CarbonSinkIncreases.html

[98] Richard Tol, "Bogus prophecies of doom will not fix the climate," *Financial Times*, March 31, 2014, http://www.ft.com/intl/cms/s/0/e8d011fa-b8b5-11e3-835e-00144feabdc0.html#axzz3SKGnOmrf

[99] Kevin D. Dayaratna and David W. Kreutzer, "Unfounded FUND: Yet Another EPA Model Not Ready for the Big Game," Backgrounder #2897, Heritage Foundation, April 2014,

Similarly, Kreutzer and Dayaratna found that SCC values "shift substantially" when the DICE model is run with a 7% discount rate and an updated climate sensitivity estimates.[100] Specifically:

- Using a 7% discount rate reduces the DICE model's 2020 SCC estimate by more than 80%.
- Using the climate sensitivity range indicated by recent studies reduces the 2020 SCC estimate by 40%.
- If, in addition to those substitutions, projections of future damages are limited to an almost plausible time span (through 2150 rather than all the way to 2300, when Captain James T. Kirk would be an old man), the 2020 SCC estimate falls by nearly 90%, from $37.79 to $4.03.

The two analysts conclude that the DICE model is "loaded" and unfit to guide policy decisions.

Bottom line: Incorporating SCC estimation in NEPA reviews will not produce better decisions. Instead, it will puff up raw political preferences with the pretense of scientific objectivity and precision.

V. Conclusion

NEPA review is an inappropriate basis for determining climate change policy, and project-related GHG emissions should not be a factor determining whether agencies grant or deny permits for individual projects.

The Draft Guidance instructs agencies to incorporate analysis of project-related GHG emissions and climate effects in NEPA reviews. That will embolden anti-development groups and politicize rather than improve agency decisions. The Draft Guidance should be withdrawn.

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http://www.heritage.org/research/reports/2014/04/unfounded-fund-yet-another-epa-model-not-ready-for-the-big-game

[100] Kevin D. Dayaratna and David W. Kreutzer, *Loaded DICE: An EPA Model Not Ready for the Big Game*, Heritage Foundation Backgrounder #2860, November 21, 2013, http://www.heritage.org/research/reports/2013/11/loaded-dice-an-epa-model-not-ready-for-the-big-game