



## Dr. Pat Michaels on the ‘voluminous science that the USGCRP either ignored or slanted’ for the EPA endangerment finding

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### Guest Post by Dr. Pat Michaels

Here is a version of my EPA testimony that contains links to the 2009 publication *Global Climate Change Impacts in the United States*, published by the U.S. Global Change Research Program (USGCRP). As shown in my comments, this document played a principal role in their Endangerment Finding of December 7, 2009.

Also linked is a draft document, *ADDENDUM: Global Climate Change Impacts in the United States*, by the Center for the Study of Public Science and Public Policy at the Cato Institute. This document is analogous to the USGCRP report in form and content, but details the voluminous science that the USGCRP either ignored or slanted. It is a fact that there are almost twice as many references and endnotes in the Addendum than there are in the original report. Note that this is

a draft version that contains various minor errors and will undergo some slight changes before the final version is released later this year.

Readers should enjoy looking at the USGCRP document and the Addendum side-by-side. (see below).

## **UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

Docket No. EPA-HQ-OAR-2011-0660

### **Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units**

Public Comments by:  
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Chapter 3 of EPA's the Regulatory Impact Analysis (RIA) for the *Proposed Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units* is concerned with "The climate change problem and rationale for rulemaking." The Chapter "summarizes the adverse effects on public health and public welfare detailed in the 2009 Endangerment Finding" and has this to say regarding the source of the scientific opinions underlying the Endangerment Finding:

*The major assessments by the U.S. Global Change Research Program (USGCRP), the Intergovernmental Panel on Climate Change (IPCC), and the National Research Council (NRC) served as the primary scientific basis for these effects.*

In fact, the USGCRP 2009 report, *Global Climate Change Impacts in the United States* is the only one of these documents that relates directly and purposefully to climate change in the U.S. It is therefore of much more import than the other two.

The EPA's proposed rule states that "There is no reason to revisit the 2009 Endangerment Finding given recent scientific findings that strengthen the scientific conclusion that GHG air pollution endangers human health and welfare."

That is not the case. Through careful consideration and involved effort, I conclusively demonstrate in the attached report that the 2009 USGCRP report *Global Climate Change Impacts in the United States*—itself a summary of 21 Synthesis and Assessment Reports produced by the USGCRP (formerly the Climate Change Science Program) over the past several years prior to 2009—is unrepresentative of the larger body of scientific research on the topic of anthropogenic climate change and its potential impacts in the United States. It is wholly inappropriate for the EPA to rely on a set of documents that is clearly slanted towards negative impacts from climate change when there is a large body of scientific evidence, much of it not included in the USGCRP assessment products, that argues for the contrary. The EPA, contrary to its assertion, must revisit the Endangerment Finding.

I submitted an extensive public comment when *Global Climate Change Impacts in the United States* was in draft form, in which I stated, with some dismay, that:

*Of all of the "consensus" government or intergovernmental documents of this genre that I have reviewed in my 30+ years in this profession, there is no doubt that this is absolutely the worst of all. Virtually every sentence can be contested or does not represent a complete survey of a relevant literature...*

Not only did the 2009 USGCRP report re-appear in near its draft form, but, what's worse, it served as *the* foundation document pertaining to climate impacts *in the U.S.* for EPA's Endangerment Finding, and, subsequently, the EPA's *Proposed Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units*.

The USGCRP report is scientifically misleading and unfortunately it has served to mislead the EPA. However, my initial review of the draft report, while extensive, was limited by the brevity of the Comment Period.

To complete my review, I began to work on a separate document, an “Addendum” to the 2009 USGCRP report, extensively detailing, in the same format as that report, the “missing” science. It is noteworthy that the number of citations and endnotes in the Addendum substantially exceeds—932 versus 569—the number in the 2009 USGCRP report. Some of these papers were available to the authors of the report. Many additional new and influential scientific findings have been published subsequent to the 2009 USGCRP report. Consequently, my Addendum draws upon a considerably more comprehensive body of scientific research. Noteworthy is that many of the papers cited in the Addendum that were published after the 2009 USGCRP report indicate the probability of extreme climate change is much lower than the USGCRP assumed.

This directly challenges EPA’s glib assertion that recent science reinforces “the scientific conclusion that GHG air pollution endangers human health and welfare,” and with regard to science published concurrently or previous to the USGCRP report, is *prima facie* evidence that there was a voluminous refereed literature that the USGCRP chose to ignore, and, by the reference standard, a volume that was larger than the science it did consider.

A team of well-qualified scientists and experts produced the “Addendum”, which represents a complementary and extensive assessment of the “missing” scientific literature. While this report is not in its absolute final form, I include the fourth-order draft as the central part of my public comments on the New Stationary Source proposal. It is imperative that the EPA closely examine and compare this Addendum to the original USGCRP document. Such an examination will be eye-opening and should convincingly demonstrate that the EPA must reassess the science of climate change and therefore reconsider their Endangerment Finding, which, of course, is the rationale for the New Stationary Source proposal. The proposed regulation should be withdrawn until such time as a thorough review of the most current science can be conducted and submitted for public comment.

As an example of differences between the two reports, I include below a comparison between the “Key Findings” in each of the two reports—the original 2009 USGCRP *Global Climate Change Impacts in the United States* and my *Addendum* to that report. The side-by-side comparison clearly shows that the

whole of the scientific literature tells a much different story than only those parts selected for inclusion by the USGCRP.

## Original USGCRP Report

### Key Findings

- 1. Global warming is unequivocal and primarily human-induced.**  
Global temperature has increased over the past 50 years. This observed increase is due primarily to human-induced emissions of heat-trapping gases. (p. 13)
- 2. Climate changes are underway in the United States and are projected to grow.**  
Climate-related changes are already observed in the United States and its coastal waters. These include increases in heavy downpours, rising temperature and sea level, rapidly retreating glaciers, thawing permafrost, lengthening growing seasons, lengthening ice-free seasons in the ocean and on lakes and rivers, earlier snowmelt, and alterations in river flows. These changes are projected to grow. (p. 27)
- 3. Widespread climate-related impacts are occurring now and are expected to increase.**  
Climate changes are already affecting water, energy, transportation, agriculture, ecosystems, and health. These impacts are different from region to region and will grow under projected climate change. (p. 41-106, 107-152)
- 4. Climate change will stress water resources.**  
Water is an issue in every region, but the nature of the potential impacts varies. Drought, related to reduced precipitation, increased evaporation, and increased water loss from plants, is an important issue in many regions, especially in the West. Floods and water quality problems are likely to be amplified by climate change in most regions. Declines in mountain snowpack are important in the West and Alaska where snowpack provides vital natural water storage. (p. 41, 129, 135, 139)
- 5. Crop and livestock production will be increasingly challenged.**  
Many crops show positive responses to elevated carbon dioxide and low levels of warming, but higher levels of warming often negatively affect growth and yields. Increased pests, water stress, diseases, and weather extremes will pose adaptation challenges for crop and livestock production. (p. 71)
- 6. Coastal areas are at increasing risk from sea-level rise and storm surge.**  
Sea-level rise and storm surge place many U.S. coastal areas at increasing risk of erosion and flooding, especially along the Atlantic and Gulf Coasts, Pacific Islands, and parts of Alaska. Energy and transportation infrastructure and other property in coastal areas are very likely to be adversely affected. (p. 111, 139, 145, 149)
- 7. Risks to human health will increase.**  
Harmful health impacts of climate change are related to increasing heat stress, waterborne diseases, poor air quality, extreme weather events, and diseases transmitted by insects and rodents. Reduced cold stress provides some benefits. Robust public health infrastructure can reduce the potential for negative impacts. (p. 89)
- 8. Climate change will interact with many social and environmental stresses.**  
Climate change will combine with pollution, population growth, overuse of resources, urbanization, and other social, economic, and environmental stresses to create larger impacts than from any of these factors alone. (p. 99)
- 9. Thresholds will be crossed, leading to large changes in climate and ecosystems.**  
There are a variety of thresholds in the climate system and ecosystems. These thresholds determine, for example, the presence of sea ice and permafrost, and the survival of species, from fish to insect pests, with implications for society. With further climate change, the crossing of additional thresholds is expected. (p. 76, 82, 115, 137, 142)
- 10. Future climate change and its impacts depend on choices made today.**  
The amount and rate of future climate change depend primarily on current and future human-caused emissions of heat-trapping gases and airborne particles. Responses involve reducing emissions to limit future warming, and adapting to the changes that are unavoidable. (p. 25, 29)

## New Addendum to USGCRP Report

## Key Findings

- 1. Climate change is unequivocal and human activity plays some part in it.**  
There are two periods of warming in the 20th century that are statistically indistinguishable in magnitude. The first had little if any relation to changes in atmospheric carbon dioxide, while the second has characteristics that are consistent in part with a changed greenhouse effect. (p. 16)
- 2. Climate change has occurred and will occur in the United States.**  
US temperature and precipitation have changed significantly over some states since the modern record began in 1895. Some changes, such as the amelioration of severe winter cold in the northern Great Plains, are highly consistent with a changed greenhouse effect (pp. 34-55, 189-194)
- 3. Impacts of observed climate change have little national significance.**  
There is no significant long-term change in US economic output that can be attributed to climate change. The slow nature of climate progression results in *de facto* adaptation as, as can be seen with sea level changes on the East Coast. (pp. 44-45, 79-81, 157-160, 175-176)
- 4. Climate change will affect water resources.**  
Long-term paleoclimatic studies show that severe and extensive droughts have occurred repeatedly throughout the Great Plains and the West. These will occur in the future, with or without human-induced climate change. Infrastructure planners would be well-advised to take them into account. (pp. 56-71)
- 5. Crop and livestock production will adapt to climate change.**  
There is a large body of evidence that demonstrates substantial untapped adaptability of US agriculture to climate change, including crop-switching that can change the species used for livestock feed. In addition, carbon dioxide itself is likely increasing crop yields and will continue to do so in increasing increments in the future. (pp. 102-118)
- 6. Sea level rises caused by global warming are easily adapted to.**  
Much of the densely populated East Coast has experienced sea level rises in the 20th century that are more than twice those caused by global warming, with obvious adaptation. The mean projections from the United Nations will likely be associated with similar adaptation. (pp. 175-176)
- 7. Life expectancy and wealth are likely to continue to increase.**  
There is little relationship between life expectancy, wealth and climate. Even under the most dire scenarios, people will be much wealthier and healthier than they are today in the year 2100. (pp. 141-147, 160-162)
- 8. Climate change is a minor overlay on US society.**  
People voluntarily expose themselves to climate changes throughout their lives that are much larger and more sudden than those expected from greenhouse gases. The migration of US population from the cold North and East to the much warmer South and West is an example. Global markets exist to allocate resources that fluctuate with the weather and climate. (pp. 156-171)
- 9. Species and ecosystems will change with or without climate change.**  
There is little doubt that some ecosystems, such as the desert west, have been changing with climate, while others, such as cold marine fisheries, move with little obvious relationship to climate. (pp. 119-140)
- 10. Policies enacted by the developed world will have little effect on global temperature.**  
Even if every nation that has obligations under the Kyoto Protocol agreed to reduce emissions over 80 percent, there would be little or no detectable effect on climate on the policy-relevant timeframe, because emissions from these countries will be dwarfed in coming decades by the total emissions from China, India, and the developing world. (pp. 27, 212)

In addition to my complete Addendum which is included below, I am providing two links that will aid EPA and interested parties in comparing the original USGCRP document and the Addendum.

The original USGCRP document can be found at:

<http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf>

and the Addendum is located at:

<http://www.cato.org/pubs/Global-Climate-Change-Impacts.pdf>

I submit the full Addendum report as part of my comments on the EPA's *Proposed Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units*. I ask that the EPA complete a thorough review of this Addendum in order to better expose them to the full scope of the science of anthropogenic climate change—a scope that was not provided by the USGCRP. As a result, the Endangerment Finding may be sufficiently compromised so that it cannot serve as the basis for any proposed regulation.

Further, no static report can provide long-term guidance as to the nature of climate change and its impacts as this field is constantly evolving under the weight of new scientific findings. Consequently, it is imperative EPA reassess the current scientific understanding on an annual basis, if not continuously. If the EPA were to do have done that with the regulations being proposed here (consideration of my comments and Addendum would have been an appropriate place to start) it is quite likely that their original Endangerment Finding would have to be revised and potentially overturned.

Relying on dated and incomplete science in a rapidly evolving environment will almost certainly lead to poor regulations. In the name of science and in the spirit of responsible government, the EPA must revisit the Endangerment Finding before adopting sweeping regulations with potentially enormous economic and social implications.