

# Ad-Hoc Committee Report on APS Climate Change Statement

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## Report of the Ad - Hoc Committee to Advise the APS President on Proposed Revisions of the 2007 Statement on Climate Change

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**This report responds to the charge to the committee from Dr. Cherry Murray in a letter of July 14, 2009:**

*to review the APS Council November 2007 Statement on Climate Change, the proposed new wording in the Austin petition, to take into account any other data or input you deem necessary to make a judgment, and to advise the presidential line on what actions to take in this regard.*

## 1) The Austin Petition

Robert H. Austin and his colleagues have petitioned the APS to replace its 2007 Council resolution on global warming with the following statement.

Greenhouse gas emissions, such as carbon dioxide, methane, and nitrous oxide, accompany human industrial and agricultural activity. While substantial concern has been expressed that emissions may cause significant climate change, measured or reconstructed temperature records indicate that 20th - 21st century changes are neither exceptional nor persistent, and the historical and geological records show many periods warmer than today. In addition, there is an extensive scientific literature that examines beneficial effects of increased levels of carbon dioxide for both plants and animals.

Studies of a variety of natural processes, including ocean cycles and solar variability, indicate that they can account for variations in the Earth's climate on the time scale of decades and centuries. Current climate models appear insufficiently reliable to properly account for natural and anthropogenic contributions to past climate change, much less project future climate.

The APS supports an objective scientific effort to understand the effects of all processes — natural and human — on the Earth's climate and the biosphere's response to climate change, and promotes technological options for meeting challenges of future climate changes, regardless of cause.

### Discussion

The crucial issues in the Austin statement are the assertions that global warming in the 20th century is not exceptional, that evidence for anthropogenic causes of global warming is lacking, and that climate modeling is too imprecise to provide credible guidance for the future. To review these issues we have relied primarily on the 4th Assessment Report of the International Panel on Climate Change, in particular its first volume: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group 1 to the Fourth Assessment Report*

of the Intergovernmental Panel on Climate Change [Solomon et al, Cambridge University Press]. (PSB). We have also turned to the NRC report *Surface Temperature Reconstructions for the Last 2,000 Years*, Committee on Surface Temperature Reconstructions for the Last 2,000 Years, (National Research Council, 2006). (STR).

With respect to the question of whether or not 20th century warming was exceptional, according to PSB, page 9,

“Average Northern Hemisphere temperatures during the second half of the 20th century were *very likely* higher than during any other 50-year period in the last 500 years and *likely* the highest in at least the past 1,300 years.” Here *very likely* is described to mean that the assessed likelihood of expert opinion has a probability greater than 90%, and *likely* indicates that the probability is greater than 66%.

On the question of whether 20th century warming was exceptional, STR, page 18, asserts that:

“It can be said with a high level of confidence that global mean surface temperature was higher during the last few decades of the 20th century than during any comparable period during the preceding four centuries. This statement is justified by the consistency of the evidence from a wide variety of geographically diverse proxies.

Less confidence can be placed in large - scale surface temperature reconstructions for the period from A.D. 900 to 1600. Presently available proxy evidence indicates that temperatures at many, but not all, individual locations were higher during the past 25 years than during any period of comparable length since A.D. 900. ”

Turning now to the question whether anthropogenic effects were important in 20th century warming, according to PSB, the evidence is strong. The following statement on page 3 summarizes the thrust of the analysis.

“The understanding of anthropogenic warming and cooling influences on climate has improved since the [Third Assessment Report], leading to *very high confidence* that the global average net effect of human activities since 1750 has been one of warming, . . .”

“*Very high confidence* is described to mean that the expert judgment is estimated to be correct with a 9 out of 10 chance. Further discussions of anthropogenic sources of climate warming in PSB reinforce the position that there is preponderant evidence for anthropogenic warming.”

On the subject of anthropogenic effect, STR, page 28, comments

“To the extent that the warmth of the most recent one or two decades stands out above the natural variability in mean surface temperature over the last 2,000 years, the surface temperature record serves as supporting evidence that human activities are largely responsible for the recent warming. However, the attribution of the recent global warming to human activities does not rest solely or even principally upon paleoclimate evidence.”

Finally, with respect to the projections of global climate change and analyses of the impact on our environment, there can be little doubt about the large uncertainties of climate modeling . However, every climate model predicts further warming if greenhouse gases continue to be emitted at the current rate. Given this, and the potentially high cost to humanity of a major change in the global climate, it would be irresponsible to underestimate the possible consequences of continued or accelerated warming.

For these reasons, we recommend against the APS Council adopting the Austin statement.

## **2) Review of the 2007 Council Statement**

The statement is

Emissions of greenhouse gases from human activities are changing the atmosphere in ways that affect the Earth's climate. Greenhouse gases include carbon dioxide as well as methane, nitrous oxide and other gases. They are emitted from fossil fuel combustion and a range of industrial and agricultural processes.

The evidence is incontrovertible: Global warming is occurring. If no mitigating actions are taken, significant disruptions in the Earth's physical and ecological systems, social systems, security and human health are likely to occur. We must reduce emissions of greenhouse gases beginning now.

Because the complexity of the climate makes accurate prediction difficult, the APS urges an enhanced effort to understand the effects of human activity on the Earth's climate, and to provide the technological options for meeting the climate challenge in the near and longer terms. The APS also urges governments, universities, national laboratories and its membership to support policies and actions that will reduce the emission of greenhouse gases.

## **Discussion**

There are a number of problems with this statement. The first sentence presents as a fact what is only a surmise. Although the evidence is strong that climate warming has anthropogenic sources, as described above, anthropogenic warming is not a *proven* fact. Consequently, the wording in the first sentence "are changing the atmosphere" should have been "are *probably* changing the atmosphere". In the second paragraph, the first sentence states that the fact of climate warming is incontrovertible, which is true. However, by its context this is easily misread to mean that anthropogenic warming is incontrovertible. The only clue that there are uncertainties in the predictions for the global climate is the phrase "*likely* to occur" in the second paragraph. This hardly conveys the great uncertainties in analysis displayed in PSB. The paragraph as a whole has an alarmist tone that belies the underlying uncertainties.

Members of the committee have varying degrees of reservation about the 2007 APS Council statement. However, ultimately these criticisms of the statement center on clarity and tone, rather than the ultimate message: global warming is potentially a grave problem and society needs to take it seriously. We recommend that Council return its resolution to POPA to address the issues of clarity and tone.

Despite the uncertainties in detailed predictions, it is the conviction of this committee that the APS would be well advised not to retract its support for policies and actions that are aimed at reduction in the production of greenhouse gasses. The weight of the evidence we have examined points to this as a prudent policy position.

Finally, the committee expresses its appreciation to Robert Austin and his colleagues for preparing the petition. Although we do not agree with their views, we are grateful that they have focused attention on the complexities of climate change and the inadequacies of the Council statement.