

Comments by John P. Holdren¹ on

“The Shaky Science Behind the Climate Change Sense of the Congress Resolution”

US Senate Republican Policy Committee

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Introduction

In my judgment, the Sense of the Congress Resolution is reasonable, balanced, and consistent with the state of understanding of climate-change science as presented in the 2001 reports of the Intergovernmental Panel on Climate Change (IPCC) and the analysis of key questions in climate science produced by the National Academy of Sciences (NAS) in response to a request from the Bush Administration in 2001. The Republican Policy Committee’s June 2, 2003, critique of the Sense of the Congress Resolution, by contrast, is loaded with misleading assertions, misrepresentations, and misunderstandings. The critique appears to have been motivated by an ideological predisposition against the idea that greenhouse-gas-induced global climate disruption could possibly be real or dangerous. Its arguments are not only inconsistent with the best current scientific understanding and with elementary logic; they are also inconsistent with many of the Bush Administration’s own statements on the issue.

Scientific consensus

The RPC critique denies that there is “widespread scientific agreement on climate change science”, claiming that “scientific opinion about global warming is very diverse.” These assertions are misleading. A very large majority of the scientists who have studied climate change are in agreement that: (a) global climate has been changing over the past several decades at a rate highly unusual in climatic history; (b) the observed build-up of atmospheric carbon dioxide from fossil-fuel burning has almost certainly been responsible for a substantial part of the change in climate that has been observed; (c) continuation of anything resembling “business as usual” in civilization’s carbon dioxide emissions during the 21st century will lead to much larger changes in climate than those observed so far; and (d) while the consequences of changes of the sort likely to occur under “business as usual” cannot be predicted with high confidence at the current state of the science, the kinds of consequences that are plausible and even likely, given current understanding, entail large disruptions of a wide range of environmental conditions and processes and serious adverse impacts on human well-being.

While there are significant scientific uncertainties and disagreements about what the magnitude, timing, and geographic distribution of the consequences will be, the basic propositions (a)-(d) above -- on which there is strong consensus among the knowledgeable -- are sufficient basis for taking action to reduce the risks that civilization is now running with its unrestrained carbon dioxide emissions. The RPC critique’s implication that scientific uncertainties are a sound basis for delaying action reflects a profound misunderstanding. If the

¹ John P. Holdren is Teresa and John Heinz Professor of Environmental Policy and Director of the Program on Science, Technology, and Public Policy at the John F. Kennedy School of Government, and Professor of Environmental Science and Public Policy in the Department of Earth and Planetary Sciences, at Harvard University. He is a member of the National Academy of Sciences, the National Academy of Engineering, and the American Academy of Arts and Sciences. He offers his views here as an individual, not as a representative of these organizations.

consensus best estimate is that we are headed for trouble, uncertainties surrounding that estimate are not a consolation. It must be remembered that uncertainties cut in both directions: when more is learned, it might turn out that things are not as bad as the current best estimate suggests, but it also might turn out that they are worse than this estimate suggests.

Of course, scientists who have not studied these problems display a wider range of opinion than those who have; not all scientists, the RPC should know, are equally qualified or equally credible on all scientific topics. It is true, though, that a few of those who have studied the problem take “contrarian” positions asserting that everybody else in the field is wrong. That dissenters always exist is part of the human condition as well as part of science, and it is a good thing. Every now and then, on one scientific issue or another, the dissenters turn out to be right. But this is the exception, not the rule, and it would be a mistake for policy-makers to bet the welfare of their constituents on the long odds that the dissenters will turn out to be right in the case of climate change.

The RPC critique goes overboard in its quotation of the only really distinguished climate-change contrarian, Prof. Richard Lindzen of MIT, in trying to discredit the Sense of the Senate resolution’s account of the degree of agreement represented by the 2001 reports of the IPCC and the NAS review, in both of which Lindzen participated. The facts are that Lindzen signed the NAS report without dissent and that this report plainly stated that

“Greenhouse gases are accumulating in Earth’s atmosphere as a result of human activities, causing surface air temperatures and subsurface ocean temperatures to rise. Temperatures are, in fact, rising. The changes observed over the last several decades are likely mostly due to human activities, but we cannot rule out that some significant part of these changes is also a reflection of natural variability. Human-induced warming and associated sea-level rises are expected to continue through the 21st century.” (p 1)

“The IPCC’s conclusion that most of the observed warming of the last 50 years is likely to have been due to the increase in greenhouse gas concentrations accurately reflects the current thinking of the scientific community on this issue. ... Despite the uncertainties, there is general agreement that the observed warming is real and particularly strong within the last 20 years.” (p 3)

“The Committee finds that the full IPCC Working Group I (WGI) report is an admirable summary of research activities in climate science, and the full report is adequately summarized in the *Technical Summary*. The *Summary for Policymakers* reflects less emphasis on communicating the basis for uncertainty and a stronger emphasis on areas of major concern associated with human-induced climate change. This change in emphasis appears to be the result of a summary process in which scientists work with policy makers on the document. Written responses from U.S. coordinating and lead scientific authors to the committee indicate, however, that (a) no changes were made without the consent of the convening lead authors (this group represents a fraction of the lead and contributing authors) and (b) most changes that did occur lacked significant impact.” (p 4)

The RPC critique quotes a subsequent Lindzen op-ed piece in the *Wall Street Journal* to the effect that Lindzen’s signature on the NAS report does not necessarily mean he agrees with it. Prof. Lindzen can write what he likes in the *Wall Street Journal*, but the fact is that members of NAS committees who do not agree with major findings are expected to enter their dissenting views in the report. If Prof. Lindzen had any significant disagreements, he should have written them up for inclusion in the NAS document. He chose not to do so, perhaps because he did not

think he had any points to make that he cared to subject to face-to-face scrutiny and criticism from his equally distinguished colleagues who made up the rest of the committee.

“New Scientific Evidence”

The RPC critique tries to discredit the Sense of the Congress statement on grounds that, while it quoted the IPCC accurately on sea-level rise, it failed to give all the details and failed to consider scientific research relevant to this issue that has been published since the IPCC report came out in 2001. As to the details, the sea-level issue is complicated, and it is evident from the RPC write-up that its author does not understand them. The article it cites from *Nature* relates to a finding that the Antarctic ice sheet may be gaining rather than losing volume. But, precisely because the factors that affect whether the Antarctic and Greenland ice sheets shrink or grow under a global-warming regime are too complex to sort out at the current state of the science (and could well entail growth in the early stages of warming and shrinkage in the late stages), the IPCC’s estimates of sea-level rise only take into account the effect of thermal expansion of the oceans, not ice-sheet shrinkage or growth. The IPCC’s “central estimate” for the 21st century is a rise of about 50 centimeters, which is consistent not only with the well-understood thermal expansion effect under anticipated temperature changes but also with what has been observed during the 20th century under a less-warm temperature regime than expected in the 21st. (It is also enough to spell disaster for low-lying island nations and many US shorefront property owners. Of course, ice-sheet dynamics may end up making the increase smaller; but they also may end up making it larger.)

More generally, it is almost always a mistake to trumpet one new publication as having overturned prior understandings. Quite often publications appear that are subsequently shown to be wrong or to be less sweeping in their implications than their authors (or interpreters) may have claimed. It is precisely the function of the IPCC to review comprehensively, every five years, the entire literature of climate change, so as to characterize the state of scientific understanding of the problem through the participation and deliberation of a large number of the leading scientists in the relevant fields. (NAS studies perform a similar function, albeit drawing on a smaller cross-section of the relevant community of scientists.) Assertions that the IPCC has gotten something wrong or has been superseded by a new result must be viewed with skepticism unless and until bolstered by arguments that display a solid understanding of what the IPCC concluded in the first place, as well as persuasive analysis concerning what part of the IPCC’s position is in need of revision. The RPC critique does not remotely meet this standard.

“Undue Alarmism”

The RPC critique disparages the Sense of the Congress resolution for “undue alarmism” because it quoted the IPCC (again accurately) about there being “new and stronger evidence that most of the warming experienced over the past 50 years is attributable to human activities” and about the IPCC report’s 2.5- to 10.4-degree Fahrenheit range for the global-average temperature increase expected in the 21st century. The author of the critique then demonstrates his complete confusion about the issues by mixing up the IPCC’s basis for the “new and stronger evidence” statement with its basis for the indicated range of temperature increases, declaring that the scenario-dependence of the temperature range means that the “new and stronger evidence” statement “cannot be supported”.

This confusion would completely discredit the RPC critique even if nothing else did. The two propositions have nothing to do with each other. The statement that most of the warming experienced in the last 50 years is due to human activities depends on a variety of statistical analyses and computer simulations showing a persuasive match between the pattern of climate change actually observed in the 20th century and the pattern that climate science says should have resulted from the combination of observed increases in greenhouse-gas concentrations, offsetting effects of reflecting particles from human emissions and volcanic eruptions, and natural solar variability.² The wide range of temperature increases portrayed by the IPCC for the 21st century, on the other hand, results in part from uncertainty about the “sensitivity” of the average temperature to a given increase in greenhouse-gas concentration, but even more from the wide range of assumptions the IPCC used about what economic growth and energy-supply technologies will be like in the 21st century. (The RPC author got this latter point right; but he was wrong to think this wide range in choice of scenarios for the 21st century undermines in any way the IPCC’s analysis of what caused the observed warming in the 20th.)

The reason the IPCC 2001 report explores a wider range of assumptions in its scenarios for the 21st century, beyond those employed in its 1990 and 1995 reports, was that it had been criticized for not taking into account a wide enough range of possibilities. If it is now to be criticized for “undue alarmism” because of the 10.4-degree F figure associated with the high-emission end of this wider range of scenarios, it should perhaps also be criticized for “undue complacency” because of the 2.5-degree F figure associated with the low-emission end. In addition, of course, anybody who puts much stress on these global-average temperature increases at all can be accused of undue complacency, because the temperature increases on the continents (where everybody lives) will be larger than the global averages (the temperature increases over the oceans being smaller), and the temperature increases to be expected mid-continent in the Northern hemisphere mid- and northern latitudes will be 2-4 times as high as the global averages.

“Discredited” Clinton-Era Report

The relentlessly ideological and partisan -- as opposed to scientific -- slant of the RPC critique is nowhere more evident than in its attempt to slam the Sense of the Congress resolution for mentioning the October 2000 National Assessment of Climate-Change Impacts on the United States. This report was a pioneering effort -- engaging scores of experts from government agencies, national laboratories, universities, and non-governmental organizations -- to characterize the range of possible impacts of global climate change at the regional level within the United States. It is full of informed analysis, cutting-edge environmental science, and appropriate disclaimers about the uncertainties. Because it concludes that the potential for harm to the well-being of US citizens from greenhouse-gas-induced climate change is considerable, it has come under venomous attack from far-right-wing ideologues who reject this possibility categorically. While these attacks appear to have intimidated some in the current administration into announcing that the National Assessment “does not represent government policy”, it made no pretense of being a policy document. It is an analytical document intended to inform policy, which is how the Sense of the Congress resolution used it. Indeed, the resolution’s reference to the National Assessment, which brought forth the critique’s reflexive chastisement, is extremely restrained:

² Contrarians have the difficult task of explaining both what hitherto unsuspected phenomenon caused the observed warming if carbon dioxide increases did not and how it could be that carbon dioxide increases didn’t do what everything we know about greenhouse gases says they should have done.

“(5) In October 2000, a United States Government report found that global climate change may harm the United States by altering crop yields, accelerating sea-level rise, and increasing the spread of tropical infectious diseases.”

One would not even need the National Assessment to reach this very general, thoroughly hedged, and unexceptionable conclusion, and one certainly does not need to be a Clintonite. (Since when is analysis of possible harm to the public interest a partisan act?) In pouncing on this reference in the Sense of the Congress resolution -- and in claiming that the report is discredited because Patrick Michaels says it is³ -- the RPC author discredits only himself.

The Cost of Climate Policy

The section of the RPC critique on “The Cost of Climate Policy” mainly attacks the Kyoto Protocol, arguing that it would be both too costly to implement and inadequate to deal with the climate-change problem if it is real. Aside from being irrelevant to the Sense of the Congress resolution, which does not endorse the Kyoto Protocol, this section of the critique ignores that the Kyoto protocol was intended only to be a first step -- no one ever pretended it would solve the climate-change problem by itself -- and it reaches a sweeping conclusion that is utterly unsupported by evidence or analysis here or elsewhere, namely that “there is no policy that would have an appreciable effect on global temperatures that would not cause unacceptable economic burdens.”

Middle-of-the-road analyses of the costs to the US economy of a carbon tax high enough and enduring enough to have an appreciable effect on US CO₂ emissions -- and, if applied worldwide, on global CO₂ emissions, atmospheric CO₂ concentrations, and global temperatures -- amount to a US GNP reduction in the range of 1-2% by 2020 and 2-5% by 2050. Since the usual rates of growth forecasted for the US economy over the next several decades are in the range of 2-3% per year (in real terms), the “unacceptable economic burden” associated with a substantial reduction in the risks from climate change would appear to amount to Americans needing to wait until June or September 2020 to be as prosperous as they otherwise would have been in January of that year, and having to wait until 2051 or 2052 to be as prosperous as they otherwise would have been in 2050. These penalties are quite likely to be smaller than the damages from unabated climate change, but they are hardly unacceptable even if viewed only as “insurance”. (Consider what we spend for “insurance” in the military-preparedness domain, with uncertainties about what is really required that are at least as great as in the case of climate.)

It is not even clear, however, that the middle-of-the-road analyses are correct in indicating that there would be a net economic penalty associated with a carbon tax. Harvard professor Dale Jorgenson, former chair of the economics department at that university, has been using sophisticated general-equilibrium economic models of the US economy to study the effects of carbon taxes under different assumptions about what is done with the revenue. He finds that, if the money from the carbon tax is used to reduce capital gains taxes, the result is an increase of

³ Michaels is another of the handful of US climate-change contrarians, but lacks Richard Lindzen’s scientific stature. He has published little if anything of distinction in the professional literature, being noted rather for his shrill op-ed pieces and indiscriminate denunciations of virtually every finding of mainstream climate science.

US GNP over the base case without a carbon tax, rather than a decrease.⁴ This is not so surprising intuitively -- taxing “bads” (things one wants to discourage, such as carbon emissions) ought to be better for the economy than taxing “goods” (things one wants to encourage, such as capital gains).

Concluding Observation

The RPC author claims that his critique of the Sense of the Congress resolution is “[b]ased on a critical evaluation of the science and the economics”. There is not the slightest sign in that critique that its author is competent in either area. It is an ideological document, not an analytical one.

⁴ Dale W. Jorgenson and Peter J. Wilcoxon, “Reducing US Carbon Dioxide Emissions: An Econometric General Equilibrium Assessment”, Chapter 6 in Dale W. Jorgenson, Growth: Vol. 2. Energy, the Environment, and Economic Growth, MIT Press, pp 252-273.