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

During its markup of the State Department Authorization bill in April, the Senate Foreign Relations Committee resurrected a Sense of the Congress resolution on climate change that was removed during last year's conference on H.R.1646, the State Department Authorization for fiscal years 2002 and 2003 (see also S. 1401, 107th Congress). The resolution, which is contained in the bill as reported (S. 925, Calendar No. 77), makes identical scientific claims to the one rejected last year. This paper will examine those claims and attempt to determine whether they are valid today in light of new research, or even whether they were ever valid.

The resolution is troublesome on several fronts. First, it incorrectly implies widespread scientific agreement on climate change science. There is virtually no hint of opposing scientific views. In reality, scientific opinion on global warming is very diverse. Indeed, the two scientific sources cited in the Sense of the Congress resolution were the result of a *collaborative effort between scientists who disagree about many fundamental climate change issues*.

Second, the resolution attributes several scientific claims to reports that either ignore their proper context – thereby misrepresenting the science – or contradict what the reports actually say. Likely, this is because the resolution relied on a summary version of its key scientific source rather than the full text. Also, it is important for policymakers to be aware that since the 2001 publication of the key scientific report cited in the resolution, new evidence has come to light that contradicts many of the report's scientific claims.

Third, one of the key report's climate predictions (the other doesn't make predictions) are unreliable because they are based on faulty economic assumptions about future economic growth, which lead to scenarios that significantly overstate future greenhouse gas emissions. Those faulty assumptions, not better science, are primarily responsible for the report's alarming temperature projections.

Fourth, the resolution assumes that the United States can take meaningful action on climate change without harming the economy. This is demonstrably false. Any action taken by the U.S. government to address climate change would be costly and have no noticeable effect on the climate.

Finally, the resolution inexplicably cites a report from the Clinton era that has been scientifically discredited and disavowed by the U.S. government.

The two scientific reports that the resolution refers to are the Third Assessment Report of the United Nations' Intergovernmental Panel on Climate Change (IPCC) and a report by the U.S. National Academy of Sciences (NAS) (this one does not make climate projections). This paper clarifies what these reports actually say, discusses some of the problems with the reports, and describes some of the new scientific evidence.

There is No Scientific Consensus on Climate Change

The two government reports cited in the Sense of Congress resolution to provide scientific justification for government action on global warming have been widely portrayed in the press as representing a scientific consensus on global warming. By citing these reports, the resolution implies that there is widespread scientific agreement that global warming is caused by humans, and that it will be catastrophic. But neither the IPCC nor the NAS reports are consensus documents; rather, they were prepared by scientists who disagree on many fundamental climate change issues.

For instance, Dr. Richard S. Lindzen, a distinguished Professor of Meteorology at MIT, who helped prepare the NAS report and also served as a lead author of the IPCC Third Assessment Report, noted in a *Wall Street Journal* editorial that, "the NAS never asks that all participants agree to all elements of a report, but rather that the report represent a span of views. This the full report did [represent all views], *making clear that there is no consensus, unanimous or otherwise, about long-term climate trends and what causes them*" (Lindzen, 2001b, emphasis added).

He also noted in testimony before the Senate Environment and Public Works Committee that "neither the full text of the IPCC documents nor even the summaries claim any such agreement." In his testimony, he challenged, "Those who insist that the science is settled should be required to state exactly what science they feel is settled. In all likelihood, it will turn out to be something trivial and without policy implications" (Lindzen, 2001a).

In his editorial, Lindzen explains that there are essentially three things upon which informed scientists agree:

"We are quite confident (1) that global mean temperature is about 0.5 degrees Celsius [0.9 degrees Fahrenheit] higher than it was a century ago; (2) that atmospheric levels of carbon dioxide have risen over the past two centuries; and (3) that carbon dioxide is a greenhouse gas whose increase is likely to warm the earth (one of many, the most important being water vapor or clouds).

“But – and I cannot stress this enough – we are not in a position to confidently attribute past climate change to carbon dioxide or to forecast what the climate will be in the future. That is to say, contrary to media impressions, agreement with the three basic statements tells us almost nothing relevant to policy discussions” (emphasis added).

To summarize, what scientists do agree on is not policy-relevant, and on policy-relevant issues, there is little scientific agreement.

Scientific Sources Not Fully Represented; New Evidence Not Addressed

The resolution attributes several scientific claims to the reports that either (because they are out of context) present a misleading picture, or that contradict what the reports actually say. As an example of the need for context, the resolution reads, “The IPCC has stated that in the last 40 years, the global average sea level has risen, ocean heat content has increased, and snow cover and ice extent have decreased, which threatens to inundate low-lying island nations and coastal regions throughout the world.” Although not untrue *per se*, this stand-alone statement is highly misleading, unless it is put into its proper context. To present a full and accurate view of sea level change, one needs to present the following information, all of which is available on the first page of Chapter 11, “Changes in Sea Level,” of the IPCC report.

The report notes, for example, that “Since the Last Glacial Maximum [Ice Age] about 20,000 years ago, sea level has risen by over 120 [meters].” It also states that, “Based on the few very long tide gauge records, the average rate of sea level rise has been larger during the 20th century than the 19th century,” and that “Based on tide gauge data, the rate of global average sea level rise during the 20th century is in the range 1.0 to 2.0 mm/yr [millimeters per year], with a central value of 1.5 mm/yr.” And finally, “*No significant acceleration in the rate of sea level rise during the 20th century has been detected*” (IPCC, 2001). In other words, the present rate of sea level rise began long before the industrial revolution when significant emissions of greenhouse gases began, and was insignificant during the last century!

It should also be remembered that science is not static, but dynamic. The IPCC published its report in 2001. Since that time, much research has been done that should be considered. For example, the claim that the sea-ice extent is decreasing, which threatens to inundate low-lying island nations and coastal regions, does not take into account relevant new research. There is some evidence that sea-ice extent has diminished in the Arctic; but since Arctic sea-ice is floating, it already fully displaces an equivalent amount of water, so even if it melted completely it would have no effect on sea levels. However, the Antarctic ice sheet is not floating, but is grounded. Were it to melt significantly, it would cause sea levels to rise and might pose a danger to low-lying island nations and coastal regions. But new research shows that the *Antarctic is cooling and its ice sheet is growing*. A study published in *Nature* (Doran, *et al.*, 2002) concluded that “Our spatial analysis of Antarctic meteorological data demonstrates a net cooling on the Antarctic continent between 1966 and 2000, particularly during

summer and autumn.” Antarctic cooling is also documented in the IPCC report. A study published in *Science* found “strong evidence for ice-sheet growth (between about 10 and 40 gigatons per year)” in the Antarctic (Joughin and Tulaczyk, 2002). Overall, the evidence suggests that observed sea level rise is a natural phenomenon.

It should also be noted that the NAS statement quoted in the Sense of the Congress resolution was taken from the “hastily prepared summary,” (Lindzen, 2001b), which the report itself contradicts. The resolution quotes the summary that “observed warming is real and particularly strong within the past twenty years.” But the NAS report itself states “that temperature trends based on such short periods of record [20 years], with arbitrary start and end points, are not necessarily indicative of the long-term behavior of the climate system.”

Resolution Invokes Undue Alarmism

The resolution relies heavily on statements taken from the Summary for Policymakers of the IPCC. It quotes the summary’s claim that “there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities,” and notes that the IPCC projects a rise in global average temperature of between 2.5 and 10.4 degrees Fahrenheit by 2100. Many credible scientists believe such statements are unduly alarmist. For example, John Christy, a professor of Atmospheric Science and director of the Earth System Science Center at the University of Alabama at Huntsville, and a lead author of the IPCC report, commented at a seminar in 2001 that, “Recent publicity regarding the release of the IPCC Summary for Policymakers promoted catastrophic consequences to the planet due to human- caused climate change. In truth, the IPCC’s 1000-page report is much less alarmist and quite honest in identifying the uncertainties regarding this issue” (Christy, 2001).

It is important to consider that the Summary for Policymakers was written by government representatives, not scientists, whereas the underlying report was written by the scientists (Lindzen, 2001b). As Professor Christy noted, a careful reading of the reports themselves gives a much less alarmist picture of the state of the climate and the likelihood of future catastrophe.

Alternative Views to IPCC’s Problematic Climate Projections

Although the IPCC’s 2001 report was an important review of current climate research, it went seriously awry when it attempted to predict future climate change. Some economists and statisticians argue that the report’s projections are based on faulty economic assumptions.

An alternative view of the IPCC’s climate projections has been offered by Ian Castles of the National Center for Development Studies at Australian National University and formerly the head of Australia’s national office of statistics, and David Henderson of the Westminster Business School, and

former Head of the Economics and Statistics Department at the OECD. The two criticized the IPCC's economic assumptions and emissions scenarios in correspondence with IPCC Chairman Rajendra Pachauri and in presentations at the Experts Meeting of the IPCC Task Group on Scenarios for Climate Impact Assessment on January 10, 2003 in Amsterdam. Their criticisms have since been published in the March 2003 issue of *Energy and Environment*.

World Economic Growth Overestimated

In their critiques, Castles and Henderson focus on the emission scenario that yields the lowest projected temperature rise of 2.5 degrees F from 1990 to 2100, on the premise that if that scenario is unrealistic, then higher scenarios are even more so. First, they say, the IPCC significantly overestimated future world economic growth. Its Special Report on Emissions Scenarios (SRES) analyzed 166 scenarios of economic growth from the open peer-reviewed literature. Most of those scenarios showed that the gross world product (GWP) would be roughly five times greater in 2050 than now. But according to Castles, the IPCC's scenarios "assume higher levels of GWP in 2050 than more than 95 percent of the scenarios in the open literature."

The Flaw of Using Exchange Rates in Income Comparisons

Second, the IPCC assumed that the developing countries would achieve economic convergence with the developed countries by 2100. To determine the amount of economic growth needed to achieve convergence, the IPCC had to determine the current developing country income relative to developed country income. It did this by converting average country incomes into a single currency using exchange rates and found that the average income of developed countries is 40 times higher than the average income in developing countries in Asia and 12 times higher than the average income in other developing countries. The problem with using exchange rates to make income comparisons is that it fails to take into account differing price levels. "This comparison is invalid," said Castles, "because it is based on the assumption that [a] poor Bangladeshi family has converted the whole of its income into foreign currency, and spent it on goods and services at average world prices rather than [at much lower] Bangladeshi prices."

Rather than using exchange rates, the accepted practice of making inter-country income comparisons (according to the internationally recognized *System of National Accounts*) is to use "purchasing power parity," which takes into account differing price levels between countries. The purchasing power of a Bangladeshi's income is much greater if he can buy goods and services at Bangladeshi prices, rather than at world prices. Assuming that he must buy those goods and services at world prices makes him look much poorer than he really is and the gap between his income and the income of the average person from a developed country also looks much larger than it really is. Instead of a 40-to-1 income ratio between developed countries and Asia's developing countries, for instance, the use of purchasing power parity results in a 10-to-1 ratio.

The assumption that developing economies will equal developed economies, combined with the use of exchange rate comparisons, leads to economic scenarios where developing countries experience mind-boggling levels of economic growth and growth in greenhouse gas emissions over the next 100 years. For example, the amount of goods and services produced per person in developing countries in Asia would increase 70-fold by 2100 under the IPCC's low-end scenario, and nearly 30-fold for other developing countries. To put that in perspective, the United States only achieved a five-fold increase in per capita economic growth in the 19th century and Japan achieved a nearly 20-fold increase in the 20th century. No significant country has increased per capita income by 20 times in a century. As Castles noted in his first letter to Pachauri, "These assumptions are patently unrealistic, even for a 'high-emissions scenario'." Yet these are the low-emissions scenario assumptions.

Effects of Flawed Data on Carbon Dioxide Emissions

These scenarios also lead to a situation where global emissions of carbon dioxide skyrocket despite historical evidence to the contrary. For example, under the IPCC low-end projection, carbon dioxide emissions are expected to increase by 1.6 billion tons between 2000 and 2010 and 1.5 billion tons between 2010 and 2020. But the decade of the 1980s experienced a growth rate of only 0.8 billion tons. In the 1990s, the rate fell to 0.7 billion tons. So there is no historical justification for the IPCC's emissions scenarios, say Castles and Henderson.

Confirming Preconceived Conclusions

Others have also criticized the IPCC's scenarios. "The catastrophic warming projections are based on one set of scenarios that are way off the chart," according to Dr. Christy (Bailey, 2001). John Reilly, an economic modeler with the MIT Joint Program on the Science and Policy of Global Change, stated that, "the SRES scenarios were just, in my view, a kind of insult to science. . . an insult to serious analysis." He also accused the IPCC of looking for economists who were willing to provide scenarios that led to the IPCC's desired results. "They wanted our group [at MIT] to do this, but we just refused" (Corcoran, 2002).

Flawed Scenarios Result in Flawed Temperature Projections

The economic assumptions discussed above, rather than better scientific understanding or better climate modeling techniques, were largely responsible for the large century-scale warming projections cited in the IPCC report, according to Drs. Thomas Wigley and Sarah Raper. Last October they published a study in the *Journal of Climate*, a publication of the American Meteorological Society, charging that the IPCC's new temperature projections were due almost entirely to its new economic assumptions and emissions scenarios and not to better scientific understanding or even better climate modeling. Wigley and Raper are the creators of the climate model used to construct the IPCC's "storylines" and to come up with the new projections. They found that only 4 percent of the high end of the projection (5.8 degrees Celsius) can be attributed to differences in

science. The rest is due to changes in emission scenarios. Only 34 percent of the low-warming limit (1.4 degrees Celsius) is attributable to changes in science, while the rest is due to changes in emissions scenarios.

These findings corroborate what Stephen Schneider wrote in *Nature* on May 3, 2001, that the new climate projections were due to changes in emissions scenarios. He also noted that these storylines were not subjected to scientific peer review, but were added to the IPCC report during a “government review” after the scientific peer review was concluded.

Evidence Not ‘Newer and Stronger’

In light of the above discussion, the claim that there is “new and stronger evidence” that humans are significantly contributing to climate change cannot be supported. Moreover, the IPCC’s projections appear to be largely due to erroneous economic assumptions and technically unsound emissions scenarios.

The National Academy of Sciences Comments on the IPCC’s Summary

The Sense of the Congress resolution also implies that a National Academy of Sciences report unequivocally agrees with the conclusions of the IPCC report. It quotes the summary of a National Academy of Sciences (NAS) report as saying, “The IPCC’s conclusion that most of the observed warming of the last 50 years is likely to have been due to the increase of greenhouse gas concentrations accurately reflects the current thinking of the scientific community on this issue” and that “there is general agreement that the observed warming is real and particularly strong within the past twenty years.”

What the *NAS report – in contrast to its summary* – concluded, however, was that the IPCC’s Summary for Policymakers does *not* provide suitable policy guidance for the U.S. government. The main task of the NAS report was to evaluate the differences between the text of the IPCC report (about 1,000 pages) and its 20-page summary. According to the NAS, “The full text of the IPCC Third Assessment Report on *The Scientific Basis* represents a valuable effort by U.S. and international scientists in identifying and assessing much of the extensive research going on in climate science.” It also explains that the summary lacks a thorough discussion of the uncertainties essential to policymaking. “The SPM [Summary for Policymakers] frequently uses terms (e.g., “likely,” “very likely,” “unlikely”) that convey levels of uncertainty; however, the text less frequently includes either their basis or caveats,” said the report.

The NAS report makes clear that the science is far from settled: “Climate projections will always be far from perfect. Confidence limits and probabilistic information, with their basis, should always be considered as an integral part of the information that climate scientists provide to policy- and

decision-makers. Without them, the IPCC SPM [Summary for Policymakers] could give an impression that the science of global warming is ‘settled,’ even though many uncertainties still remain.”

Dr. Lindzen reemphasized this point: “Within the confines of professional courtesy, the NAS panel essentially concluded that the IPCC’s Summary for Policymakers does not provide suitable guidance for the U.S. government.” Lindzen also notes that, “The full IPCC report is an admirable description of research activities in climate science, but it is not specifically directed at policy. The Summary for Policymakers is, but it is also a very different document. It represents a consensus of government representatives (many of whom are also their nations’ Kyoto representatives), rather than scientists. *The resulting document has a strong tendency to disguise uncertainty, and conjures up some scary scenarios for which there is no evidence*” (Lindzen, 2001b, emphasis added).

Report from Clinton Era Has Been Discredited and Disavowed

The Sense of the Congress resolution inexplicably cites a Clinton-era report (the U.S. National Assessments on Climate Change) released in 2000, just prior to the presidential election, that has been scientifically discredited and disavowed by the U.S. government. Patrick Michaels, a climatologist with the University of Virginia, who reviewed the National Assessments report, found that the two climate models used for the report could not simulate past temperatures any better than a table of random numbers (2000). This finding was confirmed by Dr. Thomas Karl, Director of the National Climate Data Center, and a co-chair of the National Assessments, but Michaels’ review comments were ignored. The Bush Administration has stated that the National Assessments “do not represent government policy” and are not “policy positions or statements of the U.S. Government” (Karl, 2002).

The Cost of Climate Policy

The resolution calls for “creating flexible international and domestic mechanisms, including joint implementation, technology deployment, tradable credits for emissions reductions and carbon sequestration projects that will reduce, avoid, and sequester greenhouse gas emissions.” It also calls for “participating in international negotiations, including putting forth a proposal to the Conference of the Parties, with the objective of securing United States participation in a future binding climate change Treaty in a manner that is consistent with the environmental objectives of the UNFCCC [United Nations’ Framework Convention on Climate Change], that protects the economic interests of the United States, and that recognizes the shared international responsibility for addressing climate change, including developing country participation.”

In 1997, the United States became a signator to the Kyoto Protocol, which would have required it to reduce greenhouse gas emissions 7 percent below 1990 levels by the 2008-to-2012 compliance period. Estimates of the costs to the U.S. economy of complying with the Kyoto targets have ranged from \$100 billion to \$400 billion per year (Thorning, 2000). The Kyoto Protocol would

have virtually no effect on the climate, however. According to Thomas Wigley, Kyoto would prevent a mere 0.14 degrees C (0.25 degrees Fahrenheit) increase by 2100, an amount too small to detect (Wigley, 1998).

A different perspective has been offered by Bjorn Lomborg (2001). He noted that Kyoto would only delay the projected century-scale warming by *six years*. This amounts to the United States spending thousands of billions of dollars over the next 100 years to prevent global warming, at the end of which it would have to pay the costs of global warming anyway, if it were to materialize.

Although the resolution expresses a desire to protect “the economic interests of the United States,” there is no policy that would have an appreciable effect on global temperatures that would not cause unacceptable economic burdens. Anything less than Kyoto would do nothing. Anything more would be economically disastrous.

Summary

To justify the tremendous cost of global warming policy, it must be agreed that global warming poses a serious and looming threat, that humans are the cause, and that there is something meaningful and economically feasible that can be done about it. This paper shows that there is little expert agreement on any of these propositions. The scientific claims cited by the Sense of the Congress resolution do not offer a sufficiently broad view of climate change science, nor does it critically evaluate the validity of long-range climate predictions, but instead it leads to needlessly alarmist conclusions. Based on a critical evaluation of the science and economics, it can be concluded that the science is not settled, there is little cause for alarm, and the IPCC’s long-range forecasts are based on unreasonable economic assumptions. The resolution does not meet the significant burden of proof needed to justify government action on global warming.

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