



BRIEF ANALYSIS

Climate Change Forecasters on the Hot Seat

by H. Sterling Burnett

More than 20 years ago, climate scientists began to sound the alarm over the possibility that global temperatures were rising due to human activities, such as deforestation and the burning of fossil fuels. In 1988, the World Meteorological Organization and the United Nations Environment Program created the Intergovernmental Panel on Climate Change (IPCC) in order to study and better understand this potential threat. The IPCC's mission was to provide a "comprehensive, objective, scientific, technical and socio-economic assessment of human-caused climate change, its potential impacts and options for adaptation and mitigation."

IPCC reports have predicted that average world temperatures will increase dramatically, leading to the spread of tropical diseases, severe drought, the rapid melting of the world's glaciers and ice caps, and rising sea levels. Congress is considering proposals to slow rising temperatures by joining international agreements or by implementing policies to cut greenhouse gas emissions.

However, several assessments have shown that the techniques and methods used to derive and verify the IPCC's climate predictions are fundamentally flawed. They indicate that the IPCC's central claims — that the present warming trend is unusual, caused by human activities and will result in serious harm — are not supported by scientific forecasts. Rather, these claims are opinions that are no more likely to be right than wrong.

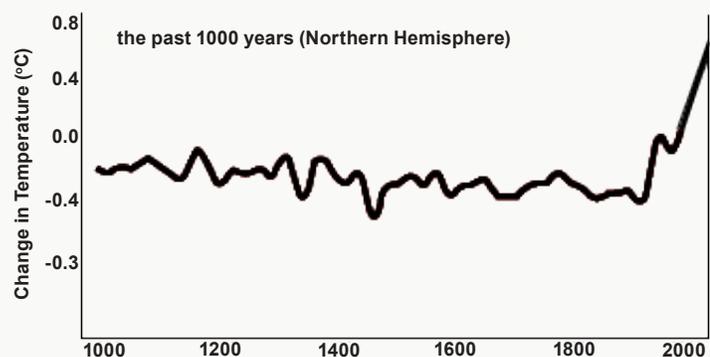
Taking the Temperature of the IPCC. In its *Third Assessment Report: Climate Change 2001*, the IPCC published an image commonly referred to as the "hockey stick." [See the figure.] This graph showed relatively stable temperatures from A.D. 1000 (and in later versions from A.D. 200) to 1900, with temperatures rising steeply from 1900 to 2000. The IPCC and various public figures, such as former Vice President Al Gore, have used the hockey stick to support the conclusion that human energy use over the past 100 years has caused a rise in global temperatures.

However, several studies cast doubt on the accuracy of the hockey stick, and in 2006 Congress requested an independent analysis of the calculations on which the graph was based. A panel of statisticians chaired by Edward J. Wegman of George Mason University found

significant problems with the statistical methods used by the researchers and with the IPCC's peer review process. For example, in reconstructing temperatures for previous centuries from such physical evidence as tree rings, the researchers who created the hockey stick used the wrong time scale to establish the mean temperature to compare with recorded temperatures of the past century. Because the mean temperature was low, the recent temperature rise seemed both unusual and dramatic. This error was not discovered by the authors or during peer review — in part because statisticians were never consulted.

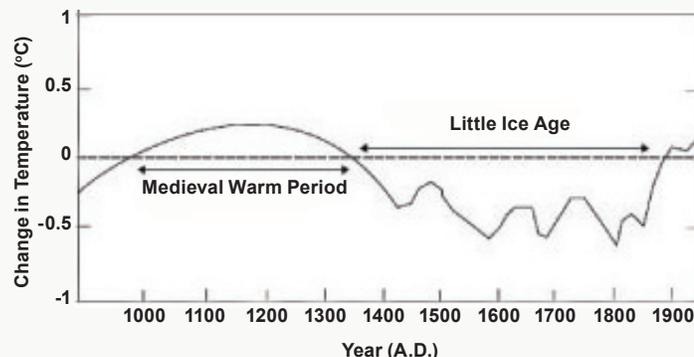
Furthermore, peer reviewers are supposed to be experts who independently examine research findings prior to publication to check the logic and accuracy of the methods used. However, the community of specialists in ancient climates from which the peer reviewers

IPCC's Climate Change "Hockey Stick"



Source: *Third Assessment Report*, Intergovernmental Panel on Climate Change, 2001; uncertainty estimates omitted.

Alternative Temperature Reconstruction



Source: David R. Legates, National Center for Policy Analysis, Policy Report No. 285, May 2006, Figure I.

were drawn was small and many of them had ties to the original authors — 43 paleoclimatologists had previously coauthored papers with Michael Mann, the lead researcher in constructing the hockey stick.

These problems led Wegman's team to conclude that the idea that the planet is experiencing unprecedented global warming "cannot be supported" by the reconstruction.

Warmed-over IPCC Errors. With much fanfare, the IPCC published its *Fourth Assessment Report* in 2007. It predicted that global warming will lead to widespread catastrophe if it is left unmitigated. Yet, the report failed to provide the most basic requirement for effective climate policy: accurate temperature statistics. The IPCC measures global temperature by averaging readings from thermometers at ground stations throughout the world. There are a number of potential errors in these readings:

- Temperature-recording stations are absent from large areas of the Earth's surface.
- Weather stations that were once in undeveloped areas are now surrounded by buildings, parking lots and other heat-trapping structures — and due to the urban-heat-island effect, give high and inaccurate temperature data.
- Temperature data has been further distorted as the locations and number of measuring stations have changed, contributing to inconsistent measurements over time.

Expert Opinion versus Scientific Forecasting.

Even using accurate, consistent temperature data, sound forecasting methods are required to predict climate change. Over time, forecasting researchers have compiled 140 principles that can be applied to a broad range of disciplines, including science, sociology, economics and politics. In a recent NCPA study, Kesten Green and J. Scott Armstrong used these principles to audit the climate forecasts in the *Fourth Assessment Report*:

- They found that 127 principles were relevant in assessing the process the IPCC used to project climate change.
- The IPCC clearly violated 60 of the 127 principles.
- Twelve additional principles appeared to be violated.
- Another 38 could not be assessed because there was insufficient information.

For example, a principle clearly violated is: "Make sure forecasts are independent of politics." Politics shapes the IPCC from beginning to end. Legislators, policymakers and/or diplomatic appointees select (or approve) the leading IPCC scientists. Those scientists then select the authors of the reports. The summary and final draft of the IPCC's *Fourth Assessment Report* was written in collaboration with political appointees and subject to their approval. David Henderson, former head of Economics and Statistics at the Organization for Economic Cooperation and Development, contends that "political considerations influence all stages of the IPCC process."

Green and Armstrong found no evidence that the IPCC was even aware of the vast amount of literature concerning scientific forecasting methods, much less ap-

plied the principles, which are available from the International Institute of Forecasters.

Just Ask the Experts. Instead of scientific forecasting methods, the IPCC reports depend on expert opinion. Expert opinion — otherwise known as judgmental forecasting — lacks scientific objectivity and accuracy. Green and Armstrong note that expert opinion is among the "least accurate of the methods available to make forecasts." For instance, a study that asked 284 political and economic consultants to make predictions on events "within and outside their areas of expertise" found that, of over 82,000 forecasts collected, the experts were no more accurate than nonexperts. Both groups were less accurate than simple forecasting procedures that "extrapolate from the past to predict the future."

The Inconvenient Truth about Climate Models.

The IPCC has attempted to back up expert opinion with computer climate models. However, the IPCC's climate models are nothing more than mathematical representations of expert opinion.

Bob Carter, of the Marine Geophysical Laboratory at James Cook University, tested the ability of the general circulation models (GCMs) developed by IPCC scientists to predict global warming. Carter found that the GCMs did incorporate "some basic principles of physics," but relied too heavily on "educated guesses" because knowledge of climate change is incomplete. He determined that:

- "The GCMs failed to predict recent global average temperatures as accurately as fitting a simple curve to the historical data and extending it into the future."
- "The models forecast greater warming at higher altitudes in the tropics, when the greatest warming has occurred at lower altitudes and at the poles."
- "Furthermore, individual models have produced widely different forecasts from the same initial conditions, and minor changes in their assumptions can produce forecasts of global cooling."

Conclusion. The IPCC and its defenders often argue that critics who are not climate scientists are unqualified to judge the validity of their work and should not be taken seriously. Basically, they argue that only climate experts can judge claims made by climate scientists. However, climate predictions rely on methods, data and evidence from other fields of expertise, including statistical analysis and forecasting. Thus, the work of the IPCC is open to analysis and criticism from other disciplines.

The IPCC's policy recommendations are based on flawed statistical analyses and unscientific expert opinions that violate general forecasting principles. Policymakers should take this into account before attempting to counter global warming by enacting laws that could have severe economic consequences. To date, no *scientific* forecasts have verified a causal link between humans and climate change. Before their predictions are used to craft public policy, climate scientists should consult forecasting experts.

H. Sterling Burnett is a senior fellow with the National Center for Policy Analysis.

Note: Nothing written here should be construed as necessarily reflecting the views of the National Center for Policy Analysis or as an attempt to aid or hinder the passage of any legislation.

The NCPA is a 501(c)(3) nonprofit public policy organization. We depend entirely on the financial support of individuals, corporations and foundations that believe in private sector solutions to public policy problems. You can contribute to our effort by mailing your donation to our Dallas headquarters or logging on to our Web site at www.ncpa.org and clicking "An Invitation to Support Us."