



Is Human Activity Responsible for Global Warming?

YES: Mary-Elena Carr, Kate Brash, and Robert F. Anderson, from "Climate Change: Addressing the Major Skeptic Arguments," Deutsche Bank Climate Change Advisors (September 2010)

NO: Alex Newman, from "Global-Warming Alarmism Dying a Slow Death," *New American* (April 12, 2010)

Learning Outcomes

After studying this issue, students will be able to:

- Explain how human activities contribute to future climate change.
- Explain what can be done to cope with future climate change.
- Explain why the nature of science helps critics say the science is not certain.
- Discuss how funding sources and other sources of bias can affect the conclusions a scientist reaches.
- Explain how action to prevent global warming may affect some industries.

ISSUE SUMMARY

YES: Mary-Elena Carr, Kate Brash, and Robert F. Anderson argue that although scientists continue to work on improving our understanding of how carbon emissions affect climate, it is clear that human activities affect climate and that preventive efforts are justified. So-called skeptics misrepresent the science, the adequacy of computer models of climate, the motives of researchers, and the need for action.

NO: Alex Newman argues that critics have revealed so many defects in the science and scientists who support global warming that the climate-crisis crusade is clearly failing, although it is not likely to vanish until after a prolonged battle between the skeptics and alarmists.

Scientists have known for more than a century that carbon dioxide and other "greenhouse gases" (including water vapor, methane, and chlorofluorocarbons) help prevent heat from escaping the Earth's atmosphere. In fact, it is this "greenhouse effect" that keeps the Earth warm enough to support life. Yet, there can be too much of a good thing. Ever since the dawn of the industrial age, humans have been burning vast quantities of fossil fuels, releasing the carbon they contain as carbon dioxide. Because of this, scientists estimate that by the year 2050, the amount of carbon dioxide in the air will be double what it was in 1850. By 1982, an increase was apparent. Less than a decade later, many researchers were saying that the climate had already begun to warm. Today, there is a solid consensus that human-caused climate change is a genuine problem; see Joseph Romm, "The Cold Truth about Climate Change," *Salon* (February 27, 2008) (http://www.salon.com/news/feature/2008/02/27/global_warming_deniers/print.html).

Debate over the reality of the warming trend and its significance for humanity and the environment has been vigorous. Much of this debate has been over the quality of the data and the conclusions drawn from the data, which are crucial in any discussion of global warming (and other issues). If the data and conclusions are not solid, they cannot be used to go further, as in forming public policy designed to ward off disaster that people think the data allow us to predict. If the data *are* solid, however, then moving from the data to public policy may be urgent.

In June 2006, the National Academy of Sciences reported that the Earth is now warmer than it has been in the last 400 years, and perhaps in the last 1000 years (*Surface Temperature Reconstructions for the Last 2,000 Years* (National Academies Press, 2006)). Concerns have been raised about the risks to coastal populations from rising seas and changes in storm patterns; see John Young, "Black Water Rising," *World Watch* (September/October 2006). Nicholas Stern, "Stern Review on the Economics of Climate Change," (October 30, 2006) (www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm), reports that although taking steps now to limit future impacts of global warming would be very expensive, the economic and social impacts of not doing so will be much more expensive. According to Richard A. Kerr, "Pushing the Scary Side of Global Warming," *Science* (June 8, 2007), some climate researchers are concerned that we are seriously underestimating how disastrous global warming will be. Indeed, recent projections suggest sea level may rise as much as 1.5 meters (5 feet) by 2100 (see "Global Sea Levels Set to Rise Above IPCC Forecast," *Geographical* (June 2008)).

On May 29, 2008, the Bush Administration released "Scientific Assessment of the Effects of Global Change on the United States: A Report of the Committee on Environment and Natural Resources, National Science and Technology Council" (available at <http://www.ostp.gov/cs/nstc>), describing the current and potential impacts of climate change. In sum, it says that the evidence is clear and getting clearer that global warming is "very likely" due to greenhouse gases largely released by human activity and there will be consequent changes in precipitation, storms, droughts, sea level, food production,

fisheries, and more. Globally, "poor communities can be especially vulnerable, particularly those concentrated in high-risk areas." Dealing with these effects may require changes in many areas, particularly relating to energy use, but "significant uncertainty exists about the potential impacts of climate change on energy production and distribution, in part because the timing and magnitude of climate impacts are uncertain." See Susan Milius, "Already Feeling the Heat," *Science News* (Web edition) (May 29, 2008).

Consonant with the Bush Administration's previous position that imposing restrictions on fossil fuel use or carbon emissions is a bad idea both because of uncertainty about global warming and because it would harm the economy, mitigation of the risks—which the report says are likely or very likely—is barely mentioned. U.S. goals should be limited to reducing uncertainty in projections of how the Earth's climate and related systems may change in the future. "Reducing uncertainty is crucial to providing decision makers with tools for assessing strategies for adaptation, mitigation, and other forms of risk reduction." Richard Moss of the World Wildlife Foundation, a past director of the CCSP, says that because of its shortcomings, the report fails to meet the needs of the public.

On the other hand, the public may be losing interest. Richard A. Kerr, "Amid Worrisome Signs of Warming, 'Climate Fatigue' Sets In," *Science* (November 13, 2009), notes that many people do not believe the problem is real, perhaps because climate change is too long term and big picture for people to see on a local scale. Long-term, big-picture consequences were highlighted in 2010, when the National Academies of Science, Engineering, and Medicine's Committee on Stabilization Targets for Atmospheric Greenhouse Gas Concentrations released *Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia* (National Academies Press, 2010), stressing the seriousness of the problem and the need for mitigation efforts.

The price tag for immediate action to prevent or—with luck—reduce the negative impacts of global warming will not be small, but it should be worth it in many ways. Gregg Easterbrook, "Global Warming: Who Loses—and Who Wins?" *The Atlantic* (April 2007), concludes that "Keeping the world economic system and the global balance of power the way they are seems very strongly in the U.S. national interest—and keeping things the way they are requires prevention of significant climate change. That, in the end, is what's in it for us."

Skeptics such as Patrick Frank, "A Climate of Belief," *Skeptic* (vol. 14, no. 1, 2008), argue that the claim that human-caused carbon dioxide emissions are changing climate is insupportable because computer models of climate are imperfect. Roy W. Spencer, "How Serious Is the Global Warming Threat?" *Society* (July 2007), argues that the science of global warming is not as certain as the public is told, but even if predictions of strong global warming are correct, it is not at all clear what the best policy reaction to that threat should be. Massive reductions in greenhouse gas emissions will require new energy technologies, which are most likely to be developed in the countries that can afford massive energy R&D efforts. Therefore, draconian, government-mandated controls on emissions could very well hurt, rather than help, efforts to develop those new technologies. Mike Carey, president of the Ohio Coal

Association, testified before the U.S. House of Representatives' Select Committee on Energy Independence and Global Warming on April 14, 2010, that such problems indicate no need for legislation to combat global warming, and certainly no need for restrictions on the use of fossil fuels such as coal. Unfortunately, many if not most climate-change skeptics have reportedly been funded by the fossil fuel industry, which renders their skepticism highly suspect; see Kate Sheppard, "Inside Koch's Climate Denial Machine," *Mother Jones* (blog; April 1, 2010) (<http://motherjones.com/blue-marble/2010/04/inside-kochs-climate-denial-machine>), and "Koch Industries: Secretly Funding the Climate Denial Machine," *Greenpeace* (March 2010) (<http://www.greenpeace.org/usa/en/media-center/reports/koch-industries-secretly-fund/>). See also Union of Concerned Scientists, "Smoke, Mirrors & Hot Air: How ExxonMobil Uses Big Tobacco's Tactics to Manufacture Uncertainty on Climate Science" (January 2007) (http://www.ucsusa.org/global_warming/science/exxonmobil-smoke-mirrors-hot.html), and David Michaels, *Doubt Is Their Product: How Industry's Assault on Science Threatens Your Health* (Oxford University Press, 2008).

In the YES selection, Columbia University's Mary-Elena Carr, Kate Brash, and Robert F. Anderson, with an introductory editorial by Mark Fulton, Global Head of Climate Change Investment Research for Deutsche Bank Group, argue that although scientists continue to work on improving our understanding of how carbon emissions affect climate, it is clear that human activities do affect climate and that preventive efforts are justified. So-called skeptics misrepresent the science, the adequacy of computer models of climate, the motives of researchers, and the need for action. In the NO selection, Alex Newman argues that critics have revealed so many defects in the science and in the character of scientists who support global warming that the climate-crisis crusade is clearly failing, though it is not likely to vanish until after a prolonged battle between the skeptics and alarmists.



Climate Change: Addressing the Major Skeptic Arguments

Addressing the Climate Change Skeptics

The purpose of this paper is to examine the many claims and counter-claims being made in the public debate about climate change science.

For most of this year, the volume of this debate has turned way up as the 'skeptics' launched a determined assault on the climate findings accepted by the overwhelming majority of the scientific community. Unfortunately, the increased noise has only made it harder for people to untangle the arguments and form their own opinions. This is problematic because the way the public's views are shaped is critical to future political action on climate change.

For investors in particular, the implications are huge. While there are many arguments in favor of clean energy, water and sustainable agriculture—for instance, energy security, economic growth, and job opportunities—we at DB Climate Change Advisors (DBCCA) have always said that the science is one essential foundation of the whole climate change investment thesis. Navigating the scientific debate is therefore vitally important for investors in this space.

For these reasons, we asked our advisors at the Columbia Climate Center at the Earth Institute, Columbia University, to examine as many as possible of the major skeptic claims in the light of the latest peer reviewed scientific literature and to weigh the arguments of each side in the balance. Although the scientific community has already addressed the skeptic arguments in some detail, there is still a public perception that scientists have been dismissive of the skeptic viewpoint, so the intention in this report is to correct the balance. The result is, we believe, a balanced, expert, and detailed assessment of the scientific case for climate change that will help investors navigate these extremely complex issues.

The paper's clear conclusion is that the primary claims of the skeptics do not undermine the assertion that humanmade climate change is already happening and is a serious long term threat. Indeed, the recent publication on the State of the Climate by the US National Oceanic and Atmospheric Administration (NOAA), analyzing over thirty indicators, or climate variables, concludes that the Earth is warming and that the past decade was the warmest on record. Quantifying cause and effect or projecting future conditions is always incomplete in a system as complex as Earth's climate, where

multiple factors impact the observations. Conclusions are thus presented in terms of probabilities rather than dead certainties. This uncertainty is not always adequately explained in the public debate and, when discussed, can appear to be a challenge to the credibility of the field. However, uncertainty is an inevitable component in our understanding of any system for which perfect knowledge is unattainable, be it markets or climate.

To us, the most persuasive argument in support of climate change is that the basic laws of physics dictate that increasing carbon dioxide levels in the earth's atmosphere produce warming. (This will be the case irrespective of other climate events.) The only way that warming can be mitigated by natural processes is if there are countervailing 'feedback mechanisms', such as cooling from increased cloud cover caused by the changing climate. A key finding of the current research is that there has so far been no evidence of such countervailing factors. In fact, most observed and anticipated feedback mechanisms are actually working to amplify the warming process, not reduce it.

Simply put, the science shows us that climate change due to emissions of greenhouse gases is a serious problem. Furthermore, due to the persistence of carbon dioxide in the atmosphere and the lag in response of the climate system, there is a very high probability that we are already heading towards a future where warming will persist for thousands of years. Failing to insure against that high probability does not seem a gamble worth taking.

Introduction

In response to a growing body of research pointing to human-induced warming of Earth's climate, and in recognition of the global nature and potentially sweeping implications of a changing climate, the world's governments have launched national and international efforts to periodically assess the state of knowledge in the many areas of research that bear on climate change. The Intergovernmental Panel on Climate Change (IPCC), a consultative body of scientists from around the world, was established in 1988 under the auspices of the United Nations Environment Program and the World Meteorological Organization. Every six years the IPCC publishes a summary and review of hundreds of peer-reviewed studies relating to the state of knowledge about climate change. The IPCC reports serve as a common, authoritative source and they are a critical tool for enabling an effective international response.

The IPCC's Fourth Assessment Report (hereafter IPCC AR4), released in 2007, states that "[W]arming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level." Furthermore, "[M]ost of the observed increase in global average temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic GHG [*greenhouse gas*] concentrations." This conclusion is similar to that of the US Global Change Research Program in their latest assessment: "global warming is unequivocal and primarily human-induced." Most recently, the National Academy of Science summarized that "Climate change is occurring, is caused largely by human activities, and poses significant risks

for—and in many cases is already affecting—a broad range of human and natural systems.”

However, a small but vocal group of individuals and organizations, including some scientists, argue that the current scientific evidence is not sufficient to conclude that human-induced climate change is underway or that it poses a clear and present danger to society. Emails stolen from the University of East Anglia's Climatic Research Unit or CRU and mistakes recently identified in the IPCC AR4 have exacerbated these criticisms.

These critics contend that “the science isn't settled.” This is entirely correct in the sense that the scientific process of discovery, testing, peer review and re-assessment carries on. Significant uncertainties about specific dynamics within the climate system persist and scientists continue to pursue research aimed at filling gaps in our knowledge. For example, climate models make poor predictions at the regional scale, and our understanding of cloud dynamics, the distributions and characteristics of aerosols, the rates of glacial melt, and the magnitude of many feedback processes (such as vegetation responses) is still incomplete.

Despite these unanswered questions, the role of carbon dioxide as a driver of Earth's present and future climate is borne out by the increasing body of observations. This is seen most clearly in the annual overviews of climate and weather observations compiled by the National Oceanic and Atmospheric Administration. Over thirty indicators, or climate variables, have been identified to characterize the earth system, including atmospheric levels of greenhouse gases, air temperature, sea level, and extreme weather events. These indicators, which are measured using a wide array of observational techniques, are interpreted in a historical and global context. Some of the variables, like air temperature, are directly related to whether the climate is warming. Other indicators, such as ocean currents or precipitation patterns, need to be monitored over time to understand how the climate system evolves in response to natural and anthropogenic drivers. The latest report, *State of the Climate in 2009*, concludes that Earth is warming and that the past decade was the warmest on record. Even if the thousands of weather stations that report air temperature were suspect, other indicators are consistent with this warming: glaciers continue to lose mass, northern hemisphere snow cover is falling as spring melt occurs earlier, sea levels are rising, and summer Arctic sea ice cover has been on a steadily decreasing trend. Progress in our understanding and more conclusive observational evidence are also manifest in the increased certainty of expressions in successive IPCC reports and of the evolving research. For example, Stott et al. concluded that human influence in regional climate impacts is now discernible throughout the globe based on a review of studies published since the last IPCC report.

Science continues to progress as a discussion among peers and specialists within and across disciplines. Creative and careful research aiming for improved understanding is vital, preferably verified and evaluated via the peer-review process. Although much insight can be gained by scrutiny from people in other fields, the complexity and breadth of climate science do not make it readily or easily accessible in its entirety. Expertise in quantum mechanics

does not qualify a person to perform a heart transplant, nor would a surgeon be likely to identify flaws in a finding from particle physics.

Critiques by people from outside the scientific community who aim to “audit” the research process can help identify errors or lead to improved understanding. These criticisms sometimes highlight insufficient transparency within the scientific process. Both the hearing of the UK House of Commons Science and Technology Committee and the Independent Climate Change Email Review into whether the stolen CRU emails indicated misconduct recommended more open sharing of both data and methods. More transparency is always desirable, but making data sets and methods accessible to an untrained public would require significant additional resources for the research endeavor.

Many criticisms, however, center on matters that have been resolved scientifically or on selective use of observations that may be misinterpreted. Cook outlined five characteristics of attacks on science (originally from a study that focused on public health . . . that apply to many claims from those skeptical of climate science: (1) **conspiracy theories**, by which the existence of a large body of accepted evidence is itself purported to be proof of a conspiracy, as has been expressed about the IPCC report; (2) **fake experts**, the presentation as experts of people with scant training in the field; (3) **selectivity**, by which isolated studies or graphs are presented out of context; (4) **impossible expectations**, the practice of demanding research to provide greater certainty than the study system permits, such as complete weather predictability; and (5) **use of misrepresentations and logical fallacies**, including straw man arguments, such as “CO₂ isn't the only driver of climate;” this true statement is integral to our understanding, but is largely irrelevant for the case about anthropogenic change.

This study aims to respond to the most common misconceptions that are presented to challenge the position that GHG emissions are adversely impacting Earth's climate and will continue to do so. . . .

Executive Summary

Periodic summaries and reviews of the state of knowledge about Earth's climate come from several institutions, including the Intergovernmental Panel on Climate Change (IPCC) and national science academies of countries worldwide. These entities have concluded that the increasing body of observations is consistent with the physical principles by which greenhouse gases (GHGs) affect climate: the planet is warming and it will likely continue to warm due to GHG emissions. Although continued research is needed to quantify the timing, location, and extent of climate impacts, many experts are confident that the precautionary principle justifies action to reduce emissions. However, some individuals and organizations dispute this conclusion, asserting that the science isn't settled. These arguments fall into three general categories: Earth is not warming; Earth may be warming but human activity is not responsible; and Earth may be warming, and humans may be responsible, but we don't need to act to stop it. Here we briefly respond to the primary claims made under each of these categories with the current state of scientific knowledge. Each claim is addressed in detail in the body of the report.

Earth Is Not Warming

Claim: Global average temperatures have not risen since 1998. Multiple factors affect global average temperatures, including the long-term warming trend from GHGs. This time-varying interaction of climate drivers can lead to periods of relatively stable temperatures interspersed with periods of warming. The anomalously high global average temperatures in 1998 associated with the El Niño have been followed by comparably high values that reflect a combination of long-term warming and shorter-term natural variability. Periods of relatively constant temperature are not evidence against global warming; in fact, the decade of 2000 to 2009 is the warmest in the instrumental record.

Claim: Climate researchers are engaged in a conspiracy: global warming is a hoax. There is no evidence that scientists have engaged in alleged conspiracies. Four investigations discerned no scientific misconduct in emails stolen from University of East Anglia's Climatic Research Unit. Weather stations have not been deleted purposefully from the global network since the 1990s, as has been claimed; furthermore, the reduction in number of stations reporting data has introduced no detectable bias in the trend of the global average temperature anomaly. The IPCC reports undergo significant scrutiny, but as is inevitable in a 3000-page document, that scrutiny sometimes fails to detect errors. The few errors identified in the latest IPCC report were primarily in referencing and not in content. Their existence does not support a conspiracy to misrepresent climate research.

Claim: Climate models are defective and therefore cannot provide reliable projections of future climate trends. Despite many weaknesses, climate models are increasingly able to represent a range of physical processes and feedbacks and thereby reproduce past and present observations. Consistency between models and observations lends confidence to model projections of future climate change. Models are but one tool, together with theory and observations, to assess and quantify climate processes.

Earth May Be Warming But Human Activity Is Not Responsible

Claim: The greenhouse gas signature is missing. Global observations are consistent with the model-based prediction of GHG-induced cooling in the stratosphere and warming at the surface and throughout the troposphere. Furthermore, new measurements in the tropics suggest greater warming in the upper troposphere than at the surface, as predicted by the models.

Claim: The Medieval Warm Period was just as warm as, or warmer than, today. Scarce records and spotty spatial coverage make estimates of medieval temperatures uncertain. Northern hemisphere average temperatures during the medieval period do not appear to have been higher than those of the late 20th century. Furthermore, a warmer medieval period has no bearing on the

conclusion that temperatures have increased in the past half-century, and that temperatures will continue to rise due to GHG emissions.

Claim: Atmospheric CO₂ levels rise hundreds of years after temperature in ice cores. The correlation of records of atmospheric CO₂ and Antarctic temperature over the past 800,000 years indicates that CO₂ amplified the warming attributed to variability in Earth's orbit in the transition out of the ice ages. Different processes can and do affect climate concurrently.

Claim: Earth's climate is driven only by the sun. While the importance of the sun as a driver of Earth's climate is undeniable, the measured changes in solar activity over the last fifty years cannot explain the observed rise in temperature; solar activity has in fact decreased since the 1970s.

Claim: Water vapor is the most prevalent greenhouse gas. Although water vapor plays an important role in the natural greenhouse effect and as a positive feedback, CO₂ and other anthropogenic GHGs are perturbing the natural system.

Claim: CO₂ in the atmosphere is already absorbing all of the infrared radiation that it can. The absorption of infrared radiation by carbon dioxide is an integral part of our understanding of the greenhouse effect and of current climate models which take into account the details of the logarithmic absorption of infrared radiation by CO₂. Adding more CO₂ to the atmosphere will continue to perturb the climate system and warm the planet.

Claim: Climate sensitivity is overestimated in current climate models. Quantifying climate sensitivity, or the change in global mean temperature in response to doubling CO₂, is extremely complex because of the unknown rate and magnitude of feedbacks, such as changes in vegetation or ice cover. Attempts to identify negative feedback processes, which would counter the warming due to GHGs, have not been borne out by observations. Sensitivity values below 2.5°C cannot explain the observed climate changes of the past.

Earth May Be Warming, and Humans May Be Responsible, But We Don't Need to Act to Stop It

Claim: Increasing carbon dioxide will stimulate plant growth and improve agricultural yield. Despite the fertilization effect due to increased CO₂, it is likely that crop yields will be reduced in many regions by rising temperature and shifts in precipitation. Unfortunately, regions that are already food-insecure are expected to suffer the greatest negative impacts. While some locations are expected to benefit from the combination of shifting climate and CO₂ fertilization on the short-term, these yields are unlikely to continue indefinitely,

Claim: Human society and natural systems have adapted to past climate change. Past climate changes have often been accompanied by migration,

war, and disease. The growing human population will inevitably make environmental change more disruptive in the future, even in the face of increased technological prowess.

Scientific debate is best carried out within the peer-review literature. However, translation of the scientific literature is a necessary step for the non-expert, as language, results, and implications are often narrowly focused and can be obscure even to those in closely related disciplines. The climate science community must work in a concerted fashion to provide regular state-of-the-art assessments and to answer questions about the current understanding. The present document aims to contribute to the effort by presenting scientific arguments in response to the major claims. . . .

Conclusion

The foundation of the science of human-induced climate change is the understanding of the physical effect of increasing concentrations of greenhouse gases on the planet's heat budget. Observations made throughout the instrumental record are consistent with this understanding: warming, melting land-based glaciers, reduced snowpack and Arctic sea ice, shifts in rainfall, and responses in ecosystems worldwide. The study of past climate through proxy records provides additional insight into the response of the climate system to various forcing mechanisms. Model simulations of present and past changes assist in interpreting these observations while also providing a means to quantify the climate response to each forcing factor and to project these dynamics into the future. These three avenues of investigation—theory, observations, and modeling—are crucial to build our understanding of Earth's climate and how it changes.

Climate research straddles multiple disciplines, from the physics of light interacting with aerosol particles to the relationship between ecosystems and human societies. It involves processes that occur at a broad range of temporal and spatial scales (e.g., from molecular to astronomical). The complexity and diversity of climate science requires independent bodies that can summarize, assess and integrate results, such as the national academies of countries worldwide (e.g. National Academy of Sciences 2008) or the IPCC. In response to a request from US Congress, the National Academies has released a series of reports on *America's Climate Choices* which address the strategies to reduce human influence on climate, actions to reduce vulnerability and increase adaptive capacity to climate change, and steps to advance scientific understanding of natural and human-induced climate change.

The scientific process relies on skepticism. Results and conclusions are routinely questioned. Existing data and methods are re-evaluated while new data are constantly being acquired. Theory, data, principles and methods are discussed openly. The scientific endeavor with regards to climate change exemplifies this process, as is clearly seen in the successive assessment reports of the IPCC, where uncertainties are reduced, new processes identified, and approaches refined. Key climate indicators that characterize the climate system are consistent with warming. Although continued research is needed to quantify the

timing, location, and extent of climate impacts, many experts are confident that "global warming is unequivocal and primarily human-induced."

However, some individuals and organizations dispute this conclusion. These challenges sometimes allege the existence of conspiracies, such as an effort to purposefully remove weather stations from the GHCN or to locate them in close proximity to buildings or airports with the aim of modifying the long-term temperature trend. The claims of conspiracy are not borne out by the facts. Similarly, the recent theft of 15 years of emails from the Climatic Research Unit of University of East Anglia failed to provide any evidence of scientific misconduct or conspiracy. A few errors identified in the IPCC AR4 have added to an atmosphere of criticism. While some assert that these discussions may have had a negative impact on public perception of climate science, the identified errors provide no evidence of conspiracy and have no impact on the scientific conclusions concerning climate change expressed in the IPCC AR4.

In an information-rich world, where sophisticated lay-people question the scientific tenets that inform societal decisions, open access to information and transparency in methods are key to the increased democratization of ideas. The climate community is working to meet this need by facilitating access to observational datasets, method descriptions, and to model code and output. Some examples include the data portal of the National Climate Data Center, the surface temperature datasets maintained by the UK Meteorological Office, the model code of the NASA Goddard Institute of Space Studies, or the output of the models from the IPCC AR4, maintained by the Program for Climate Model Diagnosis and Intercomparison at Lawrence Livermore National Laboratory in the US.

Challenges to scientific understanding are rarely resolved in the mainstream media, as journalists seldom have the training to interpret and present the complex concepts involved. Furthermore, the reader can be easily overwhelmed by journalistic whiplash when competing views are presented. The scientific debate is best addressed within the scientific literature, but translation is required for the non-expert, as language, results, and implications are often narrowly focused and can be obscure even to those in closely related disciplines. The climate science community has the responsibility to provide regular state-of-the-art assessments and to answer questions about the current understanding. Several books, web pages, and blogs work to this end and the present document aims to contribute to the effort by presenting scientific arguments in response to the major claims.

The conclusion that climate is changing in response to human emissions of greenhouse gases does not preclude the existence of other drivers of climate variability, such as solar activity or orbital forcing. Multiple drivers of climate act concurrently today as they have throughout Earth history. The fact that climate has changed in the past without human influence, including a Medieval Warm Period, does not reduce the likelihood of human-induced changes today. Rather, it demonstrates the sensitivity of Earth's climate to perturbation, thereby heightening concern as humans perturb the system by increasing atmospheric carbon dioxide to levels not observed in 800,000 years. Natural variability in climate will continue to occur and the conditions that

we experience will result from the interaction of all climate drivers. This is likely to produce periods of warming interspersed with periods of more stable temperatures, as well as trends that vary from one region to another. Regional conditions and short-term variability also can depart from longer-term global trends. Cold conditions observed in parts of the United States and Europe in winter of 2009-2010 were not representative of global temperature anomalies, which were among the highest in the instrumental record.

Science cannot "prove" that a specific feature observed in historical climate records was caused by greenhouse gases, but the scientific method allows general inferences about trends and patterns by rejecting competing hypotheses. For example, the observed long-term warming since the 1950s cannot be reproduced in models that do not include anthropogenic emissions of GHGs. There is no other forcing that could account for the observations. Solar activity declined while Earth warmed and global brightening due to increased regulation of air pollutants is inadequate to explain the warming.

The planet is warming and it is likely to continue to warm as a consequence of increased greenhouse gas emissions. Ultimately, questions revolve around sensitivity: how much will Earth warm, what will be the impacts, and when will they occur. As discussed above, sensitivity estimates below 2.5°C cannot account for past climate changes. Atmospheric carbon dioxide levels are expected to have doubled by the end of the century if we continue with business as usual. Failing to reduce emissions will thus lead the planet beyond the guardrail of 2°C average global warming.

Lower values of sensitivity require the existence of negative feedbacks, processes that would act to counteract warming. The strongest hypotheses of negative feedbacks put forth to date regard shifts in the dynamics of cloud formation; however, they have not been borne out by further research. Instead, as discussed above, warming is accompanied predominantly by positive feedbacks that further heat the planet: a warmer atmosphere holds more water vapor and forests stressed by water and temperature take up less carbon dioxide.

In addition, CO₂ has a direct effect on plant growth, with complex consequences for ecosystems. Crop yields may see a fertilization effect due to increased CO₂ in some regions, but they are likely to be negatively impacted by rising temperature and shifts in water availability elsewhere, especially in regions that are already food-insecure. Our best projections indicate that the most negative impacts of climate change will occur in nations that are already vulnerable to other stressors such as rapid population growth and extreme poverty. Humans have survived climate changes of the past, though never with global populations of the current magnitude. One might ask whether survival of the human species is an adequate standard of success.

Alex Newman



Global-Warming Alarmism Dying a Slow Death

Last December in Copenhagen at the United Nations climate summit, officials and global-warming alarmists seemed confident of their imminent triumph. "There is no doubt in my mind whatsoever that it will yield a success," proclaimed UN global-warming chief Yvo de Boer just weeks before the conference.

But Copenhagen was not the victory de Boer had been anticipating. In fact, most analysts labeled it a significant setback for the alarmist agenda. And since then, problems for the human-caused warming campaign have only grown. After a series of scandals exposed extreme misconduct (if not criminality) by leading climate scientists and errors surrounding the movement's theories, pundits began announcing the inevitable collapse of climate hysteria. But the vested interests will not go down without a long, hard fight.

Scandals

The climate alarmists were already doing poorly in the United States before the Copenhagen failure. An October 2009 Pew poll showed that only 36 percent of Americans even believed in man-made global warming. The issue consistently ranked last among public priorities. Commentators referred to the movement as a "cult," and critics ridiculed the theories and dangerous "solutions" all over the Internet. And that was before the proverbial hitting of the fan late last year.

In November 2009, a scandal now known as Climategate changed everything. Just before the much-touted global-warming conference, incriminating e-mails and data from the University of East Anglia's Climatic Research Unit were revealed to the world. And the picture was not pretty. Prominent climate scientists, including many who were deeply involved with the Intergovernmental Panel on Climate Change (IPCC) report, were exposed plotting to "hide the decline" in global temperatures, conspiring to violate Freedom of Information laws, and scheming to keep contradictory viewpoints excluded. The scandal led to even more distrust of the alarmist narrative.

After Climategate made headlines around the world, obvious factual errors started turning up in the UN's IPCC report as researchers began scrutinizing it more closely. Widely considered the "gospel" of the anthropogenic-warming campaign, the report was rapidly losing credibility.

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First came "Glaciergate." In its final report, the IPCC suggested that Himalayan glaciers could melt by 2035 or sooner. It turns out the wild assertion (along with several others in the same paragraph) was lifted from an advocacy group's propaganda literature, which took it from an Indian magazine article that has since been discredited. The claim was totally incorrect. The IPCC has been forced to recant it.

More errors were soon exposed in a flurry of bad press for the alarmists. Amazongate, as it has become known, involved fantastical predictions about global warming's effect on the Amazon rain forest. Up to 40 percent of it could be in danger, according to the report. The IPCC also took this claim from advocacy group literature. But on top of that, it incorrectly attributed it to a report that did not even hint at such a prediction. Critics have correctly labeled the assertion a "fabrication."

There was also Africagate. The IPCC erroneously claimed that rain-dependent agriculture in some African countries could be cut in half by 2020, with the wildly inaccurate claims also taken from an advocacy group report (written by an academic who works with "carbon credits"). Of course, this was also wrong. But this time, IPCC Chair Rajendra Pachauri was the one responsible for allowing the error to be repeated in the condensed "Synthesis Report."

Questions and criticism about the use of temperature data have also been ongoing and continue to plague the UN panel's credibility. "Chinagate," where scientists misused Chinese temperature records, is just one example.

The claims of increased hurricane frequency were also proven fraudulent. And as if those blows were not enough, the Dutch government recently forced the IPCC to retract its claim that 55 percent of the Netherlands was below sea level. It's actually 26 percent.

The rapid loss of public credibility over all the errors has also accompanied numerous calls by prominent voices for official inquiries and even criminal investigations. Several universities involved have already launched reviews. And even previous IPCC chief Professor Robert Watson, for example, is calling for a probe to investigate "warming bias" by the UN panel. "The mistakes all appear to have gone in the direction of making it seem like climate change is more serious by overstating the impact. That is worrying," he told the U.K. Times Online. "The IPCC needs to look at this trend in the errors and ask why it happened." The UN will indeed launch an "independent" inquiry, but critics generally expect a coverup.

U.S. Senator James Inhofe (R-Okla.) went further, proposing criminal investigations to determine if alarmists violated any laws. A Senate report produced for Inhofe's Environment and Public Works Committee concluded that, among other problems, "scientists involved in the CRU controversy violated fundamental ethical principles governing taxpayer-funded research and, in some cases, may have violated federal laws."

Similarly, British authorities were investigating possible criminal activity by Climategate scientists who refused to provide documents and data under lawful Freedom of Information requests. The scientists may reportedly escape prosecution under the FOI law because of a six-month statute of limitations.

Rats and Ships

Even the politicians and officials still pushing the alarmist agenda have distanced themselves from the IPCC report. The analogy of "rats" frantically ditching a "sinking ship" has been used by numerous critics to describe the situation.

Climate chief Yvo de Boer, the executive secretary of the UN Framework Convention on Climate Change who predicted "success" in Copenhagen, announced his resignation in mid-February. He said it was time to pursue "new challenges." But he still advises companies about global warming.

Even a prominent member of the pro-United Nations, internationalist Council on Foreign Relations has thrown in the towel, possibly trying to salvage some credibility by denouncing the scandals. "The global warming movement as we have known it is dead" because of "bad science and bad politics," wrote CFR senior foreign policy fellow Walter Mead in a piece for *The American Interest*. He still believes in human-caused warming, but harshly criticized the movement for its lawbreaking and phony claims. "The global warming meltdown confirms all the populist suspicions out there about an arrogantly clueless establishment invoking faked 'science' to impose cockamamie social mandates on the long-suffering American people, backed by a mainstream media that is totally in the tank," he rightly concluded.

Prominent companies that were once leading the push for "action" on climate change have also been retreating to the shadows. Around the time of de Boer's announcement, three large American firms (including two oil companies) bailed on the U.S. Climate Action Partnership, a powerful lobby pushing for "cap and trade" legislation.

Some of the media have also finally started to report the apparent demise of climate alarmism. "The strategy pursued by activists (including scientists who have crossed the line into advocacy) has turned out to be fatally flawed," declared the *Canadian Globe and Mail* in a recent article entitled "The great global warming collapse: As the science scandals keep coming, the air has gone out of the climate-change movement."

Even a writer for the BBC admitted the campaign was falling apart in a recent piece entitled "The dam is cracking." This same media organization has in recent years issued dire predictions of global warming almost daily and last year sat on the Climategate e-mails for over a month. (The BBC claims it wasn't aware of the significance of the information it was given.)

The "neoconservative" *Weekly Standard*—normally a promoter of the globalist establishment's agenda—actually ran a cover story recently with a cartoon depicting polar bears laughing at a naked and freezing Al Gore. The article, entitled "In Denial—The meltdown of the climate campaign," was written by fellow Steven Hayward with the American Enterprise Institute, an organization that has repeatedly peddled climate propaganda and the desirability of "emission reductions" and a "carbon tax." More rats jumping ship?

Even alarmism ringleader Al Gore seemingly conceded defeat on the impact of his efforts to "educate" the public on human-caused climate change.

"I have thus far failed," he told a Norwegian talk show in early March while promoting his new climate book. But, his fight is far from over.

Alarmists Fight Back

Ironically, some of the news articles announcing the demise of climate hysteria were adorned with government-funded Google ads from the State Department reading "Adapting to a Changing Climate." The link takes readers to America.gov, where articles like "The Need for Action on Climate Change Is Urgent" share the page with a picture of a lonely polar bear and propaganda videos citing the IPCC. (What part of the Constitution authorizes government propaganda ads?) Government has obviously not given up the fight.

Indeed—like an animal backed into a corner—committed alarmists are putting up an increasingly hysterical battle as their movement begins to unravel. The U.K. *Telegraph* ran a piece entitled "Warmists overwhelmed by fear, panic and deranged hatred as their 'science' collapses."

There are many players with a significant stake in making sure the public believes "climate change" is caused by man and carbon emissions. Governments have invested hundreds of billions in it—likely because greenhouse-gas legislation will allow government to monitor and control almost everything every citizen does. Banks, too, have vast sums tied up in the scheme—including Goldman Sachs, one of the most powerful firms on Earth—because they stand to make piles of money trading carbon permits. Gore and Pachauri have their fortunes and their reputations at stake. Many climatologists have their careers to lose, too.

"I, for one, genuinely wish that the climate crisis were an illusion," wrote Gore in a wildly inaccurate editorial temper tantrum printed by the *New York Times* on February 27. Then he proceeded to the usual scaremongering, warning about "the displacement of hundreds of millions of climate refugees" and other calamities. Former Vice President Gore intensified his lobbying efforts, consolidating two of his organizations "to create in one [sic] of the largest non-profit climate change education and advocacy organizations in the world," according to a March 5 press release posted on its website. Will Gore go down with the alarmism ship? As its captain, he probably has no choice at this point—though unlike the captain of the *Titanic*, his action will likely be viewed as less than noble.

Scientists under fire have also attempted to deflect criticism by demonizing skeptics. Stanford climatologist Stephen Schneider, for example, complained of receiving "threatening" e-mails. "They shoot abortion doctors here," he told *Tierramérica*, a UN-affiliated propaganda organ in Latin America.

And just as global warming was rebranded "climate change" to be more all-encompassing, some Senators are now trying to deviously re-sell the "cap and trade" scheme with linguistic gimmicks. "We will have pollution reduction targets," explained Senator Joseph Lieberman, ignoring the fact that CO₂ is not a pollutant but an essential component of life without which green plants would cease to exist.

And despite the apparent implosion of the alarmist movement, governments are steamrolling ahead with the agenda. The taxation commissioner at

the European Commission, for example, recently announced a push for EU-wide carbon taxes.

A recently leaked UN Environment Program document from December 2009 revealed plans to create a "green world order" by 2012, while the head of the International Monetary Fund recently called for the creation of a giant climate-change slush fund. And in the United States, despite bipartisan opposition and the lack of constitutional authority, the Environmental Protection Agency is still moving forward with its anti-CO₂ regulation regime. Other national governments around the world are also marching forward with various climate schemes.

More to Come

The fight is not over yet. But no matter what happens in the coming months and years—trials and convictions for climate swindlers, or taxes on breathing for everyone on Earth—the alarmist campaign will eventually fall.

"There's a lot more to come out yet about the [Climategate] e-mails, and how they cooked the computer models," said Canadian climatologist Dr. Tim Ball, who emphasized that he never received money from oil companies and that he was also against the "global cooling" alarmism of a few decades ago.

He told *THE NEW AMERICAN* that the Internet played a pivotal role in exposing the scandals, and that this phenomenon will continue. "It's no coincidence that so much of what was exposed came through the blogs. . . . The mainstream media is ignoring the issues almost completely. And it's because most of them were complicit and bought into the argument." As a consequence, the complicit media is becoming increasingly irrelevant.

But the battle against the alarmist agenda will likely be protracted and difficult. "It won't die—it simply won't die—until the economies start to suffer," Dr. Ball said about the carbon tax and cap-and-trade schemes, citing Spain's experience with new "green jobs" causing an overall loss of jobs as an example of the economic price of alarmist policies. But, he added, the truth will inevitably triumph eventually.

"Reality always comes through, sooner or later, it's just that sometimes it takes a long time," agreed Professor Nils-Axel Mörner, one of the world's foremost experts on sea levels and the head of the Paleogeophysics and Geodynamics Department at Stockholm University until he retired in 2005. He told *THE NEW AMERICAN* that as an expert reviewer for the sea-level section of the IPCC report, he had the opportunity to understand the inner workings of the IPCC. And it is doomed to fail eventually.

The sea-level chapter he was supposed to review was "of very poor quality," Mörner said. And the hysteria surrounding sea-level rises, like most of the IPCC scaremongering, "is not grounded in reality." The panel chose authors based on loyalty, not credentials, Mörner explained. And though he warned the IPCC of errors, they mostly ignored the advice. But the anti-science attitude came back to haunt them. Climategate was "wonderful," Mörner exclaimed. He called the scandal an "iceberg of shame," noting that there was still much to be discovered.

"The first thing which has to come now is the restoration of scientific values," he said, explaining that the climate campaign had "autocratically" tried to impose beliefs on the public that were not based on science. "Al Gore is a salesman, not a scientist, and we don't need salesmen." Mörner is optimistic.

Despite all the trouble and wasted resources expended on the movement, there is certainly a bright side emerging as the climate-crisis crusade self-destructs. For one, more people may begin to think twice before blindly trusting governments and the media. Additionally, the whole episode illustrates the crumbling gate-keeping ability of "Big Media" in the age of the Internet. This is an encouraging sign for the future of freedom.

Scaremongering to swindle the public out of money and freedom is an old trick. But hopefully, people will know better than to fall for it again next time.



EXPLORING THE ISSUE



Is Human Activity Responsible for Global Warming?

Critical Thinking and Reflection

1. Why does the fact that it is difficult to predict society's future actions, particularly in the areas of population growth, energy consumption, and energy technologies, make it difficult to pinpoint the magnitude of future climate changes?
2. What measures should be taken in the near future to best prepare for the long-term impacts of global warming?
3. Discuss how the nature of science permits critics to say that the evidence of global warming is not incontrovertible.
4. Discuss the degree to which a scientific report's funding sources affect the report's credibility.
5. What special interest groups can you expect to be harmed by global warming, or by doing something to stop global warming?

Is There Common Ground?

The positions taken in the two essays for this issue leave little room for agreement. But previous issues in this book may help you answer the following questions.

1. Are there actions society can take that make sense whether or not global warming is a real problem?
2. Do fossil fuels come with enough environmental drawbacks to warrant finding replacements, whether or not global warming is a real problem?
3. What technologies seem most helpful for meeting society's future needs, whether or not global warming is a real problem?

