ISSUES IN PERSPECTIVE

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Climate Change and Public Policy: The Need for Prudence

The mantra of "settled science" when it comes to climate change is uttered on the national media, by President Obama and by the Intergovernmental Panel on Climate Change (IPCC). For these folks the matter is settled; there is no more need for debate or discussion on the causes of climate change. For them, the next urgent matter is a change in public policy that immediately mandates significant reductions in greenhouse emissions (e.g., from the burning of coal). Is it "settled science"? Do we need aggressive laws that reduce carbon emissions? What should public policy be when it comes to managing climate change?

In fact, climate change is a given. The climate has always been changing and it always will be. Both geological and historical records validate that change. Further, there is also little doubt that growing amounts of greenhouse gases in the atmosphere are having an influence on climate. But as Steven E. Koonin, Undersecretary for Science in the Energy Department during President Obama's first term and now faculty member at New York University asks: The real question is not one of climate change but, "How will the climate change over the next century under both natural and human influences? Answers to that question at the global and regional levels, as well as to equally complex questions of how ecosystems and human activities will be affected, should inform our choices about energy and infrastructure."

Koonin identifies three fundamental challenges about what science can tell us about future climates:

1. Even though human influences could have serious consequences for the climate, they are physically small in relation to the climate system as a whole. Koonin writes that "human additions to carbon dioxide in the atmosphere by the middle of the 21st century are expected to directly shift the atmosphere's natural greenhouse effect by only 1% to 2%. Since the climate system is highly variable on its own, that smallness sets a very high bar for confidently projecting the consequences of human influences."

2. A second challenge is our poor understanding of the oceans. "The oceans, which change over decades and centuries, hold most of the climate's heat and strongly influence the atmosphere. Unfortunately, precise, comprehensive observations of the oceans are available only for the past few decades; the reliable record is still far too short to adequately understand how the oceans will change and how they will affect climate."

3. A third challenge, according to Koonin, arises from feedbacks that can dramatically amplify or mute the climate's response to human and natural influences. "One important feedback, which is thought to approximately double the direct heating effect of carbon dioxide, involves water vapor, clouds and temperature. But feedbacks are uncertain. They depend on the details of processes such as evaporation and the flow of radiation through clouds. They cannot be determined confidently from the basic laws of physics and chemistry, so they must be verified by precise, detailed observations that are, in many cases, not yet available."

One final point from Koonin's article – it is important to fairly and honestly evaluate the "settled science" of climate change. The recent IPCC report (September 2013) utilizes five different models tuned to reproduce the gross features of the Earth's climate and then synthesizes them together in the report. But, Koonin shows, the marked differences in their respective details and projections reflect the limitations described in the above "challenges." Here is a synopsis of his findings:

1. The models differ in their descriptions of the past century's global average surface temperature by more than three times the entire warming recorded during that time. Such mismatches are also present in many other basic climate factors, including rainfall, which is fundamental to the atmosphere's energy balance. Therefore, the models give widely varying descriptions of the climate's inner workings. Since they disagree so markedly, no more than one of them can be right.

2. The models roughly describe the shrinking extent of Arctic sea ice over the past two decades, but they fail to describe the comparable growth of Antarctic sea ice, which is now at a record high.

3. The models predict that the lower atmosphere in the tropics will absorb much of the heat of the warming atmosphere. But that "hot spot" has not been confidently observed, casting doubt on our understanding of the crucial feedback of water vapor on temperature.

4. Even though the human influence on climate was much smaller in the past, the models do not account for the fact that the rate of global sea-level rise 70 years ago was as large as what we observe today—about one foot per century.

5. A critical measure of our knowledge of feedbacks is climate sensitivity—i.e., the warming induced by hypothetical doubling of carbon-dioxide concentration. Today's best estimate of the sensitivity is no different, and no more certain, than it was 30 years ago; despite research that has cost billions of dollars!!

Koonin shrewdly observes that "Policy makers and the public may wish for the comfort of certainty in their climate science. But I fear that rigidly promulgating the idea that climate

science is ‘settled’ (or is a ‘hoax’) demeans and chills the scientific enterprise, retarding its progress in these important matters.”

Further, Judith Curry, professor and former chairwoman of the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology, adds that the “climate sensitivity” estimates based on her research and a dozen other observation-based studies have found climate sensitivity values are lower than those determined using global climate models, such as in the recent IPCC report. If these climate-model sensitivities are too high, then we must ask whether the climate-model projections of 21st-century temperatures are fit for making public-policy decisions. Curry concludes that “This slower rate of warming—relative to climate model projections—means there is less urgency to phase out greenhouse gas emissions now, and more time to find ways to decarbonize the economy affordably. This also allows us the flexibility to revise our policies as further information becomes available.”

God has given human beings stewardship responsibility over His world. We are to manage it and care for it as His theocratic stewards. Understanding the dynamics of climate change and making wise public policy decisions is a part of that stewardship. The research and conclusions of Koonin and Curry, both summarized in this *Perspective* indicate that climate change science is not “settled science” and wisdom dictates that more time and more research are needed. Our models are not adequate and, if that is true, we cannot make wise public policy.

See Judith Curry in the *Wall Street Journal* (10 October 2014) and Steven E. Koonin in the *Wall Street Journal* (20-21 September 2014).