A Framework for US Climate Policy

Lewis E. Gilbert
Center for Science, Policy and Outcomes
Arizona State University

INTRODUCTION

Climate is changing

Earth's climate changes. Some of that change is natural variability and some of it is driven by human activity. There is no doubt that the CO_2 concentration of the atmosphere has increase by about 1/3 over the last 150 years and that the increase in CO_2 is dominated by human causes. Debate enters the picture as we try to decipher how recent and dramatic increase in CO_2 concentration translates into changes in temperature patterns, precipitation patterns, weather events, and their impacts on human and natural systems.

Much of this debate has been centered on distinguishing which elements of climate change are due to human influences and which elements are the result of natural changes in Earth's climate system. From the perspective of climate impacts on humans and other Earth systems, this distinction is not of much use. An increase in flood frequency or lengthening of a growing season is a change our society will have to deal with independent of whether its source is human or natural. Migration of populations to coastal cities exposes more people to weather impacts regardless of how the climate itself is changing.

Climate policy must address not only human-driven changes in climate, but also the natural variability that affects our economic and social resilience.

Climate changes will have both positive and negative impacts

We must recognize that the impacts of changes in climate and climate variability will themselves vary in space and time. The *National Assessment of the Potential Consequences of Climate Variability and Change* process, which included rigorous peer-review and has been recognized several times by the National Research Council, was a tremendously important step forward in understanding the impacts of climate on the lives and livelihoods of people and communities throughout the US. The Intergovernmental Panel on Climate Change is working along similar lines, albeit at larger physical scales (e.g. at the scale of the nation-state). These efforts mark new scientific avenues that are important to our ability to make decisions and to take action to mitigate and adapt to climate impacts.

The spatial variability in climate change ensures that there will be winners and losers as precipitation, temperature and weather event patterns change. There may be longer, more productive growing seasons in the Midwest and Canada, while changes in precipitation patterns may subject other regions to more frequent and severe drought or floods. Similarly winners and losers may be distributed within a single region. For instance, heating costs in New England may go down as winters moderate, but there will be revenue losses as well in the tourism sector related to changes in foliage patterns and natural snow fall.

Climate policy should reflect our scientific understanding of the impacts of climate on the well-being of our society on local, regional and global scales, but because there will be winners and losers, climate policy is inherently political.

Climate science will always include uncertainty

Climate is a statistical phenomenon. There is a saying, "climate is what you expect, weather is what you get." This is the reason that it is impossible to attribute any particular weather event, a heat wave for example, to climate change. It also implies a truth about climate prediction: Climate models will allow us to make statements about what kinds of future climates are plausible, but uncertainty with regards to those statements is inescapable.

This inherent uncertainty in climate predictions is further highlighted by the fact that predictions of future climates must include predictions of human behavior. The characteristics of global and regional climate in 2050 depend not only on the physical and chemical processes of the atmosphere, but also on the political and economic processes of human societies. Climate predictions will only be as good as our characterizations of human behavior—and such characterizations are notoriously inaccurate.

Climate policy must advance in the context of these uncertainties and be designed to facilitate and accommodate new knowledge of the interactions of humans and our planet.

Anthropogenic influences have inertia and timescales of centuries

CO_2 has a residence time scale in the atmosphere of centuries. This means that even if we were able to stop polluting tomorrow, the effects of our earlier emissions would continue to influence the climate for up to several hundred years. The implication is that, in addition to limiting our future damage, we must also contend with accumulating damage done by emissions that have already been made. In the language of climate policy, in addition to mitigating our impacts (e.g. reducing emissions), we must also adapt to inevitable changes, which are already in motion, in our climate and the related changes in the natural environment.

Climate policy should focus on human vulnerability to the natural environment and take actions that improve quality of life in the face of prioritized risks and probabilistic change.

The US has lost its leadership in this arena

Many US innovations form the foundation for current climate policies. The Acid Rain program in the US pioneered the development of emissions trading markets for pollutants and those trading mechanisms are central to the Kyoto Protocol. Private sector innovation in the US played a crucial role in the development of the Montreal Protocol for the management of ozone destroying substances and it is likely technological innovation will play an important role in the management of greenhouse gasses. Despite this distinguished history, the US has now clearly abdicated leadership regarding climate policy on both the domestic and international fronts.

There are strong arguments, both theoretical and practical, in favor of giving up on the Kyoto protocol, but even the best of those arguments is predicated on the notion of replacing the current framework with an improved one. The Bush administration squandered an opportunity for the US to regain leadership in this arena when it failed to put forward its promised, improved framework.

The EU is now clearly the world leader with respect to broad scale implementation of a carbon management framework based on the Kyoto Protocol. An editorial in the FT recently worried that EU leadership could be overly costly if other regions do not follow suit. With Russia prevaricating on its own position regarding Kyoto, there is a gaping opening for renewed US leadership and multilateral cooperation on the world stage regarding climate change.

US climate scientists are still the best in the world in fields such as paleoclimate, annual / inter-annual climate variability, and climate observation; in other areas, such as global

climate modeling it is likely that leadership is now abroad. Other nations are beginning to build research programs around climate vulnerability, but the US remains the world leader with respect to our research infrastructure. With aggressive decision-making we could establish an entirely new and vital approach to advancing our understanding of the interactions between climate and human societies.

Similarly, the US has severely under funded energy R&D. This is a mistake, not only with respect to developing technologies that will meet our economy's growing need for energy, but also with respect to our international economic competitiveness and energy security. The 18% target that President Bush has set for decrease in greenhouse gas intensity is a business as usual target; GHG intensity has fallen by an average of just under 18% in every decade since 1930. Again the Europeans and others are well ahead of us in things as simple as fuel efficiency standards.

FOUR THEMES:

With its Orwellian approach to the National Assessment and its rhetorically stultifying focus on reducing scientific uncertainty, the current administration has hamstrung US climate science and policy development. While the National Assessment process was not perfect, it did open up a new mode of exploring the impact of climate on our society; however, as a Clinton administration effort, reference to it as a foundation for future efforts has been expunged from the current administration's efforts to develop a coherent approach to climate change and variability. Instead, the strategic plan that has been developed diverts attention from action by proposing many more years of "policy relevant" research before decisions are taken. In many parts of the private sector, but especially in the financial industry, it is clear that our current understanding of the physical climate is sufficient and industry leaders are taking action.

Four themes should guide the revitalization of US climate policy and help us to begin to clarify and improve our climate science policy:

Climate Policy is different from Energy Policy

Much of the debate around the development of a climate policy has centered on energy use and conservation. It is true that we need energy to drive our economy and that energy use is a dominant driver of CO_2 emissions. It is also true that in the long run we must learn to manage human CO_2 emissions so that we can stabilize atmospheric concentrations; however, climate policy must encompass much more than managing greenhouse gas emissions and capture.

Climate change and variability are policy issues because they threaten human well-being both directly and indirectly. It follows then that climate policy should address well-being first and foremost. Take for example the Grand Forks flood of 1997. That event was catalyzed by very heavy snowfall followed by a fast thaw, the resulting flood devastated the Grand Forks community and had impacts that reached throughout the broader region. Costs related to the flood and coincident fire exceeded $1billion.

Central to the Grand Forks recovery has been the idea of disaster resilience. Neighborhoods in particularly vulnerable floodplains have not been rebuilt. Instead those areas have been dedicated to public greenways. Those greenways provide new public space, and add recreational resources during most times. During future flood events they will serve as buffer zones by absorbing large amounts of floodwater. Critical infrastructure, such as the water treatment facilities, has been redesigned to keep it operational not only in floods but also in blizzards and other weather events.

An increase in the frequency of floods like the 1997 event is among the possible impacts of changes in climate over the next few decades. Those climate changes will occur regardless of any actions we take regarding greenhouse gas emissions because the climate system responds to aggregate emissions over many preceding decades; thus the effects of near-term emissions reductions will not become evident for many decades to come.

The inertia of the climate system requires that disaster preparedness be part of our near- and intermediate-term climate policy. The knowledge that we need in this realm is less about the functioning of the physical climate system and more about how our society interacts with and depends on the natural environment and about how people make decisions and perceive risks. This same research will have important implications for homeland security.

Other policy areas that have climatic elements include: public health (e.g. how can managing urban landscapes and ecologies mitigate morbidity and mortality such as that associated with the 1995 Chicago heat wave that killed more than 700 people?); agriculture (how can we evolve our agricultural portfolio to increase its resilience and perhaps at the same time reduce our net CO_2 emissions?); and natural resource management (e.g. how can we ensure that our communities continue to have the plentiful and cheap clean water that is provided by well managed watersheds?)

Moving away from hazard is progress

The response to the Grand Forks flood was not to replicate the conditions prior to the flood, but to learn from the event's impacts and move away from the hazard. The notion of metaphorically moving people away from hazard, and as a corollary increasing infrastructural resilience, is an important framework. It is not always possible to remove an environmental or social hazard, but more often than not, we can take action that minimizes the danger that hazard poses to our society.

While there is still a lot of work to be done, the Superfund program has gone a long way with regard to moving people out of harm's way. Most hazardous materials are now contained in known locations that can be managed. In an ideal world those materials would not have been dumped in the first place, but given that the messes exist, we have are now in a position where human health is less threatened than it was. In dramatic cases, such as Love Canal, people have been physically moved, but in most cases, harm's way has been shifted rather than the people. In the case of Love Canal, people are now returning to the area and it has recently been removed from the Superfund list.

In the context of climate, consider the devastation that Hurricane Mitch wreaked on Honduras and Nicaragua. The life and property loss resulting from that storm's tremendous rainfall reflected land-use practices and inadequate emergency preparedness. Developing and successfully implementing land-use policies that stabilize watersheds will move people away from hazard in this case. Such policies will also advance sustainable development in the region.

The policy issues involved in metaphorically moving people and property out of harm's way are not centered on emissions reductions. A focus on vulnerability allows us to see policy avenues that address climate while also addressing other policy issues as well. With clever monitoring, we might even be able to make statements about avoided costs as we move forward.

Market mechanisms are strong levers

Litigation is a growing risk associated with climate change for large emitters of greenhouse gasses. While assigning responsibility for individual weather events is not possible,

there is growing statistical understanding of weather and climate that may allow firms with very large greenhouse gas emissions to be held responsible for increments of increased exposure to climate risks on the part of others. Along similar lines, corporate boards are increasingly being called upon to disclose exposure to risks associate with climate change and variability. The inherently statistical nature of their activities and their focus on managing risk make the insurance and reinsurance natural leaders here.

These changes in the landscape in which firms operate are market mechanisms and many companies are beginning to see responsibility with respect to the environment as a competitive advantage rather than as an added business cost. Even as the Bush administration has removed Federal pressure to do so, significant voluntary and positive movement in the private sector has been occurring relative to climate.

An often-cited example of a very successful environmental market is the emissions trading schemes that have resulted in spectacular reductions in sulfur and nitrogen emissions at much lower than expected costs. These markets were created in the US and have formed the basis for the design for one of the key implementation tools of the Kyoto Protocol. It is interesting to note that even with US abandonment of the Kyoto protocol, a carbon market is continuing to develop in the US. The most visible of these markets is the completely voluntary Chicago Climate Exchange (CCX). In parallel with the CCX, groups of Northeastern states and of Western states are developing regional designs for the management of emissions. While there are strong constraints on the effectiveness of regional schemes, these leadership efforts can make important contributions to the development of broader markets.

The US carbon market is growing but it is dramatically overshadowed by developments in the EU. The EU Emissions Trading Scheme (ETS) is scheduled to become active in 2005 and Kyoto targets are now binding independent of the future of ratification. The EU market has been created by regulation and this difference is reflected in the prices for CO_2 ($0.95/ton in the US, and €10 in the EU). A key point here is that markets can do a great deal of our work with respect to mitigating and adapting to climate change. Such markets may develop independently but regulatory establishment market foundations (e.g. prices and initial property rights) drives much more implementation. (At the recent Green Trading Summit in New York City, the CEO of GE's wind energy unit stated that the primary reason that the US wind market significantly lags that of the EU is the lack of a stable renewable energy policy framework in the US.

Climate is global, leadership is local

One of the primary challenges in developing climate policy is that, because the atmosphere is well mixed, there is a strong free-rider problem with respect to mitigation. Greenhouse gasses mix in Earth's atmosphere on the scale of months; thus emissions in one country or region are felt through out the planet. Conversely the effects of reductions in one place are averaged over the entire atmosphere. Global leadership calls for us to address our local emissions.

The US response, at least recently, has been to refuse to take responsibility for our contribution global emissions until emissions reductions can be taken at no relative costs to US interests. (Despite the Bush administration's stance, there is growing expectation in the US that greenhouse gas emissions will eventually be capped (e.g. Susan Tomasky, CFO at Applied Electric Power, recently cited in *Forbes*)). In strong contrast, the EU ETS is a response that is attempting to capture first mover advantage, by acknowledging responsibility and taking action. The risks associated with EU's actions were much lower when it was more certain that the Kyoto

Protocol would come into force; none-the-less, as noted above, the EU is committed to Kyoto targets independent of Russia's decision to ratify. The important element here is less that EU countries actually hit targets, but that the EU is developing the skill and market infrastructure to regulate and trade emissions on regional scale.

Climate impacts are felt locally and require local and regional adaptation in the short run. In the timeframe of our grandchildren's lives, the Earth's vitality requires that we also mitigate our greenhouse gas forcing of our climate system. The atmosphere is finite and there are physical limits to how much CO_2 it can absorb. Ultimately humans will need to manage the Earth's climate and atmosphere on a global scale and this will require broad international agreements and frameworks.

Currently the EU is the leader with respect to mitigation, but their leadership is in strong need of followers. Returning to the global stage would both bolster the brave steps that the EU has taken and do much to restore US credibility. Furthermore, a forceful return to the global stage now would undercut Russia's current maneuvering with respect to ratification. Action now will also prevent us from falling further behind in the development of what will be critical skills and large and valuable financial markets.

While international leadership with respect to climate will be difficult to recover in the short run, the US has a moral responsibility to address its greenhouse gas emissions. Developing policies that reduce climate vulnerability can establish the US as a leader in the skills that will be necessary through out the planet as we adapt to certain changes in the climate and its variability. These skills will serve us well domestically as we avoid costs and internationally as we bring them to bear across a wide range of security, aid and diplomatic fronts.

CONCLUSION

Climate policy is multifaceted. The US can begin to reassert leadership by embracing climate policy on both domestic and international fronts. In the domestic sphere we can develop innovative tools for managing exposure to climatological risks. Developing these tools will require that we invest in understanding social and economic vulnerability to changes in the climate and its variability. Once developed, these tools can be exported in support of other agendas as well. On the international front, the US must rejoin the effort to mitigate long-term climate risk through the creation and participation of international atmospheric management regimes.