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VIEWPOINT

Climate Change: The Political Situation

Robert T. Watson

Human-induced climate change is one of the most important environmental issues facing society worldwide. The overwhelming majority of scientific experts and governments acknowledge that there is strong scientific evidence demonstrating that human activities are changing the Earth's climate and that further human-induced climate change is inevitable. Changes in the Earth's climate are projected to adversely affect socioeconomic systems (such as water, agriculture, forestry, and fisheries), terrestrial and aquatic ecological systems, and human health. Developing countries are projected to be most adversely affected, and poor people within them are the most vulnerable. The magnitude and timing of changes in the Earth's climate will depend on the future demand for energy, the way it is produced and used, and changes in land use, which in turn affect emissions of greenhouse gases and aerosol precursors.

The most comprehensive and ambitious attempt to negotiate binding limits on greenhouse gas emissions is contained in the 1997 Kyoto Protocol, an agreement forged in a meeting of more than 160 nations, in which most developed countries agreed to reduce their emissions by 5 to 10% relative to the levels emitted in 1990. Although the near-term challenge for most industrialized countries is to achieve their Kyoto targets, the long-term challenge is to meet the objectives of Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC), i.e., stabilization of greenhouse gas concentrations in the atmosphere at levels that would prevent dangerous anthropogenic interference with the climate system, with specific attention being paid to food security, ecological systems, and sustainable economic development. To stabilize the atmospheric concentration of carbon dioxide requires that emissions eventually be reduced to only a small fraction of current emissions, i.e., 5 to 10% of current emissions.

All major industrialized countries except the United States, the Russian Federation, and Australia have ratified the Kyoto Protocol. The United States and Australia have publicly stated that they will not ratify it, and statements from the Russian Federation are contradictory. Russian ratification is essential for the Kyoto Protocol to enter into force.

The United States has stated that the Kyoto Protocol is flawed policy for four reasons:

1) There are still considerable scientific uncertainties. However, although it is possible that the projected human-induced changes in climate have been overestimated, it is equally possible that they have been underestimated. Hence, scientific uncertainties, as agreed by the governments under Article 3 of the UNFCCC, are no excuse for inaction (the precautionary principle).

2) High compliance costs would hurt the U.S. economy. This is in contrast to the analysis of the Intergovernmental Panel on Climate Change (IPCC), which estimated that the costs of compliance for the United States would be between US$14 and US$135 per ton of carbon avoided with international carbon dioxide emissions trading (a 5-cents-per-gallon gasoline tax would be equivalent to US$20 per ton of carbon). These costs could be further reduced by the use of carbon sinks, by carbon trading with developing countries, and by the reduction of other greenhouse gas emissions.

3) It is not fair, because large developing countries such as India and China are not obligated to reduce their emissions. However, fairness is an equity issue. The parties to the Kyoto Protocol agreed that industrialized countries had an obligation to take the first steps to reduce their greenhouse gas emissions, recognizing that ~80% of the total anthropogenic emissions of greenhouse gases have been emitted from industrialized countries (the United States currently emits ~25% of global emissions); that per capita emissions in industrialized countries far exceed those from developing countries; that developing countries do not have the financial, technological, or institutional capability of industrialized countries to address the issue; and that increased use of energy is essential for poverty alleviation and long-term economic growth in developing countries.

4) It will not be effective, because developing countries are not obligated to reduce their emissions. It is true that long-term stabilization of the atmospheric concentration of greenhouse gases cannot be achieved without global reductions, especially given that most

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of the projected growth in greenhouse gas emissions over the next 100 years is from developing countries. Hence, developing countries will have to limit their emissions of greenhouse gases, but industrialized countries should take the lead, as agreed in Kyoto.

Protection of the climate system will require substantial reductions in greenhouse gas emissions; hence, the Kyoto Protocol is recognized to be only the first step on a long journey to protect the climate system. However, unless the United States agrees to meaningful reductions in greenhouse gas emissions, it is highly unlikely that major developing countries will agree to limit their emissions or that industrialized countries will agree to further reductions beyond those already agreed in Kyoto.

One very positive development is that about half of the U.S. states have enacted some climate protection measures, and there are a number of initiatives in the U.S. Congress that would reduce greenhouse gas emissions. Although the McCain-Lieberman Climate Stewardship Act failed to pass in the Senate, 43 senators did vote for it, demonstrating an increasing recognition by members of Congress that there is an urgent need to deal with the climate issue. In addition, more than 40 multinational companies have voluntarily agreed to reduce their emissions of greenhouse gases and to improve the energy efficiency of their products. Several of these companies have already met or exceeded their initial targets and have saved money in doing so.

Technologies exist or can be developed to cost-effectively limit the atmospheric concentration of carbon dioxide to between 450 and 550 parts per million (ppm), but it will take political will, enhanced research and development activities, public-private partnerships, and supporting policies to overcome barriers to the diffusion of these technologies into the marketplace. A number of countries, including the United States, have committed themselves to developing climate-friendly technologies, but the level of investment must be substantially increased. The Kyoto Protocol needs to be ratified, and the United States needs to take meaningful actions to reduce its greenhouse gas concentrations. Governments should then consider setting a long-term target based either on a greenhouse gas stabilization level (between 450 and 550 ppm) or on limits for both the absolute magnitude of global temperature change (less than 2 to 3°C) and the rate of temperature change (less than 0.2°C per decade). A series of intermediate targets can then be developed to involve developing countries in an equitable manner. The need to reduce greenhouse gas emissions offers a unique opportunity to modernize energy systems and enhance competitiveness in a globalized world.

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VIEWPOINT

Tales from a Troubled Marriage: Science and Law in Environmental Policy

Oliver Houck

Early environmental policy depended on science, with mixed results. Newer approaches continue to rely on science to identify problems and solve them, but use other mechanisms to set standards and legal obligations. Given the important role that science continues to play, however, several cautionary tales are in order concerning "scientific management," "good science," the lure of money, and the tension between objectivity and involvement in important issues of our time.

"The scientific debate remains open. Voters believe that there is *no consensus* about global warming within the scientific community. Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly. Therefore, you need to continue to make the lack of scientific certainty the primary issue in the debate. . ." [Frank Luntz, political strategist, 2002 (*1*)].

This essay explores the relationship between science and law in environmental policy. The relationship has not been easy, nor has it achieved closure after more than 30 years of marriage. Two alpha partners are still trying to figure out who does what. Both agree on the importance of an environmental policy. The debate is about what it should be based on and how it should be carried out.

Back in the pre-dawn of public environmental statutes, there were private remedies for environmental harms, in tort and nuisance. If someone contaminated your apple orchard, or your child, you could seek damages and even an injunction against the activity. These remedies proved insufficient for at least two reasons. The first is that a civil law response to harm already done is small solace for someone who has lost her livelihood or the health of her child. The second is illustrated by the real-life saga described in *A Civil Action*, involving the contamination of drinking water from, in all probability, industrial waste sites (*2*). Children died, others were rendered vegetables for life, and their parents suffered a grief that is impossible to describe. But their legal case failed, as many others did, over the requirements of proof and causation. Which chemical, of the many toxins in the waste sites, caused these strange infirmities and through exactly what exposure pathways? Which waste sites were responsible: this one, operated by a company with lawyers on tap and a war chest of money available for its defense; or that one, now abandoned, once owned by a corporation long dissolved? Civil law failed because the science could not make the proof.

First-Generation Environmental Law: Science Embraced

Beginning in the 1960s, Congress surmounted these difficulties with new public environmental statutes, each based on standards of performance. The standards would operate by preventing rather than compensating for harm. They would, further, bypass the rigors of causation and proof: Once a standard was set, one had only to see whether or not it was met. The question remained, however: Who would set the standard? The answer seemed apparent. Scientists would, on the basis of scientific analysis. After all, it was the scientists, such as Rachel Carson, Jacques Cousteau, and Yuri Timoshenko, who had sounded the alarm; they were the ones to put out the fire.

The first wave of environmental law, therefore, was science-based environmental policy in action. One of the first was the Water Quality Act of 1965 (*3*), which sought the attainment of water quality criteria. It was soon followed by the National Environmental Policy Act of 1969 (*4*) and the analysis of environmental impact. Then came the Clean Air Act in 1970 (*5*), focused on the attainment of national ambient air quality stan-

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