

EDITORIAL

Beyond Kyoto

Over the last 4,000 centuries, the carbon dioxide (CO₂) content of the atmosphere has peaked four times at around 280 parts per million (ppm), setting the "natural" range in increased carbon content and in related global warming. However, in the last two centuries since the beginning of the industrial revolution, CO₂ has risen to 375 ppm—and two-thirds of this rise occurred in the last 50 years. Over the last two years, the increase in CO₂ as measured at Hawaii's Mauna Loa Observatory has risen dramatically,¹ and global CO₂ is on a path to doubling preindustrial levels (to 550 ppm) and possibly tripling by the end of the century.

While few scientists actually expect such tripling, the world is committed to a level of climate change unknown over those thousands of centuries—the impacts of which are already evident from the shrinking world of polar bears to the vanishing snows of Kilimanjaro. With Russian ratification, the Kyoto Protocol will go into effect—but at best, with U.S. participation, it will lower the emissions rate in 50 years below a 1990 baseline by 13 percent. Without U.S. participation, the reduction could be as little as 1–2 percent. Although the United States will probably never subscribe formally to the Kyoto Protocol, with the reelection of George W. Bush, it will be under growing pressure to adopt what Bo Kjellén describes in his report (beginning on page 47) as the "parallel tracks" policy of reducing emissions, especially given the rising efforts of U.S. cities, states, and corporations to reduce their greenhouse gas emissions.

Depending on assumptions as to growth of emissions, efforts to stabilize the atmosphere at a doubled content of CO₂ will require emissions cuts of 50–85 percent. Thus, with this special issue, *Environment* seeks to go beyond the symbolically important but environmentally trivial Kyoto Protocol. "Beyond Kyoto" is our shorthand for this formidable task.²

Beginning on page 8, Robert Socolow, Roberta Hotinski, Jeffery B. Greenblatt, and Stephen Pacala describe in their article the enormous magnitude of the effort required to keep 2054 CO₂ content at just below doubling (500 ppm). The good news is that the 15 strategies described are many, are all technologically feasible, and do not assume culture and lifestyle

change. The bad news is that stabilizing current emissions would require by 2054 a combination of carbon-free energy and carbon sequestration roughly equal to the entire energy use of the world today.

Robert N. Stavins says in his article (beginning on page 22) that he is "agnostic" as to whether to go beyond Kyoto by building on it or beginning anew. What is crucial, according to Stavins, is that an effective framework for the necessary large-scale emissions reductions include three key elements: involving all nations on terms that they can afford; setting long-term but flexible targets; and adopting market-based policies of carbon taxes, emissions trading, or combinations of both.

But going beyond Kyoto also requires a greater sense of urgency regarding climate change than is currently present. In multinational surveys, the environment ranks low in lists of current concerns, and climate change ranks low among environmental concerns. In their article, Susanne C. Moser and Lisa Dilling (page 32) describe the limits of fear and guilt as motivations for actions and then suggest seven strategies for communicating urgency for action on climate change.

Phasing out fossil fuels while they are still very accessible and inexpensive to extract is truly the grand environmental challenge of our century. In doing so we will slow the collateral damage fossil fuels create—not only climate change but a host of environmental, human health, and security problems (including air pollution, sprawl, traffic, and dependence on Middle East oil). Doing so will be extraordinarily difficult. But collectively doing so will mark a further evolution of global cooperation and action, a new scientific-industrial revolution, and a renewed sense of stewardship and responsibility for the planet and ourselves.

—Robert W. Kates

1. See S. Beam, "Unsolved (CO₂) Mystery," *Environment*, this issue, 5–6.

2. This is also the title of the 2003 Pew Center on Global Climate Change report, J. E. Aldy et al., eds., *Beyond Kyoto: Advancing the International Effort Against Climate Change* (Arlington, VA: Pew Center on Global Climate Change, 2003), accessible via http://www.pewclimate.org/global-warming-in-depth/all_reports/beyond_kyoto/index.cfm.

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