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## Kyoto Protocol

### New strategies are needed to encourage wider participation as climate threats loom large

BETTE HILEMAN

Now that the Russian Cabinet has approved the Kyoto Protocol to the [United Nations Framework Convention on Climate Change](#), setting the stage for the treaty to become legally binding, governments and businesses need to take stronger measures to address greenhouse gas emissions. They also should think seriously about how to convince more countries, such as the U.S. and large developing nations, to commit to binding targets and timetables for emission reductions.

Recently, several scientists warned that if emissions are not brought under control soon, Earth may approach a point beyond which carbon dioxide levels in the atmosphere will rise uncontrollably and ice sheet disintegration will proceed rapidly.

After the protocol becomes binding, many businesses in the industrialized countries that have ratified the treaty will be required to reduce their greenhouse gas emissions. Eventually, most firms in those countries will be assigned emissions limits and will have to buy permits if they expect to exceed their limits. U.S. multinational companies with facilities in Europe will have to start figuring out how to reduce their CO<sub>2</sub> emissions at those sites.

This is likely to spur a number of major American companies to start pushing for U.S. participation in the Kyoto protocol so that the U.S. will have some influence over the process. In my view, the U.S. should find a way to ratify the protocol without agreeing to the U.S. target for the first commitment period—a 7% reduction in emissions from the 1990 level by 2008–12. Meeting this target would be nearly impossible because U.S. emissions have increased 14% since 1990.

One way the U.S. could begin to participate in the Kyoto process is to engage seriously in the climate-change negotiations at the December meeting of the parties to the UN climate-change convention. There, it should devise a practical plan to reduce greenhouse gas emissions during the second commitment period under the protocol, most likely 2013–17.

However, revisions to the protocol may be necessary to make it more acceptable to U.S. lawmakers and to large developing countries. U.S. and developing country participation could be encouraged by setting emissions targets or limits with some sort of safety valve for future economic growth, says Richard D. Morgenstern, senior fellow at [Resources for the Future](#). "You have to have some way of addressing unanticipated economic growth or new technologies that don't work as expected, or other unexpected events that could cause the cost of

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complying with climate-change commitments to be higher than anticipated," he says. A safety valve would, for example, specify a maximum market price for emissions permits at which additional permits would become available to prevent prices from rising further, he explains.

If the U.S. and other nations were to listen carefully to warnings that several scientists have voiced recently, they would have little hesitation about working to reduce emissions, even if economic growth suffered modestly in the short term.

Christopher B. Field, director of the [Global Ecology Department at Carnegie Institution of Washington](#), says that, as temperatures rise during the 21st century, the oceans may absorb far less CO<sub>2</sub> than they do today. Currently, the oceans take in 1.5 billion to 2 billion tons of CO<sub>2</sub> (measured as carbon) each year, he says. According to the 2001 report of the UN Intergovernmental Panel on Climate Change (IPCC), the oceans are expected to absorb a total of 250 billion to 400 billion tons of CO<sub>2</sub> during the 21st century. "But responses to warming in oceanic biota may down-regulate many processes that move carbon into the ocean," Field explains, and consequently, the oceans may sequester far less CO<sub>2</sub> during the 21st century than the IPCC projects. At some point, they may even become a net source of CO<sub>2</sub>, he says. "We may be approaching a precipice where [atmospheric] carbon begins to rise uncontrollably," he warns.

Similarly, James E. Hansen, director of the National Aeronautics & Space Administration's [Goddard Institute for Space Studies](#), has become increasingly concerned about the possibility that ice sheets will begin to disintegrate rapidly. The buildup of ice sheets, he explains, is a slow process because it depends on the meager amount of snow that generally falls on the ice each year. But, he says, "disintegration of ice sheets is a wet, potentially rapid process."

Hansen uses the Greenland Ice Sheet as an example. The extent of summer melting on Greenland has expanded rapidly since 1979. Surface water enters cracks and creates moulins, near-vertical shafts about 1 km long that carry water to the base of the ice sheet. There, the water acts as a "lubricating fluid that speeds motion and disintegration of the ice sheet," he says. "Once ice-sheet melting is under way, it can be explosively rapid," he says. Sea-level rise may become the dominant danger from climate change during this and coming centuries, he warns, with perhaps a 1 meter rise every 50 years.

Field and Hansen urge governments to take multifaceted approaches to reducing emissions. Countries should tackle the problem immediately with conservation, efficiency, renewable energy, and sequestration of CO<sub>2</sub> in biota and geological formations, while at the same time pursuing aggressive research on new technologies, Field says.

The U.S. is basing most of its climate-change mitigation strategies on technologies, such as the hydrogen economy, that probably won't be available for decades. In my view, these U.S. policies are necessary, but not sufficient, to prevent potential catastrophes.

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