Scientists Shower Climate Change Delegates With Paper

LONDON, U.K.—A group of prominent European academics this week released a trio of reports aimed at reviving the stalled international talks on climate change. Their advice comes on the heels of a report by the U.K.'s Royal Society that questions the value of carbon sinks in absorbing greenhouse gas emissions, one of the major sticking points to those talks. The torrent of words reflects the vigorous debate over the fate of the Kyoto Protocol, which delegates will take up next week during a follow-up meeting in Bonn, Germany.

The first set of reports comes from Climate Strategies, a new pan-European network of senior climate researchers and social scientists formed to shape the post-Kyoto debate by keeping policy-makers abreast of relevant climate data. "We've come up with great ideas in the past, but it's been too late," says Benito Müller, an expert on the Kyoto Protocol at the Oxford Institute of Energy Studies and a founding member of the group, which announced its formation at a press briefing here on 9 July. "The idea is to coordinate research so that it comes out on a timely basis."

Funded by a seed grant from the Shell Foundation, Climate Strategies argues in two reports that U.S. opposition to Kyoto should not torpedo the 1997 agreement. "Kyoto is a huge investment in intellectual and research effort, and renegotiating a new protocol would not necessarily give a better product —and would waste another 10 years," says Michael Grubb, a professor of climate change and energy policy at Imperial College and leader of the group. A third report looks at ways to tap carbon sinks for energy.

Up a tree. A Royal Society report warns against overstating the value of carbon sinks in mitigating global warming.

Carbon sinks were also the subject of a report last week by the Royal Society, the U.K.'s most prestigious scientific body. It warned against overreliance on carbon sinks as an alternative to slashing carbon dioxide emissions. "Carbon sinks may help to reduce greenhouse gas levels during the short term, but the amounts of carbon dioxide that can be stored are small compared to emissions from the burning of fossil fuels," says David Read, an ecologist at the University of Sheffield, U.K., and leader of the panel that prepared the report. Countries such as Japan, Australia, and the United States have been arguing for a larger role for sinks in meeting emissions targets. The report, however, says the role of sinks is small and finite.

One big uncertainty, the report says, is their estimated life-span. "Land sinks are not stable for long periods of time. Carbon locked up in trees and soils can also be released," says John Shepherd, a climate modeler at the Southampton Oceanography Centre. Another major issue involves the techniques required to monitor, quantify, and verify sinks. "Current techniques are not good enough operationally for something as important as this," says Shepherd.

Climate change experts not involved in any of the reports are divided on their value in shaping the negotiations to be held in Bonn from 16 to 27 July. "[The reports] will have some visibility, but I don't think the primary driver will be scientists or policy analysts," says Mike Hulme, director of the Tyndall Centre for Climate Change Research in Norwich, U.K. But Darren Goetze, a senior policy adviser on carbon sinks for the Canadian Environment Ministry in Ottawa, says the Royal Society's report "in large part confirms what the IPCC [Intergovernmental Panel on Climate Change] has been saying" and, thus, may steer debate away from carbon sinks and toward more lasting solutions to anthropogenic global warming.

As with greenhouse gases, there is no shortage of greenhouse analyses. Climate Strategies hopes to feed government officials throughout Europe a steady stream of reports that will help them take definitive action, and Frank Biermann, a political scientist not affiliated with the group, thinks that it can play a valuable role. "European [research] institutes are too small, and it makes sense that they join forces," says Biermann, who is with the Potsdam Institute for Climate Impact Research in Germany. "Europe needs a united position on climate change policy, which is sometimes lacking."

Even so, Grubb and others readily admit that a problem as complex as climate change won't be solved overnight. "Countries need to focus on completely restructuring their generation and use of energy," says Read. "These measures may be socially and politically more painful to implement. ... But they provide the ultimate solution."

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aerosols, says climate modeler John Mitchell of the Hadley Center for Climate Prediction and Research in Bracknell, U.K. "But we've probably not progressed at all as far as decreasing uncertainty." Indeed, the estimated range of climate's sensitivity to increasing greenhouse gases—a measure of just how warm it could get—hasn't shrunk since it was first officially estimated in 1979.

To narrow these uncertainties, researchers call for many more targeted field investigations like INDOEX, the 1998–99 study of pollutant aerosols over the Indian Ocean. They also urge dramatic improvements in the most computationally demanding sort of climate modeling and in the collection of global climate data used to verify the models. "A sustained network of global observations is required if we're going to believe what's coming out of the models," says climate modeler Jeffrey Kiehl of NCAR. "We don't have that, and what we do have is deteriorating."

After a decade of planning and construction, NASA's space-based Earth Observing System satellites, such as Terra, are beginning to return the data on changing seasons and year-to-year climate variations that are needed to validate models of atmospheric behavior, Kiehl says. But for the long-term records that are also needed, climate researchers have had to depend on data collected for daily weather forecasts, a poor substitute. "A climate observing system really has always been lacking," says atmospheric chemist Ralph Cicerone of the University of California, Irvine, who chaired the NRC review of climate change science. "We're limping by with observations from platforms that were never designed for climate studies."

Nor is all of U.S. climate modeling up to world standards, researchers say. "I find it extraordinary that England does more focused and more extensive climate modeling than the United States," says oceanographer Edward Sarachik of the University of Washington, Seattle, who headed a recent NRC study on improving the effectiveness of U.S. climate modeling. "In the United States, our top two centers together don't amount to one-fifth of the European effort." When the U.S. global change program assessed the prospects for greenhouse warming in various regions of the country, it had to rely on two foreign models, one Canadian and one British (*Science*, 23 June 2000, p. 2113). No U.S. center with a top-of-the-line climate model had the spare computer time to run the needed simulations. And when the U.N.–sponsored Intergovernmental Panel on Climate Change compiled its regular 5-year report on the state of climate science, U.S. researchers were embarrassed

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