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## **Steered by CU Profs, Kyoto Takes Effect**

### ***New Protocol Relies on Market Forces to Provide Incentives for Reducing Emissions***

By Elizabeth Trembath-Reichert  
Columbia Daily Spectator  
February 28, 2005

The Kyoto Protocol went into effect February 16 with 166 countries, not including the US, committing to limit their emissions of greenhouse gases which have been linked to global warming. Economist and Columbia professor Graciela Chichilnisky created the market idea behind the Kyoto Protocol and was integral in its development and implementation.

With Columbia's strong earth science departments and proximity to the United Nations, where Newberry Professor of Earth & Environmental Science Wallace Broecker and other Columbia professors frequently testify about threats of global warming, Columbia is heavily involved in the climate change policy and technology.

A 2001 report by the United Nations-commissioned Intergovernmental Panel on Climate Change projected that the "increasing atmospheric concentrations of greenhouse gases [will] result in changes ... such as more hot days, heat waves, heavy precipitation events, and fewer cold days ... increased risks of floods and droughts in many regions, and predominantly adverse impacts on ecological systems, socio-economic sectors, and human health."

The Protocol limits the amount of greenhouse gases, particularly carbon dioxide, that countries can emit by issuing them "credits." These credits can be bought and sold in international markets to help countries meet their pollution limits. Countries can also gain extra credits through such methods as transporting "clean" technologies to developing countries or starting reforestation projects.

Professor Chichilnisky created the idea of using credits in global markets to control emissions.

"If you want something to work, create a profit motive," Chichilnisky said. She said she believes the United States will eventually join the Protocol in response to pressure from American business interests, which will have to move toward energy efficiency in order to be competitive in international markets.

"I'm not predicting the U.S. will join during the Bush administration," Chichilnisky said. "Bush did everything he could to stop the Protocol from becoming law. Through the international economy there will be improvements even if Bush doesn't want it. The

Protocol is stronger than Bush.”

But Chichilnisky admits that the Protocol has its flaws.

“It’s vague ... [and] doesn’t have an institutional foundation,” she said.

According to Maurice Ewing and J. Lamar Worzel Professor of Geophysics Klaus Lackner, the “greening” idea promoted in Kyoto, which gives additional credits to countries for planting trees, is hardly effective. In order to make a significant difference, a country would have to plant so many trees that it would compete with using land for food production .

“We are dealing with a very small sink for carbon,” Lackner said of the trees’ ability to decrease the amount of carbon dioxide in the air.

The issue of global warming has struggled to gain credibility among the public.

“If you took a national referendum asking if global warming exists, 60 percent of people would say no,” Broecker said. “But it’s hard to find a scientist that doesn’t believe in global warming. Glaciers around the world are melting like hell. Temperatures around the world are rising. In the arctic these effects appear the most. The way of life for the Inuit—this could be the end of it.”

Broecker led a series of four lectures last semester to freshmen about this issue as part of the Frontiers of Science curriculum.

Overall the Protocol is about more than simply limiting emissions. “Initially there will be business benefits, then a new form of globalization ... that is more connected with international agreements and cooperation between nations. This is the most important effect of Kyoto—the emergence of humans as global citizens,” Chichilnisky said.

But Kyoto alone will not be enough, according to Broecker.

“Kyoto is a baby step, and an important one, because it raises awareness,” he said. “This is the first time the world has recognized this problem. The problem is, even if every country met their goal, CO2 levels would still rise because developing countries’ [which are not limited by Kyoto] CO2 emissions are still rising,” he added.

Since Kyoto will not be enough to rid the world of its greenhouse gases, Broecker explained, other options have to be developed—and soon.

“People think we have a lot of time, but we don’t,” he said. “The only two alternate energy sources that would really supply core needs of the world are nuclear and solar. Solar is the ultimate solution, no doubt. But it is more expensive. We just gotta hope the development of solar gets cheaper and cheaper.”

The main objections to nuclear energy are with its waste disposal.

“It only takes one ton of plutonium to make an atomic bomb. We have to think very hard about how much nuclear we want,” Broecker said.

Lackner said he believes we might not have to give up on fossil fuels.

"I don't know if levels of CO<sub>2</sub> have to come down," he said. "There is some incentive to have less, but the world will need energy. I have a hard time seeing how we could or would abandon fossil fuels. They are so cheap and abundant."

Lackner is researching ways of taking carbon out of the atmosphere to reduce atmospheric levels of CO<sub>2</sub>. "It has been proven on small scales, and I would argue we could start tomorrow," he said.

Once carbon is captured from the atmosphere, there are many possibilities for disposal. It can be stored underground in liquid form, which experts say might be a good starting point, but there is not enough storage space to make that a long term option. Lackner is looking into magnesium silicates, which react with CO<sub>2</sub> to form limestone and sand which could then be stored in the pits where the magnesium silicates were first mined.

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