Climate scientists uncover major accounting flaw in Kyoto Protocol, other climate legislation

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(PhysOrg.com) -- A team of 13 prominent scientists and land-use experts has identified an important but fixable error in legal accounting rules for bioenergy that could, if uncorrected, undermine efforts to reduce greenhouse gases by encouraging deforestation.

The error, reported in the Oct. 23 issue of the journal *Science*, involves an issue that is at the heart of ongoing discussions about how biofuels and land use change will be treated under the global climate treaty nations are developing for the December summit in Copenhagen, Denmark.

"The error is serious, but readily fixable," said Timothy Searchinger, a research scholar and lecturer in public and international affairs at Princeton University's Woodrow Wilson School and at the Princeton Environmental Initiative. He also is a fellow with the German Marshall Fund of the United States.

"As we approach the most important climate treaty negotiations in history, it is vital that technologies, such as biofuels, that are proposed as solutions to global warming, are properly evaluated," said team member Daniel Kammen, a University of California, Berkeley, professor of energy and resources and of public policy, who directs the campus's? Renewable and Appropriate Energy Laboratory and the Transportation Sustainability Research Center. "Our paper builds on recent work on the

direct and indirect land use impacts of biofuels, and clarifies how the accounting should be done."

The burning of bioenergy and fossil energy releases comparable amounts of carbon dioxide from tailpipes or smokestacks, but bioenergy use may reduce emissions overall if the biomass results from additional plant growth. This is because plants grown specifically for bioenergy absorb carbon dioxide from the atmosphere, and this offsets the emissions from the eventual burning of the biomass for energy.

On the other hand, burning forests releases stored carbon into the atmosphere in the same way as burning oil releases carbon stored for millions of years underground. For these reasons, the greenhouse gas consequences of using bioenergy vary greatly with the source of the biomass.

Unfortunately, Kammen said, the accounting rules used in the Kyoto Protocol, the European Union's Emissions Trading System, and in the climate bill that recently passed the U.S. House of Representatives, exempt the carbon dioxide emitted by bioenergy, regardless of the source of the biomass. That legally makes bioenergy from any source, even that generated by clearing the world's forests, a potentially cheap, yet false, way to reduce greenhouse gas emissions by oil companies, power plants and industry as they face tighter pollution limits.

According to a number of studies, including one by a U.S. Department of Energy lab, applying this incentive globally could lead to the loss of most of the world's natural forests as carbon caps tighten.

The *Science* article, co-authored by Searchinger, Kammen and 11 others, explains that the error stems from a misapplication of guidelines established by the Intergovernmental Panel on Climate Change (IPCC) at the time of the Kyoto Protocol.

According to the IPCC, exempting carbon dioxide from bioenergy use is appropriate only if an accounting system also counts emissions from clearing land and other land use activities. In that way, if biomass for energy use results in deforestation, emissions are counted as land use emissions. However, the exemption of carbon dioxide from energy use is inappropriate for laws and treaties that do not legally limit emissions from deforestation and other land use activities. Neither the protocol, nor the existing or proposed climate legislation in Europe and the U.S., apply limits to emissions from land use. Because these laws nevertheless exempt all emissions from bioenergy use, the IPCC warns, they can therefore create large, perverse incentives to clear land.

This error in the system for administering carbon caps is distinct from other laws that require minimum quantities of biofuels. Many of these other laws do account for at least some of the emissions from land use activities.

According to the authors, the solution is to count all emissions from energy use, whether from fossil fuels or bioenergy, and then to develop a system to credit bioenergy to the extent it uses biomass derived from "additional" carbon sources, and thereby offsets energy emissions.

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