Alarming growth in expected CO2 emissions in China

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The growth in China's carbon dioxide (CO_2) emissions is far outpacing previous estimates, making the goal of stabilizing atmospheric greenhouse gases even more difficult, according to a new analysis by economists at the University of California, Berkeley, and UC San Diego.

Previous estimates, including those used by the Intergovernmental Panel on Climate Change, say the region that includes China will see a 2.5 to 5 percent annual increase in CO_2 emissions, the largest contributor to atmospheric greenhouse gases, between 2004 and 2010. The new UC analysis puts that annual growth rate for China to at least 11 percent for the same time period.

The study is scheduled for print publication in the May issue of the *Journal of Environmental Economics and Management*, but is now online.

The researchers' most conservative forecast predicts that by 2010, there will be an increase of 600 million metric tons of carbon emissions in China over the country's levels in 2000. This growth from China alone would dramatically overshadow the 116 million metric tons of carbon emissions reductions pledged by all the developed countries in the Kyoto Protocol. (The protocol was never ratified in the United States, which was the largest single emitter of carbon dioxide until 2006, when China took over that distinction, according to numerous reports.)

Put another way, the projected annual increase in China alone over the next several years is greater than the current emissions produced by

either Great Britain or Germany.

Based upon these findings, the authors say current global warming forecasts are "overly optimistic," and that action is urgently needed to curb greenhouse gas production in China and other rapidly industrializing countries.

The authors of the study, Maximillian Auffhammer, UC Berkeley assistant professor of agricultural and resource economics, and Richard Carson, UC San Diego professor of economics, based their findings upon pollution data from China's 30 provincial entities.

Auffhammer said this paper should serve as an alarm challenging the widely held belief that actions taken by the wealthy, industrialized nations alone represent a viable strategy towards the goal of stabilizing atmospheric concentrations of carbon dioxide.

"Making China and other developing countries an integral part of any future climate agreement is now even more important," said Auffhammer. "It had been expected that the efficiency of China's power generation would continue to improve as per capita income increased, slowing down the rate of CO_2 emissions growth. What we're finding instead is that the emissions growth rate is surpassing our worst expectations, and that means the goal of stabilizing atmospheric CO_2 is going to be much, much harder to achieve."

Researchers traditionally calculate the CO_2 emissions for a region or country from data on fossil fuel consumption. Existing models then use those emission figures and factor in such variables as population size, a society's affluence and technology developments to forecast the growth of greenhouse gas emissions.

In explaining the startling differences in results from previous estimates

for China's carbon emissions growth, the UC researchers point out that they used province-level figures in their analysis to obtain a more detailed picture of the country's CO_2 emissions up to 2004.

"Everybody had been treating China as single country, but each of the country's provinces is larger than many European countries, both in geographic size and population," said Carson. "In addition, there is a wide range in economic development and wealth from one province to the next, as well as major differences in population growth, all of which has an effect on energy consumption that cannot be easily addressed in models based upon aggregate national data."

Since data on fossil fuel consumption is not reported at the province level in China, the researchers used waste gas emissions, available from China's state environmental protection administration reports, as a proxy for CO_2 emissions in this paper.

Moreover, the researchers said, the majority of other studies forecasting China's CO_2 emissions relied upon information from nearly a decade ago. During the 1990s, per capita income was growing faster than the use of energy in China, which typically relates to slower growth in carbon emissions.

"A notable shift occurred in China around the year 2000, around the time when hope for an agreement with the U.S. on the Kyoto Protocol began to diminish along with external pressure for China to reduce its emissions," said Carson. "Energy use started to grow faster than income, and much of the energy that was used wasn't efficient."

The authors also pointed out that after 2000, China's central government began shifting the responsibility for building new power plants to provincial officials who had less incentive and fewer resources to build cleaner, more efficient plants, which save money in the long run but are

more expensive to construct.

"Government officials turned away from energy efficiency as an objective to expanding power generation as quickly as they can, and as cheaply as they can," said Carson. "Wealthier coastal provinces tended to build clean-burning power plants based upon the very best technology available, but many of the poorer interior provinces replicated inefficient 1950s Soviet technology."

"The problem is that power plants, once built, are meant to last for 40 to 75 years," said Carson. "These provincial officials have locked themselves into a long-run emissions trajectory that is much higher than people had anticipated. Our forecast incorporates the fact that much of China is now stuck with power plants that are dirty and inefficient."

Source: University of California - Berkeley