Doubling Vehicle Fuel Efficiency Could Cut Carbon Dioxide Emissions by 10 Percent

January 24 2007

In his State of the Union address tonight, President George W. Bush is expected to call for Americans to slash gasoline consumption by up to 20 percent by 2017.

In 2004, Robert Jackson and William Schlesinger of Duke University's Nicholas School of the Environment and Earth Sciences examined the impact that doubling the fuel efficiencies of cars and light trucks would have on reducing net U.S. carbon dioxide emissions. Carbon dioxide has been implicated in global warming because it can trap heat in the atmosphere much like a greenhouse.

The two scientists estimated that cars and light trucks emit roughly 20 percent of carbon dioxide emissions. Doubling the fuel efficiency of such vehicles -- for example through hybrid gas-electric vehicles -- could achieve a 10 percent carbon dioxide reduction, they said in their analysis, which was published in October 2004 in the online edition of the Proceedings of the National Academy of Sciences.

On Tuesday, Jackson praised President Bush's expected proposal.

"Republican or Democrat, the president's initiative makes sense for the security and environmental health of our country," said Jackson, a professor of environmental science and biology who is also director of Duke's Center on Global Change.

In their 2004 article, the two scientists looked at other ways to reduce

carbon dioxide in the atmosphere, including the implementation of "carbon sequestration" measures. Carbon sequestration includes adopting no-till agriculture to retain crop wastes in the soil rather than letting them decay after plowing, and retiring croplands by paying farmers to revert them to grassland or forests. Their calculations showed that converting all U.S. croplands to no-till agriculture, or even taking the unthinkable step of retiring all croplands, would yield only a reduction of less than 4 percent in carbon dioxide emissions.

In the conclusion of their article, they called for all possible strategies to be considered in plans to reduce carbon dioxide emissions. Other solutions include the use of renewable energy sources, decarbonization and geological sequestration.

"A doubling in fuel efficiency through hybrid technology, advanced diesel engines and lightweight materials could precede a transition to hydrogen vehicles, which now require fossil fuels or other sources of energy to generate the hydrogen," Jackson and Schlesinger wrote. "Coupled with changes in the way that agricultural lands are managed, doubling the fuel efficiency of our nation's vehicles seems a logical first step in balancing the carbon budget."

Jackson said on Tuesday that "reducing emissions is the step that's simplest and most directly under our control. But we need to examine all carbon sequestration technologies wherever they're cost-effective, and to evaluate the consequences that would arise if they were implemented."

Source: Duke University

efficiency-carbon-dioxide.html