

Reducing CO₂ through technology and smart growth

February 11 2009



Brian Stone is associate professor of city and regional planning at Georgia Tech.
Credit: Rob Felt/Georgia Tech

A Georgia Tech City and Regional Planning study on climate change, published February 10, 2009 online by *Environmental Science and Technology*, shows that "smart growth" combined with the use of hybrid vehicle technology could reduce cities' carbon dioxide (CO₂) emissions - the principal driver of global warming - significantly by 2050.

According to Brian Stone, associate professor of City and Regional Planning, the research shows that expected levels of CO₂ emissions

from cars and trucks in 2050 could be reduced back to 2000 levels if the full vehicle fleet was converted to hybrid electric vehicles, such as the Toyota Prius or the soon-to-be released Chevy Volt. This research also found that a doubling of population density in large U.S. cities by 2050 would have a greater impact on CO₂ reductions than full hybridization of the vehicle fleet.

Stone's study looked at 11 major metropolitan regions of the Midwestern U.S. over a 50-year period and took into account three different scenarios: the use of hybrid vehicles and two different urban growth scenarios through which population density was increased over time, a central component of smart growth planning.

"In this study we looked at two general approaches on how to deal with the challenge of climate change," said Stone. "One approach is to improve vehicle technology and become more efficient. We can use less gas and reduce tailpipe emissions of CO₂. The second approach is to change behavior by changing the way we design cities. We can travel less and take more walking and transit trips."

Stone says he believes it would be possible for virtually all cars on the roads by 2050 to be hybrid electric vehicles, assuming the costs of these vehicles become more competitive with conventional engine technologies. Today's hybrid electric vehicles can achieve 40 miles to the gallon and higher.

However, even the full hybridization of the national vehicle fleet by 2050 would not meet the CO₂ targets identified through the Kyoto Protocol, an international climate change agreement which the United States has signed but not yet ratified. To meet these global targets, CO₂ emissions from all sectors on the U.S. would need to return to 1990 levels or lower. According to Stone's work, meeting this goal in the transportation sector would require a combination of technological

improvements and higher density land use patterns in cities.

"If we can help cities to grow in more compact ways, what we call smart growth, it will help reduce emissions even further by allowing people to travel less often, travel shorter distances when they do travel and take advantage of public transit," said Stone.

Source: Georgia Institute of Technology

Citation: Reducing CO2 through technology and smart growth (2009, February 11) retrieved 24 April 2024 from <https://phys.org/news/2009-02-co2-technology-smart-growth.html>

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