



Curbing gasoline use requires a multipronged approach, researchers say

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The key to curbing America's ever-growing appetite for petroleum isn't more fuel-efficient vehicles or high gasoline taxes or huge surcharges on gas-guzzling models. It's all of those measures and more -- carefully combined into a self-reinforcing set of policies that affects everyone who makes, buys or uses vehicles and fuels.

This multidimensional approach to tackling the U.S. petroleum problem was outlined by John Heywood, the Sun Jae Professor of Mechanical Engineering and director of the Sloan Automotive Laboratory, and graduate student Anup Bandivadekar of the Technology and Policy Program at a March 18 lunchtime seminar hosted by the Laboratory for Energy and the Environment (LFEE).

The United States consumes almost a quarter of the world's petroleum, and current projections suggest that by 2025 it will use 40 percent more petroleum than it does now, according to the International Energy Agency. About 70 percent of that petroleum will be imported, and almost three-quarters of it will be used for transportation.

Such tremendous growth in petroleum use has serious environmental implications, Heywood noted. In addition, it sets the stage for possible petroleum system shocks that could disrupt the transportation system on which the U.S. economy and lifestyle depend.

"We've had one or two such shocks, but they were isolated and our economy recovered. What happens if they come more frequently?" Heywood said.

Developing better engine, vehicle and fuel technologies could cut petroleum use and make our transportation system more robust, he said. A recent comprehensive assessment by Heywood, Malcolm Weiss of the LFEE and others concluded that even "evolutionary" improvements in "mainstream" technologies could yield a 35 percent reduction in fuel consumption in new vehicles in 20 years -- and at moderate cost (see report number EL 00-003 at <http://lfee.mit.edu/publications/reports>).

But better technology alone may not help. Indeed, over the past 20 years, vehicle efficiency increased by 30 percent but any potential fuel savings disappeared because people bought bigger, heavier vehicles and drove them faster and farther.

According to Bandivadekar, gains will come only when we tackle all aspects of the problem simultaneously. "A simple way to think about it is that petroleum use and greenhouse emissions depend on how fuel-efficient our vehicles are, how much we drive and how carbon-intensive our fuel is. We need to target all those pieces of the puzzle," he said.

The trick is to combine measures so they work together. For example, one proposal is a "feebate" system in which customers pay an extra fee to buy big gas-guzzlers but get a rebate if they buy small, fuel-efficient models -- a measure that can be revenue-neutral. The feebate system combines well with stricter corporate average fleet economy (CAFE) standards. Auto manufacturers will be required to make smaller, more efficient cars -- and that's what their buyers will want. Adding higher fuel taxes to the package will both discourage additional driving and add further incentive for customers to buy fuel-efficient models. Tax credits elsewhere can offset the added fuel costs so vehicle users will feel no extra financial burden.

As an example, Heywood and Bandivadekar put together a package that combined stricter CAFE standards, feebates, an ongoing gasoline tax increase of 5 cents a gallon per year and a requirement for increased biomass content in fuels. According to their analysis, if we enact those policies now, petroleum use and carbon dioxide emissions will be 30 percent lower in 2030 than if we do nothing. The reduction in total distance traveled will be just 15 percent -- not too much of a hardship for transportation users.

Heywood and Bandivadekar are now gearing up to take their message to the business community and ultimately to Washington. They believe an integrated policy package will have more chance of implementation than individual proposals have had. Lobbying groups are less likely to be able to defeat a policy package that spreads responsibility broadly.

"This approach will make people realize that it's not my problem or your problem or Detroit's problem -- it's everybody's problem, and everybody will have to do something about it," said Bandivadekar.

The researchers' final warning: don't wait to take action. A few years' delay now will mean a significantly higher level of petroleum

use in 20 or 30 years -- and a significantly greater problem to be solved by hydrogen fuel cells or whatever technology we come up with for the long term.

"We need to find ways to change attitudes as well as technologies. It's not clear we'll win, but we'd better try," Heywood said.

URL: <http://web.mit.edu/newsoffice/2004/vehicles.html>



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