

MIT recommends steps to slash gasoline use by 2035

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(PhysOrg.com) -- How much gasoline would the nation save in the year 2035 if lightweight hybrid and plug-in hybrid vehicles dominated the marketplace? More than 68 billion gallons, or about half the fuel currently used each year by today's vehicles.

Such detailed analyses in a [new MIT report published this month](#) conclude that over the next 25 years, the fuel consumption of new vehicles could be reduced by 30-50 percent and total U.S. fuel use for vehicles could be cut to year 2000 levels, with greenhouse gas emissions cut by almost as much. But it will be challenging to meet those demands.

It will require not just developing improved and new engines, vehicles and fuels, but also convincing people that they don't need to buy bigger, faster cars. Each step will be difficult, yet all must be pursued with an equal sense of urgency.

"We've got to get out of the habit of thinking that we only need to focus on improving the technology--that we can invent our way out of this situation," said John B. Heywood, the Sun Jae Professor of Mechanical Engineering, who led the research. "We've got to do everything we can think of, including reducing the size of the task by real conservation."

MIT teams spent five years examining different approaches to cutting transportation fuel use and emissions. Projects analyzed specific propulsion technologies, vehicle performance and design, market penetration rates for the various technologies, consumer expectations, new fuels and potential policy measures.

For example, the teams calculated the fuel economy and emissions gains achievable with hybrid technology, then, using analyses of cost and consumer preferences, they projected how rapidly sales volumes of hybrids may build up and how much total U.S. gasoline consumption would decline as a consequence.

"That last task is very important because unless you've got lots and lots of vehicles with the better technology, the impact is limited," Heywood said. "The need to bring better technology into production and build up volume inevitably makes the time frames for technologies to make a difference long. Optimists want to move faster, but it's not clear we can really do it much faster."

Slashing transportation fuel use and greenhouse gas emissions by 2035 will require immediate action on several challenging fronts.

For the near term (up to 15 years), we should increase our efforts to improve light-duty vehicle engines and transmissions, but all improvements must go toward increasing fuel efficiency rather than making cars bigger and faster. Also critical is reducing vehicle weight and size.

For the mid- and long-term (15-30 years, and more than 30 years), we should ramp up work on radically different technologies such as plug-in hybrids and hydrogen fuel-cell vehicles.

We must also develop and market more environmentally benign fuels based on nonpetroleum sources. In general, the use of biofuels will grow but not as fast as expected just a few years ago.

The final key is policy action. A coordinated set of regulatory and fiscal measures will be needed to push and pull improved technologies and greener alternative fuels into the market place in high volume. Measures should require auto manufacturers to make smaller, more-efficient cars, encourage consumers to choose those vehicles, and discourage everyone from driving so much.

Overall, the report shows that there are many opportunities for change. However, the challenges involved are enormous.

"Transitioning from our current situation onto a path with declining fuel consumption and emissions, even in the developed world, will take several decades--much longer than we had hoped or realized," Heywood said. "We've got to start now."

Other authors on the report are Anup Bandivadekar PhD '08; Kristian Bodek SM '08; Lynette Cheah, graduate student in the Engineering Systems Division; Christopher Evans SM '08; Tiffany Groode PhD '08; Emmanuel Kasseris, graduate student in mechanical engineering;

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Provided by MIT

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