

Analysis used to set fuel economy, greenhouse gas standards for US cars was generally high quality

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The analysis used by federal agencies to set standards for fuel economy and greenhouse gas emissions for new U.S. light-duty vehicles—passenger cars and light trucks—from 2017 to 2025 was thorough and of high caliber overall, says a new report from the National Research Council. However, the agencies should re-examine certain issues - such as consumer behavior and the effectiveness of certain technologies—in an upcoming mid-term review. In addition, the report finds, evidence suggests that the standards will lead the nation's light-duty vehicle fleet to become lighter but not less safe.

In 2012 the U.S. National Highway Traffic Safety Administration (NHTSA), which regulates [fuel economy](#), and the U.S. Environmental Protection Agency (EPA), which regulates [greenhouse gas emissions](#), proposed new unified [standards](#) for fuel economy and greenhouse gas emissions over the years 2017 to 2025. The Corporate Average Fuel Economy (CAFE) standards require that vehicles offered for sale in the U.S. attain an average fuel economy of 40.3 to 41 mpg by 2021 and 48.7 to 49.7 mpg by 2025. These standards will require the U.S. new vehicle fleet to double in fuel economy between 2012 and 2025.

NHTSA plans to conduct a joint mid-term review with EPA to evaluate if technology development and implementation is on track to help automakers meet the standards. To inform the review, the National Research Council was asked to independently assess the CAFE/GHG

national program, the technologies that are expected to contribute to meeting the standards, and possible impacts of the standards.

The increasingly stringent fuel economy and greenhouse gas emission standards will drive the development of new powertrain designs, alternative fuels, advanced materials, and significant changes to the vehicle body, the [report](#) says. By the end of the next decade, because of the standards and other regulations, new vehicles will be more fuel-efficient, lighter, less polluting, safer, and more expensive to purchase compared with current vehicles.

Most of the reduction in fuel consumption will come from improvements to gasoline internal combustion engines, due to the continuing dominance of such technologies through 2025, the report says. However, the study committee that wrote the report considered a wide range of technologies to be critical in meeting the 2025 standards and beyond, including improvements to transmissions, reductions in mass, and hybrid/electric engines.

Costs and Fuel Savings of Some Technologies Should Be Re-examined

As part of the analysis used to set CAFE and greenhouse gas standards, NHTSA and EPA estimated the fuel economy improvements that could be generated by various technologies available between 2017 and 2025, as well as the costs of implementing those technologies. The report concurs with the agencies' costs and effectiveness analyses for many technologies. However, in some cases its estimates significantly differed from the agencies'; NHTSA and EPA should pay particular attention to re-analyzing these technologies during the mid-term review.

For example, the report finds that auto manufacturers are likely to

reduce the weight of vehicles more than NHTSA and EPA's analysis indicates, leading to both greater fuel economy benefits and greater costs than the agencies estimate. In addition, deploying turbocharged, downsized engines - which are expected to replace many current engines - may cost more and produce less fuel savings than the agencies' analysis indicates.

New Standards Unlikely to Lead to Safety Problems

The standards set targets for fuel economy for cars and light trucks based on the size of their "footprint" - their length and width. Cars with larger footprints have lower fuel-economy targets. One reason the agencies chose the footprint-based approach was to be safety-neutral. If a single target had instead been set for all vehicles, the agencies and others have argued, manufacturers might have tried to meet the standard by downsizing vehicles, which could have led to safety concerns. Basing standards upon vehicle footprint is a reasonable approach to a safety-neutral standard, the report says; the empirical evidence appears to support the argument that the new footprint-based standards are likely to have little effect on vehicle and overall highway safety.

Manufacturers are likely to make cars lighter in their efforts to improve fuel economy. The most current studies support the argument that making vehicles lighter, while keeping their footprints constant, will have a beneficial effect on safety for society as a whole, especially if the greatest weight reductions come from the heaviest vehicles, the report says. During the transition period when vehicle weights are being reduced, however, there could be an increase in safety risk due to variation in the distribution of weight across the vehicle fleet. NHTSA should carefully consider and, if necessary, take steps it believes could mitigate the possible threats to safety during the transition period, as the fleet moves from current vehicle designs to lighter ones.

Agencies Should Research Consumer Behavior, Monitor Effects of New Standards

How much consumers actually value increases in fuel economy in new vehicles is critical to evaluating the costs and benefits of fuel economy and greenhouse gas standards, but the scientific literature does not provide a definitive answer, the report says. There is a good deal of evidence that consumers appear to undervalue fuel economy; in other words, they do not appear to fully factor in how much money they will save on fuel when deciding how much to spend on a vehicle. Recent studies suggest that there could be many reasons underlying this undervaluation, and that it may not be true for all consumers. The agencies should do more research on consumer valuation of fuel economy and other vehicle attributes, and consumer response to unfamiliar technologies in the vehicle market, the report says.

The agencies also should monitor the effects of the new fuel economy and [greenhouse gas](#) standards by collecting data on fuel efficiency, vehicle footprint, the mix of car sizes in the fleet, and the price of new vehicles to understand the impact of the rules on consumers' choices and manufacturers' products offered, the report says. In addition, NHTSA and EPA, perhaps in collaboration with other federal agencies, should also conduct an ongoing, scientifically designed survey of cars' real-world fuel economy, since the performance of some new technologies, particularly hybrid powertrains and turbocharged, downsized engines, may deviate to a greater degree from CAFE label and compliance values than other technologies. This information would be useful in determining the adequacy of the current method of estimating fuel economy for regulatory purposes, and it could improve future certification tests.

More information: Cost, Effectiveness and Deployment of Fuel

Economy Technologies for Light-Duty Vehicles ,
[www.nap.edu/catalog/21744/cost ... -light-duty-vehicles](http://www.nap.edu/catalog/21744/cost...-light-duty-vehicles)

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