

To: Office of Management and Budget
From: Securing America's Future Energy (SAFE)
Date: 14 December 2007
Subject: Feasibility of 4 Percent Annual Fuel-Economy Improvements

In order to reduce U.S. oil dependence, the Energy Security Leadership Council advocates 4 percent annual improvements in the fuel economy of the entire new vehicle fleet, including medium and heavy trucks. A combination of existing and emerging technologies will sustain this rate of improvement over the next two decades. In fact, even without moving to exotic new technologies like hydrogen-fueled vehicles, we can achieve annual increases of 4.7 percent for the next twenty years.

Analysis — In its 2002 study of CAFE's effectiveness, the National Academy of Sciences (NAS) concluded that the fuel economy of large U.S. passenger cars could be cost-effectively raised by as much 27 percent within a decade using available and emerging technologies to increase the efficiency of engines and transmissions. For the largest light trucks, the potential improvement was 42 percent. The implied potential fuel economy for the entire fleet given the existing mix of vehicles was 30.3 mpg.

The NAS study was very conservative. The authors assumed only existing and emerging technologies and applied a gasoline price of only \$1.50 per gallon. A retail gasoline price of \$2.50 per gallon raises the expected cost-effective fuel economy of the entire fleet to 33.9 mpg. At \$3.55 per gallon, the figure rises to 37.6 mpg, which equates to annual fuel economy increases of approximately 4.6 percent year for 10 years.

Significantly, the NAS study "gave little consideration" to the fuel-economy benefits of hybrids and advanced diesels.¹ *Within the last five years, however, these technologies have dramatically raised the near-term bar on fuel economy.* For example, Toyota's Prius gasoline-electric hybrid averages 46 mpg (2008 EPA combined mileage), giving it a fuel-economy rating that is 59 percent higher than its conventional sister-model, the Toyota Corolla.²

And another wave of technological innovation is on the way. Diesel-hybrid concept cars—not compacts, but full-size family sedans—have been rated at 70 to 80 mpg.³ Cutting-edge materials such as carbon fiber were developed for national defense, but they can also trim vehicle weight without compromising strength or safety and boost fuel economy to over 100 mpg.

By combining the engine and transmission technologies foreseen by the NAS with hybrid technologies and advanced materials, the nation can achieve a fleet-wide fuel economy of 60 mpg.⁴ This fleet will still provide consumers with a full range of vehicle choices, including SUVs and full-size pick-ups. The achievement of a 60-mpg fleet in two decades translates to a 4.7 percent annual improvement every year for twenty years.

And there is more good news to come. With a nationwide network for distributing renewable fuels such as E85, the actual *oil fuel economy* of our cars and trucks will increase sixfold. This will lead to true reductions in oil dependence, unlike today's dual-fuel loophole that artificially inflates the fuel-economy rating of flex-fuel cars that run almost purely on gasoline because alternatives are usually unobtainable. Last but not least, within twenty years, plug-in hybrids that draw power from the electric grid will permit most daily commutes to be completed with little or no liquid fuel input.

Not only is 4% achievable, America can do better.

¹ Statement of Paul R. Portney, Chairman of the CAFE Committee Board on Energy and Environmental Systems and Transportation Research Board, National Research Council, before the House Science Committee (9 February 2005).

² See www.fueleconomy.gov.

³ Amory B. Lovins, E. Kyle Datta, Odd-Even Bustnes, Jonathan G. Koomey, and Nathan J. Glasgow, *Winning the Oil Endgame: innovation for profits, jobs, and security* (Snowmass, CO: Rocky Mountain Institute, 2005), 50 ff.

⁴ David Friedman, *A new road: the technology and potential of hybrid vehicles* (Union of Concerned Scientists, 2003).