STUDY OF FEASIBILITY AND EFFECTS OF REDUCING USE OF FUEL FOR AUTOMOBILES

The Energy Policy Act of 2005

U.S. Department
Of Transportation

National Highway
Traffic Safety
Administration

Report to Congress

Office of Rulemaking August 2006

EXECUTIVE SUMMARY

The President signed the Energy Policy Act of 2005 into law on August 8, 2005. Section 773 of the Act, "Study of Feasibility and Effects of Reducing Use of Fuel for Automobiles" requires the Administrator of the National Highway Traffic Safety Administration (NHTSA) to conduct a study regarding the feasibility and effects of reducing by model year 2014, by a significant percentage, the amount of fuel consumed by automobiles. Section 773 also requires the Administrator to take into account, in conducting the study, alternatives to the policy under Federal law and the extent to which potential fuel cell technologies could contribute to achieving the reduction in automobile fuel consumption.

When the Energy Policy Act of 2005 became law, NHTSA was in the midst of a major rulemaking determining the best way of reforming the structure consistent with recent findings and recommendations by the National Academy of Sciences (NAS) and increasing the standards of the Corporate Average Fuel Economy (CAFE) program for light trucks. Successfully completing this reform effort was indispensable to finding a responsible way of significantly reducing the amount of fuel consumed by automobiles by 2014 and beyond.

Those findings and recommendations were the central features of a study that NAS completed in 2002 regarding the feasibility of significantly reducing fuel consumption by automobiles. As part of that study, it evaluated the then unreformed CAFE program as a whole. The study covered both trucks and passenger cars and made specific findings regarding the shortcomings of the unreformed CAFE system and recommended some reform alternatives.

Those findings and recommendations are highly relevant to the study required by the Energy Policy Act of 2005. The NAS found that there was sufficient technology for making significant fuel economy improvements if sufficient leadtime was provided. At the same time, it also found that shortcomings in the unreformed program not only limited the potential for improvements, but also posed a risk of adverse social impacts related to safety, jobs, and consumer choice. It strongly recommended, therefore, that any step to significantly improve the fuel economy of cars or light trucks should be taken only if it were combined with reforming the CAFE program so as to reduce or eliminate those shortcomings.

The release of the NAS study in January 2002 closely followed the late 2001 lifting of a multi-year (Fiscal Years 1996-2001) freeze on NHTSA's use of appropriated funds to prepare, propose or promulgate CAFE standards higher or lower than the ones for the preceding year. When the freeze was lifted, the agency began its first efforts in over 6 years to gather and analyze up-to-date information related to fuel economy technology and capability. In February 2002, then Secretary Mineta wrote to Congress asking for full authority to reform CAFE standards as urged in the NAS study.

In the meantime, the agency acted within its existing authority to begin the reform effort. It focused its efforts to reform the CAFE program and raise CAFE standards first on light trucks. There were several reasons for doing so, as follows:

(1) NHTSA had not only the statutory obligation to set light truck standards, but also the statutory authority to reform the structure of the light truck standards (but not the passenger car standards);

(2) The agency used this opportunity to change the light truck CAFE program into one that does not suffer from the drawbacks of the unreformed system;

(3) Since the safety and economic concerns raised by NAS were applicable to both light trucks and cars, finding a way to address these concerns through a reformed structure for light trucks would form a solid basis for the agency's continued effort to seek authority for reforming the passenger car standards; and

(4) As NAS found, more fuel savings could be derived from increasing standards for light trucks than from increasing them for passenger cars by an equivalent amount because the baseline fuel economy level of trucks is lower and there are more cost beneficial opportunities to apply additional technologies.

NHTSA's decision to raise light truck standards for 7 consecutive model years (2005-2011) will contribute greatly to reducing fuel consumption. In addition to the 14.3 billion gallons of fuel saved over the lifetime of the vehicles affected by the standards, NHTSA also completed and institutionalized a size-based CAFE reform structure that will save more fuel than the unreformed CAFE structure without negatively affecting safety and jobs. There still will be

more reductions in fuel consumption by light trucks once NHTSA sets standards for model years 2012-2014 and beyond. In addition, the regulation of the large sport utility vehicles, beginning in model year 2011, will produce further increases in fuel savings in 2012-2014.

Further reductions in fuel consumption could also be achieved by 2014 and beyond if Congress were to give NHTSA the authority it needs to reform the passenger car CAFE program and set CAFE standards accordingly. While the agency cannot precisely quantify the potential reduction of fuel consumed by passenger cars at this time due to unavailability of passenger car data and product plan information, the agency believes that significant fuel economy improvements could be made through raising passenger car standards within a reformed structure. A well-designed, attribute-based system for passenger cars would always result in more fuel savings than the unreformed flat average CAFE system because it requires all manufacturers, not just a few, to apply additional fuel-saving technologies. It would also address the safety and economic concerns with the unreformed system.

The agency is mindful that there are alternative demand and supply side policies aimed broadly at reducing fuel consumption that could complement unreformed CAFE regulatory programs and further reduce fuel consumption. In its study, the NAS committee cited some of these policies, for example, tradable fuel economy credits and feebates, and found that these other policies could accomplish the same end as raising CAFE standards at a lower cost. The agency is working with other Federal agencies, including the U.S. Department of Energy (DOE) the U.S. EPA (EPA), the U.S. Department of Commerce, and the U.S. Department of the Treasury to evaluate the feasibility of some of these alternative approaches.

NHTSA notes that in its 2002 NAS report on fuel economy, NAS stated that only breakthrough technologies will make truly dramatic increases in fuel economy possible. The agency is working with the DOE and the EPA, as well as with industry, on promoting the development of longer-range, breakthrough technologies, such as plug-in hybrids and hydrogen fuel cell vehicles, which have the greatest potential of significantly reducing fuel consumption over the long term.

Finally, the Department unveiled a major initiative in May of this year that is designed to reduce the costs of growing transportation system congestion on the U.S. economy, including the 2.3 billion gallons of fuel wasted every year on America's highways. Through the introduction of innovative new highway pricing and technology approaches, we have the potential to save large quantities of fuel, in addition to providing a host of other economic and social benefits.

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I. BACKGROUND

A. CAFE HISTORY

Congress enacted the Energy Policy and Conservation Act (EPCA) (Pub. L. 94- 163) during the aftermath of the energy crisis created by the oil embargo of 1973-1974. The Act established an automobile fuel economy regulatory program by adding Title V, "Improving Automotive Efficiency," to the Motor Vehicle Information and Cost Savings Act. The goal was a doubling of passenger car fuel economy by 1985. To that end, Congress set standards for passenger cars at 27.5 miles per gallon (mpg), beginning in 1985 from its 13.5 mpg level in 1975, and gave the National Highway Traffic Safety Administration (NHTSA) the authority to adjust the standard up or down, subject to a legislative veto.[1] If the agency takes no action, the standard remains at its default level of 27.5 mpg. If the agency deems it appropriate to adjust the standard for a model year, it is required to set it at the "maximum feasible" level at least 18 months in advance of that model year. In addition, in determining that level, the agency is required to consider technological feasibility, economic practicability, the effect of other government regulations on fuel economy and the nation's need to conserve energy. The agency has also always considered safety impacts in setting CAFE standards.

Congress did not specify a mile per gallon target for light trucks. The agency is required to do so at the maximum feasible level and pursuant to the same criteria and lead time requirements for passenger cars. Unlike passenger cars, if the agency does not set standards for light trucks 18 months in advance of a model year, there is no light truck standard for that year. The agency began setting fuel economy standards for light trucks in 1979, specifying a level of 13.7 mpg. By 1996, when Congress began a multiyear freeze on any changes to the passenger car or light truck standards, that light truck standard had reached 20.7 mpg. When the freeze was lifted and upon the release of a 2002 National Academy of Sciences' study on the Effectiveness and Impact of CAFE Standards, whose findings and recommendations are described below, the agency resumed its rulemaking activities for light truck CAFE.

[1] The legislative veto was ruled unconstitutional by the Supreme Court in 1983. Immigration & Naturalization Service v. Chada, 462 U.S. 919 (1983). However, whether the legislative veto provision is severable has never been tested in court.

When Congress enacted EPCA, it attempted to address the energy problem the nation faced within the context of the vehicle fleet and technologies existing at that time. EPCA focused on passenger cars, which constituted the vast majority of the light vehicle market. Light trucks sold in 1975, on the other hand, largely functioned as commercial utility vehicles and tended to face more demanding load-carrying and towing requirements. Thus, it was believed that greater opportunities existed for redesigning passenger cars to improve their fuel economy. For those reasons, and as described below, the statute was more prescriptive for passenger cars than light trucks.

1. Statutory Authority for Passenger Car and Light Truck CAFE Standards

Title V, "Improving Automotive Efficiency" of EPCA established an automotive fuel economy regulatory program. Title V has been amended from time to time and codified without substantive change as Chapter 329 of title 49, United States Code. For the purposes of the CAFE statute, "automobiles" include any "4-wheeled vehicle that is propelled by fuel (or by alternative fuel) manufactured primarily for use on public streets, roads, and highways (except a vehicle operated only on a rail line), and rated at not more than 6,000 pounds gross vehicle weight." They also include any such vehicle rated at between 6,000 and 10,000 pounds gross vehicle weight (GVWR) if the Secretary decides by regulation that an average fuel economy standard for the vehicle is feasible, and that either such a standard will result in significant energy conservation or the vehicle is substantially used for the same purposes as a vehicle rated at not more than 6,000 pounds GVWR.

In 1978, NHTSA published a final rule in which we determined that standards for vehicles rated between 6,000 and 8,500 pounds GVWR are feasible, that such standards will result in significant energy conservation on a per-vehicle basis and that those vehicles are used for substantially the same purposes as vehicles rated at not more than 6,000 pounds GVWR (March 23, 1978; 43 FR 11995, at 11997). Vehicles rated at between 6,000 and 8,500 pounds GVWR first became subject to the CAFE standards in MY 1980.

As discussed in more detail below, the agency recently extended the CAFE regulations to include medium duty passenger vehicles (MDPVs), i.e., light trucks with a GVWR between 8,500 and 10,000 lbs that are manufactured primarily to transport passengers (71 Fed. Reg. 17566; April 6, 2006). MDPVs will be subject to the CAFE standards beginning with model year 2011.

The statute defines "fuel economy" in § 32901(10) as the average number of miles traveled by an automobile for each gallon of gasoline used, i.e., miles per gallon. The fuel economy of individual vehicle models is measured in accordance with procedures established pursuant to Chapter 329. A manufacturer's compliance is determined based on a comparison of the manufacturer's fleet wide fuel economy average against the appropriate standard. Chapter 329 provides for the issuance of average fuel economy standards for passenger automobiles (passenger cars) and non-passenger automobiles (light trucks).

In enacting EPCA, Congress made a clear and specific choice about the structure of the average fuel economy standard for passenger cars. Congress established a common statutory CAFE standard applicable to each manufacturer's fleet of passenger cars. Chapter 329 is also fairly prescriptive with regard to the passenger car fuel economy standard and the procedures for determining compliance.

As stated above, fuel economy is defined in terms of miles per gallon. The fuel economy of individual vehicle models is measured in accordance with procedures established pursuant to Section 32904(c). For passenger cars, Section 32904(c) commands that testing and measurement procedures be the same or equivalent to those used in 1975. These data are then used to derive a manufacturer's average fuel economy level for each fleet. For passenger cars, Section 32904(a)(1)(B) requires use of a formula that results in derivation of the harmonic sales weighted average of a manufacturer's fleet. The Environmental Protection Agency generates and oversees the federal database of vehicle fuel economy values. It also provides letters to NHTSA and the vehicle manufacturers that document the annual CAFE values for individual manufacturers that are used by NHTSA in enforcing the CAFE standards.

Congress did not establish by statute a CAFE standard for light trucks and was considerably less prescriptive with respect to what sort of standards and procedures should be established for light trucks. It did not, for example, make a clear choice among the approaches (i.e., production-weighted standards for each manufacturer's entire fleet or class standards) to setting those standards or among the forms of those approaches (e.g., a common standard or a variable standard) it considered. Instead, Congress provided the Secretary of the U.S. Department of Transportation (DOT) with a choice of establishing some form of a production-weighted average standard for each manufacturer's entire fleet of light trucks similar to passenger car standards, or some form of production-weighted standards for classes of light trucks. Congress directed the Secretary to establish CAFE standards applicable to each manufacturer's light truck fleet, or alternatively, to classes of light trucks, that represent a "maximum feasible" level of fuel economy.

2. NAS Findings and Recommendations

In response to direction from Congress, NAS published a lengthy report in 2002 entitled "Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards."[2] The report made several findings and recommendations relevant to the Energy Act of 2005 feasibility study.

The report concluded that technologies exist that could significantly reduce fuel consumption by passenger cars and light trucks within 15 years, while maintaining vehicle size, weight, utility and performance (NAS, p. 3 (Finding 5)). Light duty trucks offer the greatest potential for reducing fuel consumption (NAS, p. 4 (Finding 5)). However, the report also noted that vehicle development cycles – as well as economic, regulatory, safety and consumer preferences – would influence the extent to which these technologies could lead to increased fuel economy in the U.S. market. The report noted that even the widespread penetration of available technologies will probably require 4-8 years to be fully implemented (NAS, p. 5, (Finding 15)). To assess the economic trade-offs associated with the introduction of existing and emerging

[2] The NAS submitted its preliminary report to the Department of Transportation in July 2001 and released its final report in January 2002.

technologies to improve fuel economy, the NAS conducted what it called a "cost-efficient analysis" -- "that is, the committee identified packages of existing and emerging technologies that could be introduced over the next 10 to 15 years that would improve fuel economy up to the point where further increases in fuel economy would not be reimbursed by fuel savings" (NAS, p. 4 (Finding 6)).

The report found that NHTSA should provide sufficient lead time, consistent with manufacturer normal product life cycles, when considering increases to CAFE standards. By doing so, NHTSA would more likely minimize financial impacts to manufacturers, their suppliers, employees, and consumers. The report stated that there are advanced technologies that could be employed, without negatively affecting the automobile industry, if sufficient lead-time were provided to the manufacturers.

Recognizing the many trade-offs that must be considered in setting fuel economy standards, the report took no position on what CAFE standards would be appropriate for a reformed CAFE structure. It noted, "(s) election of fuel economy targets will require uncertain and difficult trade-offs among environmental benefits, vehicle safety, cost, oil import dependence, and consumer preferences" (NAS, p., 5 (Recommendation 1)).

The NAS expressed concerns about increasing the standards under the unreformed CAFE program and went further to say that, "to the extent that the size and weight of the fleet have been constrained by CAFE requirements … those requirements have caused more injuries and fatalities on the road than would otherwise have occurred" (NAS, p. 29). Specifically, they noted: "the downweighting and downsizing that occurred in the late 1970s and early 1980s, some of which was due to CAFE standards, probably resulted in an additional 1300 to 2600 traffic fatalities in 1993" (NAS, p. 3 (Finding 2)).

The NAS committee warned about the safety consequences of increasing fuel economy under the unreformed CAFE system, a system that encourages downweighting and the production of small cars. It said that if an increase in fuel economy were affected by such a system, some additional traffic fatalities would be expected. Without a thoughtful restructuring of the program, that would be the trade-off that must be made if CAFE standards are increased

by any significant amount (NAS, p. 77). The NAS Committee concluded that while the unreformed CAFE program has clearly contributed to increased fuel economy (NAS, p. 3 (Finding 1)), other alternative structures "could accomplish the same end at lower cost, provide more flexibility to manufacturers, or address inequities arising from the present" structure. (NAS, pp. 4-5 (Finding 10)).

The report made recommendations regarding ways to reform the structure of the unreformed CAFE program either through an alternative standards-setting approach or through market incentives that could complement the standards. The report also discussed longer term breakthrough technologies and their role in reducing fuel consumption over time.

a) Attribute-Based CAFE Structure

The report suggested various possible reforms.[3] The report found that the "CAFE program might be improved significantly by converting it to a system in which fuel targets depend on vehicle attributes" (NAS, p. 5 (Finding 12)). The report noted that a system in which fuel economy targets were dependent on vehicle weight, with lower fuel consumption targets set for lighter vehicles and higher targets for heavier vehicles, up to some maximum weight, would create incentives to reduce the variance in vehicle weights between large and small vehicles, thus providing for overall vehicle safety (NAS, p. 5 (Finding 12)). The report stated that such a system has the potential to increase fuel economy with fewer negative effects on both safety and consumer choice.

Adverse safety impacts could be minimized or even reversed, if weight and size reductions were limited to heavier vehicles (particularly those over 4,000 lbs). Those

[3] In assessing and comparing possible reforms, the report urged consideration of the following factors:
Fuel use responses encouraged by the policy,
Effectiveness in reducing fuel use,
Minimizing costs of fuel use reduction,
Other potential consequences
-Distributional impacts
-Safety
-Consumer satisfaction
-Mobility
-Environment
-Potential inequities, and
Administrative feasibility.
(NAS, p. 94).

larger vehicles would then be less damaging in crashes with other vehicles posing less risk to other drivers on the road (NAS, p. 5 (Finding 13)).

The report noted further that under an attribute-based approach, the required CAFE levels could vary among the manufacturers based on the distribution of their product mix. NAS stated that targets could vary among passenger cars and among trucks, based on some attribute of these vehicles such as weight, size, or load-carrying capacity. The report explained that a particular manufacturer's average target for passenger cars or for trucks would depend upon the fractions of vehicles it sold with particular levels of these attributes (NAS, p. 87). For example, if weight were the criterion, a manufacturer that sells mostly light vehicles would have to achieve higher average fuel economy than would a manufacturer that sells mostly heavy vehicles.

The report illustrated an example of an attribute-based system using a continuous function (NAS, p. 109). Essentially, as illustrated, the continuous function was represented as a line, which graphed "gallons per mile" versus "curb weight." Under the continuous function example, a vehicle's target fuel economy would be determined by locating the vehicle's curb weight along the line and identifying the corresponding gallons per mile value.

b) Alternative Policies and Advanced Technologies

NAS stated in its report that raising CAFE standards would reduce fuel consumption below what it otherwise would be. However, other policies and incentives could accomplish the same end at a lower cost. These alternatives could either replace or complement fuel economy regulations (NAS, p. 5, (Finding 10)).

NAS was in favor of a market based tradable fuel economy credit system, under which automobile manufacturers could sell to or buy from other manufacturers or from the government. The NAS committee found that a trading system would be less costly than the unreformed CAFE system, provide more flexibility and options to manufacturers; give better information on the

cost of fuel economy changes; and provide incentives to all manufacturers to improve fuel economy, thus, allowing for more ambitious fuel economy goals than under the unreformed system (NAS, p. 6, (Recommendation 2).

NAS also discussed feebates, an incentive mechanism that uses explicit government-defined fees and rebates, as an alternative worth investigating. Under a feebates system, taxes are imposed on vehicles with low fuel economy and rebates are given to vehicles achieving high fuel economy. Such systems could be designed to be revenue neutral: the tax revenues and rebate subsidies would just balance one another if the forecasted sales-weighted average fuel economy turned out as predicted.

NAS also recommended that in order to promote the development of longer-range breakthrough technologies, the government should continue to fund cooperative and precompetitive research aimed at technologies to improve fuel economy, safety and emissions (NAS, p. 6, Recommendation 6). Regarding hydrogen fuel cell technologies, NAS noted their steady stream of progress and their promise for providing improved fuel economy and reduced emissions. However, such vehicles continue to face significant technological, economic, and fueling infrastructure barriers (NAS, p. 5 (Finding 14).

II. NHTSA'S ACTION PLAN FOR REDUCING FUEL CONSUMPTION BY 2014 AND BEYOND

The release of the NAS study in January 2002 closely followed the late 2001 lifting of a multi-year (fiscal years 1996-2001) freeze on using appropriations to prepare, propose or promulgate CAFE standards higher or lower than the ones for the preceding year. When the freeze was lifted, the agency began its first efforts in over six years to gather and analyze information related to fuel economy technology and capability. In February 2002, Secretary Mineta wrote to Congress asking for authority to reform both passenger car and light truck CAFE standards.

When the Energy Policy Act of 2005 became law, requiring NHTSA to conduct the feasibility and effects of reducing the amount of fuel consumed by automobiles by a significant

percentage by model year 2014, NHTSA was in the midst of a major rulemaking determining the best way of reforming the structure and increasing the standards of the CAFE program for light trucks. Successfully completing this reform effort was indispensable to finding a responsible way of significantly reducing the amount of fuel consumed by automobiles by 2014 and beyond.

As described above, NAS made key findings and recommendations relevant to the study required by the Energy Policy Act of 2005. It found that there was sufficient technology for making significant fuel economy improvements if sufficient leadtime were provided. At the same time, it also found that shortcomings in the unreformed program not only limited the potential for improvements, but also posed a risk of adverse social impacts related to safety, jobs and consumer choice. It strongly recommended, therefore, that any step to improve significantly the fuel economy of cars or light trucks should be taken only if it were combined with reforming the CAFE program to reduce or eliminate those shortcomings.

A. NHTSA's REGULATORY PROGRAM

1. Light Truck Focus—Reforming Light Truck Cafe and Setting Standards (MY 2005-2011)

The agency decided to focus its efforts to reform the CAFE program and raise CAFE standards first on light trucks. NHTSA had the statutory obligation to set light truck standards and the statutory authority to reform the structure of the light truck program. The agency used this opportunity to reform CAFE into a system that does not suffer from the shortcomings of the unreformed system. The agency does not have the statutory authority to reform the passenger car CAFE program. However, since the safety and economic concerns raised by NAS were applicable to both light trucks and cars, finding a way to address these concerns through a reformed structure for light trucks paves the way for reforming CAFE for passenger cars as soon as Congress gives NHTSA the authority to do so. In addition, more fuel savings could be derived from focusing on light trucks. The fuel economy level achieved by trucks is lower than that for passenger cars, which presents more cost beneficial opportunities to apply additional fuel-saving technologies on light trucks.

NHTSA's decision to raise light truck standards for seven consecutive model years (2005-2011) will contribute greatly to reducing fuel consumption. In addition to the 14.3 billion gallons of fuel saved over the lifetime of the vehicles affected by the standards, NHTSA also completed and institutionalized a size based CAFE reform structure that will save more fuel over time than the unreformed CAFE structure, without negatively impact safety and jobs.

a) Setting Standards 2005-2007

On April 7, 2003, the agency published a final rule establishing light truck CAFE standards under the unreformed structure for model years (MYs) 2005-2007: 21.0 mpg for MY 2005, 21.6 mpg for MY 2006, and 22.2 mpg for MY 2007 (68 FED. REG. 16868; Docket No. 2002-11419; Notice 3). The agency arrived at these levels after balancing the express statutory factors and other relevant considerations such as the impact of the standard on motor vehicle safety and employment. NHTSA estimates that the fuel economy increases required by the standards for MYs 2005-2007 will save approximately 3.6 billion gallons of gasoline over the 25-year lifetime of the affected vehicles at a cost of $1.6 billion to the industry.

b) Reforming and Setting Standards 2008-2011

NHTSA decided to reform the light truck CAFE program for several reasons, as follows:

- The energy-saving potential of the CAFE program is hampered by the unreformed regulatory structure. The unreformed approach to CAFE does not distinguish between the various sizes of light trucks, and therefore does not recognize that some light trucks may achieve fuel economy similar to or greater than that of passenger cars. However, this outcome depends on using advanced fuel-saving technologies on these trucks. The unreformed CAFE approach just applies a single standard to each manufacturer's light truck fleet as a whole. This permits manufacturers to use advanced technologies, but it also permits them to decide not to use any advanced technologies and instead simply offer small light trucks to offset their larger vehicles that get lower fuel economy. A CAFE system that

more closely links fuel economy standards to the various market segments obliges manufacturers to use advanced technologies.

- Because weight directly affects potential fuel economy, the unreformed light truck CAFE program encourages vehicle manufacturers to reduce weight in their light truck offerings to achieve greater fuel economy. As the NAS report and a more recent NHTSA study have found, downweighting of the light truck fleet, especially those trucks in the low and medium weight ranges, results in more highway deaths.

- The agency noted the disparate economic impacts that result from the unreformed structure, in which nearly all the compliance burdens are borne by full-line manufacturers. A full-line manufacturer is one that produces a wide variety of vehicle types and sizes. Under the single fleet average used in the unreformed CAFE program, full-line manufacturers have lower CAFE averages than companies that produce more small and mid-size vehicles. This is not because the full-line manufacturers produce vehicles that are less efficient in their size classes than their competitors – it is simply a result of the fact that larger trucks cannot achieve the same fuel consumption as smaller trucks. Thus, full-line manufacturers are obliged either to add fuel-saving technology to their products or to shift production to make fewer small vehicles. Manufacturers that produce more small and mid-size vehicles are not obliged to add any technology as a result of the unreformed CAFE system, nor do they have to change their product plans. In essence, then, the burdens of the unreformed CAFE program fall nearly exclusively on the full-line manufacturers.

On March 29, 2006, NHTSA published a light truck final rule establishing CAFE standards for MYs 2008 through 2011, and more importantly reforming the CAFE program (71 FED. REG. 17566). In the final rule, the agency set fuel economy standards for light trucks in MYs 2008-2010, under the traditional CAFE system (unreformed CAFE system). The agency also set standards for MYs 2008-2010 under a proposed reformed CAFE system (reformed

CAFE). During MYs 2008-2010, manufacturers would have an option of complying with standards established under the unreformed or the CAFE system. This period would serve as a transition period to provide manufacturers an opportunity to adjust to changes in the CAFE system and to provide this agency and the manufacturers' opportunity to gain experience with the new system. For MY 2011, NHTSA proposed standards established under reformed CAFE only.

The unreformed standards for MYs 2008-2010 were proposed with particular regard to the capabilities of and impacts on the "least capable" full-line manufacturer with a significant share of the market. A single CAFE level, applicable to each manufacturer, was proposed each model year as follows:

MY 2008: 22.5 mpg
MY 2009: 23.1 mpg
MY 2010: 23.5 mpg

Under reformed CAFE, each manufacturer's required level of CAFE is based on target levels set according to vehicle size. The targets are assigned according to a vehicle's "footprint" – the product of the average track width (the distance between the centerline of the tires) and wheelbase (basically, the distance between the centers of the axles). Each vehicle footprint value is assigned a target specific to that footprint value.

The reform adopted is based on a continuous function. Under it, targets are assigned along the continuum of footprint values in the light truck fleet. Each footprint value has a different target.

The target values reflect the 12 technological and economic capabilities of the industry. The target for a given footprint value is the same for all manufacturers, regardless of differences in their overall fleet mixes. The required level of CAFE for a particular manufacturer for a given model year is calculated using the target-setting function for that model year in conjunction with that manufacturer's actual total production and its production at each footprint value for that model year. Compliance is determined by comparing a manufacturer's harmonically averaged

fleet fuel economy in a model year with a required fuel economy level calculated using the manufacturer's actual production levels and the category targets.

An example of the continuous function appears below. It relates vehicle fuel economy (measured in mpg) to vehicle size measured by footprint (the product of wheel base and track width). Fuel economy and size are inversely related – as footprint gets larger, achievable fuel economy gets smaller.

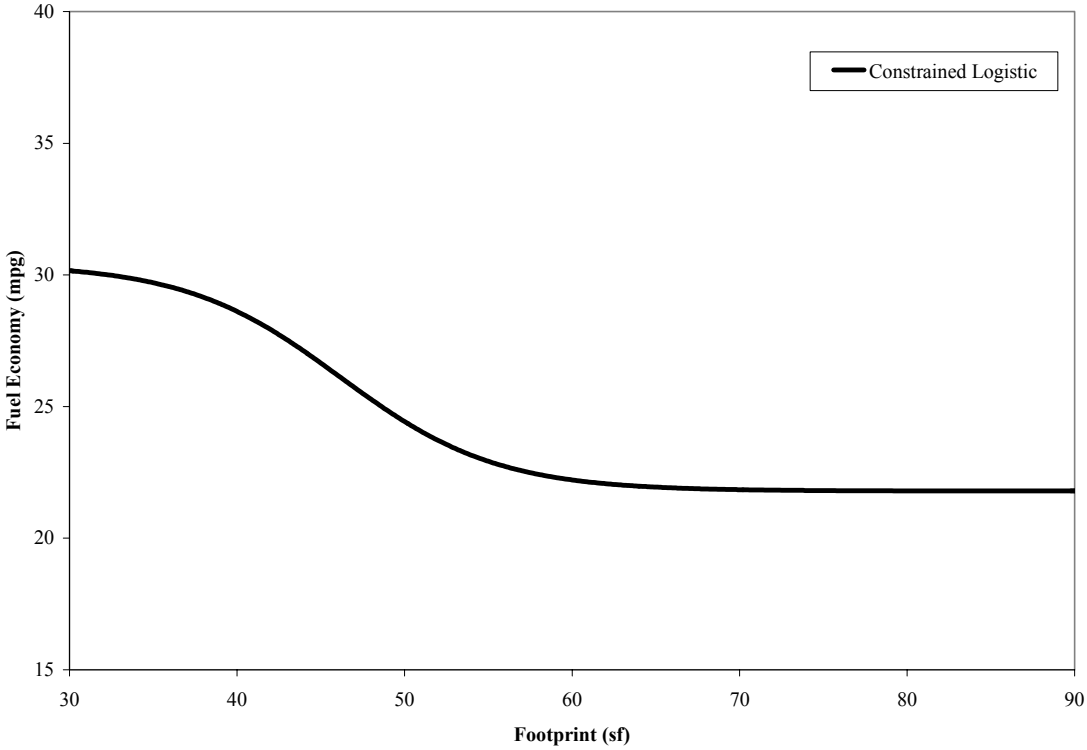

Figure 1: Constrained logistic function

We estimated that the 2008-2011 light truck standards could save up to 10.7 billion gallons of fuel over the lifetime of the vehicles sold during those model years, compared to the savings that would occur if the standards remained at the MY 2007 level of 22.2 mpg at a total cost of $6.7 billion to the industry. The standard represents the point at which the marginal costs of adding further technologies equal the marginal benefits of doing so.

c) Inclusion of the Medium Duty Passenger Vehicles in 2011 and Beyond

In addition to reforming the structure of the light truck CAFE program, the agency also expanded the applicability of the standards. Starting in MY 2011, the CAFE program will include the large Sport Utility Vehicles known as Medium Duty Passenger Vehicles (MPDVs). These are light trucks that have a gross vehicle weight rating (GVWR) less than 10,000 lbs., a GVWR greater than 8,500 lbs or a curb weight greater than 6,000 lbs., and that primarily transport passengers.

The agency estimates this will bring an additional 240,000 vehicles into the CAFE program and will further contribute toward reducing fuel consumption from automobiles by 2014 and beyond by reducing fuel consumption by an additional 250 million gallons.

d) Setting Light Truck Standards for 2012 and Beyond

NHTSA cannot quantify the reduction in fuel consumption from regulating light trucks beyond 2011 because of the lack of manufacturers' product plan information and other relevant data, such as projected gasoline prices. However, all else equal, the agency expects that the reform system will yield similar fuel savings trends from regulating 2012-2014 and beyond as those observed in MY 2011.

2. Passenger Car Focus

As noted above, the passenger car fuel economy standard was set in law at 27.5 miles per gallon in the original 1975 CAFE statute. Neither Congress nor any Administration has raised the standard beyond the statutory level. The NAS Committee concluded that while this standard has resulted in improved fuel economy over time, it has also contributed to adverse safety consequences because it encourages automakers to build smaller vehicles in order to "average out" fuel savings across their fleets. The chair of the committee wrote, "…no matter what Congress decides regarding specific fuel economy targets, our committee is adamant that changes should be made to shore up deficiencies in the program."

NHTSA believes that further reductions in fuel consumption can be achieved by 2014 and beyond, without sacrificing safety or jobs, if Congress were to give NHTSA the authority it needs to reform the passenger car CAFE program and set CAFE standards accordingly. The agency cannot quantify the potential reduction of fuel consumed by passenger cars at this time due to unavailability of passenger car data and product plan information. However, based on its experiences with the recent light truck reform rulemaking, the agency believes that significant improvements could be made from reforming the passenger car structure. A well-designed attribute-based system for passenger cars would always result in more fuel savings than the unreformed flat average CAFE system. An attribute-based system, such as the size-based (footprint) system used in the recent light truck rulemaking, requires most or all manufacturers to improve the fuel economy of most or all of their vehicles. Such a system will not result in manufacturers simply building larger vehicles to lower their CAFE standards. Changes to vehicle platforms typically require redesign and retooling for the various models that share the platform, and such changes require time and money to make. Given the costs associated with platform changes, vehicle manufacturers are unlikely to change an attribute such as a footprint solely or even primarily in response to the reformed CAFE program. A size-based attribute system would also address the safety and economic concerns of the unreformed system.

a) Seeking Authority to Reform Passenger CAR CAFE

On April 27, 2006, soon after NHTSA issued its final rule setting light trucks CAFE standards under a reformed structure, then Secretary Mineta sent a letter to Congress asking yet again for authority to reform the passenger car program. Secretary Mineta in his testimony before the House and the Senate said:

"……following our successful overhaul of the light truck CAFE program and consistent with the recommendations of the NAS, we have the capacity to establish a far more precise, efficient, and safe CAFE program for passenger cars.

He further said that:

"……If we are given the authority to reform the CAFE system for passenger cars, we can improve fuel efficiency by requiring manufacturers to apply fuel saving technologies rather than giving them an incentive to build smaller cars. Based on the automakers' confidential product plans, our experts at the National Highway Traffic Safety Administration (NHTSA) can objectively measure how much fuel saving technology we can require before the costs outweigh the benefits. This method of formulating a fuel economy standard is objective and subject to review during the rulemaking process. It is also far more likely to produce an optimal result than if Congress were to prescribe a standard in a statute."

If this authority were granted, NHTSA would immediately begin work to investigate ways to reform the passenger car program. The new light truck structure provides a sound, thoroughly considered starting point.

b) Benefits of Setting Standards Under a Reformed Passenger Car Structure

1. Increased Energy Savings

The reformed CAFE system increases the energy savings of the CAFE program over the longer term because fuel saving technologies will be required to be applied to passenger cars and light trucks throughout most or all of the entire industry, not just by a limited number of manufacturers. The energy-saving potential of unreformed CAFE is limited because it requires only a few full-line manufacturers to make improvements and is generally set below the capabilities of limited-line manufacturers, which sell predominantly lighter and smaller cars and light trucks. In effect, the capabilities of these full-line manufacturers, whose offerings include larger and heavier cars and light trucks, constrain the stringency of the uniform, industry-wide standard. Under reformed CAFE, which accounts for fuel economy potential of the fleets of individual manufacturers, virtually all automakers will be required to improve the fuel economy of their vehicles. Thus, reformed CAFE continues to require full-line manufacturers to improve the overall fuel economy of their fleets, while also requiring limited-line manufacturers to enhance the fuel economy of the vehicles they sell.

A quantitative example of the increased fuel savings can be found in the 2008-2011 light truck final rule. The rule allowed manufacturers a choice of complying with either the reformed system or with the unreformed system in years 2008-2010. During this transition period, the agency set reformed standards so that overall industry costs would be equal to the levels in the unreformed system. Table 1 shows that the reformed CAFE system will result in greater fuel savings than the unreformed CAFE system for each and every year during the transition period, even though the industry-wide compliance costs were equalized for those model years:

Table 1 - Estimated Fuel Savings from Reformed and Unreformed CAFE Systems for MYs 2008-2010
(billions of gallons)

	MY 2008	**MY 2009**	**MY 2010**
Reformed CAFE system	0.7	1.9	2.2
Unreformed CAFE system	0.6	1.8	2.0

The improvement in fuel savings made possible by the switch to the reformed CAFE system will be even greater beginning MY 2011. By requiring improvements across the entire industry, the reformed CAFE system produces greater fuel savings at levels that remain economically practicable. For comparison, the agency performed a cursory analysis under the unreformed system for MY 2011. On the basis of that cursory analysis, the agency determined that, under the unreformed CAFE system, the average fleet wide (including MDPVs) fuel economy would have been at most 23.3 mpg. This is considerably lower than the 24.0 mpg fleet wide average that was effectively required under the reformed system in that same year. Table 2 below illustrates the difference in fuel savings between the unreformed CAFE system and the fully implemented reformed CAFE system in MY 2011.

Table 2 – Comparison of the Estimated Fuel Savings from Reformed in MY 2011 and an Unreformed Standard of 23.3 mpg in MY 2011 (billions of gallons)

	MY 2011
Reformed CAFE system	2.8
Unreformed CAFE system	2.1

As illustrated above, the reformed CAFE system saves an additional 700 million gallons of fuel over the unreformed CAFE system over the lifetime of the vehicles in the MY 2011 fleet. Further, we estimate that the fuel savings under a 23.3 mpg unreformed standard in MY 2011 would have come at a cost of approximately $ 1.9 billion. While the cost of the reformed fuel savings in MY 2011 is approximately $2.5 billion, this cost is distributed across a greater number of manufacturers.

2. Reduced Incentive to Respond to the CAFE Program in Ways Harmful to Safety

The agency believes that the manner in which fuel economy is regulated can have substantial effects on manufacturer choices about vehicle design and the composition of the vehicle fleet. Reforming CAFE is important for vehicle safety because the unreformed structure of the CAFE system provides an incentive to manufacturers to reduce the weight and size of their vehicles, and to increase the types of vehicles that are more susceptible to rollover crashes and less compatible with other vehicles. The reformed structure based on footprint substantially reduces the incentive to introduce smaller vehicles or to reduce vehicle size to offset the lower fuel economy of larger vehicles. For this reason, reforming CAFE is a critical part of the agency's effort to address the vehicle rollover and compatibility problems outlined in the agency's integrated project team reports on rollover and compatibility. These reports can be found at: http://www.nhtsa.dot.gov/IPTReports.html.

3. More Equitable Regulatory Framework

The reformed CAFE system provides a more equitable regulatory framework for full-line vehicle manufacturers and creates a level playing field for all manufacturers. Under unreformed CAFE, all vehicle manufacturers are required to comply with the same fleet-wide average CAFE requirement, regardless of their product mix. For full-line manufacturers, this creates an especially burdensome task. We note that these manufacturers often offer vehicles that have high fuel economy performance relative to others in the same size class, yet because they sell many vehicles in the larger end of the car and light truck market, their overall CAFE is low relative to those manufacturers that concentrate in offering smaller cars and light trucks. As a result, unreformed CAFE is binding for such full-line manufacturers, but not for limited-line manufacturers who sell predominantly smaller vehicles.

The reformed CAFE program requires manufacturers to comply with a fuel economy level that is representative of that manufacturer's actual production mix. Under both functions, vehicles are compared to fuel economy targets more representative of a vehicle's fuel saving capabilities than comparison to a single flat standard. In fact, a required fuel economy level under the continuous function is more representative of a manufacturer's capabilities, because a target is established for each specific vehicle footprint.

B. ALTERNATIVE POLICIES -- EXPLORING THE DEMAND SIDE OF FUEL ECONOMY

1. Market Based Approaches and Policies

In its study, the NAS Committee cited some alternative demand-reduction or incentive policies aimed broadly at reducing fuel consumption, including tradable credits and feebates. According to NAS, these policies could be superior to or could complement the unreformed CAFE regulatory programs, accomplishing the same end but at a lower cost.

The National Energy Policy also recommended that the President "look at other market based approaches to reducing fuel consumption."[4] The DOT is working with four other federal departments and agencies on a study to evaluate the feasibility of some of these alternative approaches aimed at reducing fuel consumption. The four agencies are: the EPA, the U.S DOE, the U.S. Department of Commerce, and the U.S. Department of the Treasury.

The interagency study will consider the economic, environmental, safety, and energy-saving effects of these market based mechanisms and others. The study is designed to cover the long-term -- through 2025 and be completed by early 2008. In addition to this work, DOT recently unveiled a *National Strategy to Reduce Congestion on America's Transportation Network (Congestion Strategy)*. This Strategy is a broad plan designed to reverse the large and growing impacts of transportation system congestion on the U.S. economy and quality of life. Featured prominently in that plan is a focus on major demonstrations of congestion pricing in America's metropolitan areas. According to the Texas Transportation Institute, highway congestion in just the 85 largest metropolitan areas wastes 2.3 billion gallons of fuel every year.

a) Tradable Fuel Economy Credit Program

It has been widely recognized that setting the same fuel economy target for all manufacturers can be expensive and may reduce the attainable level of fuel economy. The cost of meeting target levels of fuel economy will vary significantly by manufacturer depending upon their product mix, firm specific technology availability, and available assets. In theory, allowing trading of fuel economy credits across manufacturers will reduce compliance costs that are ultimately paid by society. However, in practice, there are only a few large auto manufacturers in the U.S. market, some of whom would probably be consistent potential buyers of credits, while others would be consistent potential sellers. Thus, the usual assumption that all firms will trade to minimize total cost cannot be taken for granted. In a market characterized by few participants in head-to-head competition, the actual outcome of trading will be difficult to predict.

[4] National Energy Policy Development Group, *National Energy Policy*, (Washington, DC: USGPO, May 2001), p. 4-12.

b) Vehicle Price Fee /Rebate/Subsidy Strategies

Three types of strategies have been specified for the study, which attempt to affect the fuel economy of new vehicles by changing their price. These are:

- Feebate, where new vehicles are either charged a fee (excise tax) or given a rebate based on their fuel economy relative to specified level of fuel economy. In the study, feebates are intended to be 'revenue neutral,' meaning that the taxes on vehicles with low fuel economy will exactly pay for the subsidies paid for vehicles with high fuel economy.
- Efficient vehicle subsidy, like the feebates without the fees.
- Enhanced gas guzzler fee, similar to the feebates without the rebate.

The study will examine the effects of these strategies on the product mix of vehicles desired by consumers and provided by manufacturers. In the modeling framework, consumers are much more directly influenced by vehicle price than they are by fuel economy. These strategies share the common feature of making fuel economy more visible and salient to new vehicle purchasers.

c) Congestion Pricing and Employer Strategies

Aside from and in addition to efforts on the interagency study, DOT believes that market based highway pricing, particularly when combined with the adoption of more flexible scheduling and telecommuting practices by employers, holds tremendous promise to reduce the waste associated with highway congestion. In our *Congestion Strategy*, the Department is seeking to partner with metropolitan areas to demonstrate the power and benefits of these concepts. While the primary benefits of such an approach are increased travel speeds and system reliability, it is also clear that significant fuel savings could be achieved through the reduction of stop and go driving and idling. Market based pricing, commonly referred to as "congestion pricing," brings transportation supply and demand into balance, and provides new choices to

drivers and keeps lanes congestion free. Drivers pay variable fees or tolls for road use depending on congestion levels. New technologies such as those implemented on I-15 in Southern California and I-394 in Minnesota permit road providers to price roads dynamically (every few minutes) depending on live traffic conditions. One study by Komanoff Energy Associates in 2004 to the National Commission on Energy Policy found that "applying area-wide congestion pricing to just a quarter of the U.S. population would eliminate between 65,000 and 260,000 barrels of petroleum usage a day." Depending on the true negative fuel economy impacts of congested driving, these fuel savings numbers may be even higher. DOT is currently discussing area-wide pricing pilot opportunities and other congestion reducing measures with transportation stakeholders throughout the country.

2. Longer-Term Technologies

In its 2002 study on reducing fuel consumption by automobiles, the National Academy of Sciences stated that only through breakthrough technologies will dramatic increases in fuel economy become possible.[5] Several advanced technology programs are detailed below.

a) Advanced Energy Initiative

To significantly improve our energy security by decreasing demand for oil and refined gasoline and diesel fuels, The President's *Advanced Energy Initiative*[6] is accelerating consumer adoption of hybrid-electric vehicles and offering the potential to significantly reduce oil consumption in the near-term. Further gains are possible with the plug-in hybrid vehicle work by the DOE and hydraulic hybrid technology being developed by EPA, both of which integrate industrial efforts. In addition, the Advanced Energy Initiative proposes significant new investments and policies in three promising areas: (1) advanced batteries; (2) cellulosic ethanol; and (3) hydrogen vehicles.

1. Advanced Batteries

[5] National Research Council, *Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards,* Washington, DC: National Academy Press, 2002, Recommendation 6, p.114.

[6] This document can be found at http://www.whitehouse.gov/stateoftheunion/2006/energy/index.html

To address storage issues, advanced battery technologies such as lithium-ion batteries - similar to batteries used in cellular phones and other consumer electronics - can be adapted for vehicle use. These batteries, coupled with the development of advanced electric drive technologies, will enable the commercialization of plug-in hybrids that can deliver the desired range. To reduce the cost of these highly-efficient vehicles, the President's 2007 Budget includes $31 million in new research funding to support advanced battery research, a 27 percent increase over 2006 levels.

2. Cellulosic Ethanol

Virtually all domestically produced ethanol currently is made from corn. However, corn and other starches and sugars are only a small fraction of biomass that can be used to make ethanol. A recent DOE and Department of Agriculture study suggests that, with aggressive technology developments, biofuels could supply some 60 billion gallons per year – 30% of current U.S. gasoline consumption – in an environmentally responsible manner without affecting future food production. To achieve greater use of "homegrown" renewable fuels, we will need advanced technologies that will allow competitively priced ethanol to be made from cellulosic biomass, such as agricultural and forestry residues, material in municipal solid waste, trees, and grasses. Advanced technology can break those cellulosic materials down into their component sugars and then ferment them to make fuel ethanol. The President's goal is to make cellulosic ethanol cost-competitive with corn-based ethanol by 2012, enabling greater use of this alternative fuel to help reduce future U.S. oil consumption. To help reduce the costs of producing these advanced biofuels, and ready these technologies for commercialization, the President's 2007 Budget increases biomass research funding by 65 percent, to a total of $150 million.

In addition, the Energy Policy Act of 2005 requires that a certain percentage of motor fuel in the U.S. be obtained from renewable sources such as ethanol and biodiesel. This is intended to double America's supply of ethanol, up to eight billion gallons by 2012. This is another step towards meeting the President's energy initiatives.

3. Hydrogen Vehicles

i. Hydrogen Fuel Initiative and the FreedomCAR Partnership

The President's Hydrogen Fuel Initiative and the FreedomCAR Partnership, led by the Department of Energy, will develop, in parallel, technologies for hybrid components, fuel cells, and hydrogen production and distribution infrastructure needed to power fuel cell vehicles. Under FreedomCAR, most advanced automotive technologies (for example, lightweight materials and batteries) can be used to accelerate deployment of gasoline-electric hybrids as well as advance development of fuel cell vehicles. Research into advanced combustion engine technologies also continues.

Development efforts are underway under FreedomCAR to improve materials and methods to allow for more effective hydrogen storage in vehicles and at refueling stations, as well as to make hydrogen vehicles more affordable. The program is also working with industry to develop technology to enable safe production and delivery of hydrogen. The DOE estimates that, if hydrogen reaches its full potential, the Hydrogen Fuel Initiative and FreedomCAR program could reduce the U.S. oil demand by over 11 million barrels per day by 2040 – approximately the same amount of crude oil America imports today. The President's 2007 budget increases funding for hydrogen technology research by $46 million over current levels.

ii. NHTSA's Efforts on Hydrogen

Since 2003, the National Highway Traffic Safety Administration has been playing an important role in facilitating the potential introduction of hydrogen fuel cell vehicles into the U.S. market. The agency has been coordinating with other departments of the U.S. Government as well as with industry on an important component that surrounds the transition to a hydrogen economy: building the necessary regulatory structure will ensure safety and build consumer confidence in this new technology. NHTSA has the authority to promulgate the necessary Federal Motor Vehicle Safety Standards (FMVSS) for hydrogen fuel cell vehicles and fuel

systems. NHTSA regulates fuel system integrity of vehicles, including gasoline, diesel, compressed natural gas (CNG) and electric powered vehicles (Federal Motor Vehicle Safety Standards 301, 303, 304 and 305). The standards ensure safety either by simply regulating full vehicle crash performance or by also regulating the safety of components and on-board fuel storage systems. NHTSA enforces compliance with these standards and conducts safety defects investigations on fuel leaks and fires.

NHTSA has established an agency-wide hydrogen project team to (1) study existing technologies in coordination with other agencies of the U.S. Government and industry, and (2) devise a plan of action identifying the research and testing needed to establish a performance-oriented safety standard that will build consumer confidence in these vehicles by addressing the safety concerns related to hydrogen leakage. It is important to provide occupants of hydrogen fuel cell vehicles with a level of safety comparable to that provided passengers of vehicles fueled by gasoline or diesel fuel without limiting innovations or slowing the development and marketing of these vehicles.

NHTSA has the authority to regulate fuel economy of hydrogen-powered vehicles. It is required to set fuel economy standards at the maximum feasible level for each model year. To that end, it is necessary for NHTSA to investigate and analyze the potential increases in fuel economy attributable to hydrogen vehicles. Thus, the critical path of technology and the use of hydrogen as an energy carrier must be understood. NHTSA interfaces extensively with DOE and EPA on their respective hydrogen/fuel cell programs in order to keep pace with developments. Hydrogen is an alternative fuel for the purposes of the CAFE program. Vehicles that use hydrogen as their only source of fuel (dedicated vehicles) or can alternately use hydrogen and petroleum fuel (dual-fuel vehicles) qualify for special calculation of their fuel economy performance under regulations administered by NHTSA. These special calculation procedures provide manufacturers with powerful incentives to develop and produce these vehicles, which could contribute to our efforts to reduce our dependence on foreign energy supply.

In 2004, NHTSA published in the Federal Register its multi-year Hydrogen Research Plan that outlines the necessary testing and evaluations leading to the development of safety regulations for hydrogen vehicles. In 2006, NHTSA plans the following testing efforts:

- Conduct fuel cell vehicle testing to identify potential failure modes of a high pressure compressed hydrogen storage system.
- Develop a fuel cell vehicle and electrical isolation test procedure.
- Conduct container integrity testing.
- Conduct a comparative analysis/evaluation of existing and proposed regulations and standards on hydrogen container integrity, general fuel cell vehicle safety, and vehicle crash safety.

To facilitate Research, Development & Deployment (RD&D) and data collection, NHTSA will review and provide appropriate exemptions to hydrogen-powered prototype vehicles. Industry demonstration data, and early NHTSA research, will serve as the basis for proposed rulemaking. As vehicle design concepts mature, NHTSA anticipates an increase in availability of vehicles for crash testing. The crash testing will validate models, highlight areas for further R&D, support the rulemaking process, and final promulgation of any FMVSS.

Through its participation in the United Nations World Forum for the Harmonization of Vehicle Regulations (WP.29), NHTSA is one of three co-sponsors of the effort to develop a Global Technical Regulation (GTR) for hydrogen fuel cell vehicles. NHTSA's role in this forum will help ensure the development of comprehensive, whole vehicle-focused and performance-based regulations. Once the GTR is completed, NHTSA will start the GTR adoption process to implement its requirements into the appropriate FMVSS. In the coming year, the WP.29 group of experts, under the leadership of Germany, Japan, and the United States, will be proposing a road map for the development of the GTR. The road map will identify specific milestones and a target time frame for completion of each effort.

Under the road map, the GTR will address both environmental and safety concerns, including crashworthiness considerations. In order to effectively implement the roadmap, two

sub-groups, environmental and safety, were formed under the Working Party on Passive Safety (GRSP) and the Working Party of Experts on Pollution and Energy (GRPE), respectively.

The first exploratory meeting of the safety sub-group was conducted in October 2005. The main purpose of the meeting was to exchange technical information and to obtain a better understanding of existing national regulations and voluntary standards. While NHTSA leads the U.S. delegation to WP.29 and to the safety subgroup addressing this GTR, it coordinates its efforts very closely with the EPA and the DOE.

iii. Federal Transit Administration (FTA) Program

FTA is in the forefront of the research, development, and demonstration of fuel cell buses. In partnership with key stakeholders, FTA is developing a Hydrogen and Fuel Cell Bus Initiative. This initiative is a broad-based, national effort to coordinate and consolidate the diverse efforts in the private and public sectors. FTA is also spearheading an effort to enhance international coordination and collaboration in fuel cell bus research, development, and demonstration.

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