Federal Register

Monday,
April 7, 2003

Part II

Department of Transportation

National Highway Traffic Safety Administration

49 CFR Part 533

Light Truck Average Fuel Economy Standards Model Years 2005–2007; Final Rule

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 533

[Docket No. 2002–11419; Notice 3]

RIN 2127–AI70

Light Truck Average Fuel Economy Standards Model Years 2005–2007

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

ACTION: Final rule.

SUMMARY: This final rule establishes corporate average fuel economy standards for light trucks. NHTSA is setting a standard of 21.0 miles per gallon (mpg) for model year (MY) 2005, 21.6 mpg for MY 2006, and 22.2 mpg for MY 2007.

DATES: Effective: May 5, 2003. If you wish to submit a petition for reconsideration of this rule, your petition must be received by May 22, 2003.

ADDRESSES: Petitions for reconsideration should refer to the docket number and be submitted to: Administrator, Room 5220, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: For technical issues, call Ken Katz, Lead Engineer, Fuel Economy Division, Office of Planning and Consumer Standards, at (202) 366–0846, facsimile (202) 493–2290, electronic mail *kkatz@nhtsa.dot.gov*. For legal issues, call Otto Matheke or Nancy Bell, Office of the Chief Counsel, at (202) 366–2992.

SUPPLEMENTARY INFORMATION:

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I. Introduction

Beginning in 1996, NHTSA was subject to a series of limitations on appropriations that prevented the agency from considering changes to the corporate average fuel economy (CAFE) levels established by statute at 27.5 mpg for passenger cars and by regulation at 20.7 mpg for non-passenger automobiles (light trucks). In July 2001, Secretary of Transportation Mineta asked Congress not to renew the appropriations rider restricting the agency's authority.

Congress enacted the Department of Transportation and Related Agencies Appropriations Act for FY 2002 (Pub. L. 107–87) in December 2001 without the appropriations rider. Since that time, the agency has been actively engaged in collecting and analyzing data, establishing appropriate fuel economy standards, and considering ways to enhance the CAFE program within current statutory authority.

Because NHTSA is required by the CAFE statute to establish the CAFE standard for a model year not later than 18 months before its beginning, and thus had to establish the light truck standard for MY 2004 on or before April 1, 2002, the agency had to act quickly after December 2001 to set that standard. Due to the lack of opportunity to gather and analyze the data necessary to support a standard different from 20.7 mpg, the agency set the MY 2004 standard at 20.7 mpg. (67 FR 16052, April 4, 2002)

On February 7, 2002, the agency published a Request for Comments, seeking data relating to manufacturers' product plans for light trucks for MYs 2005–2010 and seeking comments relating to potential reforms to the CAFE program. (67 FR 5767) Having received and analyzed detailed data about manufacturers' product plans for MYs 2005–2007, the agency published a Notice of Proposed Rulemaking (NPRM) on December 16, 2002 proposing to establish the CAFE standard for light trucks at 21.0 mpg for MY 2005, 21.6 mpg for MY 2006 and 22.2 mpg for MY 2007. (67 FR 77015)

NHTSA noted in the NPRM that, consistent with the recommendations of the National Academy of Sciences (NAS) in its report on the effectiveness and impacts of the CAFE standards, the agency intended to consider alternatives to the current structure of the CAFE program that would enhance long term fuel economy while protecting motor vehicle safety and American jobs, and to implement reforms consistent with our statutory authority for model years after MY 2007. We further noted our belief that advanced fuel saving technologies, such as hybrid electrics and advanced diesel vehicles, could substantially enhance the average fuel economy of the American light vehicle fleet as even more advanced technologies, such as fuel cells, are developed.

Since that time, both public and private initiatives have been announced. Earlier this year, President Bush proclaimed the government's support for the active research and development of commercially viable hydrogen-powered fuel cells for transportation and stationary power applications, and the infrastructure to support them. As the President indicated in his State of the Union address, successful execution of the Hydrogen Fuel Initiative would mean that the first car driven by a child born today could be powered by fuel cells, and pollution-free. The President's Hydrogen Fuel Initiative complements the FreedomCAR initiative, a partnership with the U.S. auto industry aimed at developing technologies needed for mass production of safe and affordable hydrogen fuel cell vehicles. Together, these initiatives will enable automobile manufacturers to decide to offer affordable and technologically viable hydrogen fuel cell vehicles in the mass consumer market by 2015 and the ability to produce and deliver such vehicles to the market by 2020.

The private sector is also responding to the nation's need to develop energy independence. On January 6, 2003, General Motors announced that it would offer an optional hybrid powertrain on several of its most popular models, including light trucks. While pointing out that its plans involve ''relatively low volumes,'' General Motors also stated that its initiative would make it ''well

positioned to meet market demand as it develops.'' Similarly, Ford Motor Company will introduce an optional hybrid electric powertrain in its Escape Sport Utility Vehicle, beginning with MY 2004. As Ford explained:

> While a few automakers have introduced small, low-volume hybrid-electric cars, Ford is introducing its first HEV on a family-sized sport utility to increase mass customer appeal. The hybrid-electric powertrain also has been developed with additional applications and vehicles in mind to expand the potential impact of the environmentally responsible technology.

DaimlerChrysler will introduce an optional diesel engine in the Jeep Liberty Sport Utility Vehicle, also beginning with MY 2004. The company claimed in December 2002 that American consumers could help reduce oil use by about 800 million gallons annually if they chose to purchase clean diesel engines at the same rate as Europeans. According to DaimlerChrysler: ''Today's modern diesel vehicles should be part of the solution to improving fuel efficiency and reducing carbon dioxide emissions. Diesels lead to up to 30 percent improvement in fuel economy, while reducing carbon dioxide emissions an average of 20 percent.''

The agency intends to address potential long-term enhancements to the fuel economy program through a separate rulemaking to be initiated this year. We will examine the best methods through which to redefine the distinctions between light trucks and passenger cars and the best basis on which to set CAFE standards. We will identify and seek comment on specific reforms aimed at enhancing fuel economy while protecting the safety of the American public and American jobs.

In the meanwhile, the agency must establish fuel economy standards for light trucks to address the current need to conserve energy within the bounds of technological feasibility and economic practicability, taking into account the effects of other Federal vehicle standards on fuel economy. Having analyzed the manufacturers' product plans and other available information, and considering the nation's need to conserve energy while seeking to protect the safety and jobs of the American public, we proposed light truck CAFE levels for MYs 2005–2007.

We received a significant amount of comment on the proposal, expressing a wide range of views. While some of those commenting charged that technology is available to set the standards higher, others argued that insufficient lead time and technological and market risks make it unlikely that the proposed standards would be attained. We have reviewed the comments and adjusted many aspects of the analyses to account for many of the points made. We have similarly reassessed the costs and benefits of the proposed standards.

After considering the foregoing, we are adopting the standards as proposed in the NPRM, having concluded that they constitute the maximum feasible level, taking into consideration the statutory criteria, for average light truck fuel economy standards for MYs 2005–2007. We have concluded that the standards are within the technological feasibility and economic practicability of the primary companies in the light truck market, and will enhance the ability of the nation to conserve fuel and reduce its dependence on foreign oil. We have concluded further that the standards established today present the overall best balance between the express statutory criteria.

II. Background

In December 1975, during the aftermath of the energy crisis created by the oil embargo of 1973–1974, Congress enacted the Energy Policy and Conservation Act (EPCA). The Act established an automotive fuel economy regulatory program by adding Title V, ''Improving Automotive Efficiency,'' to the Motor Vehicle Information and Cost Saving Act. Title V has been amended from time to time and codified without substantive change as Chapter 329 of title 49, United States Code. 49 U.S.C. 32901–32919.

Chapter 329 provides for the issuance of CAFE standards for passenger automobiles and for automobiles that are not passenger automobiles (light trucks). The CAFE standards set a minimum performance requirement in terms of an average number of miles a vehicle travels per gallon of gasoline or diesel fuel. Individual vehicles and models are not required to meet the mileage standard; rather, each manufacturer must achieve an average level of fuel economy for all specified vehicles manufactured in a given model year.

Section 32902(a) of Chapter 329 states that the Secretary of Transportation shall prescribe by regulation CAFE standards for light trucks for each model year.[1] That section requires that the CAFE standards for light trucks for a given model year be issued at least 18 months before the beginning of that model year. That section also states ''[e]ach standard shall be the maximum feasible average fuel economy level that the Secretary decides the manufacturers can achieve in that model year.'' Section 32092(f) directs the Secretary to consider four factors in determining the ''maximum feasible'' fuel economy level:

(1) Technological feasibility;
(2) Economic practicability;
(3) The effect of other Federal motor vehicle standards on fuel economy; and
(4) The need of the Nation to conserve energy.

The first light truck CAFE standards were established for MY 1979 and applied to light trucks with Gross Vehicle Weight Ratings (GVWR) up to 6000 pounds. Beginning with MY 1980, NHTSA raised this GVWR ceiling to 8500 pounds. For MYs 1979–1981, NHTSA established separate standards for two-wheel drive (2WD) and four-wheel drive (4WD) light trucks, without a ''combined'' standard blending the two together. Beginning with MY 1982, NHTSA established a combined standard, plus optional 2WD and 4WD standards. After MY 1991, NHTSA dropped the optional 2WD and 4WD standards. During MYs 1980–1995, NHTSA also required U.S. light truck manufacturers' ''captive imports'' to be separated from their other truck models in determining compliance with CAFE standards. The following table lists the ''combined'' standards established since MY 1982:

Model year	CAFE standard (mpg)
1982	17.5
1983	19.0
1984	20.0
1985	19.5
1986	20.0
1987	20.5
1988	20.5
1989	20.5
1990	20.0
1991	20.2
1992	20.2
1993	20.4
1994	20.5
1995	20.6
1996	20.7
1997	20.7
1998	20.7
1999	20.7
2000	20.7
2001	20.7
2002	20.7
2003	20.7
2004	20.7

In 1994, the agency departed from its usual past practice of considering light truck standards for one or two model years at a time and published an Advance Notice of Proposed

[1] The Secretary has delegated the authority to implement the automotive fuel economy program to the NHTSA Administrator. 49 CFR 1.50(f).

Rulemaking (ANPRM) in the **Federal Register** outlining NHTSA's intention to set standards for some, or all, of MYs 1998–2006. 59 FR 16324 (April 6, 1994).

On November 15, 1995, the Department of Transportation and Related Agencies Appropriations Act for FY 1996 was enacted. Pub. L. 104–50. Section 330 of that Act provided:

> None of the funds in this Act shall be available to prepare, propose, or promulgate any regulations * * * prescribing corporate average fuel economy standards for automobiles * * * in any model year that differs from standards promulgated for such automobiles prior to enactment of this section.

Pursuant to that Act, we then issued an NPRM limited to MY 1998, proposing to set the light truck CAFE standard for that year at 20.7 mpg, the same level as the standard we had set for MY 1997. 61 FR 145 (January 3, 1996). We adopted this 20.7 mpg-standard in a final rule issued on March 29, 1996. 61 FR 14680 (April 3, 1996).

On September 30, 1996, the Department of Transportation and Related Agencies Appropriations Act for FY 1997 was enacted. Pub. L. 104–205. Section 323 of that Act included the same limitation on appropriations regarding the CAFE standards contained in Section 330 of the FY 1996 Appropriations Act. The agency followed the same process as the prior year and established a MY 1999 light truck CAFE standard of 20.7 mpg, the same level as the standard that had been set for MYs 1997 and 1998.

Because the same limitation on the setting of CAFE standards was included in the Appropriations Acts for each of FYs 1998–2001, the agency followed that same procedure during those fiscal years and did not issue any NPRMs in the series of rulemakings we conducted to establish the light truck fuel economy standards for MYs 2000–2003. The agency concluded in those rulemakings, as it had when setting the MY 1999 standard, that the restrictions contained in the appropriations acts prevented the issuance of any standards other than the standard set for the prior model year. The agency also determined that issuing an NPRM was unnecessary and contrary to the public interest because there was no other course of action available to it.

The Department of Transportation and Related Agencies Appropriations Act for FY 2001 was enacted on October 23, 2000. Pub. L. 106–346. That is the appropriations act under which we issued the light truck CAFE standard for MY 2003. While Section 320 of that Act contained a restriction on CAFE rulemaking identical to that contained in prior appropriation acts, the conference committee report for that Act directed that NHTSA fund a study by NAS to evaluate the effectiveness and impacts of CAFE standards (H.R. Conf. Rep. No. 106–940, at 117–118).

NAS submitted its report to the Department of Transportation on July 30, 2001. The final report was released in January 2002. The report concludes that technologies exist that could significantly increase passenger car and light truck fuel economy within 15 years. However, their development cycles as well as future economic, regulatory, safety and consumer preferences will influence the extent to which these technologies appear in the U.S. market.

All but two members of the NAS committee that authored the report said, ''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, pp. 3 and 111.)

The NAS found that, to minimize financial impacts on manufacturers, and on their suppliers, employees, and consumers, sufficient lead-time (consistent with normal product life cycles) should be given when considering increases in CAFE standards. 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. In the NAS' view, the selection of future fuel economy standards will require uncertain and difficult trade-offs among environmental benefits, vehicle safety, cost, energy independence, and consumer preferences. It also suggests that consideration be given to changing the CAFE regulatory program to one based on vehicle attributes, such as weight, and that allowing ''credit trading'' could eliminate the current CAFE program's encouragement of downweighting or the production and sale of more small cars, and also reduce costs. (NAS, pp. 5, 113) Recognizing the many trade-offs that must be considered in setting fuel economy standards, the NAS committee took no position on what CAFE standards would be appropriate for future years.

In a letter dated July 10, 2001, Secretary of Transportation Mineta asked the House and Senate Appropriations Committees to lift the restriction on the agency's spending funds for the purposes of improving CAFE standards. The Department of Transportation and Related Agencies Appropriations Act for FY 2002 (Pub. L. 107–87), which was enacted on December 18, 2001, did not contain a provision restricting the Secretary's authority to prescribe fuel economy standards.

When issuing our January 2002 proposal to establish the MY 2004 standard at 20.7 mpg (67 FR 3470), we noted that our newly regained ability to spend funds did not immediately enable us to conduct the level of analysis needed to set different fuel economy standards.[2] Although a number of commenters reacted to this proposal by advocating a higher MY 2004 standard, the agency determined, based on the limited information available to the agency for analyzing the manufacturers' product plans and on the lack of lead time to change those plans significantly, to set the MY 2004 standard at 20.7 mpg (67 FR 16052, April 4, 2002).

On February 7, 2002, we issued a Request for Comments (RFC) (67 FR 5767) seeking data on which we could base our analysis of appropriate CAFE standards for light trucks for upcoming model years, beginning with MY 2005. We also sought comments on possible reforms to the CAFE program, as it applies to both passenger cars and light trucks, to protect passenger safety, advance fuel-efficient technologies, and obtain the benefits of market-based approaches. In the same month, Secretary Mineta asked Congress ''to provide the Department of Transportation with the necessary authority to reform the CAFE program, guided by the NAS report's suggestions.''

While we are limited today in setting CAFE standards for the relative short term and within the constraints of the current CAFE statute, we will continue to support and encourage the development of advanced vehicle technologies capable of substantial fuel economy improvements and a market

[2] To prepare to establish any fuel economy standard, the agency must collect information relating to prospective CAFE levels, analyze and weigh the information in light of the statutory criteria for determining the ''maximum feasible'' average fuel economy level, and incorporate this information and analysis into a rulemaking action to set the standard, with opportunity for notice and comment. As NHTSA was unable to spend any funds by virtue of Section 320 of the FY 2001 Appropriations Act and the predecessor restrictions in earlier Appropriations Acts, it was not able to prepare the factual or analytical foundation necessary for rulemaking to establish CAFE standards at new levels from September 1995 to December 2001.

structure to support them through efforts like the President's proposed research initiative to aid in developing clean, hydrogen-powered automobiles, targeted research dollars and consumer tax incentives. Consistent with the recommendations of the NAS report, we intend to study programmatic CAFE alternatives and to implement those reforms within our statutory authority to allow for greater improvements in fuel economy safely in the years beyond those addressed in this final rule.

III. Summary of the NPRM

NHTSA proposed light truck CAFE standards for MYs 2005–2007 in an NPRM published on December 16, 2002 (66 FR 77015). This proposal sought to set a standard for light trucks at 21.0 mpg for MY 2005, 21.6 mpg for MY 2006 and 22.2 mpg for MY 2007. These proposed standards represented NHTSA's tentative view of the maximum feasible fuel economy levels that could be achieved by light truck manufacturers in each of these model years.

The agency's proposal relied heavily on the NAS fuel economy report, confidential product plans submitted by some manufacturers, data maintained by NHTSA for other manufacturers, and responses to the agency's February 2002 RFC. NHTSA analyzed the information from these sources to develop an understanding of the availability, effectiveness and costs of technologies and other means to increase light truck fuel economy. The agency then proceeded to process these data, using two methodologies. One methodology, which has been labeled as the ''Stage'' analysis, primarily involved application of the agency's engineering judgment and expertise about possible adjustments to the detailed product plans submitted in response to the RFC by DaimlerChrysler, General Motors, and Ford. The Stage analysis was limited to these manufacturers because they were the only ones that provided the agency with detailed product plans for MYs 2005–2007. The other methodology, used by the Department's Volpe National Transportation Systems Center (Volpe Center) and labeled as the ''Volpe'' analysis, relied on the aforementioned product plans as well as data relating to manufacturers that had not submitted detailed information in response to the RFC.

The Stage and the Volpe analyses were both intended to provide reliable estimates of manufacturer capabilities. Stage I of the Stage analysis took existing product plans and applied technologies that manufacturers indicated would be available by MY 2005. Stage II applied more advanced transmission upgrades and engine improvements to planned model and engine changeovers.

The Volpe analysis considered product plans, but also used a technology application algorithm developed by Volpe Center staff. This algorithm systematically applied consistent cost and performance assumptions to the entire industry, as well as consistent assumptions regarding economic decision-making by manufacturers. Technologies were applied in order of cost-effectiveness. Use of this methodology led to projections that low-friction lubricants, engine accessory improvements, reductions in engine friction and rolling and aerodynamic resistance, cylinder deactivation, and transmission upgrades (5-speed, 6-speed, and automatically shifted manual transmissions) would account for most of the response to the proposed CAFE standards.

The NPRM explained that the Stage analysis provided the initial basis for the proposed CAFE standards, while the Volpe Center's technology application algorithm was used to estimate the overall economic impact of the proposal. The Volpe analysis covered the entire industry and assessed the economic impact of the proposal as measured in terms of increases in new vehicle prices on a manufacturer-wide, industry-wide, and average per-vehicle basis. Based on these estimates and corresponding estimates of the proposal's net economic and other benefits, the agency tentatively concluded that the proposal would be economically practicable and technologically feasible.

IV. Summary of Final Rule and Supporting Documents

The agency is adopting the light truck CAFE standards proposed in the NPRM: 21.0 mpg for MY 2005, 21.6 mpg for MY 2006, and 22.2 mpg for MY 2007. In establishing these standards, the agency has carefully considered all the comments submitted to the docket, but in particular those of motor vehicle manufacturers and of groups representing consumer and environmental interests. The agency has determined that these levels are the maximum feasible CAFE levels for light trucks for those model years, balancing the express statutory factors and, in particular, the impact of the standard on motor vehicle safety and American jobs. NHTSA estimates that the fuel economy increases required by the standards for MYs 2005–2007 will generate approximately 3.6 billion gallons of gasoline savings over the 25-year lifetime of the affected vehicles.

The agency has analyzed potential technological improvements to the product offerings for each manufacturer with a significant share of the light truck market. In response to the public comments, we updated both the Stage and the Volpe analyses, making numerous changes to our engineering and economic calculations and determinations to account for computational errors and other adjustments we found appropriate. The agency's projection of CAFE capability is based on the most recently submitted product plans and involves technological improvements we have determined to be appropriate and feasible within the time frame. We do not believe this final rule will necessitate, nor do we believe it will result in, any ''mix shifting,'' *e.g.,* changing from the planned production of heavier or larger vehicles to lighter or smaller vehicles, which might result in significant employment and/or weight reductions were it to occur.

Indeed, we sought public comment on the possibility or likelihood that manufacturers would comply with these new standards by reducing vehicle weight and, if so, any safety consequences of weight reduction. The manufacturers suggested that weight reduction is a possible compliance option, while falling short of predicting that they would in fact comply by reducing the mass of their vehicles in ways that may affect their overall crashworthiness. We believe that the final rule neither will necessitate nor result in reductions in vehicle weight that will impede the overall safety of the vehicle fleet traveling on the roads of America. Indeed, as the NAS report noted, there are many technological means available to manufacturers for improving fuel economy that are much more cost-effective than weight reduction. Accordingly, we did not rely on weight reduction.

We recognize that the standard established for MY 2007 is a substantial challenge for General Motors, especially in light of the updates to the product plans submitted with its comments on the NPRM. This is the first time since the issuance of MY 1983–1985 light truck standards in December 1980 that the agency has established light truck CAFE standards for more than two model years in the same final rule. We recognize that, between now and the last (MY 2007) of the model years for which standards are being established, there is more time than in previous light truck CAFE rulemakings for significant changes to occur in external factors

capable of affecting the achievable levels of CAFE. These external factors include fuel prices and the demand for vehicles with advanced fuel saving technologies, such as hybrid electric and advanced diesel vehicles. Changes in these factors could lead to higher or lower levels of CAFE, particularly in MY 2007.

Recognizing that the MY 2007 standard may have to be reexamined in light of any significant changes in those factors, the agency plans to monitor the compliance efforts of the manufacturers. To this end, the agency will examine the manufacturers' pre and mid-model year fuel economy reports filed with NHTSA through December 2004 and current market information, and consider the reasonableness of the efforts made by the manufacturers after this final rule to meet the MY 2007 standard. If appropriate, the agency could adjust the standard upward or downward. The CAFE standard for a model year can be increased at anytime before the 18-month period preceding that year, and decreased at anytime before the beginning of that year. Thus, the MY 2007 standard could be increased anytime before April 1, 2005 and decreased anytime before October 1, 2006.

The Final Economic Assessment (FEA) discusses in detail the fuel efficiency enhancing technologies expected to be available during MYs 2005–2007. Some of the technologies discussed in the FEA have been used for over a decade (*e.g.,* overhead camshafts, engine friction reduction, and low friction lubricants). Others have only recently been incorporated into passenger cars, (*e.g.,* 5-speed and 6-speed automatic transmissions and variable valve timing). Still others have been under development for a number of years, but have not been produced in quantity for an extended period (*e.g.,* cylinder deactivation, variable valve lift and timing, continuously variable transmission (CVT), integrated starter/generator, advanced diesels and hybrid drive-trains).

The FEA also details, and this preamble summarizes, the agency's analysis of the costs and benefits of these CAFE standards. The agency has estimated not only the anticipated costs that would have to be borne by General Motors, Ford and DaimlerChrysler and other light truck manufacturers to comply with the standards, but also the significance of the societal benefits anticipated to be achieved through direct and indirect fuel savings. We have concluded that these CAFE standards—while challenging—can be met in a cost beneficial way, and that they will benefit society considerably.

A final Environmental Assessment (EA) also accompanies this final rule. The agency has determined that the proposed action would not have a significant effect on the quality of the environment.

V. Maximum Feasible Fuel Economy Considerations

The CAFE statute sets forth the parameters within which the agency is required to establish corporate average fuel economy standards. Section 32902(a) provides that ''each standard shall be the maximum feasible average fuel economy level that the Secretary decides the manufacturers can achieve in that model year.''

As noted above, the agency is required to consider the factors in 49 U.S.C. 32902(f) when determining the ''maximum feasible'' CAFE standards for any given model year. These are technological feasibility, economic practicability, the effect of other Federal motor vehicle standards on fuel economy, and the need of the nation to conserve energy. Although the EPCA does not include motor vehicle safety as an express statutory factor, it does not preclude consideration of it. Accordingly, NHTSA should consider safety in accordance with its statutory responsibilities regarding safety and the Administration's emphasis on ensuring motor vehicle safety.

The agency has historically included consideration of numerous public policy concerns, whether considered as part of the enumerated factors or in addition to them. The courts have routinely affirmed the agency's authority to do this and have consistently upheld NHTSA's conclusions. *See, e.g., Center for Auto Safety* v. *NHTSA,* 793 F.2d 1322 (CAS II) (D.C. Cir. 1986) (administrator's consideration of market demand as component of economic practicability found to be reasonable); *Public Citizen* v. *NHTSA,* 848 F.2d 256 (D.C. Cir.1988)(Congress established broad guidelines in the fuel economy statute; agency's decision to set lower standard was a reasonable accommodation of conflicting policies).

In particular, consideration of the impact of CAFE standards on motor vehicle and passenger safety has long been recognized as an integral part of the agency's process of examining the various considerations and determining maximum feasible average fuel economy. As the United States Court of Appeals pointed out in upholding NHTSA's exercise of judgment in setting the 1987–1989 passenger car standards, ''NHTSA has always examined the safety consequences of the CAFE standards in its overall consideration of relevant factors since its earliest rulemaking under the CAFE program.'' *See, Competitive Enterprise Institute* v. *NHTSA* (CEI I), 901 F.2d 107, 121 at n.11 (DC Cir. 1990).

As discussed in many past fuel economy notices, it is clear from the legislative history of EPCA that Congress intended NHTSA to take industry-wide considerations into account in determining the maximum feasible CAFE levels, and not necessarily base its determination on any particular company's asserted or projected abilities. This does not necessarily mean that CAFE standards will be set at the level asserted by the ''least capable manufacturer'' with a substantial share of the market. Instead, it means that we must take particular care in considering the statutory factors with regard to these manufacturers—weighing their asserted capabilities, product plans and economic conditions against agency projections of their capabilities, the need for the nation to conserve energy and the effect of other regulations (including motor vehicle safety and emissions regulations) and other public policy objectives.

This approach is consistent with the Conference Report on the legislation enacting the CAFE statute:

> Such determination [of maximum feasible average fuel economy level] should take industry-wide considerations into account. For example, a determination of maximum feasible average fuel economy should not be keyed to the single manufacturer that might have the most difficulty achieving a given level of average fuel economy. Rather, the Secretary must weigh the benefits to the nation of a higher average fuel economy standard against the difficulties of individual manufacturers. Such difficulties, however, should be given appropriate weight in setting the standard in light of the small number of domestic manufacturers that currently exist and the possible implications for the national economy and for reduced competition association [sic] with a severe strain on any manufacturer. * * *

S. Rep. No. 94–516, 94th Congress, 1st Sess. 154–155 (1975).

The agency has historically assessed whether a potential CAFE standard is economically practicable in terms of whether the standard is one ''within the financial capability of the industry, but not so stringent as to threaten substantial economic hardship for the industry.'' *See, e.g., Public Citizen* v. *National Highway Traffic Safety Administration,* 848 F.2d 256, 264 (D.C. Cir. 1988). In essence, in determining the maximum feasible level of CAFE, the agency assesses what is

technologically feasible for manufacturers to achieve without leading to adverse economic consequences, such as a significant loss of jobs or the unreasonable elimination of consumer choice. The CAFE statute does not compel that fuel savings be gained at the expense of American jobs or competition within the motor vehicle market.

At the same time, the law does not preclude a CAFE standard that poses considerable challenges to any individual manufacturer. The Conference Report makes clear, and the case law affirms, ''(A) determination of maximum feasible average fuel economy should not be keyed to the single manufacturer which might have the most difficulty achieving a given level of average fuel economy.'' CEI–I, 793 F.2d 1322, 1352 (D.C. Cir. 1986). Instead, the agency is compelled ''to weigh the benefits to the nation of a higher fuel economy standard against the difficulties of individual automobile manufacturers.'' *Id.* The statute permits the imposition of reasonable, ''technology forcing'' challenges on any individual manufacturer, but does not contemplate standards that will result in ''severe'' economic hardship by forcing reductions in employment affecting the overall motor vehicle industry.[3]

The law permits CAFE standards exceeding the projected capability of any particular manufacturer as long as the standard is economically practicable for the industry as a whole. Thus, while a particular CAFE standard may pose difficulties for one manufacturer, it may also present opportunities for another. The CAFE program is not necessarily intended to maintain the competitive positioning of each particular company. Rather, it is intended to enhance fuel economy of the vehicle fleet on American roads, while protecting motor vehicle safety and the totality of American jobs and the overall United States economy. By the same token, maximum feasible fuel economy levels must be ones that account for the need to place technologies into mass production and cannot be based on claims of potential technologies that have not been shown to be feasible on such a production level.

The standards established in this final rule fall within our Stage analysis for each of the primary companies in the light truck market for MYs 2005 and 2006, and for all but one for MY 2007. Of those companies, the Stage analysis projects that the current product plans of both DaimlerChrysler and Ford for MY 2007 will produce a light truck CAFE of 22.2. The Volpe analysis, which looks more globally at the industry as a whole, further confirms the feasibility of a CAFE level of 22.2 mpg for MY 2007. Accordingly, while the standard for that model year is being set at a level above the Stage analysis' projection for one of the primary companies in the light truck market, we believe that industry wide considerations and the additional lead time provided confirm that the standard reflects the overall best balance of technological feasibility, economic practicability and the nation's need to conserve energy and reduce our dependence on foreign oil.

VI. Summary of Public Comments

NHTSA received over 65,000 individual submissions to the rulemaking docket from vehicle manufacturers and associations, environmental and consumer advocacy groups, members of Congress and individual citizens. The majority of the submissions were letters or emails provided to the public by various organizations and submitted by private citizens to the docket. Many contained supplementary thoughts from the individual senders.

The citizenry expressed both support for the proposal and concern that the proposed standards would not be sufficient to meet the nation's need to conserve energy in the short term or to protect natural resources and secure energy independence in the long term. Many of the individual submissions included a letter provided by the Natural Resources Defense Council describing the proposal as ''woefully inadequate'' and expressing concern that the proposal did not go far enough to help the country reduce our dependence on foreign oil. This letter also pointed out that the proposal was consistent with the preexisting plans of much of the automobile industry.

The Union of Concerned Scientists provided citizens with a form to fill out stating that ''I am disappointed because,'' with a space for individual comments. Other similar documents were also placed in the docket. Some expressed a belief that technology is available through which manufacturers could exceed the CAFE standards proposed. Many stated that the potential of war in the Middle East warrants more aggressive standards. Other individuals, using either forms or personally developed submissions, expressed support for the proposal. The Coalition for Vehicle Choice urged citizens to submit comments expressing support for the maintenance of consumer choice from amongst a broad array of vehicles.

Members of Congress also differed in their reaction to the proposal. Over 100 members of the House of Representative wrote to NHTSA urging the agency to increase the standards further, and stating that ''a much greater increase can and should be done to take advantage of the many existing technologies in automotive design that can increase fuel economy and reduce our nation's dangerous over-dependence on imported oil.'' These Congressmen also stated that ''it is now unarguable that the fuel efficiency of light trucks can be improved without sacrificing safety,'' and that automobile manufacturers have boasted of plans to incorporate hybrid electric vehicles in their fleets.

In contrast, the Chairman and Ranking Member of the Committee on Energy and Commerce in the House of Representatives wrote that the proposal was ''laudable,'' and was consistent with the fuel savings goal set forth in H.R. 4, which was adopted by the House of Representatives and the House-Senate conference committee in the last Congress. These members pointed out that while H.R. 4 passed the House of Representatives by a vote of 240 to 189 with a mandate for NHTSA to conduct a multi-year rulemaking resulting in a savings of five billion gallons of gasoline by the year 2010, an amendment statutorily to increase light truck standards ''was soundly defeated by a vote of 269 to 160.'' These members further point out that H.R. 4 would have codified NHTSA's practice of considering any adverse safety and employment impacts. The Chairman and Ranking Member concluded that the ''legislative summary of the consideration of H.R. 4, the 'SAFE Act of 2001,' should be instructive on the intent of Congress regarding the CAFE standards for light trucks.''

The Competitive Enterprise Institute and Consumer Alert argued that increased CAFE standards have the potential to adversely affect motor vehicle safety. The Mercatus Center and Randall Lutter and Troy Kravitz of the

[3] In the past, the agency has set CAFE standards above its estimate of the capabilities of a manufacturer with less than a substantial, but more than a de minimus, share of the market. See, *e.g., Center For Auto Safety* v. *National Highway Traffic Safety Administration,* 793 F.2d 1322, 1326 (D.C. Cir. 1986) (noting that the agency set the MY 1982 light truck standard at a level that might be above the capabilities of Chrysler, based on the conclusion that the energy benefits associated with the higher standard would outweigh the harm to Chrysler, and further noting that Chrysler had 10–15 percent market share while Ford had 35 percent market share). On other occasions, the agency reduced an established CAFE standard to address unanticipated market conditions that rendered the standard unreasonable and likely to lead to severe economic consequences. 49 FR 41250, 50 FR 40528, 53 FR 39275, *Public Citizen* v. *National Highway Traffic Safety Administration,* 848 F.2d 256, 264 (D.C. Cir. 1988).

AEI-Brookings Institute (Lutter and Kravitz) raised concerns relating to many of the analytic assumptions used in the PEA and discussed in the NPRM.

Environmental and consumer advocacy groups commenting on the proposal included Public Citizen, Center for Auto Safety, the Union of Concerned Scientists, the Natural Resource Defense Council, the Sierra Club, 20/20 Vision, U.S. Public Interest Research Group, Environmental Defense, the Alliance to Save Energy and the American Council for an Energy-Efficient Economy.

In general, these groups expressed dismay that the nature of the CAFE program, and its heavy reliance on the confidential technological, financial and product abilities of motor vehicle makers, preclude access to the data upon which much of the CAFE analysis is based. These groups contend that basing CAFE standards on the manufacturers' product plans unduly limits the agency to conducting passive rulemakings that neither force the companies to alter course nor advances the nation's longer-term energy needs. They also contend that technologies are available to manufacturers to enhance the fuel economy performance of their fleet. Many of these groups offered suggestions for the upcoming notice that the agency intends to publish seeking comment on potential reforms within current statutory authority.

Many automobile manufacturers and their trade associations also commented on the proposal. None took issue directly with the agency's decision to establish light truck CAFE standards over a period of model years. However, many took issue with specifics of the agency's analytic approach and particular assumptions built into both the technological and economic analyses used. The companies generally, but not universally, suggested that the proposed standards are challenging, but achievable. Most of the companies argued that the agency did not properly account for technological and market risks that could render the standards infeasible.

Of those who sell light trucks in the U.S. market, DaimlerChrysler, Ford and General Motors each have approximately 25 percent market share, and the remaining companies have the rest. DaimlerChrysler, whose projected CAFE levels were the highest of the three, did not take issue with any particulars in the agency's analysis of its capabilities. However, DaimlerChrysler raised concerns relating to the agency's general analytic approach and the company's view that the agency did not adequately consider the risk of deterioration in the projections. To account for that risk, DaimlerChrysler urged the agency to reduce its CAFE proposals to 20.9 mpg for MY 2005, 21.1 mpg for MY 2006 and 21.5 mpg for MY 2007.

Ford's comments indicated that the company viewed NHTSA's proposal as technologically challenging. Like DaimlerChrysler, Ford raised concerns with the agency's general analytic approach and argued that the agency had underestimated the lead time necessary to incorporate fuel economy improvements in vehicles, as well as the difficulties of introducing new technologies across a high volume fleet. Nonetheless, Ford indicated that it was committed to taking additional actions beyond those it already planned to achieve the ''difficult'' standards as proposed.

General Motors submitted the most extensive comments, challenging many of the agency's assumptions and arguing that the agency had overestimated that company's ability to achieve the proposed CAFE levels. General Motors pointed out computational errors and lead-time considerations that, it contended, render our proposal technologically infeasible and economically impracticable. We will discuss the various issues raised by General Motors and other manufacturers more fully below.

While the above discussion very briefly describes the comments submitted by the various interested parties, the following summary sets forth the comments by topic. In some cases, we have provided or summarized the agency's response in this section. In other cases, our response to the comments is embedded in the more detailed analysis of the technological and economic issues discussed later in this document.

A. Technological Comments

1. Relationship Between Technology Analyses

General Motors commented that the ''Stage'' and Volpe analyses consider different technologies. General Motors said that it believed that due to the differences in the two analyses, there was a substantial gap in the rulemaking record. General Motors also stated that NHTSA has neither presented the costs of the improvements that it used in the Stage analysis nor vouched for the feasibility of the technology applications used in the Volpe analysis.

2. Technology Application Algorithm Methodology

General Motors stated that Volpe's algorithm suffers from the following methodological limitations: (1) Application of technologies to all trucklines in a single model year, (2) the addition and subsequent removal of some technologies, (3) the application of aerodynamic drag reduction to only some versions of a given nameplate.

3. Lead Time

The Alliance of Automobile Manufacturers (Alliance), Ford Motor Company (Ford), and General Motors stated that NHTSA's analysis inadequately considered lead-time requirements for adding existing fuel technologies and for developing new technologies, and overestimated the number of vehicle models to which technologies could be added in a single model year. General Motors and Ford submitted confidential comments responding to the particular technological advances contemplated in the NPRM. General Motors, Ford, DaimlerChrysler and the Alliance expressed concern with the simultaneous application of some technologies to all of a given manufacturer's products and stated that technologies cannot be incorporated in every vehicle at the same time. General Motors and DaimlerChrysler further claimed that NHTSA paid little attention to product life cycles or the need for lead-time. The National Automobile Dealers Association (NADA) commented that any CAFE standard set too high might prematurely force technological changes, resulting in decreased vehicle performance, reliability, and/or marketability. Honda asserted that development lead-time is essential to enhancing fuel economy without degrading safety. Union of Concerned Scientists contended that automobile manufacturers could incorporate fuel-efficient technology into vehicles faster than assumed in the NHTSA analysis.

We have reviewed our analysis in light of these comments and, where appropriate, have incorporated additional lead time into the analysis by applying some technologies in MYs 2006 or 2007, rather than in MY 2005. The establishment of CAFE standards over a period of years allows us both to ensure that the standards are reasonably within the industry's projected capabilities without incurring adverse economic and safety consequences, and to encourage progress in technological advances to enhance fuel economy

performance during the later model years covered by the regulation.

4. Implementation Risks in Forecasted Technological Improvements

General Motors, Ford, DaimlerChrysler and the Alliance suggested that NHTSA must fully account for implementation risks in its forecast of technological improvements and that the proposed standards be lowered to account for the numerous technological and implementation risks that they may encounter. The Alliance stated that the following risks should be included: availability of technology options, cost of technology, level of technology applied, success of each new technology in meeting its targets, range of product offerings, overall economic climate, customer requirements for utility, size, performance, usage patterns, options, powertrains, and the level of new regulations in vehicle safety and emissions. The Alliance also stated that risks cannot be reduced by assuming that an increase in the popularity of crossover vehicles may limit the future sales of full size utility vehicles or that consumers will consider traction control and limited slip differentials as replacements for 4WD in vehicles. DaimlerChrysler stated that NHTSA's projections are based on the highest and riskiest levels of technology and may not be attainable.

General Motors provided specific estimates of suggested CAFE reductions to account for various risks, Ford suggested that NHTSA consider scenarios involving both high and low fuel economy estimates from each manufacturer, and DaimlerChrysler recommended reducing the standards to 20.9 mpg for MY 2005, 21.1 mpg for MY 2006 and 21.5 mpg for MY 2007. DaimlerChrysler stated that its current projected costs to improve fuel economy, taking into account the risks described in its submission to the RFC, are approximately four times higher than those projected by the agency in the NPRM. DaimlerChrysler provided no other analysis or data to support lowering the proposed CAFE standards.

The companies also asserted that their projected CAFE performance tends to be overly optimistic and must often be reduced in light of actual market demand. Public advocates were skeptical of those claims and countered that the industry's tendency to market less fuel efficient vehicles, in lieu of marketing more fuel efficient vehicles, contributes to any discrepancy between projected and actual CAFE performance.

As noted above, we have made adjustments in our technological analysis, where appropriate, to account for certain technology risks and included into our analysis additional lead time.

The agency has at times included in its assessment of maximum feasible a ''risk factor'' to account for unforeseen external factors that may render reasonable efforts to comply inadequate to meet the standards. This was done, for example, when establishing light truck CAFE standards for MY 1995 and reducing passenger car standards for MYs 1987–88. When faced with the necessity of lowering the statutorily established CAFE standard for passenger cars, the agency concluded that the risk that manufacturers would be forced to restrict product offerings to meet more challenging standards outweighed the risk that manufacturers could develop means to outperform the established CAFE level. The agency acted to adjust the passenger car standard just prior to the start of the 1987 model year and about a year before the advent of the 1988 model year, noting that as of that time the record showed that manufacturers had made good faith, but unsuccessful, compliance efforts.

We do not believe the same type of ''risk factor'' is appropriate to apply to this rulemaking. While we recognize that the standard set for MY 2007 is an aggressive one in light of General Motor's current product plans, we also believe that technological advancements, market acceptance of hybrids and modern diesels, and other external factors could alter General Motor's relative position. Unlike the situation in the late 1980s, which included a risk factor when no lead time was possible, there remains sufficient lead time for a manufacturer whose current product plan may not yet project compliance to develop product offerings to enhance their currently projected CAFE performance. In addition, unlike any time in the past, the market is beginning to include vehicles with advanced technologies including hybrid electric and advanced diesel engines that are more fuel-efficient and that do not adversely affect safety or American jobs.

Accordingly, unlike the situation presented to the agency in the late 1980s, current conditions and contingencies lead us to conclude that the potential harm of setting the light truck CAFE standard too low for MYs 2005–2007 outweighs the risk of setting it too high. As noted above, the agency intends to examine the manufacturers' pre and mid-model year fuel economy reports filed with NHTSA through December 2004 and current market information, and consider the reasonableness of the efforts made by the manufacturers after this final rule to meet the MY 2007 standard. If appropriate, the agency could adjust the standard upward or downward.

5. Use of Weight Reduction To Meet Proposed Standards

The Alliance, General Motors, Competitive Enterprise Institute, Insurance Institute for Highway Safety, and Lutter and Kravitz commented that manufacturers may reduce vehicle weight in response to the standards and that doing so would have negative safety implications. Competitive Enterprise Institute argued that the historical fact is that vehicle manufacturers tend to respond to CAFE standards by reducing the size of their fleets. Competitive Enterprise Institute also argued that higher CAFE standards would likely encourage sales of the smaller, less crashworthy SUVs at the expense of the larger, safest SUVs. In addition, that organization argued that higher CAFE standards would diminish the ongoing market trend toward larger, safer SUVs; that is, such standards would reduce or eliminate future upsizing. That organization stated that the agency's proposal fails to acknowledge or analyze these effects.

American Honda Motor Co., Inc. (Honda), Environmental Defense, Union of Concerned Scientists, American Council for an Energy-Efficient Economy, and Center for Auto Safety argued that weight reduction is an important fuel economy strategy that may not have negative net safety implications, if it were limited to the largest and heaviest light trucks. The Sierra Club disagreed with the assumption that weight and safety are always inversely related and with the NAS report's conclusions about the safety impact of the current standards. It also commented that safety is a function of design, not size. Similarly, Environmental Defense argued that the NAS report and agency studies treat weight as the only vehicle attribute affecting safety and do not account for size, crashworthiness, compatibility and the general quality of the vehicle structure and its safety features. That organization and Public Citizen further argued that agency studies are unable to distinguish between the effects of vehicle weight and vehicle size. Public Citizen argued that any safety problem associated with changes in the fleet of light vehicles was largely due to increases in the overall divergence in vehicle weight within the light vehicle fleet caused by the growth in the number of light trucks and to the rollover proneness of light trucks.

Finally, Public Citizen argued that any safety concerns associated with downweighting are irrelevant when the focus is exclusively on CAFE standards for light trucks instead of those for both passenger cars and light trucks.

We note that these comments reflect diverging views on the relationship between size and safety. Some commenters, such as CEI, embraced the proposition that increasing vehicle size always results in safety benefits. Others, such as Honda and Public Citizen, stated that they believe that other vehicle characteristics besides size have an impact on safety. For its part, Honda emphasized that vehicles can become lighter and still retain their size and ability to protect occupants. Public Citizen took the view that there are number of design characteristics that may impact the safety of light truck occupants and persons in other vehicles, including height and stability. Moreover, the organization indicated that fuel economy regulations having a potential to reduce or restrain the size of light trucks would have different safety impacts than those that might force changes in size to both cars and trucks.

As discussed below, while manufacturers point out that weight reduction is a compliance option, the CAFE standards established by this final rule can be met without the need to reduce vehicle weight and we do not believe that manufacturers will employ weight reduction to meet the standards.

6. NHTSA's Proposed Standards and Projected Manufacturer Capabilities

DaimlerChrysler, Ford, and General Motors commented that it would be difficult to comply with the proposed standards. Toyota agreed that it would be difficult for other companies to meet the standard. General Motors detailed what it views as flaws in the agency's analysis of its potential capability and also provided revised product plans exhibiting different CAFE values (higher for MYs 2005–2006 and lower for MY 2007) than those it previously submitted. Ford presented revised fleet projections that are lower than those contained in its response to the RFC and discussed technologies that the agency added to Ford's fleet which are not feasible.

Public interest groups, based on public announcements by Ford and General Motors about improving fuel economy of SUVs and introduction of hybrids, supported higher standards than those proposed. Environmental Defense, Union of Concerned Scientists and Public Citizen presented analyses arguing that technology permits NHTSA to set a higher standard. The American Council for an Energy-Efficient Economy and Cummins argued that NHTSA should take diesel technologies into account in this rulemaking. Toyota asserted that it has applied more fuel-efficient technologies, such as variable valve timing (VVT) and multi-valve cylinder heads, than most other manufacturers. It suggested that the proposed standards would encourage the entire industry to similarly apply the best available technologies.

We believe the standards established today are challenging enough to encourage the further development and implementation of fuel efficient technologies while also available enough within the applicable time frame to be economically practicable and feasible for the industry. As noted above, we have concluded that the standards set through this final rule represent the best overall balance of the statutory factors, and in addition are consistent with the protection of motor vehicle safety and American jobs.

7. Estimated Fuel Savings of Technologies

Environmental Defense, American Council for an Energy-Efficient Economy, and Union of Concerned Scientists stated that NHTSA underestimated the fuel savings of the technologies it considered. Environmental Defense argued that some technologies can be optimized for increasing fuel economy, performance or other features and that NHTSA's analysis should use higher values more reflective of optimization for fuel economy purposes. In related comments, Environmental Defense and Union of Concerned Scientists argued also that the agency should hold vehicle weight and performance constant in determining future fuel economy capability instead of assuming continued increases in both.

American Council for an Energy-Efficient Economy and Union of Concerned Scientists stated that the National Research Council (NRC/NAS) values should have been used without reduction. More specifically, Environmental Defense disagreed with the agency's estimated 1–2 percent fuel economy benefit for VVT and variable value lift and timing (VVLT) technologies and claimed that published estimates show that optimal application of VVLT technology provides a 10–12 percent fuel economy benefit. Environmental Defense also disagreed with the agency's 0.5 percent estimated benefit for automatic transmissions using aggressive shift logic, which, they state, shows fuel economy improvements of 9–12 percent using 6-speed transmissions. American Council for an Energy Efficient Economy argued that NHTSA's limited consideration of only the technologies available to the Big 3 undercuts its estimates of achievable fuel economy and that NHTSA should have used the cost and benefit numbers from the NAS report.

In the NPRM, the agency indicated that it did not expect manufacturers to deviate from existing plans for vehicle weight and performance in their efforts to comply with our proposal. At the same time, our NPRM contained, as Stage III of the Stage analysis, a projection that manufacturers could replace 6.0L and larger displacement engines with smaller displacement engines of similar design. Perhaps focusing more on the statement that NHTSA did not anticipate changes in weight and performance than on an analysis containing a cutback in engine sizes, some commenters stated that we failed to realize the fuel saving benefits that would have been realizable if determinations of future fuel economy capability had been premised upon limiting further increases in light truck mass and performance.

CAFE standards must be economically practicable and, as we have observed before, consumers will not buy what they do not want. Forcing through regulation substantial deviation from product offerings based on projected consumer demand incurs a risk of running afoul of economical practicability. At the same time, maximum feasible fuel economy standards should encourage the continuing development and use of more fuel-efficient technology. Current projections of consumer demand may not fully account for potential changes in consumer preferences that may accompany new entrants in the market, fluctuating fuel prices, and other factors that can affect actual CAFE performance. The agency therefore intends to monitor the compliance efforts of the manufacturers and to examine the manufacturers' pre and mid-model year fuel economy reports filed with NHTSA through December 2004 and current market information before the onset of MY 2007.

As indicated below, our analysis and projection of manufacturer capabilities now relies on more optimistic fuel economy gains for some technologies, including low viscosity lubricants and low rolling resistance tires, than those contained in the NPRM. These revised values place the estimated fuel saving benefits of these technologies in line with the estimates contained in the NAS report.

We do not agree, however, that either VVLT or improved shift logic will yield the benefits claimed by Environmental Defense. We note that the NAS panel was afforded an opportunity to review similar returns claimed for these technologies and did not, on an incremental basis similar to that used here by the agency, adopt the claimed values.[4] In regard to the technologies used, NHTSA believes that the lead time available restricts the agency from assuming that manufacturers will be able to rely on advanced technologies that are not yet proven or available for use.

8. Diesel Engines and HEVs

Automobile manufacturers and their associations commented that NHTSA's exclusion of advanced diesels and hybrid electric vehicles (HEVs) from the technology analysis was appropriate given the emissions and cost challenges facing advanced diesels and HEVs, respectively. Environmental organizations and another commenter expressed greater optimism regarding diesels for consideration in setting the CAFE standard. The American Council for an Energy-Efficient Economy commented that NHTSA's technology analysis was inadequate because it excluded HEVs and diesels. Cummins stated that its diesel engine development program demonstrates a fuel economy improvement of 50 percent-70 percent over gasoline engines. Cummins also stated that target engine availability is within the time frame proposed in the NPRM. The Alliance to Save Energy cited the Ford Escape HEV as surpassing most passenger cars in fuel economy and as providing support for the proposition that there is no technological reason for NHTSA not to require a significant increase in fuel economy standards for all light trucks.

As described above, since the publication of the NPRM both public and private initiatives have been announced. These include a government initiative to develop, over the longer term, viable hydrogen fuel cell powered transportation and General Motor's initiative to begin to offer optional hybrid propulsion systems in light trucks. In addition, Ford Motor Company and DaimlerChrysler will offer hybrid and modern diesel Sport Utility Vehicles beginning with MY 2004. We believe it possible that an active market for hybrid and modern diesel vehicles may significantly enhance the actual fuel economy of the light truck fleet by MY 2007. The infusion by these companies and others of advanced technology vehicles into that market is an important step towards that development.

Although we mentioned our support for the development of a market for the advanced diesels and hybrid electric vehicles in the NPRM, we did not incorporate them into the proposal because we did not have information on the extent of product offerings and marketing to generate public interest in them during MYs 2005–2007. For the final rule, we have incorporated hybrid and diesel vehicles incorporated into the manufacturers' product plans, but not beyond. We continue to note, however, that such vehicles may yet come to play an important role in the market by MY 2007.

B. Economic Comments

1. Cost of Specific Technologies

General Motors, Ford, the Alliance and Toyota Motor North America, Inc. (Toyota) argued that manufacturer incremental costs are understated. Ford and General Motors asserted that NHTSA's analysis underestimates the costs for applying certain technologies and thus underestimates its costs per fuel economy improvement for those technologies. General Motors claimed that part of NHTSA's underestimation occurs as the result of a clerical error because NHTSA did not use the technology costs identified in its rulemaking support documents, but instead used much lower costs.

General Motors also stated that the Volpe analysis assumes that all technologies will cost manufacturers the same amount for all models no matter how much progress has been made to date. General Motors stated that NHTSA's assumption that it can make improvements in these areas at the same rate and at the same costs to other manufacturers is incorrect. Public Citizen, Honda, and 20/20 Vision commented that fuel-efficient vehicles, *e.g.*, hybrids, could be manufactured for reasonable costs.

2. Projected Number of Sales

General Motors and other manufacturers argued that the sales rate used by NHTSA for new model year vehicles during the first several months of a model year was too high (4.167 percent vs. 3.125 percent) and that the agency mistakenly assumed that all vehicles of a given model year would be on the road and in use by January 1 of the calendar year following the start of that model year. General Motors commented that NHTSA's benefit model does not accurately reflect the number of new vehicles on the road during the initial calendar years in which they were sold. General Motors provided a number that reduced the total societal benefits for the three years by $62M.

3. Impact on Consumer Choice

General Motors asserted that some product restrictions might be necessary to achieve the proposed levels. The Recreational Vehicle Industry Association stated that reductions in size and towing capacity of light trucks resulting from proposed levels may restrict size, weight, and capacity offerings in trailers and conversion vehicles.

The agency tentatively concluded in the NPRM that the standards would not lead to product restrictions or impede consumer choice. We believe that the CAFE standards established today will not diminish the existing vibrant market for light trucks, offering the public a wide array of features and functions. We further believe that sufficient lead time exists before MY 2007 such that technologies not currently within manufacturers' product plans and/or the development of a market for alternative propulsion systems may significantly enhance fuel economy performance without affecting the features and functions offered to consumers.

4. Baseline of 20.7 MPG

The Alliance and Ford asserted that manufacturer incremental costs are understated because many manufacturers have already added significant costs in anticipation of the increased CAFE standards that are not included in the agency's incremental costs. The Alliance suggested that a more appropriate baseline would utilize data from the current model year assuming the manufacturers meet the 20.7 mpg CAFE standard absent technologies used in anticipation of future standards.

Public Citizen argued that the agency relied too heavily on the manufacturers for the baseline mpg level and for estimated mpg levels for future model years. The Alliance to Save Energy argued that the proposal should have considered the manufacturers' voluntary commitments to improve the fuel economy of their fleets (citing Ford's 2001 commitment to improve SUV fuel economy by 25 percent by 2005) and indicated that hybrid technology should have been weighted more in determining model year baselines.

[4] Committee on the Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards, National Research Council, Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards, Washington, DC, National Academy Press, 2002, p. 136.

For reasons discussed below, we have estimated the incremental costs associated either with increasing CAFE from an average fuel economy standard of 20.7 mpg, or from the manufacturer's baseline, if over 20.7 mpg, to the newly established standard. We have accounted for incremental benefits the same way, and thereby have treated the incremental costs and the incremental benefits in the same manner.

5. Survival Rates by Age of Vehicle; Vehicle Miles Traveled

The Alliance and Ford commented that the agency should recalculate costs using only a 25-year useful life, rather than a 30-year useful life. Ford stated that the assumed vehicle miles travel (VMT) growth rate of 1.8 percent is too high in comparison to recent experience and claimed that VMT instead has remained stable. Public interest groups criticized the agency for its use of a VMT baseline that they asserted was too low. Union of Concerned Scientists argued that NHTSA's estimate of VMT is low compared with other studies and underestimates the consumer benefits of fuel economy improvements. Union of Concerned Scientists cited survey data and stated that first year travel is over 15,000 miles and does not lower to 12,000 miles for several years.

The agency's analysis in the NPRM used a 25-year useful life. Data reflecting a previous assumption of a 30-year lifetime was inadvertently included in a spreadsheet placed in the docket, but these data were not used in the agency's calculations. We have decided to calculate VMT based on the Update of Fleet Characterization Data for Use in EPA's MOBILE6 program, EPA's most recent mobile source emission model.

6. Value of Externalities

Citing various studies, the Alliance and General Motors asserted that NHTSA should not include any monopsony or supply disruption externality in its benefit analysis. The Alliance argued that the agency failed to address other externalities associated with an increase in the CAFE standard, such as increased congestion and highway fatalities. The Mercatus Center commented that the link between energy security and fuel economy is not well known, but suggested that it is likely close to zero.

General Motors commented that increased travel resulting from the rebound effect would result in increased traffic crashes, injuries, and fatalities. Lutter and Kravitz commented that the economic analysis should include the external costs of increased accidents caused by additional driving due to the rebound effect and stated that estimates of marginal external accident costs range from 6 to 20 cents per vehicle mile.

The Alliance, General Motors, and Lutter and Kravitz commented that the agency's economic analysis should include the external costs of increased congestion caused by additional driving due to the rebound effect. Lutter and Kravitz stated that the economic analysis should use estimates of congestion costs ranging from at least 6 to 10 cents per vehicle-mile.

As discussed below, we have added costs attributable to increased congestion, noise and crashes resulting from the additional exposure associated with the rebound effect. We have also monetized the benefits associated with the time savings gained from the increase in the intervals between vehicle refuelings. We have otherwise determined that our values were consistent with the applicable literature.

7. Impact of Safety Standards on Vehicle Weight

Comments from the Alliance, General Motors, and Ford claimed that NHTSA did not consider and/or underestimated the impact of several proposed safety standards. General Motors argued that to meet future safety standards and to voluntarily implement new safety features, manufacturers might be forced to reduce vehicle weight elsewhere on the vehicle to comply with the proposed CAFE standard. As discussed below, we have considered these concerns but do not agree that companies will be forced to limit safety related systems to comply with these CAFE standards.

8. Rebound Effect

The Alliance, General Motors, and Ford urged the agency to use a value of 35 percent rather than 15 percent, with a sensitivity analysis of 20 percent to 50 percent. These commenters each based this recommendation on a recent survey article, Greening, Greene, and Difiglio (Energy Policy 28 (2000) 389–401) and on the agreement of participants in ''Car Talk,'' a Clinton Administration dialogue on fuel economy among the auto industry, environmental organizations, think tanks, and government organizations. DaimlerChrysler seemed also to recommend a value of about 35 percent, stating, ''the commonly accepted price elasticity of VMT is a negative 3.5 percent, which means that a 10 percent reduction in per mile vehicle fuel consumption actually only reduces fuel consumption by 7 percent.''

The American Council for an Energy-Efficient Economy stated that it believes that a 15 percent rebound factor might be too high, based on the agency's statement that increasing fuel economy by 10 percent will produce an estimated 8–9 percent reduction in fuel use. According to that organization, this implies an assumption that the rebound effect is between 1 percent and 12 percent.

In consideration of these comments, we have revised the estimate of the fuel economy rebound effect for light trucks used in this analysis from 15 percent to 20 percent. We recognize that the magnitude of the assumed rebound effect and the implications of any rebound effect are complex issues. NHTSA will continue to monitor relevant research for use in future CAFE rulemakings.

9. Present Value of Benefits (Including 7 Percent Discount Factor)

Both Lutter and Kravitz and the Mercatus Center argued for discount rates higher than 7 percent. Lutter and Kravitz stated that the agency should have used a rate ranging from 7.6–10 percent, the average new car finance rate during 1984–95. The Mercatus Center argued that the discount rate should be much higher (14 percent-28 percent), since fuel economy should be treated as an irreversible investment. For reasons discussed below, we have decided to use the proposed discount rate of 7 percent.

10. Impact of Higher Prices on Sales

General Motors commented that an increase in light truck prices, due to fuel economy initiatives, above competitive pricing levels would be met by a disproportionate loss in unit sales to its competition. Honda stated that most customers would be willing to pay a little extra to buy a car with higher fuel economy but would not trade fuel economy for desired features. Public Citizen and 20/20 Vision commented that surveys illustrate that consumers are willing to pay more for vehicles that have a higher fuel economy.

In response to comments, the agency has added to its analysis a discussion of impacts of higher prices of sales using a price elasticity of 1.0. The agency believes that higher light truck prices could shift some new vehicle sales from light trucks to automobiles and might also delay retirement and replacement of used vehicles. These issues are discussed more fully in the FEA.

11. Market Efficiency and Consumer Rationality

The Alliance and General Motors commented that NHTSA has consistently overestimated consumer

demand for increased fuel economy. They stated further that automobile buyers are rational and informed and that vehicle producers effectively respond to the extent of their preferences for fuel economy.

The Mercatus Center commented that NHTSA's analysis should include the foregone benefit to consumers from being unable to choose attributes they would prefer in a vehicle, *e.g.*, a 6.0L engine in instead of a 5.3L engine.

Lutter and Kravitz stated that NHTSA's analysis incorrectly assumes that consumers have inadequate information about vehicle fuel economy, and that they are unable to value correctly the future fuel savings resulting from improved fuel economy and as a consequence vehicle manufacturers supply inadequate levels of fuel economy. Public Citizen argued that there is no validity to the ''consumer choice'' argument made by manufacturers because vehicle offerings are driven, not by consumer choice, but by manufacturers' advertising.

Many commenters asserted that NHTSA had made a determination that there is a market failure in the provision of vehicle fuel efficiency. In the NPRM, the agency did not make any such determination. NHTSA noted a paradox that cost-saving technologies appeared to be penetrating the market to only a limited extent and therefore sought public comment on possible sources of market failure.

First, on the supply side of the vehicle market, it is well known that the light truck market is concentrated in three large producers who account for roughly 75 percent of market share, although there are a number of smaller producers that account for the remaining 25 percent. As several commenters noted, there is substantial evidence of competition among producers in the light truck market and indications that the three large producers are under increasing competition from the smaller producers. Under these circumstances, NHTSA maintains its previous statement that there is only a ''remote'' possibility that a supply side failure in the marketplace accounts for the limited market penetration of cost-saving, fuel-saving technologies.

Second, commenters discussed whether there could be a failure on the demand side of the market for fuel economy, rooted perhaps in the way that consumers perceive the private benefits of enhanced fuel economy and incorporate that information in their purchasing decisions. Several commenters noted that consumers are provided clear and substantial information about the fuel efficiency ratings of different vehicles, including information about the operating expenses associated with these fuel efficiency ratings. However, the argument for demand side failure may have less to do with the absence of consumer information about fuel efficiency than with the overall complexity of the vehicle-purchasing decision, the number of other factors of greater salience to consumers, the temporal aspects of ownership and resale, and the difficulty of weighing fuel efficiency differences against other (especially nonmonetary) attributes of vehicles. Rational consumers, cognizant of decision making costs, may use simplified decision rules when purchasing vehicles that give limited, diminished or no weight to fuel economy differences—at least when projected fuel prices are relatively low. The agency does not know whether this demand-side argument is true and did not receive much comment that supports or refutes it. The agency believes the plausibility of this argument is less remote than the supply-side argument but still quite speculative. Regardless of how consumers perceive fuel economy benefits when they make purchasing decisions, it is clear that consumers will experience the benefits of cost-saving technologies when they operate their vehicles—assuming the engineering-economics information underlying the NAS Report is accurate.

C. Environmental

1. Foreign/Domestic Refining Split

General Motors disputed the agency's assumption that 45 percent of the reduction in fuel will come from domestic refineries and 55 percent will come from imported finished gasoline. General Motors stated that it believes that a 2000 Energy Information Administration's (EIA) study is the source of this estimate and that the study merely states that 55 percent of U.S. petroleum needs are imported (in the form of crude and refined products) and that the other 45 percent are met from domestic sources. General Motors claimed that there is little evidence that these same proportions apply to reductions in fuel use and that U.S. refinery emissions are just as likely to remain the same as the baseline under the proposed standard and should not be credited against the rebound effect without substantiation. After considering a variety of data sources, we have decided to use a 50/50 split to account for reductions in refining.

2. Use of the GREET Model/Value of Emissions per Ton

General Motors stated that NHTSA's benefits model incorrectly used emission factors from the ''Greenhouse Gases and Regulated Emissions in Transportation'' (GREET) model for refinery emissions. According to General Motors, NHTSA incorrectly included extraction emission factors in its analysis. General Motors calculated a reduced total societal benefit for three years of $3,000,000 based on this error.

We agree with General Motors that we did not appropriately account for emissions reductions likely to result from gasoline savings. But we disagree with the contention that emissions attributable to petroleum extraction would be unaffected. Accordingly, we separated emission factors to account for different states in the petroleum cycle.

3. Greenhouse Gas Emissions for Carbon

Environmental Defense requested that NHTSA place a value on the benefit of avoided greenhouse gas emissions, while also noting: ''the magnitude of the global warming externality is admittedly difficult to estimate.'' The value of avoiding greenhouse gas emissions is not quantifiable at this time. However, our analysis in the Environmental Assessment indicates that the established standards will result in an estimated 9.4 million metric tons of avoided greenhouse gas emissions over the 25-year lifetime of the vehicles (measured in terms of carbon equivalents).

D. Additional Comments

1. Limited-Line Light Truck Manufacturers

Porsche AG, Porsche North America, Inc. (Porsche) urged NHTSA to establish a separate standard or standards for limited-line truck manufacturers, possibly using a graduated standard based on the number of light truck models offered. According to Porsche, smaller manufacturers are penalized because they do not sell small economy vehicles that are capable of producing offsetting credits.

Limited-line manufacturers, according to Porsche, must struggle to meet CAFE because of their limited resources and a limited truck line that does not allow them to average their fleet fuel economy. Therefore, if their vehicle line does not meet the current standard, they must pay penalties or incur disproportionate costs in attempting to meet the applicable standard.

With an annual worldwide production of more than 10,000

vehicles, Porsche agreed that it was foreclosed from applying for a manufacturer-specific fuel economy standard under the exemption provisions of 49 U.S.C. § 32902(d). However, Porsche argued that worldwide consolidation of the automobile industry indicates that the 10,000-vehicle threshold is no longer appropriate and should be raised. Barring any change to the threshold, which Porsche acknowledged is beyond NHTSA's authority, the company suggested that NHTSA is obligated to ensure that small limited-line manufacturers are not harmed. To fulfill this obligation, Porsche argued that the agency should follow an earlier precedent and establish a separate light truck standard for limited-line manufacturers as it did in 1980 and 1981.

The agency does not agree with Porsche's suggestion that the company's particular circumstances support establishment of a separate fuel economy standard for limited-line manufacturers. We note that both full-line and limited line manufacturers have indicated that their product mix places them at a disadvantage in complying with CAFE. For some, having too many large trucks is a problem. For others, like Porsche, not having other more fuel-efficient trucks is the obstacle. In either case, the challenge of meeting is difficult for both classes of manufacturers.

Porsche stated that it faces a disadvantage because it makes only a single high performance truck and has no ''legitimate'' opportunity to comply. Although some manufacturers have chosen to participate in market segments that make it easier for them to meet CAFE, we note that all manufacturers must meet particular challenges when complying with a standard. Porsche is correct in pointing out that NHTSA, in the very first years in which CAFE standards were in effect, established a separate light truck standard for light truck manufacturers who did not use passenger car engines in their trucks. This separate standard, promulgated in 1978, offered a degree of relief to International Harvester, a company struggling to meet both CAFE and emissions standards with limited resources.

NHTSA finds it difficult to equate Porsche's present position with that of International Harvester in 1978. Unlike International Harvester, which had been producing a family of larger light trucks whose basic design remained unchanged from the early 1960's, Porsche began the design process knowing that CAFE standards would apply to its product. Porsche presumably entered the light truck market after determining that the costs of compliance or paying penalties were offset by the benefits of doing so. While the increase in CAFE standards established by this final rule will require that Porsche increase its efforts to build more fuel efficient light trucks, the company cannot state that its designs pre-date CAFE, that an increase in CAFE standards was not foreseeable or that it is not technologically feasible for Porsche to meet the standards.

As indicated above, NHTSA does not believe that present market conditions dictate establishing a separate fuel economy standard for Porsche or other limited-line manufacturers. We are also not convinced by Porsche's argument that doing so would be consistent with Congressional intent. Porsche has correctly observed that NHTSA cannot modify the current statutory threshold for small manufacturers entitled to seek exemption from CAFE under 49 U.S.C. § 32902(d). However, Porsche apparently believes that the existence of the exemption provision supports the larger notion that limited-line manufacturers are entitled to relief. We believe that the more logical conclusion is that in creating the exemption provision and limiting its applicability, Congress intended to restrict rather than expand NHTSA's authority to exempt manufacturers from CAFE.

2. Executive Order 12866

General Motors and the Alliance also commented that neither the NPRM nor the Preliminary Economic Assessment (PEA) identified regulatory alternatives to raising CAFE standards for light trucks as required by Executive Order 12866, Regulatory Planning and Review. General Motors stated that, for example, raising the gas tax by 2.4 cents per gallon would achieve the same fuel savings associated with NHTSA's proposal and would be 50 times less costly than NHTSA's proposal.

NHTSA believes that the statutory structure and regulatory framework narrowly limit the regulatory alternatives that the agency can consider. The statute specifically requires NHTSA to establish the maximum feasible average fuel economy standard accounting for certain, specified considerations. Implicit in that analysis is consideration of the level at which the best balance of the statutory criteria can be achieved. We note that, unlike broader based empowering statutes, EPCA does not contemplate that the agency will address the nation's need to conserve energy through any alternatives other than the establishment of an average fuel economy standard applicable to a class or classes of non-passenger automobiles. We further note that, while General Motors points out that an increase in the gas tax may be a public policy alternative, it is not a regulatory alternative available under EPCA.

3. Confidential Business Information

Consumer and environmental advocacy groups expressed frustration that they do not have access to the same confidential technological, financial and product data as the agency, and therefore are limited in their ability to critique and comment upon the agency's analysis. Environmental Defense argued that NHTSA's authorizing legislation states that the agency may withhold information only if the Administrator finds that disclosure of information would cause ''significant competitive damage.''

NHTSA considers EPCA's reference to ''significant competitive damage'' as being substantively synonymous with Exemption 4 of the Freedom of Information Act. We acknowledge the frustrations expressed by the consumer and environmental advocacy groups that they do not have access to the same confidential technological, financial and product data as the agency, and therefore are limited in their ability to critique the agency's analysis. We note, however, that Congress entrusted the establishment of appropriate corporate average fuel economy standards—and, indeed, the balancing of the express statutory and public policy considerations—to the Secretary of Transportation, who has in turn delegated that responsibility to the expertise of the National Highway Traffic Safety Administration. In the NPRM we provided detailed descriptions of the methodologies employed in our engineering and economic analysis. In doing so, we ensured that sufficient information was available for all to comment on the approach and fundamental assumptions used to conduct the analyses leading to the proposal and, ultimately, to this final rule.

4. Small Business Impacts

The Recreational Vehicle Industry Association stated that the impacts of the required increases in light truck fuel economy on sales and production of trailers, other recreational vehicles that require towing, and conversion vehicles based on light trucks would be disproportionately or exclusively borne by small businesses.

NHTSA does not believe that this standard will have an adverse effect on

the recreational vehicle industry. The agency has determined that the average fuel economy standards established in this final rule will not significantly impact product offerings or the utility available to consumers.

5. Dual Fuel Credits

General Motors and the Alliance expressed concern that the agency had not yet finalized the proposed regulation extending the Alternative Motor Fuels Act of 1988 (AMFA) credits. They argued that, while NHTSA is not permitted to incorporate those credits into the CAFE standards (and thereby potentially eliminate the pure incentive Congress intended), the agency should consider the practical impact of the credits.

On March 11, 2002, the agency published a proposal to extend the dual fuel vehicle credits that vehicle manufacturers can earn by producing vehicles capable of operating on gasoline and other types of fuel. (67 FR 10873). Since then, both the Senate and the House of Representatives passed bills that would statutorily extend the credits. The extension was also included in the conference energy bill (H.R. 4) in the last Congress.

We will separately issue a final rule addressing the proposed extension of the AMFA credits. In the meanwhile, Congress has made clear that we may not take the existence or use of those credits into consideration when determining maximum feasible fuel economy levels. We have reviewed the legislative history surrounding the establishment of those credits to determine whether Congress would nonetheless expect the agency to acknowledge the existence of those credits when analyzing the costs and benefits associated with any proposed CAFE standard. We are skeptical that Congress would have expected the agency to assume technological costs, potential job losses or adverse safety consequences that, as a practical matter, are improbable in light of the AMFA credits. The legislative history, however, indicates that Congress expected these credits to be a pure incentive. Because consideration of costs and benefits is a critical component to determining the economic practicability of the proposed standard, we have concluded that the statute does not permit us to consider the impact of the AMFA credits when assessing the costs and benefits of proposed CAFE standards.

VII. Consideration of the Maximum Feasible Fuel Economy Levels

A. Technological Feasibility

1. General Motors

Our December 2002 NPRM estimated that General Motors would be able to achieve a light truck CAFE of 20.97 mpg in 2005, 21.63 mpg in 2006, and 22.29 mpg in 2007. This estimate was based on the ''Stage'' analysis described above. Use of the ''Stage'' analysis yielded the following potential improvements to the General Motors light truck fleet:

POTENTIAL GENERAL MOTORS CAFE IMPROVEMENTS, MPG [1]

Model year	Stage I improvements	Stage II improvements	Stage III improvements	Total	Potential CAFE, mpg.
2005	.439	.466	.1065	1.012	20.97
2006	.936	.502	.0616	1.500	21.63
2007	.921	.496	.0825	1.499	22.29

[1] Due to rounding, the individual improvements may not equal the potential CAFE for General Motors.

As we indicated in the NPRM, NHTSA relied, in part, on information provided by General Motors to determine which Stage I technologies General Motors could employ in MYs 2005–2007 to enhance its fuel economy performance. Our analysis indicated that General Motors could employ five technologies by MY 2005 in certain parts of its light truck fleet and an additional three technologies in certain parts of its light truck fleet by MY 2006. In NHTSA's view, all of these technologies would continue to be used in future model years. We also used the numbers provided by General Motors for percentage increases in fuel economy in calculating the possible fuel economy increase attributable to each of these technologies.

To determine how and when General Motors could employ Stage II technologies for MYs 2005–2007, NHTSA relied on General Motors' comments, the agency's own engineering judgment, and the submissions from other manufacturers. Our analysis indicated that General Motors could employ two technologies by MY 2005, and an additional technology by MY 2006. To determine possible fuel economy increases, NHTSA examined manufacturer-provided estimates for the percentage increases in fuel economy for each technology. We placed more credence on a value if a manufacturer had already introduced that specific technology, if it was in the NAS range of estimates, and if at least one other manufacturer provided a similar value for the fuel economy potential of that technology.

In the Stage III analysis for the NPRM, the agency tentatively concluded that the bulk of General Motors models equipped with the 6.0L engines could be equipped instead with 5.3L engines without notably degrading their utility. We determined that, standing alone, this change to General Motors' MYs 2005–2007 light truck fleet would increase General Motors' CAFE by 0.1 mpg.

As we indicated in our summary of the comments provided above, General Motors disagreed with NHTSA's projections and provided new and revised data to support its assertions. The company's February 2003 submission indicates that General Motors believes it can achieve a CAFE of 20.4 mpg in MYs 2005 and 2006, and 20.6 mpg in MY 2007.

General Motors pointed out clerical mistakes in the NPRM, such as double counting certain vehicles and technologies that were already being used by General Motors to meet the company's projected CAFE. General Motors stated that correcting for these clerical errors would lower NHTSA's assessment of General Motors CAFE by 0.08 mpg in MY 2005, 0.18 mpg in MY 2006, and 0.16 mpg in MY 2007. Additionally, General Motors argued that NHTSA's technological assessment is too optimistic about the degree to which General Motors can improve its CAFE, particularly since NHTSA made no allowance for deterioration or ''risk'' in its forecasts. General Motors also stated that NHTSA's projections of the company's capability to improve its CAFE ignored how little lead time General Motors had to implement changes to its MY 2005 trucks '' which would begin production in July 2004.

Compared to its May 2002 CAFE forecasts, General Motors' February 2003 CAFE forecasts are higher for MYs 2005 and 2006, but lower for MY 2007.

The updated forecasts involve several model changes, volume changes, and greater use of some of the technologies included in NHTSA's analyses. Based on these updated forecasts, General Motors provided its own computation of what General Motors' CAFE would be for MYs 2005–2007 if either the Stage or Volpe technologies were added to General Motors' updated product plans without any instances of double counting. These projections indicated that the Stage analysis projected General Motors' attaining a CAFE of 21.20 mpg in MY 2005, 21.65 mpg in MY 2006 and 21.75 mpg in MY 2007. Using the Volpe method, General Motors reported that its projected CAFE should be 21.12 mpg in MY 2005, 21.47 mpg in MY 2006 and 21.70 mpg in MY 2007.

The foregoing projections, according to General Motors, are still far too optimistic, even after the effects of double counting and other clerical errors are addressed. General Motors indicated that the agency's proposal included the use of technologies that could not be implemented in the time available, including some that were not yet ready for commercial application. In other instances, General Motors asserted that it had already exploited particular technologies to the extent possible. General Motors also indicated that both the ''Stage'' analysis and the Volpe analysis relied on projected improvements from certain technologies that were unrealistic.

Accordingly, General Motors submitted its own estimates of benefits from the application of the same technologies. In many instances, these estimates were lower than those used by NHTSA. The company also disagreed with NHTSA's view in the NPRM that the displacement reductions envisioned in NHTSA's Stage III analysis—replacing a larger engine with a smaller one in some vehicles—were a practical means of improving fuel economy. According to General Motors, requiring the replacement of one engine with another constituted more than a change in a single vehicle. Instead, the company argued that such a change was the equivalent of prohibiting production of an entire model line. General Motors concluded that NHTSA's proposed CAFE standards are neither technologically feasible nor economically practicable.

As it did for the NPRM, NHTSA used two methodologies to explore the potential for improvement in General Motors' fuel economy. One, the ''Stage'' analysis, examined the potential use of various technologies and other means after separating these methods into three different ''Stages'' and applying them to manufacturers in a designated sequence. The agency's ''Stage'' analysis, which is contained in the FEA that has been placed in the docket, corrected errors that General Motors had found in our earlier analysis.

As was the case with the ''Stage'' analysis performed in support of the NPRM, we based our choices as to which technologies to apply on our review of manufacturer product plans. In the case of General Motors, the agency re-examined many of our preliminary findings about which technologies could be applied to improve General Motors' fuel economy and revised its estimates. In so doing, we noted that General Motors' May 2002 submission, submitted in response to our February 7, 2002 request for comments, contained a number of references to technologies or returns on technologies that the company either abandoned or discounted in its February 14, 2003 submission. In some instances, our analysis was modified to reflect General Motors' February 2003 view of which measures could be employed. In others, we examined both the May 2002 and February 2003 General Motors submissions to see if opportunities existed to expand the use of technologies that appeared to be consistent with General Motors' product plans as depicted in both documents. We also considered improvements from technologies that had been adopted by other manufacturers. Our analysis projected that some of these technologies could be used to improve fuel economy if General Motors expended additional effort to implement some of these changes.

We further believe that, while there are technological and market risks associated with establishing a CAFE standard three model years beyond MY 2004, the last year for which a standard has been established, there is also the opportunity to incorporate further technological advancements to achieve the standard and beyond. We also believe that General Motors' projected CAFE capabilities may be further enhanced should consumers begin to demand more hybrid electric vehicles, diesel vehicles and cross-over utility vehicles and should General Motors expand its offerings in this arena to meet consumer demand.

NHTSA believes that it is technologically feasible for General Motors to meet the standards established in this final rule. We note that our updated ''Stage'' analysis responds to General Motors'' most recent comments and projections by adjusting the use, introduction, and application of fuel economy improvements to conform better to General Motors' currently planned deployment of technologies. The agency also reexamined the application of several technologies to ensure that they were applied to vehicles suitable for their use. In so doing, NHTSA examined the way in which these technologies were being used by the industry. Our analysis applies technologies that are either already in use or are sufficiently mature to have been included by other manufacturers in their MY 2005–2007 product plans.

Finally, our analysis did not rely on the use of clean diesel engines or the production of hybrids beyond those already planned by General Motors. However, the agency believes that the use of diesel engines and hybrid technology would enable General Motors to offset some of their anticipated risks of technical implementation and meet the new standard. Both of these technologies offer significant promise for increased fuel efficiency and one, if not both, could certainly be in place during MYs 2005–2007. Other external uncertainties, such as further technological development and fluctuating fuel prices that may affect consumer demand by MY 2007, could assist General Motors in achieving the standards established by this final rule.

General Motors' comments also took issue with the validity and execution of NHTSA's ''Volpe'' analysis. As indicated in the PEA prepared in conjunction with our December 2002 NPRM, NHTSA computed the potential costs of its proposal through an analysis developed by the Volpe National Transportation Systems Center. This analysis used an algorithm that applied fuel economy technologies to different model lines based on the cost-effectiveness of each technology. General Motors argued that the Volpe analysis contained a number of errors, including some clerical and mathematical errors.

The company also claimed that the Volpe analysis was illogical in the manner in which technologies were used and discarded without sufficient regard for capital costs. The analysis was also flawed, in General Motors' view, because the Volpe analysis applied different techniques for estimating costs than those employed in the Stage analysis to raise General Motors' fuel economy. Finally, General Motors also indicated that many of the technologies employed in the ''Volpe'' analysis were either not ready, did not deliver the fuel savings described or were, in many instances, not practicable for General Motors.

The agency agrees that the Volpe analysis prepared for the NPRM contained clerical errors and, in some instances, applied and removed technologies without consideration of capital costs. We have remedied the clerical errors in our earlier Volpe analysis, changed our application of technologies to reflect the impact of repaying capital investments and modified the analysis so that the Volpe cost estimates are more nearly based on the technologies, or their equivalents, used by NHTSA in its updated Stage analysis. We have also performed a more traditional analysis of General Motors' projected costs by calculating the total cost of all the projected ''Stage'' technologies. As we are also using the Volpe methodology to calculate costs for the industry, as well as for General Motors, the Volpe methodology was also changed to reflect that capital costs might require employment of technologies for several years, rather than a single year. As is the case with the Stage analysis, the Volpe analysis was also changed to apply technologies in a manner more consistent with General Motors' projections of its product plans and capabilities. In so doing, we also examined the abilities and plans of the industry as a whole in determining which technologies could reasonably be used. As indicated in our discussion regarding costs, we believe that the Volpe analysis provides an accurate accounting of the potential aggregate costs of this final rule.

After careful review of General Motors' comments, the agency modified its application of both the Stage analysis and the Volpe analysis. One Stage I technology was not applied as widely as it was in the NPRM. A Stage II technology that NHTSA had calculated could be widely introduced in MY 2005 is now being applied in phases in MYs 2006 and 2007. Technologies that were not used in our analysis for the NPRM are now being applied as Stage II technologies. Finally, in regard to Stage III, our analysis no longer relies on General Motors' removing the existing 6.0L engine from some trucks and replacing it with a smaller V–8. As stated above, the possibility that forcing through regulation substantial deviation from product offerings based on projected consumer demand may impose unreasonable constraints on the market leads us to conclude that it is not appropriate to include such engine shifts in the Stage analysis. Nonetheless, market forces may yet independently favor further reassessment of product plans for which there remains adequate lead time.

In addition to these changes in the technologies used and the way they were applied, we also changed our estimates of the improvements we expect to gain from certain technologies. In the case of low rolling resistance tires and low viscosity/low friction lubricants, the agency had previously estimated that these technologies would each yield a .5 percent improvement in fuel economy. In response to criticisms that our values were either too low or too high, we decided to use the NAS mid-range estimates (where available) since they were developed based on extensive study and review. Thus, we adopted a 1.3 percent improvement for low rolling resistance tires, which is the midpoint value projected by the NAS report.

In the case of low friction/low viscosity lubricants, we indicated in the PEA accompanying the CAFE NPRM that these lubricants could yield anywhere from a 0.3 percent to 1.0 percent improvement in fuel economy. However, our calculations for the NPRM relied on a 0.5 percent improvement from low friction/low viscosity lubricants. After consideration of the potential benefits of these lubricants, we now anticipate, as did the NAS, that use of these oils will yield a 1 percent improvement. In addition to changing the estimated returns for the preceding technologies, our analysis also reduced the percentage improvement related to improved cooling fans from 2.4 percent to 2.0 percent.

After correcting errors in our earlier analysis and making other changes as described above, our Stage analysis projects, based on General Motors' most recently submitted product plans, light truck CAFE estimates for that company of 20.96 mpg for MY 2005, 21.56 mpg for MY 2006 and 21.99 mpg for MY 2007. Unlike many previous CAFE rulemakings, we are establishing light truck standards for three consecutive model years. This provides, especially as regards the third model year, MY 2007, additional lead time for companies to develop compliance options not typically available when a standard is set just 18 months prior to a model year. We believe that, although General Motors' current product plans do not project that it will achieve a 22.2 mpg light truck CAFE without further adjustments, that the opportunity and technologies exist to make such adjustments technologically feasible and economically practicable for MY 2007. We note that, while Ford finds the standards ''challenging,'' that company stated that it would make just such adjustments to meet the standards.

Further, the Volpe analysis (while principally a tool to assess costs and benefits) suggests a projection of 22.2 mpg for MY 2007 for General Motors. Rather than address General Motors' product plans on a model-by-model basis, the Volpe analysis estimates the company's projected CAFE capabilities through application of technologies available to the industry as a whole. The Volpe analysis suggests that the Stage analysis may present a conservative projection for MY 2007, given the additional lead time provided for that model year.

Moreover, the CAFE statute does not contemplate that each standard automatically be set at the lowest projected level of the ''least capable manufacturer with a significant share of the market.'' Instead, it contemplates CAFE levels at the maximum level attainable within the industry as a whole without necessitating consequential adverse economic consequences. As noted above, this is the first time since 1980 that the agency has simultaneously established light truck standards for more than two model years. As a result, we believe it to be within the intent of the statute to set more challenging—but still reasonable—CAFE levels during the year(s) furthest in the future.

Indeed, the concept of the ''least capable manufacturer with a significant share of the market'' was intended to be a surrogate for analyzing whether employment reductions or other adverse economic consequences (including vehicle weight reductions) were necessary to meet the standards. While we have not pointed to particular measures based on current plans and projections that will bring General Motors' MY 2007 CAFE level to 22.2 mpg, that level may be achieved through additional technological improvements and the expansion of hybrid electric, diesel engine or cross-over utility vehicles in the marketplace. External market factors may also impact actual CAFE performance. As a result, we have determined that—for MY 2007, as well as MYs 2005 and 2006—the CAFE standards are technologically feasible, and economically practicable, for the industry as a whole despite being set at a level above the current projections for a company with a substantial share of the light truck market.

2. Ford

Our December 2002 NPRM estimated, based on examination of Ford's product plans and use of the Stage analysis, that Ford could improve its light truck CAFE to 21.0 mpg for MY 2005, 21.6 mpg for MY 2006 and 22.2 mpg for MY 2007.

The agency determined that Ford could reach these levels by raising its projected CAFE by an additional .08 mpg from 20.9 mpg in MY 2005 and an additional .19 mpg from 22.0 mpg in MY 2007. Ford's response to the NPRM did not specifically dispute NHTSA estimates for MYs 2005 and 2006. However, Ford indicated that it believed the agency's projection for its CAFE for MY 2007 overstated the company's capability by as much as a tenth of a mile per gallon.

In its response to the NPRM, Ford indicated that it viewed NHTSA's proposal as technologically challenging and submitted updated information about its product plans that supported this contention. At the same time, Ford indicated that it was committed to taking additional actions beyond those it already planned to achieve these ''difficult'' standards. The company indicated, as did General Motors and other manufacturers, that the agency's proposal underestimated the leadtime needed to incorporate fuel economy improvements in vehicles as well as the difficulties of introducing new technologies across a large manufacturer's fleet. Ford also indicated that hybrid and advanced diesel technology are not mature enough to improve overall CAFE performance significantly. In Ford's view, the weight increases due to safety standards have been significantly underestimated. Ford also commented that NHTSA's proposal did not account for any risks that projected increases in fuel efficiency would not materialize. As a general matter, the company also said that increased sales of full-size trucks could erode its CAFE estimates in spite of its plans.

In regard to specific changes to Ford's fleet projected by NHTSA, Ford argued that it could not take some of the measures that NHTSA had identified in the agency's Stage analysis. Some of these measures, according to Ford, would be much more costly than NHTSA estimated. Others, in Ford's view, had not yet been sufficiently proven to be suitable for use on MY 2005–2007 vehicles. Ford noted that NHTSA's use of some proven technologies would make it necessary for that company to expend tremendous resources. The company also noted that some technologies, although proven and presumably available, would not be acceptable to consumers.

NHTSA projects that Ford has the technological capability to meet the light truck CAFE standards set forth in this final rule. After reviewing Ford's comments, NHTSA has undertaken a further analysis of the company's projected capabilities and the technologies available for improving Ford's CAFE. As with General Motors and DaimlerChrysler, the agency did not include expanded production of hybrid electric or diesel engines beyond those already included in each company's product plans. However, as noted above, we believe these advanced technologies are likely to offset some of the potential risks Ford anticipates and potentially may enhance CAFE performance beyond current projections. Further, our analysis continues to apply technologies as a means of improving fuel economy in lieu of weight reduction and downsizing.

After reviewing Ford's comments, we made a number of revisions to our analysis. A more detailed account of these changes is found in the FEA accompanying this document. In general, we adjusted our estimates based on the updated product plans contained in Ford's comments. Using these plans, we considered the extent to which certain fuel economy measures are now being implemented within the industry and considered those technologies that will be sufficiently mature to be available in MYs 2005–2007. These technologies were then applied in a fashion consistent with how other manufacturers are using them and, in our view, consistent with Ford's projected capabilities.

Ford's comments also indicated that it believed that NHTSA has seriously underestimated the weight penalty, and subsequent loss in fuel efficiency, caused by weight increases necessitated by safety standards. As indicated below in our discussion of the impact of other federal standards on fuel economy, NHTSA disagrees. Some of the weight penalties claimed by Ford are related to proposed requirements that are not yet final. Others are more speculative and based on agency initiatives that have not yet generated proposals. For rules that are already in place, NHTSA believes some of the Ford claims overestimate the impact.

Based on the Stage analysis, Ford's projected light truck CAFE is 20.96 mpg in MY 2005, 21.56 mpg in MY 2006 and 22.23 mpg in MY 2007. The Volpe analysis indicates that Ford can achieve 21.00 mpg for MY 2005, 21.68 mpg for MY 2006, and 22.2 mpg for MY 2007.

3. DaimlerChrysler

The agency's December 2002 NPRM projected that DaimlerChrysler was capable of achieving a light truck CAFE of 21.3 mpg for MY 2005, 21.6 mpg for MY 2006 and 22.2 mpg for MY 2007. Although DaimlerChrysler's comments in response to the NPRM characterized the agency's proposal as extremely challenging, the company did not dispute that it was capable of achieving these levels of fuel economy. However, DaimlerChrysler commented that the foregoing fuel economy projections would remain valid only so long as DaimlerChrysler's planned technology advancements and product mix remained intact.

The company warned that there were significant risks that expected fuel economy gains might not be realized or that consumer demand for less fuel efficient vehicles could cause a reduction in DaimlerChrysler's CAFE. Therefore, DaimlerChrysler suggested that NHTSA revise its proposal to reflect more accurately the risks faced by the company and other manufacturers in pursuing improved fuel economy. DaimlerChrysler indicated that the NHTSA proposal should be 20.9 mpg for MY 2005, 21.1 mpg for MY 2006 and 21.5 mpg for MY 2007.

DaimlerChrysler indicated that reducing the agency's proposed levels was supported by a number of considerations. The company noted that NHTSA had not seemed to consider that there were any risks that technologies might not yield greater efficiency or consumers would demand less efficient vehicles. DaimlerChrysler stated that these risks were particularly significant given the short lead time available to manufacturers if any changes needed to be made to their products for MYs 2005–2007. According to DaimlerChrysler, it was essentially ''locked in'' to its product plans for MYs 2005 and 2006. The company further indicated that even its MY 2007 product plans could only be changed in the most limited fashion. Due to this lack of leadtime, DaimlerChrysler cautioned NHTSA that it would not be possible for it, or any other vehicle manufacturer, to institute anything more than minor changes to its products through MY 2007.

The Agency's Stage analysis projects that DaimlerChrysler can achieve 21.3 mpg for MY 2005, 21.6 mpg for MY 2006, and 22.2 mpg for MY 2007. The Volpe analysis indicates that DaimlerChrysler can achieve 21.32 mpg for MY 2005, 21.60 mpg for MY 2006, and 22.24 mpg for MY 2007.

NHTSA acknowledges that its proposal simply specified a single value for CAFE for each year rather than stating ranges for each of the three model years. This led a number of commenters to conclude that the agency did not account for any risks that consumer demand may shift or that technologies would not yield expected fuel savings. However, the agency is

aware of such risks and notes that these risks are also accompanied by opportunities. Just as there is a risk that consumers may demand less fuel-efficient vehicles, changes in market conditions could also stimulate a greater demand for more efficient vehicles. Additionally, a number of potential technologies, including clean diesel and hybrid vehicles, and the shift to more fuel efficient cross-over utility vehicles, may offer opportunities for greater fuel savings and may serve to offset some of the risk anticipated by DaimlerChrysler.

The agency is certainly aware that vehicle manufacturers must have sufficient lead time to incorporate changes and new features into their vehicles. Similarly, NHTSA also recognizes that vehicle manufacturers follow design cycles when introducing or significantly modifying a product. This is why the agency has always been respectful of industry needs in this regard. At the same time, we also observe that competition has forced manufacturers to become considerably more agile in modifying and changing products to meet demand. This is evidenced by Ford's and General Motors' submitting revised product plans between May 2002 and February 2003. Generally speaking, we believe that manufacturers have the same ability to meet market driven demands for design changes as those required by regulation. NHTSA believes that the requirements of this final rule do not impose technical demands beyond those that DaimlerChrysler or other manufacturers can meet in the allotted time.

B. Economic Practicability and Other Economic Issues

The agency has estimated not only the anticipated costs that would be borne by General Motors, Ford and DaimlerChrysler to comply with the standards, but also the significance of the societal benefits anticipated to be achieved through direct and indirect fuel savings. In regard to manufacturer costs, the NPRM relied on the Volpe analysis to determine a probable range of costs. In preparing this final rule, we have prepared cost estimates using updated versions of both the Volpe analysis and the Stage analysis. We have concluded that these standards need not result in reductions in employment or competition, and that—while challenging—they are achievable within the framework described above, and that they will benefit society considerably. For the sake of this analysis, we have translated the societal benefits into dollar values and compared those values to our estimated costs to the manufacturers for this final rule.

1. Costs

After review of the comments submitted in response to the NPRM and performing further analysis, NHTSA estimates the average incremental cost per vehicle needed to meet the standards to be $22 for MY 2005, $67 for MY 2006, and $106 for MY 2007. The total incremental cost (the cost necessary to bring the corporate average fuel economy for light trucks from 20.7 mpg to the standards) is now estimated to be $170 million for MY 2005, $537 million for MY 2006, and $862 million for MY 2007.

The level of additional expenditure necessary beyond already planned investment varies for each individual manufacturer. These individual expenditures are discussed in more detail in the FEA. In order to estimate them, the agency developed cost estimates for the various technologies that are available to and technologically feasible for vehicle manufacturers within the time frame covered by this final rule. These cost estimates were developed through use of a refined ''Volpe'' analysis that incorporates a number of changes made in response to concerns pointed out by commenters.

The differences between the costs projected in the NPRM and the costs now estimated for this final rule are significant and reflect changes in the agency's methodology, calculations and underlying assumptions. We note first that our analysis of which technologies are most likely to be used by manufacturers to improve fuel economy has changed markedly as a result of the comments and updated product plans submitted in response to the NPRM. The remainder of the difference between the two cost estimates stems from changes to our ''Volpe'' analysis. Although this methodology is more completely described in both the FEA accompanying the NPRM and the FEA accompanying this final rule, the final rule ''Volpe'' analysis relies on several inputs and uses an algorithm to calculate overall costs for fuel economy improvements.

Manufacturer comments indicated dissatisfaction with the NPRM ''Volpe'' analysis. The companies, General Motors in particular, argued that our analysis underestimated the costs for certain of those technologies, contained clerical and mathematical errors, and applied technologies with little or no regard for leadtime and proper allocation of capital investment. General Motors also noted that the Volpe analysis and the Stage analysis applied different technologies. While the Volpe analysis estimated costs using one set of technologies, the agency's Stage analysis supported the proposed new standards by relying on another. General Motors also indicated that many of the technologies employed in the ''Volpe'' analysis were either not ready, did not deliver the fuel savings described and were, in many instances, not practicable for General Motors.

As indicated above, the agency reexamined and improved the Volpe analysis in response to the comments. As discussed in more detail in the FEA, we recalculated our assessment of the costs after remedying the clerical errors noted by General Motors. In contrast to the earlier ''Volpe'' analysis used to calculate the costs set forth in the NPRM, cost estimates in the final rule Volpe analysis first assumed that manufacturers would apply technologies in a fashion more consistent with our ''Stage'' analysis. As explained below, this differed from our methodology used for the NPRM. Our NPRM ''Volpe'' analysis applied the cheapest technologies first and added new technologies largely in order of increasing cost.

While our new analysis did not abandon the idea that less costly technologies would be used before those that are more costly (ranked on a cost per mpg investment basis), we considered both the order in which technologies are most likely to be used based on availability as well as cost. We also changed the methodology to recognize that capital costs require employment of technologies for several years, rather than a single year. Finally, we updated the Volpe analysis to include more accurate cost estimates for some technologies and increased benefits from others. In our view, this makes the Volpe analysis more consistent with the Stage analysis and better reflects actual conditions in the automotive industry.

General Motors argued that restricting availability of large engines would impact on sales and result in job losses. Referring to its experience with one of its models that was simultaneously redesigned and given a new 6.0L engine, General Motors stated that a large increase in sales of this vehicle resulted when the 6.0L engine replaced a smaller predecessor. The company then stated that replacing the 6.0L with a newly designed smaller engine would result in lost sales. General Motors' argument implies that replacing the 6.0L engine in this model with a smaller engine would reduce sales to a level equivalent to its sales before the redesign.

The Recreational Vehicle Industry Association commented that increases in light truck fuel economy could indirectly impact the sales and production of trailers, conversion vehicles and recreational vehicles by reducing the availability of suitably powerful light trucks and light truck chassis.

The final rule is not based on any engine shifts. Forcing through regulation substantial deviation from product offerings may impose unreasonable constraints on the market. Thus, we conclude that it is not appropriate to include such engine shifts in the Stage analysis. Since the final rule would not other necessitate any such substantial deviation, NHTSA does not believe that this standard will have an adverse effect on the recreational vehicle industry.

NHTSA's cost analysis recognizes the importance of the competitive market. We believe that the standards contained in this final rule will not limit the availability of vehicles that consumers need and want. We believe that the standards established in this final rule will not result in changes to power-to-weight ratios, towing capacity or cargo and passenger hauling ability. In short, the standards will not affect the utility of available vehicles and therefore should not affect consumer preferences for or against them. Since consumer choices will not be affected, neither will the production plans of any particular manufacturer.

2. Benefits to Society

In the FEA, the agency analyzed the economic and environmental benefits of this final rule by estimating fuel savings over the lifetime of the model year (approximately 25 years).

The agency's analysis estimated the undiscounted future impacts and then determined their present value using a 7 annual percent discount rate. We translated impacts other than direct fuel savings into dollar values and then factored them into our cumulative estimates. Adding indirect benefits to the direct benefits of fuel saved as a result of higher CAFE standards produced an incremental benefit to consumers, when reduced to present value, of $29 per vehicle for MY 2005, $83 per vehicle for MY 2006 and $121 per vehicle for MY 2007. The total present value of these direct and indirect benefits is estimated to be $218 million for MY 2005, $645 million for MY 2006 and $955 million for MY 2007.

We obtained forecasts of light truck sales for future years from the EIA's Annual Energy Outlook 2002 (AEO 2002). Based on these forecasts, NHTSA estimated that approximately 7,654,000 light trucks would be sold in MY 2005. For MYs 2006 and 2007, we estimated 7,795,000 and 7,922,000 light truck sales respectively.

We estimated fuel economy performance for each future model year's light trucks under the current CAFE standard and with alternative standards in effect, using the agency's projections for the application of fuel saving technologies. We then assessed the economic value of annual fuel savings resulting from higher light truck CAFE standards by applying EIA's AEO 2002 forecast of future fuel prices to each year's estimated fuel savings. In turn, we estimated future fuel savings by dividing the total number of miles that the surviving population of vehicles of that model year are estimated to be driven by the average on-road fuel economy level associated with the base standard of 20.7 mpg.

NHTSA then assumed that if the same trucks met a higher CAFE standard when sold, their total fuel consumption during each subsequent calendar year could be calculated by dividing the increased number of miles they are driven as a result of the higher fuel economy resulting from that standard. The sum of these annual fuel savings over each calendar year that vehicles remain in service represents the cumulative fuel savings resulting from applying a stricter CAFE standard to light trucks produced during that model year.

NHTSA's analysis of the benefits of external factors totaled $0.083 per gallon of gasoline, including $0.048 for ''monopsony'' effect (the effect on the world market price of gasoline from reductions in U.S. demand), and $0.035 for reducing the threat of supply disruptions.

In the FEA, we also analyzed the effect of the standards on vehicle and refinery emissions. Our analysis indicated that the MY 2005 standard would result in a net reduction of criteria pollutants with a present value of $2.4 million. For MY 2006, this net reduction would have a present value of $8.0 million and for MY 2007 the net reduction of criteria pollutants would have a present value of $12.7 million.

We obtained per mile emission rates using EPA's Mobile 6.2 motor vehicle emissions factor model. Then we monetized changes in total emission levels.[5]

Commenters questioned NHTSA's use of several of the variables and values used in the PEA and also in the Draft Environmental Assessment. In response to these comments, the agency further considered the use and accuracy of its chosen variables and values. In many cases, the agency concluded that, based upon current data and literature, it was correct in its determinations and has retained those variables or values. In other cases, the agency has decided to revise its assumptions and the estimates that they support. The agency's response to comments on the economic and environmental analyses is delineated below and a more detailed analysis is provided in the FEA and the Environmental Assessment.

a. Vehicle Miles Traveled and Survivability

A VMT growth rate is a key parameter used to account for travel trends and to calculate the resulting vehicle emissions. The EPA's MOBILE6 air quality model, which is used by State and local governments to help them meet Clean Air Act requirements, was used in the analysis and incorporates a 1.8 percent VMT growth rate.

Ford questioned whether the baseline on-road average annual VMT growth rate of 1.8 percent over the entire study period is accurate since, as it argues, historical data from the last ten years indicate that the VMT (per vehicle) has remained stable.

The agency notes that the information provided by Ford is accurate when referring to, as Ford does, VMT per vehicle per year. However, the 1.8 percent VMT growth rate used in the Environmental Assessment refers not to the per-vehicle VMT, but to fleet VMT per year. Historical data show that the VMT per year for the light-duty vehicle fleet has been increasing and this trend is expected to continue. The value of 1.8 percent was derived from the AEO 2002 report published by the EIA. EIA uses data from the FHWA Highway Statistics as inputs to its model and forecasts a growth rate of 1.8 percent for light-duty vehicles (combined) per year over the 2000–2020 period. Since the period covered by the agency's final rule falls within this period, the value projected by EIA is appropriate.

[5] White House Office of Management and Budget, Office of Information and Regulatory Affairs, ''Report to Congress on the Benefits and Costs of Federal Regulations,'' 1998, p. 72. See also Office of Management and Budget, ''Draft Report to Congress on the Costs and Benefits of Federal Regulations: Notice,'' **Federal Register**, Volume 67, No. 60, Thursday, March 28, 2002, p. 15041. The values used for VOC, NO_X, and SO2 are the midpoints of the ranges used by OMB. However, OMB does not provide a damage cost estimate for carbon monoxide (CO); the value used here was derived from Donald R. McCubbin and Mark A. Delucchi, ''The Health Costs of Motor-Vehicle-Related Air Pollution,'' Journal of Transport Economics and Policy, September 1999, Volume 33, part 3, pp. 253–86.

In both the NPRM and PEA, we stated that we had performed an analysis of the environmental impacts of the proposed CAFE standards by estimating fuel savings over the life of the vehicle. The vehicle life extends from the initial year in which the vehicle is offered for sale through approximately 25 years of use. A ''survival rate'' is assumed by applying estimates of the proportion of vehicles surviving at each age interval up to 25 years.

Ford and the Alliance noted that notwithstanding those statements, the agency's spreadsheet of calculated fuel savings made calculations for vehicles up to the age of 30 instead of 25 years. They said that the agency should recalculate costs, using a 25-year useful life (vehicle age) and the survival rate from the latest Transportation Energy Data Book. NHTSA notes that it did use a 25-year useful life in its proposal and that an earlier assumption of a 30-year useful life was inadvertently placed in a spreadsheet provided to those commenters who requested it.

In the analysis that accompanied the NPRM, NHTSA incorporated a baseline VMT estimate of 12,000 miles based upon an earlier NHTSA analysis of vehicle survivability and miles traveled. Union of Concerned Scientists argued that NHTSA's estimate of VMT is low compared with other studies and therefore the agency underestimates the fuel economy benefits. Union of Concerned Scientists urged NHTSA to use the mileage numbers provided in the Oak Ridge Transportation Data Book (15,000 miles) or the mileage used in the NAS analysis (15,600 miles in the first year, declining at 4.5 percent per year thereafter), instead of the 12,000 miles used in the PEA. After consideration of this issue, the agency has decided to calculate VMT based on the Update of Fleet Characterization Data for Use in EPA's MOBILE6 program. See Table VIII–2 of FEA.

b. Discount Rate

OMB requires government agencies to use a 7 percent discount rate as a base-case in their cost and benefit analyses.[6] (OMB Circular A–94 and Guidance of January 11, 1996) This approximates the average before tax rate of return to private capital in the U.S. economy, and represents, in general, the foregone returns (opportunity cost) that could have been received in private investments. With proper justification, agencies may supplement an analysis based on that rate with an analysis based on an alternative discount rate.

Both Lutter and Kravitz and the Mercatus Center argued for higher discount rates. Lutter and Kravitz stated that the agency should have used a rate ranging from 7.6–10 percent, the average new car finance rate during 1984–95.

The Mercatus Center argued that the discount rate should be much higher (14 percent–28 percent), since fuel economy should be treated as an irreversible investment. That organization stated that an example of an irreversible investment, in the business context, is a nuclear power plant, because it has large sunk costs that cannot be recovered should investment outcomes turn unfavorable. The Mercatus Center stated that households have limited portfolios of risky investments and may be unable to diversify away the risk of energy savings or other investments. It argued that to compensate for such risk, consumers require higher discount rates. The Mercatus Center claimed that the investment in fuel economy is a sunk cost at the time of purchase and cannot be reversed, should the consumer decided that the investment is unwarranted. That organization also cited empirical evidence of implicit consumer discount rates for energy efficiency in the 1970's and early 1980's in arguing for a much higher discount rate.

After considering the comments, we have decided not to use an alternative discount rate.

Discounting is required to adjust future impacts to a basis that is comparable with current impacts and to reflect society's preference for current consumption or investment opportunities. The appropriate basis for determining discount rates is the marginal opportunity cost of lost or displaced funds. When these funds involve capital investment, the marginal real rate of return on capital may be appropriate. The Office of Management and Budget has prescribed a 7 percent discount rate to represent the average before-tax rate of return to private capital in the U.S. economy. It approximates the opportunity cost of capital and is, according to OMB, ''* * * the appropriate discount rate to use whenever the main effect of a regulation is to displace or alter the use of capital in the private sector.'' The investments required to achieve fuel economy improvements will require some temporary displacement of capital. NHTSA consistently uses this discount rate in evaluating the impacts of its regulations.

c. Rebound Effect

By reducing the amount of gasoline used and thus the cost of fuel per mile driven, higher CAFE standards are expected to result in a slight increase in annual miles driven per vehicle from the levels from those that would result if the MY 2004 standard of 20.7 mpg remained in effect. The resulting increase, termed the ''rebound effect,'' offsets part of the reduction in gasoline consumption that results from improved fuel efficiency.

The magnitude of the rebound effect from higher CAFE standards for light-duty vehicles is typically derived from econometric estimates of the elasticity of vehicle use (either per vehicle or for an entire fleet) with respect to either fuel cost per mile driven or fuel economy measured in miles per gallon. In other words, these estimates examine the extent to which consumers are believed to respond to changes in fuel cost or fuel economy by driving more or less. Most recent estimates of the magnitude of the rebound effect for light-duty vehicles fall in the relatively narrow range of 10 percent to 20 percent, which implies that increasing vehicle use will offset 10–20 percent of the fuel savings resulting directly from an improvement in fuel economy. The NAS report concluded that the best estimate of the current rebound effect is 10–20 percent. On that basis, the NPRM used a value of 15 percent, the mid-point of the range in the NAS report.

The Alliance, General Motors, and Ford urged the agency to use a value of 35 percent rather than 15 percent, with a sensitivity analysis of 20 percent to 50 percent. These commenters each based this recommendation on a recent survey article, Greening, Greene, and Difiglio (Energy Policy 28 (2000) 389–401) and on the agreement of participants in ''Car Talk,'' a Clinton Administration dialogue on fuel economy among the auto industry, environmental organizations, think tanks, and government organizations. DaimlerChrysler seemed also to recommend a value of about 35 percent, stating, ''the commonly accepted price elasticity of VMT is a negative 3.5 percent, which means that a 10 percent reduction in per mile vehicle fuel consumption actually only reduces fuel consumption by 7 percent.''

General Motors stated that the agency's 15 percent figure is not supported by most literature. It urged the agency to consider the comments it submitted in May 2002 and the research it cited. In its May 2002 comments, General Motors stated that the Greening, Greene, and Difiglio article estimated

[6] For additional information about the use of discount rates in regulatory analysis, see OMB Draft Guidelines for the Conduct of Regulatory Analysis and the Format of Accounting Statements at 68 FR 5513, 5521, February 3, 2003.

the rebound effect at between 20 and 50 percent. In its new comment, General Motors stated that this article reviewed 75 articles on the rebound effect, including 22 on automotive transport. The company stated that very few of the reviewed articles showed a rebound effect of less than 20 percent, except for the short term, and several of the reviewed articles showed a rebound effect of up to 50 percent. General Motors stated that a more thorough review of the literature would have led NHTSA to use a rebound estimate of more than 20 percent.

General Motors included as an attachment to its comment a study of costs and benefits prepared by Dr. Andrew N. Kleit. Dr. Kleit stated that a recent study (Greene *et al.,* 1999) found a rebound effect of 20 percent, and he employed that result in his study. Dr. Kleit also cited the Greening, Greene, and Difiglio survey article, and stated that a 20 percent rebound effect is a conservative estimate. Dr. Kleit stated that the Congressional Budget Office, in a recent report on CAFE standards, also assumed a rebound effect of 20 percent.

The American Council for an Energy Efficient Economy noted that, with regard to the rebound effect, NHTSA stated in the NPRM that increasing fuel economy by 10 percent would produce an estimated 8–9 percent reduction in fuel economy. According to the Council, this implies that the rebound effect is between 1 percent and 12 percent, in contrast to the rebound effect of 15 percent used to calculate benefits reported in the agency's Preliminary Economic Analysis. The Council stated that clarification was necessary, and offered that a 15 percent rebound might be too high.

After careful review of the studies in light of the comments, the agency has determined that a rebound effect of 20 percent is appropriate for this action. The agency disagrees with the comments of the Alliance, General Motors, Ford and DaimlerChrysler that a number higher than 20 percent should be used. The recent comprehensive analysis of the effectiveness of CAFE standards conducted by the NAS concluded that the best estimate of the current rebound effect was 10–20 percent,[7] and the agency's analysis of NAS' fuel saving estimates indicates that the 20 percent figure was used in deriving them. The NAS' estimate was based on a review of recent studies that focused specifically on the fuel economy rebound effect for light duty vehicles, rather than on more general consumer purchases of durable goods and other energy-saving devices, which formed the basis of some of the studies emphasized in the Greening, Greene, and Difiglio survey.

The agency also believes that a careful analysis of the Greening, Greene and Difiglio survey on the rebound effect, which is a compendium of results of other studies surveying a wide range of rebound effects (including those associated with durable goods and energy-saving devices), shows that use of 20 percent for the rebound effect is reasonable when limiting the review to the studies analyzing vehicle use.

In response to American Council for an Energy Efficient Economy's comments, the agency notes that an 8 percent reduction in fuel use in response to a 10 percent improvement in fuel economy means that 2 percentage points of the fuel savings that would otherwise result from the 10 percent increase in fuel economy is offset by additional driving. This response implies a rebound effect ranging from 10 percent (calculated as 1 percent divided by 10 percent) to 20 percent (2 percent divided by 10 percent), the range specified in the Preliminary Economic Analysis and also used in the Draft Environmental Assessment.

The Alliance and General Motors contended that the additional miles traveled by virtue of the rebound effect could increase overall exposure to motor vehicle crashes. We note that we have now provided a value associated with the various potential consequences of increased exposure, including congestion, noise and crashes.

We recognize that the magnitude of the assumed rebound effect and the implications of any rebound effect are complex issues. NHTSA will continue to monitor relevant research for use in future CAFE rulemakings.

d. Baseline of 20.7

In our analysis, costs were estimated based on the specific technologies that were applied to improve each manufacturer's fuel economy from the level of the manufacturer's plans up to the level of the final rule. Benefits were also determined from the level of the manufacturer's plans up to the level of the final rule. If the manufacturer's plans did not reach the level of the MY 2004 standard, 20.7 mpg, the costs and benefits were estimated based on the specific technologies that were applied to improve each manufacturers' fuel economy from 20.7 mpg to the level of the final rule.

The Alliance, Ford, General Motors, and DaimlerChrysler commented that the use of 20.7 mpg as a baseline for fleet-wide fuel economy was inappropriate because the 20.7 figure incorporates anticipated technologies and fuel economy gains which are not being credited in NHTSA's analyses. The Alliance suggested that a more appropriate baseline would utilize data from the current model year assuming the manufacturers meet the 20.7 mpg CAFE standard absent technologies used in anticipation of future standards. Alliance to Save Energy and Public Citizen, on the other hand, claimed that NHTSA relied too heavily on this baseline, as well as manufacturers' projections, and should have given greater consideration to manufacturers' earlier voluntary commitments to improve fuel economy of their light trucks fleets by 2007.

NHTSA continues to believe that 20.7 mpg is a valid baseline measure for fuel economy for several reasons. First, manufacturers are required to achieve a standard of 20.7 mpg standard through MY 2004. Second, the agency considers both the costs and benefits for a manufacturer to meet the new standards from either the level of the manufacturer's plans up to the level of the final rule or 20.7 mpg up to the level of the final rule. The costs to manufacturers of meeting the new standard have not been ignored in our analysis. Finally, the agency continues to believe that using manufacturers' projections in determining their fleet wide fuel economy is the most practical means of determining those figures. These projections are the only means by which the agency can account for the planned introduction of new vehicle models.

The NPRM addressed the issue of manufacturers' earlier voluntary commitments to fuel economy. We noted that, in response to the agency's Request for Comments, DaimlerChrysler, Ford and General Motors clarified their public commitments relating to fuel economy improvements in their vehicles. More specifically, Ford clarified its July 2000 announcement that it planned to increase the fuel economy of its sport utility vehicle fleet by 25 percent by the 2005 calendar year. Ford stated that its plan calls for a significant fuel economy improvement in its existing fleet combined with the introduction of new SUVs with higher fuel economy capabilities. Ford also explained that its commitment uses MY 2000 as the base year and that the increase will become

[7] Committee on the Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards, National Research Council, Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards, Washington, D.C., National Academy Press, 2002, pp. 19–20.

effective with the introduction of the MY 2006 vehicles during the latter half of 2005.

General Motors stated that its public announcement did not refer to its average fuel economy levels, but rather to its leadership in light truck fuel economy and its intent to remain the leader over the next five years. General Motors also made clear that its leadership relates to the manufacture and *sale* of more fuel-efficient light trucks as measured through model-to-model comparisons of comparable vehicles.

Finally, DaimlerChrysler stated that it is committed to improving the fuel efficiency of all of its vehicles and that its fleet will match or exceed those of other full-line manufacturers.

e. Fraction of Calendar Year

General Motors commented that our assumptions regarding the fraction of the calendar year that new model vehicles are on the road should be adjusted downward, apparently to reflect the fact that most new vehicles are not in service for the entire calendar year in which they are sold. We note that our previous analyses did adjust for the fact that new vehicles are typically in service for less than twelve months during the year in which they are sold, although we used a slightly different procedure than that suggested in General Motors' comments. Instead of adjusting the estimated *sales* of vehicles of each model year downward during the calendar years when they are available for sale, as General Motors seems to recommend, we adjusted our estimates of light truck *usage* (average annual miles driven per vehicle) downward for those ages corresponding to the years when each model year is on sale.[8] We believe that this procedure is consistent with that recommended by General Motors in its comments, and we have also applied it to the revised estimates of annual light truck use incorporated in our revised analyses.

f. Value of Externalities

The full economic cost of importing petroleum into the U.S. includes three components, or ''externalities,'' in addition to the purchase price of petroleum itself. These externalities are: (1) Demand costs representing the higher costs for oil imports resulting from the combined effect of U.S. import demand and OPEC market power on the world oil price (also known as ''monopsony'' power), (2) disruption costs representing the risk of reductions in U.S. economic input and disruption of the domestic economy caused by sudden reductions in the supply of imported oil to the U.S., and (3) military security and strategic petroleum reserve costs representing the costs for maintaining a U.S. presence to secure imported oil supplies from unstable regions and for maintaining the Strategic Petroleum Reserve (SPR) to cushion against resulting price increases.

In the NPRM, we estimated that total value of externalities at 8.3 cents per gallon. This figure combined 4.8 cents per gallon in demand costs (monopsony effect) and 3.5 cents per gallon in supply disruption costs. Because the costs of maintaining a SPR have not varied in response to changes in oil import level, our analysis did not include any costs savings from maintaining a smaller SPR among the external benefits of reducing gasoline consumption and petroleum imports by means of a higher CAFE standard for light-duty trucks.

In response to our valuation of these externalities, the Alliance stated that an appropriate value for an oil import externality is zero because the sum of the externalities is exceedingly small. It argued that if the U.S. reduced oil consumption, it would, in theory, benefit from a reduction in oil price. The Alliance also pointed to studies by the Congressional Research Service and Bohi and Toman indicating that they question the existence of any significant externality associated with oil supply disruptions. Similarly, General Motors, citing to a study by Bohi and Toman of Resources for the Future, commented that NHTSA should not include monopsony power because U.S. monopsony pricing power has marginal benefits at best. Also, General Motors argues, citing to Bohi and Toman and a study by the Congressional Research Service, that disruption costs should not be included in the agency's analysis because the private sector uses hedges, inventories and the SPR to mitigate the risks from any significant market failure. The Mercatus Center stated that the link between energy security and fuel economy is not well known, but likely close to zero, because energy security relates to the price of oil, not its origin.

NHTSA does not agree with commenters on the value of these externalities. The extent of monopsony power is dependent upon a complex set of factors including the relative importance of U.S. imports in the world oil market, and the sensitivity of petroleum supply and demand to its world price among other participants in the international oil market.

As discussed in Chapter VIII of the FEA, most evidence appears to suggest that variation in U.S. demand for imported petroleum continues to exert some influence on world oil prices. A detailed and careful analysis by Leiby *et al.* (1993) estimated a range of values for this cost corresponding to approximately $1.00–$3.00 per barrel in today's dollar terms. Using the midpoint of this range, reducing the level of U.S. oil imports by raising CAFE standard to lower future gasoline use by light trucks results in benefits to the U.S. economy of approximately $0.48 per gallon of gasoline.

With regard to disruption costs, while the vulnerability of the U.S. to oil price shocks is widely thought to depend on total petroleum consumption rather than on the level of oil imports, variation in imports is still likely to have some effect on the magnitude of the price increase resulting from any disruption of import supply. In addition, changing the quantity of petroleum imported into the U.S. may also affect the probability that such a disruption will occur. If either the size of the resulting price increase or the probability that U.S. oil imports will be disrupted is affected by the pre-disruption level of oil imports, the expected value of the costs stemming from the supply disruptions will also vary in response to the level of oil imports.

Another detailed and exhaustive study by Leiby *et al.* (1997) estimates that, under reasonable assumptions about the probability that import supplies will be disrupted to varying degrees in the future, this component of the social costs of oil imports ranges from well under $10.00 to approximately $2.00 per additional barrel of oil imported by the U.S. The agency believes that an estimate of approximately $1.50 per barrel (or 3.5 cents per gallon) is reasonable for the disruption costs component of imported petroleum and that reductions in the level of oil imports resulting from

[8] Specifically, our analysis adjusted the estimated usage figure for ''age zero'' light trucks (those sold during the calendar year preceding their model year) to assume that they are in service for an average of two months of the calendar year in which the vehicles of each model year are introduced. This assumption is intended to reflect the typical dates on which the vehicles of a model year are introduced and monthly sales patterns for recent model years. Similarly, we adjusted the usage figure for ''age 1'' light trucks (those sold during the same calendar year as their model year) using the assumptions that one-quarter of those vehicles had been purchased during the previous calendar year and were thus in service for the entire calendar year, and that the remaining three-quarters were purchased throughout the first eight months of the following year (and were thus in service for, on average, two-thirds of that year). These assumptions are consistent with monthly sales patterns for recent model-year light trucks.

gasoline savings in response to a higher CAFE standard for light-duty trucks would reduce disruption costs by this amount in addition to the value of savings in gasoline itself.

General Motors and Lutter and Kravitz commented that the agency's economic analysis should include the external costs of increased congestion, noise, and accidents caused by additional driving due to the rebound effect. While the agency views the values provided by Lutter and Kravitz and General Motors out of the mainstream of estimates, the agency has decided to add these costs into its analysis. The agency reviewed several sources for estimates, including FHWA, and determined that it will use a figure of 4.0 cents, 2.15 cents, and 0.06 cents per vehicle-mile for congestion, accident, and noise costs, respectively.

Both vehicle manufacturers and consumer groups commented on the effect of higher vehicle prices on sales. Consumer groups argued that consumers are willing to pay more for fuel economy. Honda, on the other hand, questioned whether consumers would trade other features for fuel economy and whether they would consider fuel economy savings beyond their ownership period. The agency has decided to add into its analysis a discussion of the impacts of higher prices on sales. Based on the economic literature, cited in Chapter VII of the FEA, a price elasticity of 1.0 is assumed. The agency believes that higher light truck prices could shift some new vehicle sales from light trucks to automobiles and might also delay retirement and replacement of used vehicles.

The agency has also decided to provide a value associated with the benefits attained through refueling time saved over the lifetime of the vehicle. No direct estimates of the value of extended vehicle range were readily available, so our analysis calculates the reduction in the annual number of required refueling cycles that results from improved fuel economy, and applies DOT-recommended values of travel time savings to convert the resulting time savings to their economic value. (*See* Chapter VIII of the FEA for a detailed description of those values.) The estimated change in required refueling frequency reflects the increased light truck use associated with the rebound effect, as well as the increased driving range stemming from higher fuel economy. The present value of lifetime social benefit from extended vehicle range are estimated at $22.6 million for MY 2005, 73.2 million for MY 2006, and 107.7 million for MY 2007. We recognize that this value may represent an upper bound estimate of this benefit. Some people may periodically refuel their vehicles (*e.g.,* each weekend) regardless of how much fuel they have.

g. Refinery Emissions/GREET

In order to estimate the contribution of refinery emissions, we employed the GREET model in our analysis. The Draft Environmental Assessment included petroleum refining and distribution emissions as representative of ''upstream'' emissions. The agency calculated the changes in these upstream emissions under the proposal. General Motors commented that the agency incorrectly used extraction emissions factors in its analysis.

Upon reviewing this issue, the agency agrees with General Motors' comment that we did not appropriately account for the emissions reductions likely to result from gasoline savings due to the agency's CAFE action. However, the agency disagrees with General Motors' contention that emissions attributable to petroleum extraction would be unaffected by the action and should thus be excluded from its analysis of the action's potential environmental impacts.

In response to General Motors' comments, we have used information derived from the GREET model to disaggregate total emissions throughout the gasoline supply process into those occurring during each of the different stages in that process, and we have employed these disaggregated emission factors to develop more reliable estimates of the reduction in emissions associated with lower gasoline consumption by light trucks. Specifically, we have used information extracted from the GREET model to develop separate estimates of emissions that occur during each of four phases of the gasoline production and distribution process: crude oil extraction; crude oil storage and transportation to refineries; gasoline refining; and transportation, storage, and distribution of refined gasoline. (Emissions that occur during vehicle refueling at gasoline stations are included in our estimates of increased emissions from additional light truck use due to the rebound effect, and are presented separately in the analysis.)

Our revised analysis incorporates the following assumptions in estimating the reductions in these emissions from lower gasoline use by light trucks: (1) Reductions in imports of gasoline reduce emissions associated with gasoline transportation, storage, and distribution; (2) reductions in domestic refining of gasoline from imported crude oil reduce emissions associated with crude oil transportation and storage, crude oil refining into gasoline, and gasoline transportation, storage, and distribution; and (3) reductions in domestic refining of gasoline from domestically-produced crude oil reduce emissions associated with crude oil extraction, crude oil transportation and storage, gasoline refining, and gasoline transportation, storage, and distribution.[9]

We use these assumptions in conjunction with the disaggregated emission factors for each phase of the gasoline supply process and assumptions regarding the reductions in imports and domestic refining of gasoline (see foreign-domestic split, below) attributable to fuel savings from this final rule. The resulting estimates of emissions reductions associated with gasoline supply and distribution are reflected in our calculations. We believe that these estimates respond to General Motors' concerns.

h. Foreign-Domestic Split

In the NPRM, we assumed that 45 percent of the reduction in fuel use would be reflected in reduced domestic gasoline refining, and that the remaining 55 percent would be met by reduced imports of refined gasoline. We stated, ''Part of the fuel savings resulting from the Proposed Action leads to lower U.S. imports of refined gasoline, and thus does not affect refinery emission levels in the U.S. However, the remaining fuel savings are assumed to reduce the volume of gasoline refined within the U.S. (from either imported or domestically-produced crude petroleum), which produces a corresponding reduction in criteria pollutant refinery emissions. This analysis assumes 55 percent of refined gasoline is imported and 45 percent is refined domestically.'' This estimate was based on a detailed analysis of differences in gasoline consumption, imports, and domestic refining between the ''Low Economic Case'' and the ''Reference Case'' forecasts presented in the EIA's AEO 2002. (This analysis was conducted by EIA at the request of the agency.)

General Motors questioned this assumption, stating that there is little evidence that this same proportion

[9] In effect, these assumptions imply that the distance that crude oil typically travels to reach refineries is approximately the same regardless of whether it is transported from domestic oilfields or import terminals, and that the distance that domestically-refined gasoline travels from refineries to retail gasoline stations is approximately the same as foreign-refined gasoline must be transported from import terminals to these same gasoline stations.

would apply to reductions in fuel use under the proposal. General Motors cited new low sulfur fuel requirements and suggested that this might constrain the ability of foreign suppliers to meet U.S. refined fuel needs, with the result that a reduction in fuel consumption could lead to lower imports of refined gasoline rather than less refining in the U.S. General Motors also questioned the existence of emission reductions from domestic oil refineries based on the idea that they might fall under a cap and trade system, which would allow them to trade any potential reduction in emissions or adjust production to remain at the cap. Finally, General Motors commented that the domestic-import split in refined gasoline should be examined in terms of its marginal effects on refinery and other sources of emissions during the gasoline supply process.

In response to General Motors' comment about emissions caps, the agency contacted EPA, which stated that refineries are not regulated under any national cap and trade system. While refineries in States with Clean Air Act State Implementation Plans may be under some regulatory framework at the local or regional level, we found no regulatory programs that lead us to question the existence of real reductions in refinery emissions from baseline levels. General Motors' comment that the domestic-import split be examined in terms of its marginal effects on emissions is addressed elsewhere in this document.

Based on the remainder of General Motors' comments, we have reexamined this issue and have determined that additional data are available to support a revised assumption about the distribution of CAFE fuel savings between savings in gasoline imports and reduced domestic refining. More detailed data obtained from EIA provide a direct measure of historical and current variations in imported and domestic sources of gasoline in response to variations in U.S. gasoline consumption. Although test data capture the integrated effect of all factors—not just fuel economy—that influence the market for gasoline, we believe that as observations rather than forecasts, they provide one reliable source of information related to this issue. According to the EIA, ''In 2001, United States refineries produced over 90 percent of the gasoline used in the United States.'' Current EIA data [10] for the four-week period ending February 14, 2003 corroborate this figure by stating that 91.5 percent (7.939 MBPD) of the gasoline used by the U.S. during that period was refined domestically, and 8.5 percent (0.736 MBPD) was imported. These data (although not on an on-the-margin basis) produce an estimate that approximately 90 percent of the reduction in fuel use from the proposed CAFE standard would be met by lower domestic refining, while the remaining 10 percent would be reflected in reduced imports of refined gasoline.

Analysis of historical data concerning variations in gasoline consumption and imports reported by EIA supports a similar estimate of the likely response to gasoline savings. This analysis compares annual changes in domestic gasoline refining and gasoline imports to annual changes in U.S. gasoline consumption. From the period 1992 to 2002, growth in foreign refining accounted for 10 percent of the total growth in gasoline consumption.[11] EPA has also assumed a similar distribution of reductions in domestic and foreign refining in some analyses of potential reductions in refinery emissions in response to gasoline savings.

General Motors' criticism of the agency's analysis of refining emissions based on the theory that the pending low sulfur fuel regulations (part of the ''Tier 2'' regulations) [12] might inhibit foreign refiners from being able to meet increased U.S. gasoline demand appears to misinterpret the analysis presented in the Draft Environmental Assessment. The Tier 2 regulations are not a part of the agency's CAFE action, but they do provide part of the backdrop against which we must evaluate our action. If the low sulfur requirements do result in an increased fraction of U.S. gasoline consumption being supplied by domestic refiners, as General Motors suggests, it follows that a similarly increased fraction of fuel savings resulting from the agency's CAFE action would be reflected in reduced domestic refining, with the result that the associated domestic emissions from gasoline refining would be reduced by more than would otherwise be the case. Thus General Motors' comment supports rather than undermines the agency's treatment of potential emissions reductions from reduced domestic refining.

We acknowledge, however, that the distribution of fuel savings between reductions in domestic refining (90 percent) and reductions in gasoline imports (the remaining 10 percent) discussed above differs from the distribution forecast by EIA's National Energy Modeling System (NEMS). Following DOE's release of the version of NEMS used to develop Annual Energy Outlook 2003 (AEO 2003), we used this modeling system to explore this issue more closely. To develop a baseline, we ran the model with all inputs at values provided by DOE for the AEO 2003 reference case. To test the effects of the Proposed Action, we then ran the model after changing only those inputs corresponding to light truck CAFE standards. For each calendar year during 2006–2020, we calculated the extent to which these cases differed in terms of petroleum product consumption and imports. We then calculated the ratio between changes in imports and changes in consumption. Unexpectedly, total petroleum product imports were calculated to be 0.039 quads higher in 2006 with the proposed standards than in the reference case, although this was more than offset by a calculated 0.073 quad decline in crude oil imports. Thus, the above-mentioned ratio was −1.05 in 2006. However, during the rest of the period, petroleum product imports were calculated to be lower always with the proposed light truck standards than in the reference case, and the ratio of changes in petroleum product imports to changes in petroleum product consumption ranged from 0.62 to 1.14. As for cumulative changes, the ratio was 0.97 during 2006–2020 and 0.99 during 2007–2020. In other words, for every CAFE-induced 100-gallon reduction in petroleum product consumption, NEMS predicted that petroleum product imports would fall by 97–99 gallons.

We have discussed the disparity between these forecast trends and the implications of current and historic gasoline supply data with representatives of the Department of Energy (DOE) and EIA. They acknowledge that predicting the specific gasoline supply sources likely to be affected by the reductions in U.S. gasoline use associated with the new CAFE standards is extremely difficult and its results uncertain. DOE also indicated that the sources of changes in refined gasoline supply vary greatly by region of the U.S., with nearly all variation in gasoline demand on the East Coast met by changes in supply from foreign refiners, while changes in demand in other regions of the U.S. are

[10] *www.eia.gov,* ''This Week in Gasoline,'' four-week period ending February 14, 2003.

[11] Calculated from data reported in Energy Information Administration, Monthly Energy Review Database, ''Petroleum,'' Table 3.4 (*http://www.eia.doe.gov/emeu/mer/mets/table3_4.xls*).

[12] The Tier 2 limits on gasoline sulfur content are schedule to take effect beginning in 2006; for details, see EPA, Tier 2/Gasoline Sulfur Final Rulemaking (*http://www.epa.gov/otaq/tr2home.htm*).

met almost entirely by changes in domestic refining activity. As a consequence, the specific geographic pattern of fuel savings resulting from the agency's action—which depends in turn on the distribution of light truck purchases and use—is likely to influence the mix of reduced gasoline imports and domestic refining that occurs in response to these fuel savings.

The agency believes that the consistent association between changes in gasoline demand and domestic refining activity revealed in current and historical data is notable, and that the effect of the pending Tier 2 fuel standards will reinforce this association. However, we also realize that the effects of future variation in gasoline demand on foreign and domestic sources of supply may differ from these historical patterns. Since the new CAFE standards will take effect in the future, the agency believes it is prudent also to consider these forecast changes in foreign and domestic gasoline supply in its analysis.

In an effort to do so, as well as to recognize the uncertainty inherent in forecasting the future effects of lower gasoline demand on specific supply pathways, the agency has elected to assume that 50 percent of the reduction in future light truck gasoline use resulting from its action will be reflected in reduced imports of refined gasoline, while the remaining 50 percent will be translated into reductions in domestic gasoline refining. The agency recognizes that neither historical data nor forecast trends indicate that changes in gasoline use are likely to have equal effects on gasoline imports and domestic refining. However, this assumed distribution represents a probability-weighted average impact of reduced gasoline consumption, which incorporates both the extreme range of possible outcomes suggested by historical and forecast data, as well as the approximately equal likelihood that either outcome will occur.

The agency further assumes that the resulting decline in U.S. gasoline production will reduce domestic refiners' use of imported and domestic crude petroleum feedstocks in direct proportion to their current fractions of total U.S. refinery feedstock use. The implications of these assumptions for the resulting changes in emissions occurring during various phases of the gasoline supply chain are discussed in detail elsewhere in this document, addressing General Motors' concern that the agency examine the domestic-import split in terms of its marginal effects on refining and other sources of emissions.

i. Greenhouse/Carbon Emissions

Environmental Defense requested that NHTSA place a value on the benefit of avoided greenhouse gas emissions, while also noting the magnitude of the global warming externality is admittedly difficult to estimate. The value of avoiding greenhouse gas emissions is unquantifiable at this time. However, our analysis in the Environmental Assessment indicates that if the proposed standards were adopted in the final rule, they would result in an estimated 9.4 million metric tons of avoided greenhouse gas emissions over the 25-year lifetime of the vehicles (measured in terms of carbon equivalents).

3. Comparison of Estimated Costs to Estimated Societal Benefits

NHTSA estimates that the direct fuel-savings to consumers account for the majority of the total social benefits, and exceed the estimated costs of adopting more fuel-efficient technologies. In sum, the total incremental costs by model year compared to the incremental societal benefits by model year are as follows:

[Dollars in millions]

Model year	Total costs	Total societal benefits	Net benefits
2005	$170	$218	$48
2006	537	645	108
2007	862	955	93

In light of these figures, we have concluded that the final rule serves the overall interests of the American people and is consistent with the balancing that Congress has directed us to do when establishing CAFE standards. For all the reasons stated above, we believe the final rule is economically practicable and, independently, that it is a cost beneficial advancement for American society.

a. Consumer Choice

In their comments on the NPRM, automobile manufacturers argued that in a well-functioning market with fully informed consumers and manufacturers, consumers would take into account the savings to themselves associated with more fuel-efficient vehicles. Therefore, if the value of cumulative fuel savings exceeded the additional price and associated financing cost of purchasing a more fuel-efficient vehicle, consumers should be inclined to buy these vehicles and producers should be inclined to sell them. The Mercatus Center stated that the analysis should include foregone benefit to consumers from not being able to choose attributes they prefer in a vehicle.

The automobile manufacturers and Mercatus Center raised these issues and arguments because they do not believe that there is a market failure in the market place. Many commenters asserted that NHTSA had made a determination that there is a market failure in the provision of vehicle fuel efficiency. In the NPRM, the agency did not make any such determination. NHTSA noted a paradox that cost-saving technologies appeared to be penetrating the market to only a limited extent and therefore sought public comment on possible sources of market failure.

First, on the supply side of the vehicle market, it is well known that the light truck market is concentrated in three large producers who account for roughly 75 percent of market share, although there are a number of smaller producers that account for the remaining 25 percent. As several commenters noted, there is substantial evidence of competition among producers in the light truck market and indications that the three large producers are under increasing competition from the smaller producers. Under these circumstances, NHTSA maintains its previous statement that there is only a ''remote'' possibility that a supply side failure in the marketplace accounts for the limited market penetration of cost-saving, fuel-saving technologies.

Second, commenters discussed whether there could be a failure on the demand side of the market for fuel economy, rooted perhaps in the way that consumers perceive the private benefits of enhanced fuel economy and incorporate that information in their purchasing decisions. Several commenters noted that consumers are provided clear and substantial information about the fuel efficiency ratings of different vehicles, including information about the operating expenses associated with these fuel efficiency ratings. However, the argument for demand side failure may have less to do with the absence of consumer information about fuel efficiency than with the overall complexity of the vehicle-purchasing decision, the number of other factors of greater salience to consumers, the temporal aspects of ownership and resale, and the difficulty of weighing fuel efficiency differences against other (especially nonmonetary) attributes of vehicles. Rational consumers, cognizant of decision making costs, may use simplified decision rules when purchasing vehicles that give limited, diminished or no weight to fuel

economy differences—at least when projected fuel prices are relatively low. The agency does not know whether this demand-side argument is true and did not receive much comment that supports or refutes it. The agency believes the plausibility of this argument is less remote than the supply-side argument but still quite speculative. Regardless of how consumers perceive fuel economy benefits when they make purchasing decisions, it is clear that consumers will experience the benefits of cost-saving technologies when they operate their vehicles—assuming the engineering-economics information underlying the NAS Report is accurate.

b. EIA Analysis and Employment

As part of the interagency review process, the EIA provided NHTSA with a preliminary analysis of the energy and economic impacts of an increase in light truck CAFE standards comparable to the proposed rule. NHTSA discussed this analysis in the NPRM and included a copy of it in the docket for the rulemaking. Specifically, EIA analyzed standards of 21.2, 21.7, and 22.2 mpg for MYs 2005–2007, respectively. Using its NEMS, EIA's analysis indicated that the actual average fuel economy of new light trucks would increase to 21.7 mpg in MY 2005—well beyond the 21.2 mpg required during that year—but would fall slightly short of the 22.2 mpg standard by MY 2007. The EIA analysis also projected that NHTSA's proposed rule would cause a greater increase in the cost of light trucks than estimated by NHTSA and a slight reduction in the average weight of light trucks. NHTSA estimated no weight reduction. EIA's estimates of fuel savings resulting from stricter CAFE standards for light trucks also appear to be larger than those calculated in NHTSA's analysis. Finally, EIA's projected effects on employment and real GDP are slightly negative through 2010, but become positive during 2011 to 2020.

The automobile industry commented that EIA's analysis differed from NHTSA's in that its projected effects on employment and real GDP are slightly negative through 2010, but become positive during 2011 to 2020. Additionally, commenters noted that recent studies by the Congressional Budget Office and Professor Kleit concluded that CAFE standards are not cost-effective.

As discussed in the NPRM, the differences in results of the two analyses of the proposed light truck standards stem primarily from differences in the underlying approaches of models. For example, the NEMS model effectively treats all manufacturers identically, while NHTSA's approach relies heavily on detailed manufacturer-specific data. As a result of these differences, NHTSA's approach has advantages for analyzing the effects of near-term modest increases, while the NEMS approach is more useful for analyzing longer-term industry-wide effects of larger increases in the standards. For shorter-term analysis of modest increases in required fuel economy levels, confidential information about the differences in the relative fuel economy capabilities of the individual manufacturers at the model-specific level is essential. This is because the technology application burdens and cost impacts imposed on individual manufacturers by the stricter standards will differ significantly. Where longer-term, industry-wide analysis of significant increases in CAFE standards is required, current differences in manufacturer capabilities become much less relevant. In addition, NEMS'' ability to estimate macroeconomic ''feedbacks'' from stricter CAFE standards is very useful.

20/20 Vision also commented on employment by stating that their study, ''Fuel Standards and Jobs,'' shows that raising CAFE standards by 20 percent in 2010 would net 70,000 jobs by 2010 and 30,000 jobs by 2020. This study used a large-scale econometric 80-order interindustry model of the U.S. economy using the Management Information Services, Inc. (MISI) model. This model assumes no major market penetration of hybrid, fuel cell, or alternative fuel vehicles. Public Citizen cited ''Drilling in Detroit,'' a report by the Union of Concerned Scientists, in support of the proposition that increased CAFE standards would lead to increased employment.

Based on our analysis of the MISI assumptions, the actual employment effects of this rulemaking would be much less than that asserted by 20/20 Vision for a number of reasons.

First, because 20/20 Vision's model assumed a 20 percent increase in CAFE for passenger cars and light trucks, and light trucks are about 50 percent of the market, its estimates should be multiplied by 0.5 for this light truck rulemaking. Second, since the proposed CAFE standard increase by NHTSA is about 7 percent (22.2/20.7 mpg) rather than 20 percent, if the model were linear, the estimate might be multiplied by 0.35 (7/20).

Third, the assumed cost impact ($700 per vehicle, which is related to the 20 percent increase in fuel economy) is disproportionately high compared to our estimate for this rule. Fourth, the MISI model translates increased expenditures for reconfigured motor vehicles into per unit outputs for that industry and support industries. This assumption is not appropriate. Many of the technology improvements would not increase the number of jobs. For example, moving from a 4-speed to a 5-speed or 6-speed automatic transmission would result in very few additional jobs and changing tires would result in very few additional jobs. It appears that the MISI model assumes that these are increases rather than substitutions of technologies.

Fifth, 20/20 Vision's analysis of a 30 percent increase in CAFE estimates an increase in the Motor Vehicle and Equipment Industry of about 155,000 jobs. This number seems implausible to the agency because there are currently only 900,00 jobs in the industry. Finally, the MISI model does not seem to take into account that higher prices potentially reduce sales and thus employment levels.

VIII. The Effect of Other Federal Vehicle Standards on Fuel Economy

The statute specifically directs us to consider the impact of other Federal vehicle standards on fuel economy. This statutory factor constitutes an express recognition that fuel economy standards should not be set without due consideration given to the effects of efforts to address other regulatory concerns, such as motor vehicle safety and emissions. The primary influence of many of these regulations is the addition of weight to the vehicle, with the commensurate reduction in fuel economy.

A. Federal Motor Vehicle Safety Standards

The agency has evaluated the impact of the Federal Motor Vehicle Safety Standards (FMVSS) using MY 2001 vehicles as a baseline. We have issued or proposed to issue a number of FMVSSs that become effective between the MY 2001 baseline and MY 2007. The fuel economy impact, if any, of these new requirements will take the form of increased vehicle weight resulting from the design changes needed to meet new FMVSSs.

The average test weight (roughly equal to curb weight plus 300 pounds) of the light truck fleet in MY 2001 was 4,501 pounds. The average test weight for General Motors, Ford, and DaimlerChrysler light trucks subject to the CAFE standard for MY 2001 was 4,627 pounds. The average test weight for light trucks of these three manufacturers is expected to increase slightly between MY 2001 and MY

2007. The change in weight includes all factors, such as changes in fleet mix of vehicles, required safety improvements, and voluntary safety improvements. Our review of new safety requirements that will apply to the MY 2005–2007 light truck fleet indicates that compliance with the following safety standards will have an impact on vehicle weight:

1. FMVSS 138, Tire Pressure Monitoring Systems

As required by the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act, NHTSA published a final rule in June 2002 (67 FR 38704) requiring Tire Pressure Monitoring Systems (TPMS) be installed in all passenger cars, multipurpose passenger vehicles, trucks and buses that have a GVWR of 10,000 pounds or less, effective in November 2003. We estimated that the added weight would be that of electrical parts weighing not more than half a pound (0.23 kilograms or less) per vehicle. Ford submitted comments indicating that NHTSA's projection underestimated the weight penalty for complying with this standard. However, Ford's suggested weight penalty was not significantly higher than that estimated by the agency and would not have any greater impact on fuel economy.

2. FMVSS 139, Tire Upgrade

The TREAD Act mandated rulemaking to revise and update our safety performance requirements for tires. On March 5, 2002, NHTSA published a proposal to upgrade those requirements (67 FR 10050). Our Preliminary Economic Assessment for the proposed tire upgrade indicated there would be added cost for the improved tires but no increased weight. We also observed that changes to the required normal load ratings for passenger car tires might make it necessary for some of these vehicles to have larger tires, which would add an undetermined minimal amount of weight to those vehicles. In regard to light trucks, we observed that the agency's proposal would, for the first time, establish a maximum vehicle normal load rating for light truck tires but did not indicate if meeting the requirement would make it necessary for manufacturers to use larger rims and tires on their trucks.

Both Ford and General Motors submitted comments indicating that the proposed requirements of FMVSS 139 could have significant impacts on fuel economy. Ford indicated that the agency's proposed rule would impose weight increases from a need to make tires heavier and for rims on vehicles to be larger. General Motors' comments indicated a belief that the proposed requirements could have a serious impact on fuel economy by increasing rolling resistance.

Although NHTSA has not yet issued a final rule, the agency believes that the concerns raised by Ford and General Motors are not well founded. While General Motors did not indicate with specificity exactly why it believed that FMVSS 139 would increase rolling resistance, NHTSA believes that the standard is more likely to decrease rolling resistance. One component of NHTSA's proposal for FMVSS 139 is new requirements for high-speed endurance. Meeting these new endurance requirements is likely to result in tires that have less, rather than more, rolling resistance. One of the principal factors affecting tire endurance at high speeds is heat buildup in the tire. Tires with less rolling resistance generate less heat and have more endurance. Therefore, the new requirements are likely to encourage tires with less rolling resistance.

Ford's concern, which indicated a weight penalty from heavier tires and rims, evidently stems from a concern that complying with new high speed test requirements in FMVSS 139 and application of the load reserve requirements of FMVSS 110 to light trucks will force manufacturers to use heavier tires and rims on these trucks. FMVSS 110 specifies requirements for tire and rim selection for new vehicles. One purpose of these requirements is to prevent tire overloading by specifying that rims and tires provide a minimum load reserve.

According to Ford, the agency's proposal to modify FMVSS 139 and 110 to require light truck manufacturers to meet these load reserve requirements could, for those light trucks that did not already meet the new load reserve requirements, have the effect of making it necessary for manufacturers to use larger wheels and tires on their vehicles. However, NHTSA is currently evaluating its proposal in light of the public comments and has not yet issued a final rule. We anticipate that the agency's concerns relating to overloading will be addressed without creating a need to equip light trucks with larger wheels and tires.

3. FMVSS 201, Occupant Protection in Interior Impact

This standard specifies requirements to afford protection for occupants from impacts with interior parts of the vehicle. On April 5, 2000, NHTSA issued a proposal to require that the door frames on pillarless multi-door vehicles and seat belt mounting structures on soft top utility vehicles meet the upper interior head protection requirements of FMVSS 201. The proposed requirements would apply to passenger cars and to multipurpose vehicles, trucks, and buses with a GVWR of 10,000 pounds (4,536 kilograms) or less. Because these proposed requirements will apply only to a very small percentage of light vehicles, the agency believes that the requirements will not have an effect on the CAFE of any manufacturer. Finally, we note that none of the commenters attributed any fuel economy impacts to this standard.

4. FMVSS 202, Head Restraints

In January 2001, the agency published a proposal to improve front seat head restraints in passenger cars, pickups, vans, and utility vehicles and require head restraints in the rear outboard positions (66 FR 967). Because many pickup trucks and some vans do not have back seats, their average weight increase under that rulemaking would be lower than that for automobiles. NHTSA estimated the average weight gain for light trucks, vans and SUVs would be 4.3 pounds (1.94 kilograms) per vehicle. The agency proposed three years leadtime for the head restraints final rule. Since that rule has not been issued yet, the earliest effective date would be September 1, 2006 or MY 2007. Therefore, any weight penalty would be limited to MY 2007.

Ford was the only commenter to suggest that the FMVSS 202 rulemaking might have any impact on CAFE, based on the proposal to require rear head restraints. The company estimated a weight penalty that was based on its view that the FMVSS 202 final rule would require head restraints in some rear seating positions presently not equipped with them. NHTSA notes that the asserted weight penalty would not affect the significant number of vehicles in the light truck fleet that do not have rear seats. Based on the distribution of potential rear seat head restraints across Ford's fleet, we agree that vehicles with rear seats might experience a weight penalty for compliance with FMVSS 202 if rear seat head restraints were required. However, neither the weight increase estimated by Ford nor that estimated by the agency is significant enough to affect Ford's ability to meet the MY 2007 standard.

5. FMVSS 208, Occupant Crash Protection

On May 12, 2000, NHTSA published a final rule (65 FR 30680) amending our

occupant crash protection standard. The requirements of the final rule will be phased-in by increasing percentages during MYs 2005–2007. While only portions of the MY 2005 and MY 2006 fleets will be required to comply, all of the MY 2007 fleet will be required to comply. To comply, manufacturers will have to install air bag sensors, switches, status indicators, and associated electrical equipment. We estimate the average weight gain will be 3.4 pounds (1.54 kilograms).

In Ford's view, significant additional weight would be required to meet the occupant protection requirements. Ford attributed some of this weight to air bag sensors and other equipment. Ford also anticipates additional weight increases as a result of efforts to comply with the planned rulemaking to establish frontal offset crash requirements. Ford did not, however, indicate which portion of the weight penalty it claimed was attributable to the May 2000 final rule, and which might be attributable to the frontal offset crash requirements. Based on our knowledge of the weight of items that would have to be installed to meet the May 2000 final rule, we believe that bulk of the claimed weight penalties for FMVSS 208 are related to the frontal offset crash requirements currently under study. The agency has not yet issued a frontal offset proposal, nor considered the model years to which any new requirements would apply.

6. FMVSS 225, Child Restraint Anchorage Systems

On March 5, 1999, NHTSA published a final rule establishing FMVSS 225, Child Restraint Anchorage Systems, requiring vehicle manufacturers to install child restraint anchorage systems that are standardized and independent of the vehicle seat belts (64 FR 10786). The FEA (February 1999) for FMVSS 225 estimates the additional weight for improved anchorages will be less than 1 pound (0.45 kilogram). Ford believes that, in addition, some of its vehicles will require structural reinforcement to meet anchorage strength requirements in FMVSS 225. Ford alleges that NHTSA significantly underestimated the weight penalties imposed by these child restraint anchorage requirements and claimed that its CAFE efforts would be hampered by this added weight.

We do not believe this FMVSS will adversely affect CAFE performance. Ford's claimed weight penalties appear to assume that all light trucks will require significant additional structure. However, we believe that any need for additional structure will be much more limited than Ford claims. Our estimate is that some additional weight will be necessary, but we do not believe that Ford provided compelling evidence to alter our assessment that the impact of the FMVSS 225 requirements, will impose an inconsequential weight penalty with no adverse CAFE effect.

7. FMVSS 301, Fuel System Integrity

On November 12, 2000, NHTSA published a proposal (65 FR 67693) to amend the fuel system integrity requirements for rear-end and side crashes and resulting fuel leaks. Although a few models (generally in the middle of their production lives) might require heavy additions such as a polymer guard for the bottom of the fuel tank, most would not. Many of the vehicles to be produced for MYs 2005–2007 have anticipated the new requirements and have been designed to comply with them. We believe manufacturers will be able to meet the new requirements through the addition of lightweight items such as flexible filler necks. We estimate the average weight gain for light trucks not currently built to the new requirements to be 0.24 pounds (0.11 kilograms) per vehicle.

8. Cumulative Weight Impacts of the FMVSSs

In total, NHTSA estimates that weight additions necessitated by the FMVSS requirements that will become effective between the MY 2001 fleet and MY 2007 fleet will average about 9.5 pounds per vehicle.

NHTSA examined the changes in safety-related weight, regardless of whether mandatory or voluntary, from the plans submitted in response to the RFC and the NPRM to see if there were changes affecting their fuel economy levels. Only Ford took issue with our estimates of weight penalties and provided enough data for a complete analysis. Taken together, Ford's submissions in response to the RFC and the NPRM estimated weight impacts for complying with FMVSSs ranging from approximately 100 to 200 pounds per vehicle. Ford indicated that these weight impacts could reduce its fuel economy by approximately 0.20 mpg to 0.30 mpg. Our reading of Ford's comments indicates that the bulk of this weight increase is attributable to that company's belief that the agency will require light trucks to meet a frontal offset crash test requirement for FMVSS 208. Ford also attributes a significant weight increase to child restraint anchorage requirements and our current proposal to upgrade tire performance.

The agency agrees that we must consider all of our regulatory programs, as well as those of other agencies, when establishing CAFE standards. We also agree that we should consider anticipated requirements as well as those that have been finalized. Having done so, however, we do not believe that new safety requirements likely to be applied to MYs 2005–2007 necessitate any reduction in the proposed standards. It appears that there is a small increase in safety related weight for FMVSS 225 for MYs 2005 and 2006 and a somewhat larger increase in safety related weight if a final rule incorporating the proposed requirements for FMVSS 202 is promulgated and applies to MY 2007 light trucks. The CAFE penalties for these weight increases are too small to alter the agency's estimates of Ford's capabilities in these years. Further, the rulemaking process will allow for ample opportunities for manufacturers to comment and the agency to consider whether any future rulemakings will in fact be inconsistent with this final rule.

B. Federal Motor Vehicle Emissions Standards

With input from EPA, NHTSA has evaluated the impact of a number of vehicle related emissions standards on fuel economy. In addition, NHTSA's Environmental Assessment examines how the CAFE standards impact air quality by affecting emissions of criteria pollutants. Many of these standards and regulations are currently being implemented through a multi-year phase-in. NHTSA believes there will not be any significant fuel economy impact between the MY 2001 baseline and MY 2007 resulting from federal or state emissions standards or regulations.

The agency's position with regard to the relationship between state laws and our federal fuel economy responsibility was set forth in the NPRM and has not changed. The EPCA statute contains a preemption provision intended to ensure a unified federal program to address motor vehicle fuel economy. As a result of that statute, no state may adopt or enforce any law or regulation relating to fuel economy.

1. Tier 2 Requirements

On February 10, 2000, EPA published a final rule (65 FR 6698) establishing new federal emissions standards for vehicles classified by EPA as passenger cars, light trucks and medium duty vehicles. These new emissions standards are known as Tier 2 standards. The Tier 2 standards marks the first time that the same set of federal emissions standards have been applied to all passenger cars, light trucks, and medium-duty passenger vehicles. Under the Tier 2 standards, light trucks include ''light light-duty trucks'' (or

LLDTs), rated at less than 6000 pounds GVWR and ''heavy light-duty trucks'' (or HLDTs), rated at more than 6000 pounds GVWR. For new passenger cars and light LDTs, the Tier 2 standards phase-in beginning in MY 2004, and are to be fully phased-in by MY 2007. During the phase-in period of MYs 2004–2007, all passenger cars and light LDTs not certified to the primary Tier 2 standards must meet an interim standard equivalent to the current National Low Emission Vehicle (NLEV) standards for light duty vehicles. In addition to establishing new emissions standards for vehicles, the Tier 2 standards also establish limits for the sulfur content of gasoline.

General Motors and Ford very briefly suggested, without explanation, the Tier 2 standards might limit diesel sales. It was unclear whether they were referring to current or advanced diesels. We note that EPA, when issuing the Tier 2 standards, responded to comments its received regarding the impact of the Tier 2 standard and its impact on the Supplemental Federal Test Procedure and concluded that the Tier 2 standards would not adversely affect fuel economy.

2. Onboard Refueling Vapor Recovery

On April 6, 1994, EPA published a final rule (59 FR 16262) establishing requirements controlling vehicle-refueling emissions through the use of onboard refueling vapor recovery (ORVR) vehicle-based systems. These requirements applied to light-duty vehicles beginning in MY 1998, and were phased-in over three model years. The ORVR requirements also apply to light-duty trucks with a gross vehicle weight rating up to 6000 lbs, beginning in MY 2001 and phasing-in over three model years at the same rate as for light-duty vehicles. For light-duty trucks with a gross vehicle weight rating of 6001–8500 lbs, the ORVR requirements first apply in MY 2004 and phase-in over three model years at the same rate as light-duty vehicles.

The ORVR requirements impose a small weight penalty on vehicles as they necessitate the installation of vapor recovery canisters and associated tubing and hardware. In its comments, Honda indicated that it did not agree with the assertion in the NPRM that the ORVR system, which results in fuel vapors being made available for combustion, provides a fuel economy benefit offsetting the weight of the system.

Assuming the correctness of Honda's argument that there are negligible fuel economy benefits from ORVR systems, we note that weight increases attributable to replacing older vapor recovery technology with ORVR compliant systems are not likely to be significant enough to have an impact on fuel economy.

3. Supplemental Federal Test Procedure

The Federal Test Procedure (FTP) contains the test conditions and procedures used by the EPA when conducting new vehicle emissions and fuel economy tests. On October 26, 1996, EPA published a final rule (61 FR 54852) revising the tailpipe emission portions of the Federal Test Procedure (FTP) for light-duty vehicles (LDVs) and light-duty trucks (LDTs). The revision created a Supplemental Federal Test Procedure (SFTP) designed to address shortcomings with the existing FTP in the representation of aggressive (high speed and/or high acceleration) driving behavior, rapid speed fluctuations, driving behavior following startup, and use of air conditioning. The SFTP also contains requirements designed to more accurately reflect real road forces on the test dynamometer. EPA chose to apply the SFTP requirements to trucks through a phase-in. Light-duty trucks with a gross vehicle weight rating (GVWR) up to 6000 lbs were subject to a three-year phase-in ending in MY 2002. Heavy light-duty trucks, those with a GVWR greater than 6000 lbs but not greater than 8500 lbs, are subject to a phase-in in which 40 percent of each manufacturer's production must meet the SFTP requirements in MY 2002, 80 percent in MY 2003, and 100 percent in MY 2004.

MY 2004 is the final year of the SFTP requirement phase-in for light trucks subject to CAFE standards. Neither Ford nor General Motors indicated in their comments on the MY 2004 CAFE NPRM that the SFTP requirements would have any impact on their ability to meet the MY 2004 standard.

Although DaimlerChrysler has indicated that the changes to the FTP will have a disproportionately negative impact on light truck fuel economy, EPA has determined that the net effect on fuel economy for the recent test procedure changes is near zero. EPA considered the effects of four test changes: single-roll electric dynamometer with full-speed load simulation, elimination of the 10 percent air conditioning load factor, elimination of the 5,500 pound maximum test weight for cars, and improved test equipment. While some changes decreased measured fuel economy, others raised it. The net result was a near zero effect. This determination was based on the total fleet, which is a mix of front wheel drive and rear wheel drive cars and trucks.

Considering light trucks alone is not likely to change that determination. The light truck fleet has a larger mix of rear wheel drive vehicles than the light vehicle fleet. This would lead to a slightly increased effect of the single roll dynamometer and thereby slightly lower measured fuel economy. However, the truck sub-class also has higher road load horsepower than the combined fleet. This would lead to slightly higher effects due to the elimination of the 10 percent air conditioning load and thereby slightly higher measured fuel economy.

Consequently, there is no need to adjust the CAFE standards for these test procedures. The net effect of the combined test procedure changes on the truck sub-class is still expected to be near zero.

4. California Air Resources Board LEV II and Section 177 States

The State of California Low Emission Vehicle II regulations (LEV II) will apply to passenger cars and light trucks in MY 2004. The LEV II amendments restructure the light-duty truck category so that trucks with a gross vehicle weight rating of 8,500 pounds or lower are subject to the same low-emission vehicle standards as passenger cars. LEV II requirements also include more stringent emission standards for passenger car and light-duty truck LEVs and ultra low emission vehicles (ULEVs), and establish phase-in requirements that begin in 2004. During the initial year of the four-year phase-in, the LEV II standards require that 25 percent of production comply.

The agency notes that compliance with increased emission requirements is most often achieved through more sophisticated combustion management. The improvements and refinement in engine controls to achieve this end generally improve fuel efficiency and have a positive impact on fuel economy.

In summary, the agency believes that there will be no impact on fuel economy from emissions standards on light truck fuel economy between the baseline MY 2001 and MY 2007 fleets.

IX. The Need of the Nation To Conserve Energy

EPCA specifically directs the Department to balance the technological and economic challenges with the nation's need to conserve energy. While EPCA grew out of the energy crisis of the 1970s, the United States still faces considerable energy challenges today. Increasingly, U.S. energy consumption has been outstripping U.S. energy

production. This imbalance, if allowed to continue, will inevitably undermine our economy, our standard of living, and our national security. (May 2001 National Energy Policy (NEP) Overview, p. viii)

As was made clear in the first chapter of the NEP, efficient energy use and conservation are important elements of a comprehensive program to address the nation's current energy challenges:

> America's current energy challenges can be met with rapidly improving technology, dedicated leadership, and a comprehensive approach to our energy needs. Our challenge is clear—we must use technology to reduce demand for energy, repair and maintain our energy infrastructure, and increase energy supply. Today, the United States remains the world's undisputed technological leader: but recent events have demonstrated that we have yet to integrate 21st-century technology into an energy plan that is focused on wise energy use, production, efficiency, and conservation.

(Page 1–1)

Conserving energy, especially reducing the nation's dependence on imported petroleum, benefits the nation's efforts to address the energy challenges in several ways. Reducing total petroleum use and reducing petroleum imports decrease our economy's vulnerability to oil price shocks and improves our national security.

Over the long term, the development of advanced fuel cell technology, and an infrastructure to support it, will help achieve significant reductions in foreign oil dependence and stability in the world oil market. For the short term, the continued infusion of hybrid propulsion and advanced diesel vehicles into the U.S. light truck fleet may also contribute to reduced dependence on petroleum. Since the NPRM was issued, companies have announced enhanced efforts in this area. We believe it is possible, with substantial marketing and public policy support, to create a vibrant and efficient market for vehicles with advanced technologies by MY 2007.

The importance of improving the fuel economy of light trucks is evident from the effect that those vehicles are having on the overall fuel economy of light vehicles. As was noted in the NEP:

> Despite the adoption of more efficient transportation technologies, average fuel economy for passenger vehicles has remained relatively flat for ten years and is, in fact, at a twenty year low, in large part due to the growth and popularity of low fuel economy pickup trucks, van and sport utility vehicles.

(p. 4–9)

We have concluded that the increases to the light truck CAFE standards adopted in this final rule will contribute appropriately to energy conservation and the comprehensive energy program set forth in NEP. In assessing the impact of the standards, we accounted for the increased vehicle mileage that accompanies reduced costs to consumers associated with greater fuel efficiency and have concluded that the final rule will lead to considerable fuel savings. While increasing fuel economy without increasing the cost of fuel will lead to some additional vehicle travel, the overall impact on fuel conservation remains positive.

We acknowledge that, despite the CAFE program, the United States' dependence on foreign oil and petroleum consumption has increased in recent years. Nonetheless, data suggest that past fuel economy increases have had a major impact on U.S. petroleum use. The NAS determined that if the fuel efficiency of the vehicle fleet had not improved since the 1970s, the U.S. gasoline consumption and oil imports would be about 2.8 million barrels per day higher than they are today. Increasing fuel economy by 10 percent will produce an estimated 8 percent reduction in fuel consumption. Increases in the fuel economy of new vehicles eventually raise the fuel efficiency of all vehicles as older cars and trucks are scrapped.

Further, we do not believe that the increases in the light truck CAFE standards applicable to the 2005–2007 MYs will unduly lead to so-called ''energy waste.'' This theory, presented in comments responding to our Request for Comments and NPRM, rests on the notion that efforts to reduce energy use can result in negative economic effects from losses in product values, profits and worker incomes. As discussed above, the agency has determined that the CAFE standards can be achieved without significant adverse economic or safety consequences. Within the bounds of technological feasibility and economic practicability, the final rule will, in fact, enhance ''energy efficiency'' without adverse ancillary effects.

X. Balancing of Statutory Factors

In determining the maximum feasible average fuel economy levels for the MY 2005–07 standards, we have specifically considered all four of the factors specified by the statute—technological feasibility, economic practicability, the effect of other motor vehicle standards of the Government on fuel economy, and the need of the United States to conserve energy. We have also specifically weighed the benefits to the nation of higher average fuel economy standards against the difficulties of individual manufacturers.

We have determined that the established CAFE standards are the maximum feasible levels for each of the model years. Although the MY 2007 standard is a challenging one, the additional lead time available and the likelihood of continuing technological advancement makes a CAFE standard of 22.2 mpg technologically feasible and economically practicable in light of the nation's need to conserve energy and to reduce our dependence on foreign oil. The Volpe analysis confirms that these standards are cost-beneficial and technologically feasible. CAFE standards above those established in this rule tip the balance and render it unlikely that the standards could be achieved without significantly negative economic consequences.

XI. Rulemaking Analyses and Notices

A. Executive Order 12866 and DOT Regulatory Policies and Procedures

Executive Order 12866, ''Regulatory Planning and Review'' (58 FR 51735, October 4, 1993), provides for making determinations whether a regulatory action is ''significant'' and therefore subject to OMB review and to the requirements of the Executive Order. The Order defines a ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local or Tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

This final rule is economically significant as adopted. Accordingly, OMB reviewed it under Executive Order 12866. The rule is also significant within the meaning of the Department of Transportation's Regulatory Policies and Procedures.

Because the rule is economically significant, the agency has prepared an FEA and placed it in the docket and on the agency's Web site.

Costs: We estimated costs based on the specific technologies that were

applied to improve each manufacturer's fuel economy from the level of the manufacturer's plans up to the level of the final rule. Table 1 provides those cost estimates on an average per vehicle basis and Table 2 provides those estimates on a fleet-wide basis.

Benefits: We also determined benefits from the level of the manufacturer's plans up to the level of the final rule. The benefits are derived mainly from fuel savings over the lifetime of the vehicle. However, the benefits also include the results of a number of additional analyses that relate to the value of oil import externalities, criteria pollutant emissions, and a variety of beneficial transportation impacts brought about by the ''rebound effect''. Table 1 provides the benefit estimates on a per vehicle basis and Table 2 provides them on a fleet-wide basis.

Net Benefits: We compared the costs and benefits and concluded that the fuel economy standards are cost beneficial on a societal basis.

Safety Impacts: The agency believes the manufacturers can meet the fuel economy levels without weight reductions. Thus, there need not be a safety impact due to reducing weights for light trucks.

Table 3 provides the level of the final rule, an adjusted baseline weighted average fuel economy based on the manufacturers' product plans, and a weighted average fuel economy for the fleet after assuming increases in technology to bring the manufacturers' average fuel economy up to the level of the standard. Some manufacturers already (in MY 2001) exceed the standard levels, thus the weighted average exceeds the level of the final rule. Finally, Table 3 shows the lifetime fuel savings in millions of gallons.

TABLE 1.—INCREMENTAL COST AND SOCIAL BENEFIT ANALYSIS PER AVERAGE VEHICLE—OVER ITS LIFETIME

[In year 2000 dollars]

Model year	Costs	Benefits	Net benefits
2005	$22	$29	$7
2006	67	83	16
2007	106	121	15

TABLE 2.—INCREMENTAL TOTAL COST BENEFIT ANALYSIS OVER THE LIFETIME OF THE FLEET

[In millions of year 2000 dollars]

Model year	Costs	Benefits	Net benefits
2005	$170	$218	$48
2006	537	645	108
2007	862	955	93

TABLE 3.—SAVINGS IN MILLIONS OF GALLONS OF FUEL

Model year	Proposed fuel economy standard (mpg)	Adjusted baseline fuel economy level based on manufacturer plans (mpg)	Estimated fuel economy level with technology additions needed to meet standard (mpg)	Lifetime fuel savings (in millions of gallons)—undiscounted	Lifetime fuel savings—present discounted value
2005	21.0	21.13	21.29	432	263
2006	21.6	21.31	21.78	1,273	774
2007	22.2	21.60	22.31	1,892	1,151

B. National Environmental Policy Act

Consistent with the requirements of the National Environmental Policy Act and the regulations of the Council on Environmental Quality, the agency has prepared a final Environmental Assessment for this action, responding to comments to the draft Environmental Assessment, and has placed this analysis in the docket. Based on the final Environmental Assessment, the agency has concluded that the action will not have a significant effect on the quality of the human environment.

C. Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.,* as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (*i.e.,* small businesses, small organizations, and small governmental jurisdictions). The Small Business Administration's regulations at 13 CFR part 121 define a small business, in part, as a business entity ''which operates primarily within the United States.'' (13 CFR 121.105(a)). No regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities.

NHTSA has considered the effects of this final rule under the Regulatory Flexibility Act and certifies that this final rule will not have a significant economic impact on a substantial number of small entities. The rationale for this certification is that there are not any single stage light truck manufacturers within the United States with 1,000 or fewer employees.

D. Executive Order 13132, Federalism

Executive Order 13132 requires NHTSA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' Executive Order 13132 defines the term ''Policies that have federalism implications'' to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.'' Under Executive Order 13132, NHTSA may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal

government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or NHTSA consults with State and local officials early in the process of developing the regulation.

This final rule will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government as specified in Executive Order 13132. The statute under which the CAFE program is administered clearly says that states may not adopt or enforce any law or regulation that relates to fuel economy standards. 49 U.S.C. 32919(a). Thus, the requirements of section 6 of the Executive Order do not apply to this rule.

E. The Unfunded Mandates Reform Act

Section 202 of the Unfunded Mandates Reform Act of 1995 (UMRA) requires Federal agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of more than $100 million in any one year (adjusted for inflation with base year of 1995). Before promulgating a rule for which a written statement is needed, section 205 of the UMRA generally requires NHTSA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows NHTSA to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the agency publishes with the final rule an explanation why that alternative was not adopted.

This final rule will not result in the expenditure by State, local, or tribal governments, in the aggregate, of more than $100 million annually, but it will result in the expenditure of that magnitude by vehicle manufacturers and/or their suppliers. In promulgating this rule, NHTSA considered whether average fuel economy standards lower and higher than those adopted would be appropriate. NHTSA has concluded that the standards established by this final rule are the maximum feasible standards for the light truck fleet for MYs 2005–2007, based on a balancing of the statutory considerations.

F. Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (PRA), a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. There are no new information collection requirements in this final rule.

G. Executive Order 13045

Executive Order 13045 (62 FR 19885, April 23, 1997) applies to any rule that: (1) is determined to be economically significant as defined under E.O. 12866, and (2) concerns an environmental, health or safety risk that NHTSA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, we must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by us.

This rule does not have a disproportionate effect on children. The primary effect of this rule is to conserve energy resources by setting CAFE standards for light trucks.

H. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) requires NHTSA to evaluate and use existing voluntary consensus standards [13] in its regulatory activities unless doing so would be inconsistent with applicable law (*e.g.*, the statutory provisions regarding NHTSA's vehicle safety authority) or otherwise impractical. In meeting that requirement, we are required to consult with voluntary, private sector, consensus standards bodies. Examples of organizations generally regarded as voluntary consensus standards bodies include the American Society for Testing and Materials (ASTM), the Society of Automotive Engineers (SAE), and the American National Standards Institute (ANSI). If NHTSA does not use available and potentially applicable voluntary consensus standards, we are required by the Act to provide Congress, through OMB, an explanation of the reasons for not using such standards.

There are no voluntary consensus standards for U.S. fuel economy. Therefore, setting this final rule does not involve the use of any voluntary standards.

I. Executive Order 13211

Executive Order 13211 (66 FR 28355, May 18, 2001) applies to any rule that: (1) is determined to be economically significant as defined under E.O. 12866, and is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (2) that is designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action. If the regulatory action meets either criterion, we must evaluate the adverse energy effects of the planned rule and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by us.

The rule establishes light truck fuel economy standards that will reduce the consumption of petroleum and will not have any adverse energy effects. Accordingly, this rulemaking action is not designated as a significant energy action.

J. Department of Energy Review

In accordance with 49 U.S.C. 32902(j), we submitted this rule to the Department of Energy for review. That Department did not make any comments that we have not addressed.

K. Regulation Identifier Number (RIN)

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

List of Subjects in 49 CFR Part 533

Energy conservation, Motor vehicles.

PART 533—[AMENDED]

■ In consideration of the foregoing, 49 CFR part 533 is amended as follows:

■ 1. The authority citation for part 533 continues to read as follows:

Authority: 15 U.S.C. 2002; delegation of authority at 49 CFR 1.50.

■ 2. Section 533.5 is amended by revising Table IV in paragraph (a) to read as follows:

§ 533.5 Requirements.

(a) * * *

[13] Voluntary consensus standards are technical standards developed or adopted by voluntary consensus standards bodies. Technical standards are defined by the NTTAA as ''performance-based or design-specific technical specifications and related management systems practices.'' They pertain to ''products and processes, such as size, strength, or technical performance of a product, process or material.''

TABLE IV

Model year	Standard
1996	20.7
1997	20.7
1998	20.7
1999	20.7
2000	20.7
2001	20.7

TABLE IV—Continued

Model year	Standard
2002	20.7
2003	20.7
2004	20.7
2005	21.0
2006	21.6
2007	22.2

* * * * *

Issued on: March 31, 2003.

Jeffrey W. Runge,

Administrator.

[FR Doc. 03–8222 Filed 4–1–03; 3:41 pm]

BILLING CODE 4910–59–P