Consumer Federation of America

1620 I Street, N.W., Suite 200 * Washington, DC 20006

U.S. Department of Transportation
West Building, Ground Floor, Room W12-140
1200 New Jersey Avenue, SE
Washington, DC 20590

Re: Comments on National Highway Traffic Safety Administration Notice of Proposed Rulemaking; Docket No. NHTSA 2008-0089, RIN 2127-AK29; Average Fuel Economy Standards, Passenger Cars and Light Trucks; Model Years 2011-2015

COMMENTS AND TECHNICAL APPENDICES OF

THE CONSUMER FEDERATION OF AMERICA

Mark N. Cooper, Ph. D.
Director of Research

July 1, 2008

CONTENTS

CONSUMER COMMENTERS

The Consumer Federation of America (CFA)[1] respectfully submits these comments in response to National Highway Traffic Safety Administration (NHTSA) Notice of Proposed Rulemaking, Average Fuel Economy Standards: Passenger Cars and Light Trucks, Model Years 2011-2015.[2]

RAISING FUEL ECONOMY STANDARDS IS THE CORNERSTONE OF THE U.S. RESPONSE TO THE GLOBAL OIL CRISIS

The United States and the world are facing an increasingly severe oil supply and price crisis at the same moment that concerns about the serious negative impacts of global warming are escalating. Domestically and globally, U.S. policy to reduce gasoline and oil consumption is one of the most important factors that will affect how the energy, economic and climate change challenge is dealt with. The U.S. is by far the world's largest consumer of oil and oil products, particularly gasoline, accounting for approximately one-quarter of the total oil consumption[3] and over one-third of all global gasoline consumption.[4] Virtually all gasoline consumed in the U.S. is consumed by cars and light trucks – the light duty vehicle fleet, with the overwhelming majority consumed by household vehicles.[5]

The passage of the Energy Independence and Security Act of 2007 (EISA) and the increases in fuel economy of the vehicle fleet that it mandates are the cornerstone of the national response. Due to EISA, we have a policy in place that can address the most important aspect of the U.S. role in the global oil market: the amount of gasoline the U.S. consumes. Under the law, the National Highway Traffic Safety Administration (NHTSA) is required to set fuel economy standards at the maximum feasible level.

Unfortunately, through a series of analytical flaws and unreasonable economic assumptions, NHTSA has done a gross disservice to the American people, choosing to set standards that are far too low for far too long. NHTSA's proposed rule does not reflect the severity of the current crisis or Congress' intent to deal with it. NHTSA has vastly underestimated the value of conservation and set fuel economy standards that are far too low.

---

1 The Consumer Federation of America is an advocacy, research, education and service organization established in 1968. CFA has as its members some 300 nonprofit organizations from throughout the nation with a combined membership exceeding 50 million people. As an advocacy group, CFA works to advance pro-consumer policy on a variety of issues before Congress, the White House, federal and state regulatory agencies, state legislatures, and the courts.

2 National Highway Traffic Safety Administration, Average Fuel Economy Standards, Passenger Cars and Light Trucks, Docket No. NHTSA-2008-0089, (hereafter, NPRM), citation are to the version released by NHTSA on April 22, 2008)

3 Energy Information Administration, World Oil Balance, May 2008 International Petroleum Monthly Posted: June 9, 2008, shows the U.S. consuming 24.2% of global oil, available at http://www.eia.doe.gov/emeu/ipsr/t21.xls

4 World Resources Institute, Earth Trends, estimates the U.S. share of global gasoline consumption in 2003 at over 40 percent., available at: http://earthtrends.wri.org/searchable_db/index.php?step=countries&cID%5B%5D=190&theme=6&variable_ID=291&action=select_years

5 Energy Information Administration, *Household Vehicles Energy Awe: Latest Data & Trends,* November 2005, estimates household gasoline use at 7.37 million barrels per day in 2001, or approximately 86 percent of national gasoline usage as reported in Energy Information Administration, *Monthly Energy Review,* April 2008).

The flaws in the analysis that led NHTSA to set a standard that is unreasonably low are legion and diverse, but there are two broad categories of flaws in the analysis. The economic assumptions applied fail to reflect the energy crisis that the U.S. faces and the analytic framework is biased against requiring automakers to produce more fuel efficient vehicles.

NHTSA HAS VASTLY UNDERVALUED FUEL ECONOMY AND SET A STANDARD THAT IS FAR TOO LOW

NHTSA's economic assumptions vastly undervalued gasoline consumption and therefore undervalued fuel savings. To arrive at the proposed rule, NHTSA:

- used gasoline prices that are far too low -- a price of gasoline for 2015 of only $2.45 per gallon (in 2008 dollars);
- ascribed no military or strategic value to oil, totally ignoring the basis for the Congressional mandate which has even been included in the name of the Act;
- assumed that fuel economy has no impact on the resale value of a vehicle, something that every owner of a fuel-inefficient vehicle knows matters;
- discounted the value of fuel savings at an unnecessarily high rate; (i.e. after identifying two possible discount rates: a high rate based on the automaker view of capital costs, and a low rate based on the consumer view of consumption expenditures. NHTSA failed to choose a rate between the two, instead applying the high "capital" rate);
- assumed that consumers irrationally burn up their fuel savings on increased driving, rather than use it to buy other goods and services and applied this "rebound" effect to analyses where it should not play a role.

NHTSA conducted both consumer and societal cost-benefit analyses, and each was deeply affected by the empirical flaws in NHTSA's analysis. Combined, these flaws in NHTSA's economic assumptions led the agency to value gasoline savings at less than half of what would be a reasonable estimate (see Exhibit 1). Technical Appendix B presents detailed discussion and demonstration of the flaws in NHTSA's economic assumptions.

Exhibit 1 presents estimates of the magnitude of the impact that each of the empirical flaws has on the outcome of NHTSA's cost-benefit analysis expressed as a percentage of the base case values that NHTSA used. Because the empirical flaws are cumulative, the total impact is to undervalue fuel savings by at least 80 percent in the consumer payback analysis and over 120 percent in the societal cost-benefit analysis. Such a gross undervaluation of fuel savings led NHTSA to underestimate the value of much higher fuel economy standards.

The failure to attribute any military or strategy value to reduced oil consumption is remarkable, not only because the title of the act refers to energy independence and security, but also because there is strong evidence quantitative and qualitative evidence that oil has military and strategic value. The strategic and military significance of oil should have persuaded NHTSA to give greater weight to energy conservation, something it failed to do, as discussed below.

Exhibit 1
Correcting the Undervaluation of Fuel Savings – Percent Increase in Benefits

Source of Underestimate	**Consumer Payback**		**Societal Welfare**	
	Basis	**Value**	**Basis**	**Value**
High Price Scenario	NHTSA	36	NHTSA	39
Rebound Effect	Excluded	15	5%	10
Discount Rate at 5%	na	na	5%	15
Resale Value	15%	15	15%	15
Military Value	CFA	na	CFA	11
Payback Period	CFA	+?	CFA	+?
Cumulative Total		80		124

NHTSA HAS FAILED TO GIVE THE NEED TO CONSERVE ENERGY PROPER CONSIDERATION IN LIGHT OF THE NATIONAL ENERGY CRISIS

NHTSA's analytic framework is also fundamentally flawed. NHTSA is required to set the fuel economy standard at the "maximum feasible level" taking into consideration "the four statutory factors **underlying maximum feasibility"** (technological feasibility, economic practicability, the effect of other standards of the Government on fuel economy, and the need of the nation to conserve energy).[6] NHTSA has failed to give proper consideration to the need of the nation to conserve energy.

- In its analysis, NHTSA identified two energy conservation alternatives that bracket the range of economically reasonable standards. One alternative would maximize fuel savings at no net cost to society by including fuel savings technologies until the total cost equals the total benefit. The other would maximize the economic return on investments in fuel economy by including fuel savings technology only up to the point where marginal benefits equal marginal costs. A reasonable rule would have balanced the economic and conservation concerns and set the standard between the two extremes. NHTSA simply chose to set the standard at the lower level of conservation with no consideration of the enormous energy conservation cost of that decision.

- NHTSA chose to define "feasibility" and "practicability" in a manner that lets the least fuel-efficient auto makers drive down the standard. NHTSA's approach

6 NPRM, pp. 7-8, emphasis added.

protects the least capable automakers rather than requiring them to rise up to the level that the industry as a whole could achieve. Ironically, by setting a lower standard, in the face of dramatically rising consumer expectations, the Administration is creating an environment of failure for those companies who are driving down the standard.

Even without correcting the empirical flaws in NHTSA's analysis discussed above, a strong case can be made that the conceptual flaws in the analytic framework led NHTSA to propose a standard that is too low. Exhibit 2 shows the key characteristics of four potential standards that NHTSA considered.

The first standard included is the standard proposed by NHTSA. It stops investment where marginal benefits equal marginal costs. We call t his "maximum economic value standard" because this yields a high net economic benefit, but a low level of fuel savings. At the other extreme ("Technology Exhaust") is a standard that pushes investment to the point where technology is exhausted regardless of cost. Another standard maximizes energy conservations at no net economic cost to society by adding fuel savings technologies to vehicles until the point where the total benefit equals the total cost. We call this the "maximum economic conservation standard." .NHTSA also analyzed a standard that fell half way between the proposed standard and the maximum economic conservation standard. NHTSA called it "optimized plus 50 percent." We call this the "50-50" standard because it splits the difference between maximizing economic value and maximizing economic conservation.

We call it the "50-50 standard" rather than "optimized plus 50%"for two reasons. First the claim of "optimization" is relevant to the goal chosen. NHTSA's proposal is optimized with respect to its goal of economic maximization. It is not "optimized" with respect to the goal of maximum conservation. NHTSA's decision to optimize economic value is not statutory, but NHTSA's preference. Indeed, if there is any statutory leaning, it points toward optimizing fuel economy, based on the need to conserve energy. Second, it turns out that the "50-50" standard also splits the auto industry roughly in half with respect to the likelihood that manufacturers would be able to achieve the standard. NHTSA projects that slightly more than half of the manufacturers would be able to add technologies to vehicles to meet the standard. The other half would have to exert extra effort to catch up with the majority of the industry. Thus, because "optimized plus 50%" standard sets the goal as a balance of the economic and conservation considerations and would be met by more than half the industry, we call it the "50-50" standard.

NHTSA stopped at the "optimized" standard primarily because of the large net total societal benefit (the fourth column in Exhibit 2, i.e. the societal view: net total benefit). NHTSA would argue that moving to the standard that maximizes economic conservation would impose a severe hardship on automakers, since over three quarters of them are projected to exhaust technology and therefore be unable to achieve the standard (the final column in Exhibit 2: % of automakers exhausting technology).

Exhibit 2: Key Characteristics of Alternative Fuel Economy Standards

	Miles Per Gallon (2015)				Societal View		Consumer View			% of Auto Makers Exhausting Technology (cars & trucks Combined)
	CAFE Standard		Achieved		Net Benefit (million dollar)	Fuel Savings (million gallons)	Total Cost (million $)	Implicit Cost/Gallon		
	Cars	Trucks	Cars	Trucks				Total	Incremental	
Proposed Maximize Economic Value (marginal benefit=marginal cost)	35.7	28.6	34.7	28.4	41596	54,713	46,745	$0.85	$2.45	15
50-50 Balanced Economic and Conservation Considerations	39.5	30.9	37.6	30.0	19092	76,048	100,030	$1.32	$2.97	47
Maximum Economic Conservation as No Net Cost to Society (total benefit=total coat)	43.3	33.1	38.8	30.5	3115	86,635	131,447	$1.52	$2.32	77
Technology Exhaust Total Fuel Savings disregarding cost	52.6	34.7	39.9	31.3	-3749	94,899	150,635	$1.59		90

Sources: PRIA Tables 1-6, NPRM Figure X-7 and accompanying text.

Note, however, that in all scenarios, the fuel economy achieved is lower than the standard, indicating that some automakers fail to comply with the standard. The shortfall grows as the standard is raised because of NHTSA's assumptions about the ability of auto makers to include technologies in their vehicles. All of the technologies to reduce fuel consumption in all of the analyses are already being used in the vehicle fleet. They are available; NHTSA assumes they cannot (or will not) be added by auto manufacturers quickly enough to come into compliance with the standard being analyzed.

The impact of NHTSA's assumption about the ability to adopt available technologies can be seen by noting the large gap between the level at which the standard would be set and the level of fuel economy that would actually be achieved. For example, in the technology exhaust standard, there is a huge gap between the standard and the achieved level of fuel economy (car standard = 52.6 v. car achieved = 39.3; truck standard = 34.7 v. truck achieved = 31.3) because 90 percent of the auto makers are assumed to exhaust technologies they can include in their vehicles. Similarly, in the maximum economic conservation standard there is a large gap (car standard = 43.3 mpg v. car achieved = 38.8 mpg; trucks standard = 33.1 mpg v. truck achieved = 30.5 mpg). Because 77 percent of automakers are assumed to exhaust the technologies they can include in their vehicles.

The "50-50" balanced proposal does not suffer these two afflictions. The majority of the automakers are projected to not exhaust the technologies they could add to meet the standard. The market would achieve fuel economy that is close to the standard. The "50/50" standard would set the car standard 3.8 mpg higher and the truck standard 1.9 mpg higher than NHTSA's proposed standards. Setting the standard higher for cars would achieve a 2.9 mpg increase for cars, equal to over three-quarters of the increase in the standard. Setting the standard higher for trucks would achieve a 2.1 mpg increase, equal to over 90 percent of the increase in the standard. Leaving aside some concerns we have about NHTSA's assumptions about how quickly automakers would respond to the prospect of paying fines, this analysis suggests that increasing the standard from the "optimized" level to the "50/50" level would be effective in achieving fuel savings. The majority of automakers are projected to be in compliance, and the bulk of the fuel savings are achieved. Setting the standard at this level could create an environment in which the laggards are spurred to catch up.

The "50-50" standard strikes a balance between the two extremes of economic practicability and the ability of auto makers to comply with the standard. The value of the increase in savings is substantial by moving from the "proposed" standard to the "50/50" level. Even under NHTSA's very questionable assumptions about fuel prices, among other things, net economic benefits of the "50/50" standard are estimated at $19.1 billion (cumulative and discounted). This is less than the net economic benefit of $41.6 billon for the "optimized" standard. However, the "lost" economic benefits have a large fuel savings benefit. Properly balancing the economic and energy conservation goals by setting the standard at the "50-50" level would result in standards that are substantially higher and save the nation much more energy, at a modest economic cost. The incremental energy savings would be about 21 billion gallons and the consumer cost of those savings would be just over $53 billion, suggesting a cost of approximately $2.50 per gallon. With gasoline at $4 per gallon, these additional savings would appear to be a good deal for consumers and the nation, and when the erroneous economic assumptions are corrected, as discussed in Technical Appendix B, the net benefits rise substantially. **The "50-50" standard becomes the preferred standard both from the point of view of economic value and fuel savings.**

Technical Appendix A provides detailed discussion of the analytic flaws in the NHTSA approach.

INCREASING THE LEVEL OF THE FUEL ECONOMY STANDARD WOULD RESULT IN A HUGE INCREASE IN FUEL SAVINGS AT REASONABLE ECONOMIC COST

Exhibit 2 does not correct for the empirical flaws in NHTSA's analysis. Because of the very complex nature of NHTSA's model, it is difficult to estimate precisely how the cost-benefit analysis would work out if the all of the empirical and analytic flaws were corrected. However, examining the various alternative scenarios analyzed by NHTSA, shows that the "50-50" standard is likely to be strongly supported by such an analysis. Exhibit 3 shows the four alternatives considered by NHTSA discussed above, as well as two sensitivity analyses – a high fuel price scenario, and a low discount rate scenario.

Exhibit 3:
Correcting Conceptual and Economic Flaws in the NHTSA Analysis

Standard/Analyses	Standard (2015) Cars	Trucks	2015 Cost Per Vehicle ($) Cars	Trucks	Societal View Fuel Savings (cumulative million gal)	Net Benefit (2015) (million $)
Proposed	**35.7**	**28.6**	**649**	**979**	**54713**	**11989**
High Fuel Prices	**42.4**	**29.4**	**2081**	**1373**	**76801**	**24324**
Low Discount Rate	**40.9**	**29.0**	**1915**	**1145**	**72902**	**8421**
50%- 50%	**39.5**	**30.9**	**1694**	**2041**	**76048**	**4437**
Fuel Savings at no Net Cost	**43.3**	**38.8**	**2367**	**2509**	**86635**	**3115**
Technology Exhaust	**52.6**	**34.7**	**3264**	**2785**	**94899**	**98**

Source: PRIA, Tables 5 and 6 for Proposed, low discount rate and Optimized + 50 and Tables IX-5a and IX-52a for High fuel costs.

Technical Appendix A presents detailed discussions of the analytic and legal basis for this critique of NHTSA's analytic framework.

The high fuel price and the low discount rate are run separately, but each individually moves the standard much closer to the "50-50" level. The high fuel price sensitivity analysis involved a fuel price of approximately $3.40 per gallon (in 2008 dollars) for 2015, so in our opinion it is a more realistic fuel price scenario, one that is not terribly high.

High fuel prices alone would justify moving to a much higher standard. Using the lower discount rate also justifies raising the standard substantially. Correcting the other flaws in the economic assumptions would reinforce this conclusion, although they individually do not have as large an effect.

The bottom line is quite clear,

- *If NHTSA adopted a properly balanced view of technological feasibility, economic practicability and the need to conserve energy* ***or***
- *it adopted used a more reasonable set of fuel price assumptions,* ***or***
- *it used a consumer-oriented discount rate,* ***or***
- *it corrected the group of other flawed economic assumptions the undervalue fuel savings (rebound effect, resale value of fuel efficient vehicles, military and strategic value of gasoline consumption), then*
- *it would have set the standard at about the level of the "50-50" standard, thereby savings the nation 40 percent more gasoline while, providing a substantial net economic benefit.*

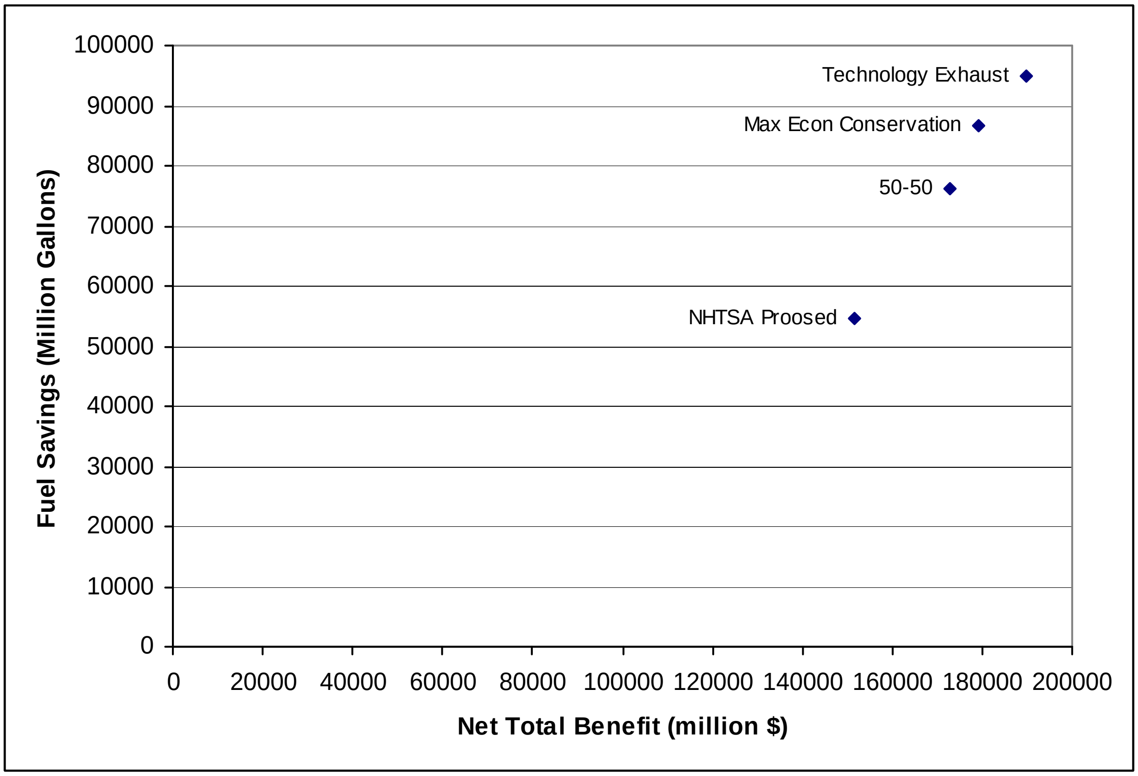
Because of the complexity of the analytic model, it is difficult to estimate what the outcome would be if NHTSA corrected all of the flaws in the model. The amount and value of fuel savings would rise significantly, although the constraint set by the inability of the auto industry as a whole would be the constraining factor. Having determined that the "50-50" standard does not violate that constraint, Exhibit 4 presents the results of an analysis that considers the effect of changing the economic assumptions as outlined in Exhibit 1. Exhibit 4 shows that the all three of the higher standards have a higher net economic benefit than the proposed standard as well as higher levels of energy conservation. The "50-50" standard captures the bulk of the benefits that could be realized by raising the standard because, as shown in exhibit 2, automakers are generally able to meet the standard. .

NHTSA HAS SET THE UNREASONABLY LOW STANDARDS FOR AN UNREASONABLY LONG PERIOD

NHTSA has set this low standard for the maximum possible period allowable under the law, even though NHTSA admits that it lacks critically important knowledge and information about the auto market. NHTSA states that the proceeding is being conducted on an expedited basis because it has to promulgate the standard for model years 2011 by mid-2009 to give automakers advanced notice of the standard; however, it did not have to rush to promulgate standards for model years 2012 through 2015. With numerous important issues still under study, it was irresponsible for NHTSA to write rules for years that do not require an expedited process, when additional time would afford a much more informed rulemaking.

The issues that are the target of NHTSA's incomplete studies are central to the rulemaking. These issues included:

Exhibit 4:
Economic and Conservation Benefits with Modified Economic Assumptions



Source: PRIA, Exhibit 4b, 5b. 6; assuming benefits are increased by 95 percent (reflecting higher fuel prices, lower rebound effect, lower discount rate and military value, from Exhibit 1) and costs of conservation are decreased by 15 percent (reflecting higher resale value of more fuel efficient vehicles, from Exhibit 1).

- The market share of various models in the vehicle fleet; and[7]
- The value of reduced emissions of greenhouse gases.[8]
- The effectiveness of technologies for improving fuel economy;[9]

7 PRIA, p. V-59. "NHTSA and Volpe Center staff are continuing to explore options for including these types of effects. At the same time, EPA has contracted with Resources for the Future (RFF) to develop a potential market share model. Depending on the extent to which these efforts are successful, the Volpe model could at some point be modified to include cost allocations and market share models.

8 PRIA, pp. V-96, "Tol's more recent (2007) and inclusive survey has been published online with peer-review comments. The agency has elected not to rely on the estimates it reports, but will consider doing so in its analysis of the final rule if the survey has been published, and will also consider any other newly-published evidence."

9 Office of Regulatory Analysis and Evaluation, National Center for Statistics and Analysis, Preliminary Regulatory Impact Analysis: Corporate Average Fuel Economy for MY 2011-2015, Passenger Cars and Light Trucks, April 2008 (hereafter (PRIA), p. V-1, "NHTSA has contracted with NAS to update the fuel economy section", Chapter 3, of the 2002 NAS report. However, this update will not be available in time for this rulemaking. Due to the expedited

- The cost of technologies for improving fuel economy;[10]

In the above cases, NHTSA recognizes that it does not have good current information and has set out to rectify the problem. There are other areas where it has simply run ahead of its data, resorting to projections in a market that is rapidly changing, such as:

- Relying on old sales data and projections in a time of rapid change in the industry;[11]
- Uncertainty about the impact of vehicle mix on safety;[12]
- Uncertainty about the pattern of inclusion of fuel saving technology in light trucks,[13]
- Technology adoption strategies ("pull ahead") that speed penetration of fuel savings technology into the vehicle fleet;[14]
- Recent changes in fuel economy and the practices of automakers in adopting fuel economy technologies; and[15]
- Changes in vehicle usage patterns across time.[16]

There are also areas where the underlying data is suspect and would benefit greatly from improvement as time allows. These include:

---

nature of this rulemaking, NHTSA, in consultation with the Environmental Protection Agency (EPA), developed an updated technology cost and effectiveness list to be used in this notice.

10 NPRM, p. 124, "Martec has recently submitted a study to the NAS committee comparing the 2004 NESCCAF study with new updated cost information. Given that this study had just been completed, the agency could not take it into consideration for the NPRM. However, the agency will review the study and consider its findings in time for the final rule." Without a Further Notice of Proposed Rulemaking, this approach denies the public the opportunity to comment on an important part of the data on which NHTSA will rely in its final rule.

11 NPRM p. 179, Relying on old data and outdated projections, "In all cases, manufacturer's respective sales volumes were normalized to produce passenger car and light truck fleets that reflected manufacturers' MY 2006 market shares and to reflect passenger car and light truck fleets of projected aggregate volume consistent with forecasts in EIA's 2007 Annual Energy Outlook."

12 PRIA, p. IV-7, "The make-up of any future mix-shift in vehicle sales is purely speculative.

13 NPRM, p. 364, "It appears that light truck levels are not as sensitive as passenger car levels to to changes in the estimated benefits. This can occur because technologies that have not been used under the optimized alternative, and are still available for light trucks, are not that close to being effective and it takes a larger incrase in benefits to bring them over the cost benefit threshold." This tentative explanation is questionable. The National Academy of Sciences cost curves do not exhibit this characteristic. The cost curves for cars and trucks are similar. At lower levels of fuel economy, equal sized increase in miles per gallon yield larger fuel savings, which should drive more technologies into vehicles.

14 NPRM p. 156, "Another possibility NHTSA and Volpe Center staff have considered, but do not yet know how to analyze, is the potential that manufacturers might "pull ahead" the implementation of some technologies in response to CAFE standards that they know will be steadily increasing over time."

15 PRIA, p. V-57, "Another possibility NHTSA and Volpe center staff have considered, but do not yet know how to analyze is the potential that manufacturers might "pull ahead" the implementation of some technologies in response to CAFE standards known to increase over time… Although NHTSA and Volpe Center staff will continue to explore the potential to present inter-model year timing, it is not yet clear that it will be appropriate and feasible to do so in the near term."

16 PRIA, p. V-82, "The agency plans to account explicitly for potential future growth in average annual use of both cars and light trucks in the analysis accompanying its Final Rule establishing CAFE standards for model years 2011-2015." Without a Further Notice of Proposed Rulemaking, this approach denies the public the opportunity to comment on an important factor on which the final rule relies.

- The production plans of automakers;[17]
- Uncertainties about market share and price data;[18]
- The validity of the speed of adoption of technology (phase-in caps) in light of dramatic changes in auto market behavior; and[19]
- Assumptions about the compliance strategies of auto manufacturers.[20]

NHTSA needed to get the rulemaking started for 2011 and perhaps 2012, so it could complete the process eighteen months before the model year, but going beyond that, in light of the lack of knowledge of such fundamental parameters in the analysis, was irresponsible. To the extent that NHTSA felt compelled to move forward with this rulemaking in light of these uncertainties, to provide adequate notice to the automakers regarding increases in fuel economy standards as required under the statute, it should have provided notice for only the necessary earlier model years, thereby keeping its options open for writing fuel economy standards for more distant years on the basis of better information.

By rushing ahead with imperfect knowledge, faulty assumptions and a bias against fuel savings, NHTSA's approach would deny critical benefits of reduced gasoline and oil consumption to consumers and the nation. Therefore, it was unreasonable for NHTSA to set standards that run so far ahead of its knowledge and data.

The negative ramifications of NHTSA's proposed rule would go beyond the immediate impact of lost savings in the current proceeding. This rulemaking is just the beginning of an ongoing process in which NHTSA will have to conduct a series of rulemakings over the coming decades. Relying on a flawed analytic framework and flawed empirical specifications undermines future rulemakings in two ways. First, once the framework is set, it is difficult to change. Inertia and judicial deference make it difficult to reverse agency decisions. Second, by setting a low standard, it becomes more challenging to the industry to meet higher future standards. Large increases in standards raise costs. Thus, it is critical for NHTSA to get the framework right out of the gate and to set the standard at a reasonable level.

---

17 PRIA, p, V-72, Eighty five percent of the product plans are incomplete. "NHTSA received product plan information from Chrysler, Ford, GM, Honda, Nissan, Mitsubishi, Porsche and Toyota. The agency didn't receive any product plan information from BMW, Ferrari, Hyundai, Mercedes or VW. However, only Chrysler and Mitsubishi provided us with product plans that showed differing production quantities, vehicle introductions, vehicle redesigns/refreshes, without any carryover quantities, from 2007 to MY 2015. The agency incorporated their product plans as part of the input file to the model without the need to project or carryover any vehicle product data."

18 PRIA, p. V-59, "NHTSA and Volpe Center staff are not confident that baseline sales prices for individual vehicle models, which would be required by a market share model, can be reliably predicted. Although NHTSA requests that manufacturers include planned MSRPs in product plans submitted to NHTSA, MSRPs do not include the effect of various sales incentives than can change actual selling prices.

19 PRIA, p. V-50, noting that "some technologies have penetrated the marketplace more quickly than projected in 2006. Confidential product plan information submitted to NHTSA in 2007 and information from suppliers confirm that the rate of technology penetration has increased as compared to 2006"; NPRM, p. 134, maintaining slow rate of adoption for engine technologies in spite of improving prospects and rapid uptake.

20 PRIA, p. V-50, "Discussions with manufacturers in late 2007 and early 2008 indicate that the industry is highly sensitive to all of these developments and has been anticipating the need to accelerate the rate of technology deployment in response to the passage of major energy legislation in the U.S."

RECOMMENDATIONS: SET THE STANDARD AT "50-50" FOR 2011 AND 2012; RESCIND THE PROPOSED STANDARDS FRO 2013-2015

Based on our review of the proposed rule, we conclude that NHTSA's analysis is riddled with flaws. Under the recently enacted Energy Independence and Security Act of 2007, NHTSA's proposed fuel economy standards for the period 2011-2015 are unreasonably low, cover a period that is unreasonably long, and are inadequately documented.

Recognizing the need to move forward on the early years and the great urgency of responding to the current energy crisis, we recommend the following:

1. NHTSA should explicitly correct the conceptual flaws in the model and establish clear tests and analytic approaches to evaluate standards, independent of the level at which they are set in any given proceeding. NHTSA needs to distinguish more precisely between the "ruler" by which standards will be measured and the "rule," which prescribes the standard at a given moment in time.

2. NHTSA should set the standards for 2011-2012 at a level substantially higher than it has proposed. It should use the "50/50." This level is justified when NHTSA corrects the empirical and conceptual flaws in its analytic framework. It is consistent with the level supported by NHTSA's high fuel price sensitivity case.

3. NHTSA should rescind the standards for 2013-2015 and complete the studies it has launched, as well as several others we recommend, before it writes rules for the out years to avoid making policy decisions based upon an incomplete understanding and erroneous assumptions about the role of fuel economy in the current auto market.

NHTSA MUST CORRECT THESE ANALYTIC FLAWS AND RAISE THE STANDARD TO COMPLY WITH THE LAW

Citing the mid-point between economic value maximization and economic conservation maximization and the mid-point of performance of automakers as the point where a standard is feasible and practicable may seem obvious, but it leads to the fundamental legal question. In line drawing exercises, under the Administrative Procedures Act (APA), an agency has a great deal of discretion and its expert opinion will be given a great deal of deference in writing rules. The rulemaking discretion is not a blank check, however. It is bound by constraints – rules must follow the intent of Congress, be based on the facts in the record before the agency, and not be unreasonable. If the rules violate any of these three parameters, they can be found to be "arbitrary and capricious" and be set aside by the courts.

NHTSA knows this well because just last year its proposed fuel economy standards for light trucks were set aside as arbitrary and capricious by the Ninth Circuit Court of Appeals on several grounds. As the Ninth Circuit Court of Appeals stated in overturning NHTSA's light truck rule:

Even if NHTSA may use a cost-benefit analysis to determine the "maximum feasible" fuel economy standard, it cannot put a thumb on the scale by undervaluing the benefits and overvaluing the costs of more stringent standards.[21]

The standards by which the actions of the agency are evaluated are broad, as the Ninth Circuit Court noted:

The agency must examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made. An agency rule normally may be arbitrary and capricious if it: "offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise."[22]

One additional legal standard that is important is the fact that the agency must adopt rules that follow the will of the Congress – "the question for the court is whether the agency's answer is based on a permissible construction of the statute… We must reject administrative constructions which are contrary to clear congressional intent."[23]

NHTSA recognizes that it has been put on notice by the court that the balancing exercise must, indeed be balanced. As the Preliminary Regulatory Impact Analysis states:

In <u>Center for Biological Diversity v. NHTSA</u>, the Ninth Circuit Court recognized that "EPCA gives NHTSA discretion to decide how to balance the statutory factors – as long as NHTSA's balancing does not undermine the fundamental purpose of EPCA: energy conservation. " 508 F. 3d 508, 527 (9th Cir. 2007). The Court also raised the possibility that NHTSA's current balancing of the statutory factors might be different from the agency's balancing in the past, given the greater importance today of the need of the nation to conserve energy and more advanced understanding of clime change. Id. at 530-31

Unfortunately, neither the ruling by the Appeals Court nor the passage of landmark legislation – the Energy Independence and Security Act of 2007 – seem to have convinced NHTSA to repair its approach to setting fuel economy standards. We believe that the fuel economy standards proposed are, once again, unreasonable, fail to implement the will of the Congress, and do not reflect the reality of the severe energy crisis in which the United States finds itself and which led Congress to pass and the President to sign the Energy Independence and Security Act of 2007.

---

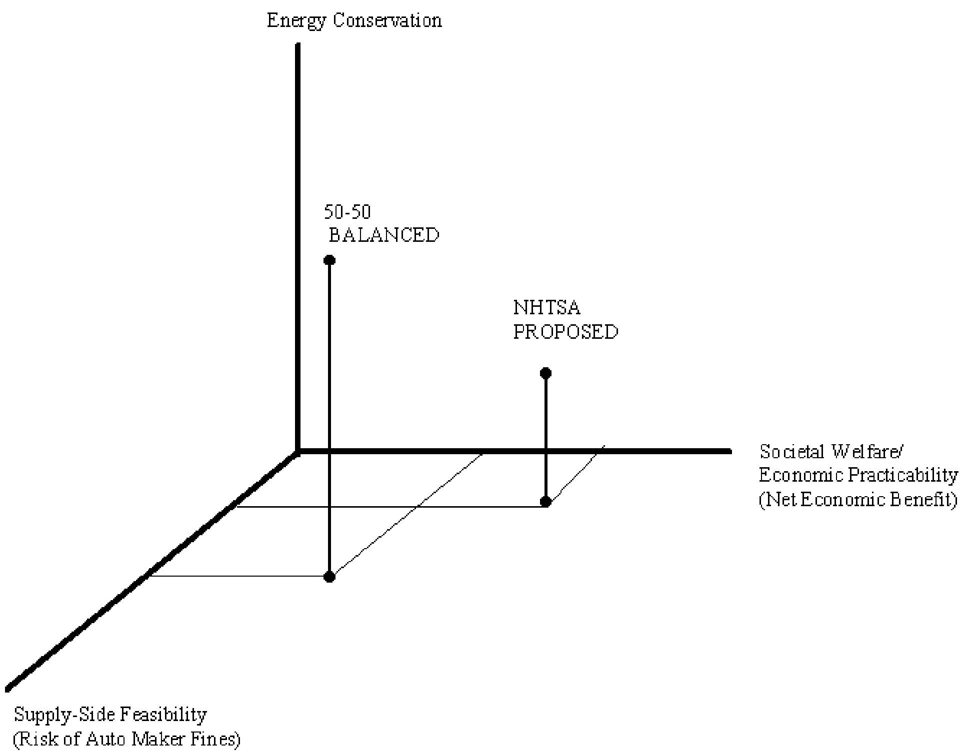
[21] Center for Biological Diversity, et al., v. National Highway Traffic Safety Administration, NO. 06-71891, p. 14871

[22] Id., p. 14863

[23] Id., p. 14863

As Exhibit 5 shows, NHTSA has let narrow concerns about economic maximization and protection of less capable auto makers pull down the level of fuel economy and conservation. It has not balanced the statutory factors, but severely disfavored conservation, choosing instead to raise fuel economy standards just about as little as it possibly could for the longest time it possibly could under the new statute.

Exhibit 5:
NHTSA has Failed to Properly Balance the Statutory Factors:
Narrow Views of Economic Practicability and Technological Feasibility Undermine Energy Conservation

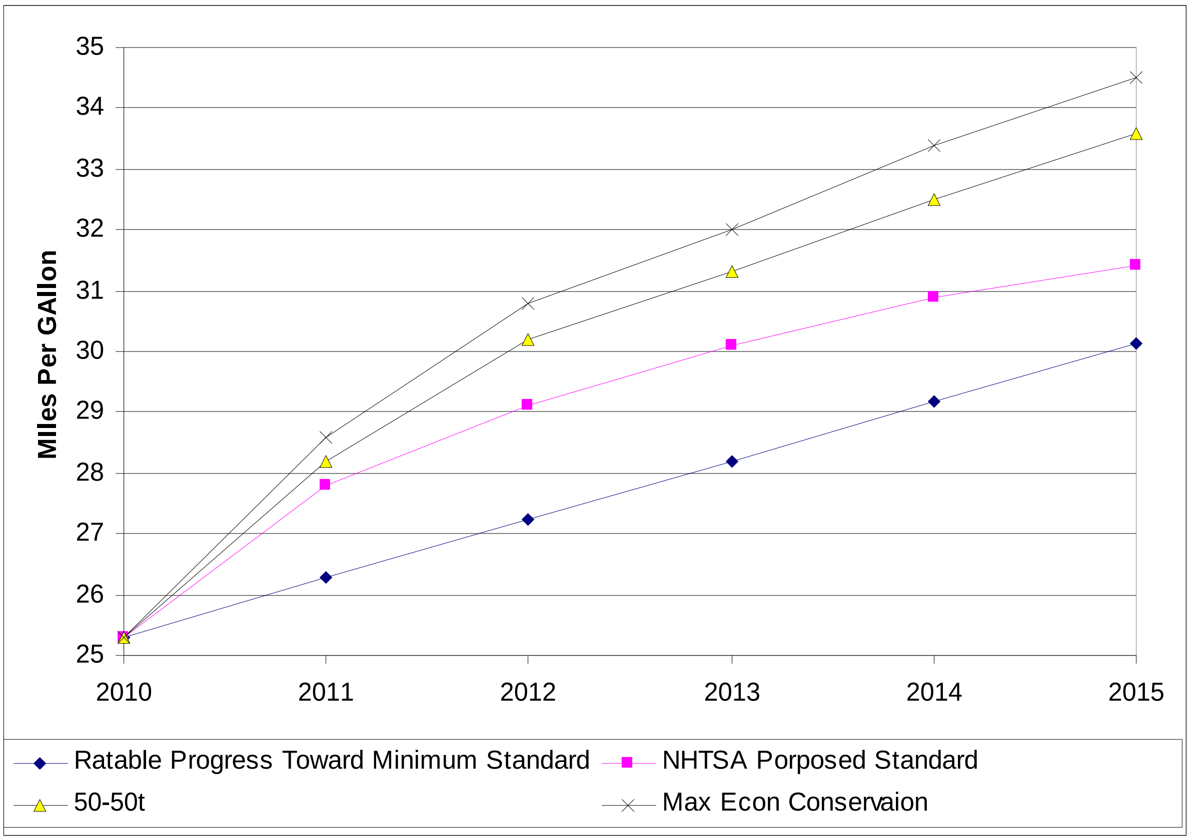


The central congressional charge to NHTSA is to set the standards at the **maximum feasible** level. Instead of increasing standards to the "maximum feasible" level as required by the statute and giving proper weight to the need to conserve energy, it has evaluated itself in terms of the "minimum allowable" and given far too much weight to economic considerations.

Exhibit 6 shows that the proposed standard falls away from the "50-50" maximum economic conservation level quickly after the first year. By 2013, NHTSA's proposed standard is capturing less than half of the difference between the minimum allowable progress and the maximum economic conservation standard level. By 2015, it is capturing a little over one-quarter. This is an analytic conclusion and policy justification that supports our call for

NHTSA to rescind its proposed standard for 2013-2015 based on the paucity of data on which it based the standards for those years.

Exhibit 6:
Achieved Average Fuel Economy Under Various Standards



Source: Achieved mpg PRIA Table 1a, sales weight from PRIA VII 1a and 1b.

We reach this conclusion not based on a "difference of opinion" about what the agency should or could do, but on the fact that NHTSA's analysis is fundamentally flawed, so deeply flawed that it rises to the level of "arbitrary and capricious." NHTSA has systematically and repeatedly undervalued the benefits of increased fuel economy and reduced fuel consumption. In spite of massive uncertainties and gaps in its knowledge, it has rushed to write rules for as long as allowed by the law, when the public interest and the intent of Congress would be far better served by writing rules for the shortest period possible. Shortening the period covered by the propose rule would have allowed the agency to educate itself about the many important features of the fuel economy landscape about which the agency admits it is ill-informed. Raising the standard for the first two years to the "50-50" level will balance the statutory factors properly and being NHTSA into compliance with the law.

TECHNICAL APPENDIX A:

CONCEPTUAL AND DEFINITIONAL FLAWS IN NHTSA'S ANALYTIC FRAMEWORK

OVERVIEW OF WHAT NHTSA DID AND WHY IT IS FLAWED

NHTSA is required by Congress to set the fuel economy standard at the "maximum feasible" level. As NHTSA points out at the beginning of the Notice of Proposed Rulemaking (NPRM):

> *…the Energy Independence and Security Act of 2007 (EISA), which Congress passed in December 2007(EISA) mandates the setting of separate* **maximum feasible standards** *for passenger cars and for light trucks at sufficient levels to ensure that the average fuel economy of the combined fleet of all passenger cars and light trucks sold by all manufacturers in the U.S. in model year (MY) 2020 equals* **or exceeds** *35 miles per gallon…. In developing the proposed standards, agency considered the four statutory factors* **underlying maximum feasibility** *(technological feasibility, economic practicability, the effect of other standards of the Government on fuel economy, and the need of the nation to conserve energy) as well as other relevant considerations such as safety.*[24]

NHTSA properly places a spotlight on the balancing required:

> *We solicit comment on all aspects of this proposal, including the methodology, economic assumptions, analysis and tentative conclusions. In particular, we solicit comments on whether the proposed levels of CAFE satisfy EPCA, e.g. reflect an appropriate balancing of the explicit statutory factors and other relevant factors.*[25]

NHTSA is required to give the automakers at least 18 months notice of what the fuel economy standard will be for a model year. However, it is forbidden to set standards more than five years in advance. The statute also set some minimum standards that must be met – a

---

[24] NPRM, pp. 7-8, emphasis added.
[25] NPRM, p. 16.

combined fuel economy standard of 35 miles per gallon for cars and trucks in 2020. NHTSA is also required to set standards that ensure that steady progress is made at least toward the minimum goal. While the new minimum level receives a great deal of attention, the maximum feasible level deserves as much, if not more attention.[26]

This technical appendix shows that NHTSA's tentative conclusions – its proposed standards – do not reflect an appropriate balancing of the three critical factors that the law requires it to consider in setting the standard. It has failed to properly balance technological feasibility, economic practicability and the need of the nation to conserve energy, unnecessarily and illegally sacrificing conservation to the other statutory factors.

- In its analysis, NHTSA identified two energy conservation alternatives that bracket the range of economically reasonable standards. One alternative would maximize fuel savings at no net cost to society by including fuel saving technologies until the total cost equals the total benefit. The other would maximize the economic return on investments in fuel economy by including fuel savings technology only up to the point where marginal benefits equal marginal costs. A reasonable rule would have balanced the economic and conservation concerns and set the standard between the two extremes. NHTSA simply chose to set the standard at the lower level of conservation with no consideration of the enormous energy conservation cost of that decision.

- NHTSA chose to define "feasibility" and "practicability" in a manner that lets the least fuel-efficient auto makers drive down the standard. NHTSA's approach protects the least capable automakers rather than requiring them to rise up to the level that the industry as a whole could achieve. Ironically, by setting a lower standard, in the face of

[26] The plain language of the statue makes it clear that maximum feasible is the goal, rather than the minimum standard legislated by Congress, and Congressman Market, floor manager of the bill emphasized this in his extension of remarks upon passage of the bill, pointing out that "if the maximum feasible level for model year 2020 is higher than 35 miles per gallon due to technological progress and/or other factors, Congress intends to require DOT to set standards at the maximum feasible level. "Extension of Remarks of Congressman Edward J. Market (D-MA) on the Senate Amendments to H.R. 6," Submitted for the Record December 18, 2008.

dramatically rising consumer expectations, the Administration is creating an environment of failure for those companies who are driving down the standard.

- In defining economic practicability on the demand-side, NHTSA fails utterly to understand consumer behavior in regard to fuel economy, vastly underestimating the value consumers place on and realize from fuel savings.

There are numerous other flaws in NHTSA's analysis that will be discussed in these technical appendices, all of which bias the analysis against fuel conservation, but these fundamental errors in the analytic framework – failing to balance technological feasibility, economic practicability and the need for conservations combined with the severe undervaluation of conservation – have led NHTSA to set standards that not only rob the nation of vitally needed, technologically feasible and economically practicable fuel savings, but also violate the Energy Independence and Security Act of 2007 and the Administrative Procedures Act.

As one of its "sensitivity" cases, NHTSA analyzed an alternative standard that is balanced – the "optimized + 50" standard.   This standard, which we call the "50-50" standard properly balances the feasibility, practicability, and conservation considerations, and reflects the will of the Congress in the Energy Independence and Security Act of 2007.   The "50/50"standard would save over 20 billion gallons more gasoline than the proposed standard at a relative modest incremental consumer cost, of just over $50 billion. The cost is equivalent to $2.50 per gallon, relatively modest compared to a current gasoline cost of $4.00 per gallon. It would still have a substantial positive net total social benefit of almost $20 billion. . With gasoline prices in excess of $4 per gallon, the higher standard would be a very good deal for consumers and the nation. When the erroneous economic assumptions are corrected, as discussed in Technical Appendix B, the net benefits rise substantially and the "50-50" standard becomes the preferred standard both from the point of view of economic value and fuel savings.

THE APPROACH TO EVALUATING STANDARDS

NHTSA has developed a highly complex model to examine the interaction of the statutory factors in setting the standard (See Exhibit A-1).

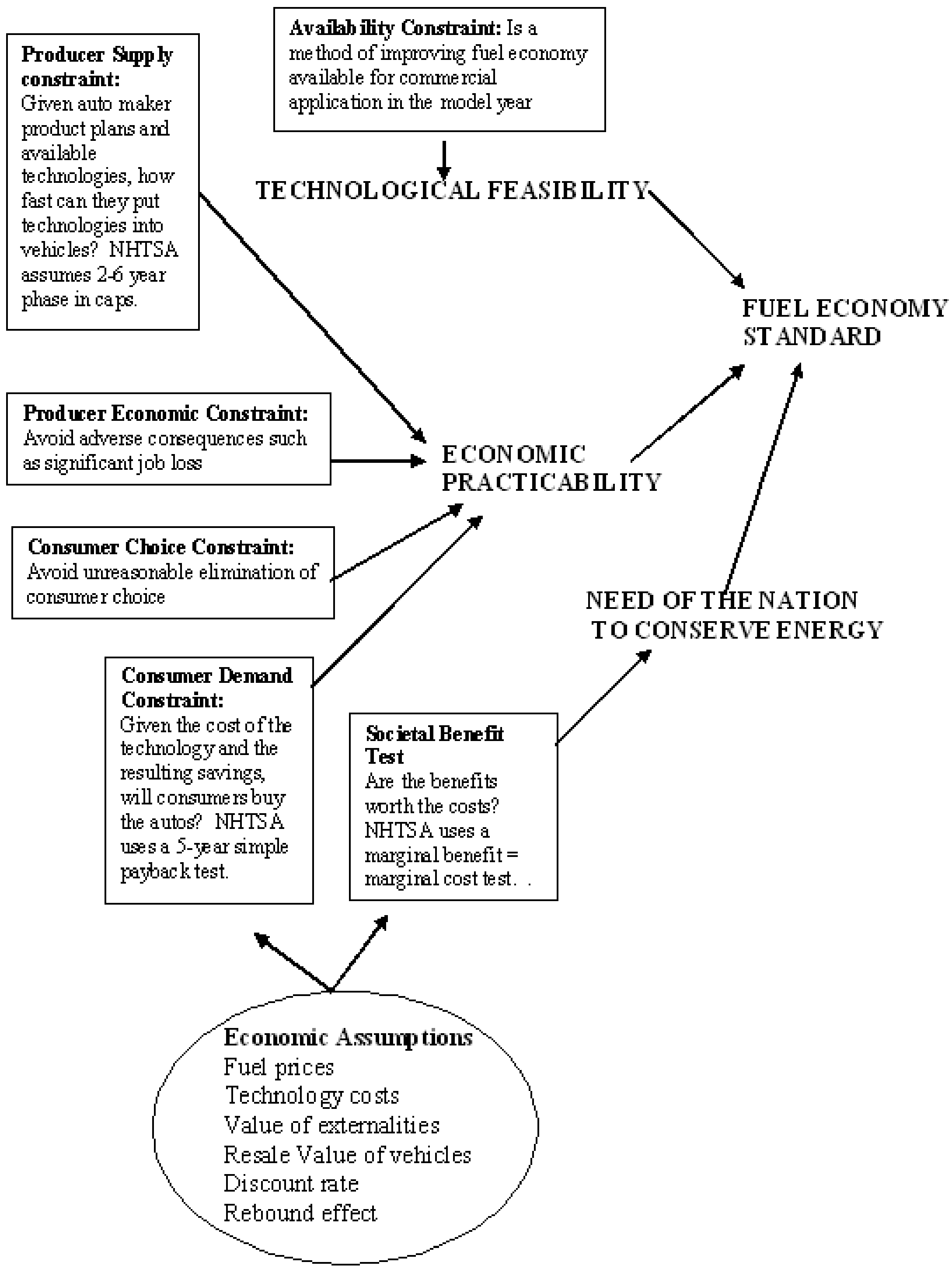
NHTSA requires fuel savings technologies to pass a series of screens in order to be included as the basis for the standard. Exhibit A-1 offers a summary picture of the model that identifies the key features of the model that greatly affect the level at which the standard is set. NHTSA defines the key elements of the analytic framework – technological feasibility and economic practicability as follows:

> *"Technological feasibility" means whether a particular method of improving fuel economy can be available for commercial applications in the model year for which a standard is being established.*[27]
>
> *"Economic Practicability" means whether a standard is "within the financial capability of the industry, but not so stringent as to" lead to "adverse economic consequences, such as a significant loss of jobs or the unrealistic elimination of consumer choice." In an attempt to ensure the economic practicability of attribute based standards, the agency considers a variety of factors, including the annual rate at which manufacturers can increase the percentage of its fleet that has a particular type of fuel savings technology and cost to consumers. Since consumer acceptability is an element of economic practicability, the agency has limited its consideration of fuel saving technologies to be added to vehicles to those that provide benefits that match their costs. Disproportionately expensively [sic] technologies are not likely to be accepted by consumers.*[28]

First, automakers must be able to put the technology into vehicles. NHTSA's analysis gives great weight to the automaker product plans and the technology adoption capabilities of

[27] NPRM, p. 44.
[28] NPRM, p. 44.

Exhibit A-1:
Schematic of NHTSA's Approach to Evaluating Fuel Economy Standards



the automakers. The product plans play a very large role in setting the standard, since they define what is technically feasible. NHTSA then assumes a limitation of the ability to implement new technologies. NHTSA sets phase-in caps for technologies ranging from 2 to 33 years, depending on the extent of redesign effort, capital investment and changes to manufacturing lines. Most caps are in the 2-6 year range.

Second, consumers must be willing to pay for those technologies. If consumers won't buy the cars, then automakers will be unable to sell them and their fleet average mpg will not improve. The will simply have to pay fines, but no fuel will be saved. NHTSA assumes consumers will not buy technologies that do not meet a simple five year payback test.[29]

Third, the technologies must yield a benefit to society. The consumer economic and societal perspectives on technologies to raise fuel economy are not identical. Society may count external costs (economic and environmental costs) that may not enter into the private calculation of the consumer. Individuals may demand a higher or lower return on investment than society (or the government). For the societal benefits test, NHTSA assumes that fuel economy spending must yield a 7% return on investment and that society prefers to stop investing in fuel economy when the marginal cost exceeds the marginal benefit. This produces the maximum economic benefit from the standard, not the maximum fuel savings that is technologically feasible and economically practicable.

Fourth, key economic assumptions dictate the outcome of the cost-benefit analysis. Key parameters are the fuel cost, technology cost, value of externalities, discount rates, etc.

While some of the criteria that are used to screen out "methods of improving fuel economy" are precisely defined in the NPRM – e.g. phase-in caps, social welfare principle

---

[29] NPRM, p. 191.

and a five year payback period – others are not. Phrases such as "Avoid adverse impact" and "avoid unreasonable elimination of consumer choice" are not precisely defined. They are judgmental black boxes. Moreover, the phrasing of these factors seems biased and is indicative of a bias against conservation and higher fuel economy that seems to pervade NHTSA's analysis. For example:

- NHTSA never considers that setting a higher standard might increase consumer choice by pushing automakers to produce a wider range of fuel-efficient cars for consumers to choose from.
- Nor does NHTSA consider in its analysis that higher standards could spur more rapid innovation and adoption of fuel savings technologies.
- It does not consider that pushing the industry to produce more fuel efficient cars might improve employment opportunities by better aligning supply and demand. The utter failure of the industry to foresee recent shifts in consumer demand and the resulting losses of jobs does not enter into NHTSA's thinking.
- NHTSA provides no precise measures by which one could evaluate the impact of the "jobs" and "choice" constraints on the outcome of its analysis. To the extent that they have influenced its decision to set the standard at a specific level, they seem out of touch with the current auto market reality.

There are key flaws in every one of the major elements of NHTSA's analysis. All of the flaws undervalue fuel economy and lead NHTSA to set the standards too low. Some of the flaws are so large and so at odds with the intent of Congress and the current energy reality that they constitute a violation of the law and administrative procedures. Other flaws are smaller and more a "difference of opinion," but they reinforce the bias against conservation. Some of the flaws are easily quantifiable because NHTSA was required to prepare sensitivity analyses that show how the standard would be raised under alternative sets of economic assumptions and parameters. Other flaws are deeply embedded in the black box that lies at the core of the analysis and therefore are difficult to quantify, but important nonetheless.

AN UNBALANCED APPROACH LEADS NHTSA TO PROPOSE AN UNREASONABLY LOW STANDARD

NHTSA conducts a very large number of analyses of individual technologies under a range of economic assumptions, but it presents no results for public review about the constraints which led to the inclusion or exclusion of any individual technology. Rather, it presents a series of evaluations of broad levels of fuel economy standards and summary measures of how those standards fare in relation to each of the key criteria. Since data to evaluate the standard is publicly available only at this very aggregate level of detail, we must conduct the analysis at this aggregate level.

In reconstructing (or deconstructing) the analysis, we dissect the results of the alternative standards that NHTSA analyzed:

> *"optimized" standard; This is the standard NHTSA proposed. The central characteristic of this standard is a marginal cost/benefit test, at a 7% discount rate. It maximizes the economic benefit by setting marginal benefit equal to marginal cost, discounted at 7%. We call it the proposed standard;*[30]
>
> *"optimized + 50 standard." This alternative looks at the mpg levels of the Optimized (7%) and the Total Cost Equal Total Benefit alternative and picks mpg levels that re 50 percent of that difference."*[31] *We call this the "50-50" standard.*
>
> *"total benefit = total cost (TB=TC)" standard, "An increase in the standard to the point where essentially total costs of the technologies added equals total benefits..*[32]*. We call this the maximum conservation at no net cost to society standard*
>
> *Technology Exhaustion: This standard represents "An increase in the standard based upon the maximum usage (from NHTSA's perspective) of available technologies, disregarding the cost impacts. We call this the technology exhaust standard.*

---

[30] PRIA, p. i.
[31] PRIA, p. ii.
[32] PRIA, p. ii.

These four represent critical policy points in arriving at a reasonable standard. The proposed standard "optimized" economic value. By setting the standard where marginal benefit equal to marginal cost, NHTSA yields the largest economic gain for society. The maximum conservation at no net cost to society "optimizes" conservation, within the constraint of imposing no cost on society. Society gets all the conservation it can while breaking even in an economic sense. Technology Exhaust imposes costs on society in pursuit of energy conservation.

The Dictionary defines the word "Optimum" ad " (1) that amount or degree of something tha it most favorable to some end."[33] NHTSA has chosen an economic end, which, as discussed below is not statutory. If there is any preference for an end to be optimized, it is conservation.

The "50-50" standard lies half way in between the maximization of economic value and the maximization of conservation at no net cost to society. This Technical Appendix explains why the "50-50" standard strikes the proper balance between technological feasibility, economic practicability and the need to conserve energy.

NHTSA analyzed two other standards in detail – twenty-five percent below its proposed standard and twenty-five percent above it. The proposed standard minus 25% is without merit. It does not substantially improve technical feasibility or economic practicability,[34] while it yields lower economic value and less conservation.[35] The proposed

---

[33] *The New International Dictionary of the English Language: Unabridged* (Springfield MA: Merriam-Webster, Inc., 1989), p. 1585.

[34] Compared to the proposed standard, it add 22 jobs in an industry of over 1,000,000 employees (PRIA, pp. VII-54-55), and reduces the percentage of automakers who are projected to experience technology exhaust by 4 percentage points from 14 to 10 (NPRM, p. 360).

standard plus 25%, improves the balance between economic considerations and conservation considerations, but it lacks conceptual clarity. The “50-50” standard exactly balances those considerations.

In short, NHTSA’s choice of the “optimized” standard is unreasonable for the following reasons:

- *Conceptually, or definitionally, NHTSA’s “optimized” alternative fails to properly balance the economic considerations and the need to conserve energy mandated by Congress.*
- *Conceptually, or definitionally, the “optimized” alternative fails to properly balance the supply-side practicability consideration and the need to conserve energy mandated by Congress.*
- *Conceptual and empirical flaws in NHTSA’s analysis undermine its application of the consumer demand-side constraint.*

It is critically important to recognize all three flaws because the policy filters or screens are cumulative. Correcting one of the errors alone will not automatically lead to the proper standard, because policy alternatives may be screened out by one of the other flaws. Each of the key factors NHTSA has used to set the fuel economy standard suffers from two types of flaws (see Exhibit A-2). They are incorrectly conceptualized/defined, and they are incorrectly specified empirically. CFA’s comments and the technical appendices focus on supply-side and demand-side economic practicability issues. Technical Appendix A focuses on the conceptual/definitional issues. Technical Appendix B discusses the empirical economic flaws in the analysis. .

[35] Compared to the proposed standard, it lowers net economic benefits by 17% (NPRM Table 5b) and fuel savings by 25% (NPRM, Table 6).

Exhibit A-2:
Flaws in NHTSA's Analysis of Fuel Economy Standards

Adoption Constraint	Conceptual/Definitional Flaw	Empirical Specification Flaw
Supply-Side	Failure to adopt a clear standard. Suggestion that laggards set a low bar.	Plans are not fully reported or evaluated. NHTSA lets product plans drive the supply-side, but the plans it has are incomplete and the track record of the industry's ability to predict where the market is going has been abysmal in recent years.
Demand-Side	Five year payback is not supported by any evidence and contradicted by current market behavior. Rebound effect is inappropriately applied to consumer welfare calculation.	Fuel prices are too low. Rebound effect is too large. Resale price fails to reflect the economic value of fuel economy.
Societal Welfare	Failure to balance economic need and need to conserve energy.	Fuel prices are too low. Oil has no military or strategic value. Rebound effect is too large. Discount rate is it too high.

THE FAILURE TO BALANCE FEASIBILITY, PRACTICABILITY AND THE NEED TO CONSERVE ENERGY

Exhibit A-3 describes the key characteristics of the four key alternative standards. It includes the key constraints in the model: the societal View, the Consumer View and he the producer supply constraint measured as the percentage of automakers that are likely to

Exhibit A-3: Key Characteristics of Alternative Fuel Economy Standards

	Miles Per Gallon (2015)				Societal View		Consumer View			% of Auto Makers Exhausting Technology (cars & trucks Combined)
	CAFE Standard		Achieved					Implicit Cost/Gallon		
	Cars	Trucks	Cars	Trucks	Net Benefit (million dollar)	Fuel Savings (million gallons)	Total Cost (million $)	Total	Incremental	
Proposed Maximize Economic Value (marginal benefit=marginal cost)	35.7	28.6	34.7	28.4	41596	54,713	46,745	$0.85		15
									$2.45	
50-50 Balanced Economic and Conservation Considerations	39.5	30.9	37.6	30.0	19092	76,048	100,030	$1.32		47
									$2.97	
Fuel Savings at No Net Cost to Society (total benefit=total coat)	43.3	33.1	38.8	30.5	3115	86,635	131,447	$1.52		77
									$2.32	
Technology Exhaust Total Fuel Savings disregarding cost	52.6	39.9	34.7	31.3	-3749	94,899	150,635	$1.59		90

Sources: PRIA Tables 1-6, NPRM Figure X-7 and accompanying text.

exhaust technologies available to them in attempting to meet the standard. This seems to be the most direct way to operationalize the phase-in capacity issue. The social welfare outcome and consumer payback tests are explicitly defined and measured as described above. Exhibit A-3 describes the also shows the 2015 fuel economy goals that would be set and the actual levels of fuel economy that would be achieved under each of the standards. In all four scenarios, the fuel economy achieved is lower than the standard, indicating that some automakers fail to comply with the standard.

Even without correcting the empirical flaws in NHTSA's analysis discussed above, a strong case can be made that the conceptual flaws in the analytic framework led NHTSA to propose a standard that is too low.

NHTSA stopped at the "optimized" standard primarily because of the large net total societal benefit (the fourth column in Exhibit A-3, i.e. the societal view: net total benefit). NHTSA would argue that moving to the standard that produces the maximum economic conservation at no net cost to society would impose a severe hardship on automakers, since over three quarters of them are projected to exhaust technology and therefore be unable to achieve the standard (the final column in Exhibit 2: % of automakers exhausting technology). The impact of this can be seen by noting the large gap between the level at which the standard would be set and the level of fuel economy that would actually be achieved (car standard = 43.3 mpg v. car achieved = 38.8 mpg; trucks standard = 33.1 mpg v. truck achieved = 30.5 mpg). NHTSA argues that setting the standard at a high level which cannot be achieved saves little energy, ignoring the possibility that the tough standards might provide an incentive to achieve higher level of fuel economy.

The technology exhaust standard is projected to have a pervasive (90 percent) failure to comply and an even larger gap between the proposed standard and the achieved level of fuel economy.

The balanced proposal does not suffer these two afflictions. The majority of the automakers are projected to not exhaust the technologies they could add to meet the standard. The market would achieve fuel economy that is close to the standard. Moreover, note that in all three scenarios, the fuel economy achieved is lower than the standard, indicating that some automakers fail to comply with the standard.

It turns out that the “50-50” standard not only splits the difference between the proposed NHTSA standard and the maximum conservation at no net cost standard, it also splits the auto industry roughly in half with respect to the likelihood that manufacturers would be able to achieve the standard. NHTSA projects that slightly more than half of the manufacturers would be able to add technologies to vehicles to meet the standard. The other half would have to exert extra effort to catch up with the majority of the industry. Thus, because “optimized plus 50%” standard sets the goal as a balance of the economic and conservation considerations and would be met by more than half the industry, we call it the “50-50” standard.

The “50/50” standard would set the car standard 3.8 mpg higher and the truck standard 1.9 mpg higher than NHTSA’s proposed standards. Setting the standard higher for cars would achieve a 2.9 mpg increase for cars, equal to over three-quarters of the increase in the standard. Setting the standard higher for trucks would achieve a 2.1 mpg increase, equal to over 90 percent of the increase in the standard. Leaving aside some concerns we have about NHTSA’s assumptions about how quickly automakers would respond to the prospect of paying fines, this analysis suggests that increasing the standard from the "optimized" level to the "50/50" level would be effective in achieving fuel savings. The majority of automakers are projected to be in compliance, and the bulk of the fuel savings are achieved.

The value of the increase in savings is substantial by moving from the "proposed" to the "50/50" level. Even under very questionable assumptions about fuel prices, among other things, net economic benefits of the "50/50" standard are estimated at $19.1 billion (cumulative and discounted). This is less than the net economic benefit of $41.6 billon for the "proposed" standard. However, the "lost" economic benefits have a large fuel savings benefit – 21.3 billion barrels.

Thus, NHTSA has failed to give proper weight to the Congressional mandate to consider the need to conserve energy in several critical parameters of the analysis. NHTSA chooses to maximize the economic value of fuel economy, rather than to maximize the amount of fuel saved. Indeed, by imposing a strict economic standard of maximizing marginal benefits, NHTSA essentially gives little consideration to the need to conserve energy in the bottom line calculation. Both the consumer and the societal screens are purely economic – a five year payback for individuals and a marginal benefit equals marginal costs test.

The NHTSA analysis states (incorrectly) that because it has put the correct value on externalities, it has taken a balanced view of economics versus the need to conserve energy.[36] That is not the case. Simply putting a price on an externality does not mean it has been considered in an appropriate manner. The maximization principle is an equally, in fact, much more important, measure of how the concern about conservation enters the analysis. By

[36] PRIA, pp. III_12 – III-13.

choosing to maximize the economic value of fuel economy, NHTSA gives short shrift to the concern for conservation. By setting the standard where the marginal benefit equals the marginal cost, society receives the maximum economic benefit from higher fuel economy standards, but foregoes a great deal of fuel savings.

The economic maximization principle that NHTSA imposes is not statutory language. It is not part of technological feasibility of economic practicability and NHTSA does not claim it as such. Rather, it is a principle imposed on the rule making that is wholly of NHTSA's making because it seems to be a sensible principle.

> *If we have valued benefits appropriately, it does not make economic sense to mandate the spending of more money than society receives in return. The resource used to meet overly stringent CAFE standards, instead of the optimized scenario standards, would better be allocated to other uses such as technological research and development, or improvements in vehicle safety.*[37]

It may not "make economic sense to mandate the spending of more money than society received in return," but it may make environmental or national security sense to spend more money on increased fuel economy. Beyond feasibility and practicability, Congress did not single out economic maximization for consideration; it singled out "the need to conserve energy." NHTSA has no idea what the additional money not spent will actually be used for, i.e. it could just as easily be devoted to inflating executives salaries. NHTSA does not know whether the social return on "research and development" or safety, if that is what it would actually be used for, would be higher than the social return on more spending to raise fuel economy higher.

An alternative possible maximization principle that makes perfect sense from the societal point of view is to maximize fuel economy at no net cost to society. If congress had

[37] PRIA, p. III-13.

not passed a law, there would be neither economic gains from higher fuel standards nor fuel savings. Having passed the law, there are both economic gains and energy conservation gains. The nation would be no worse off economically and much better off from the point of view of fuel savings, if NHTSA had chosen a maximum economic conservation principle. NHTSA's personal preference for economic value maximization rather than maximum economic conservation should not have been dispositive of where it set the standard.

NHTSA could have set the standard at the point where total benefits equal total costs. At that point, the rule would maximize fuel savings, subject to the constraint that society is not worse off than it would have been in the base case. An approach that balances the economic and energy conservation concerns would be half way between the maximization of economic value and the maximization of fuel savings. The standard for cars would be set at 39.5 and trucks are 30.9. This would be the mid-point between the maximum economic value and the maximum fuel savings, both of which are economically practicable levels at which to set the standard.

SUPPLY-SIDE CONSTRAINTS

In our view, much higher levels of fuel economy standards would pass the societal welfare test (one of the primary constraints in the proposed rule) if NHTSA balances the economic and energy conservation concerns. We believe the same is true for the conceptualization of the supply-side constraint. The proposed standard is at a level where only one or two of the automakers would fail to meet the standard. While NHTSA does not have to push the standard to a level that would cause a higher percentage of the automakers to fall short, it is important to recognize that even if that were the case; this would not disqualify the standard. In other words, if a higher percentage of automakers were likely to fall short, that would not mean that the standard is economically impracticable. As we have noted, the "50/50" level provides an example of this. According to NHTSA's analysis, over 50 percent of the auto manufacturers would be able to meet the standard because of the phase in process.[38] Those who fail to meet the standard would either have to speed adoption, develop new technologies that were not considered by NHTSA, or pay some fines until they do.

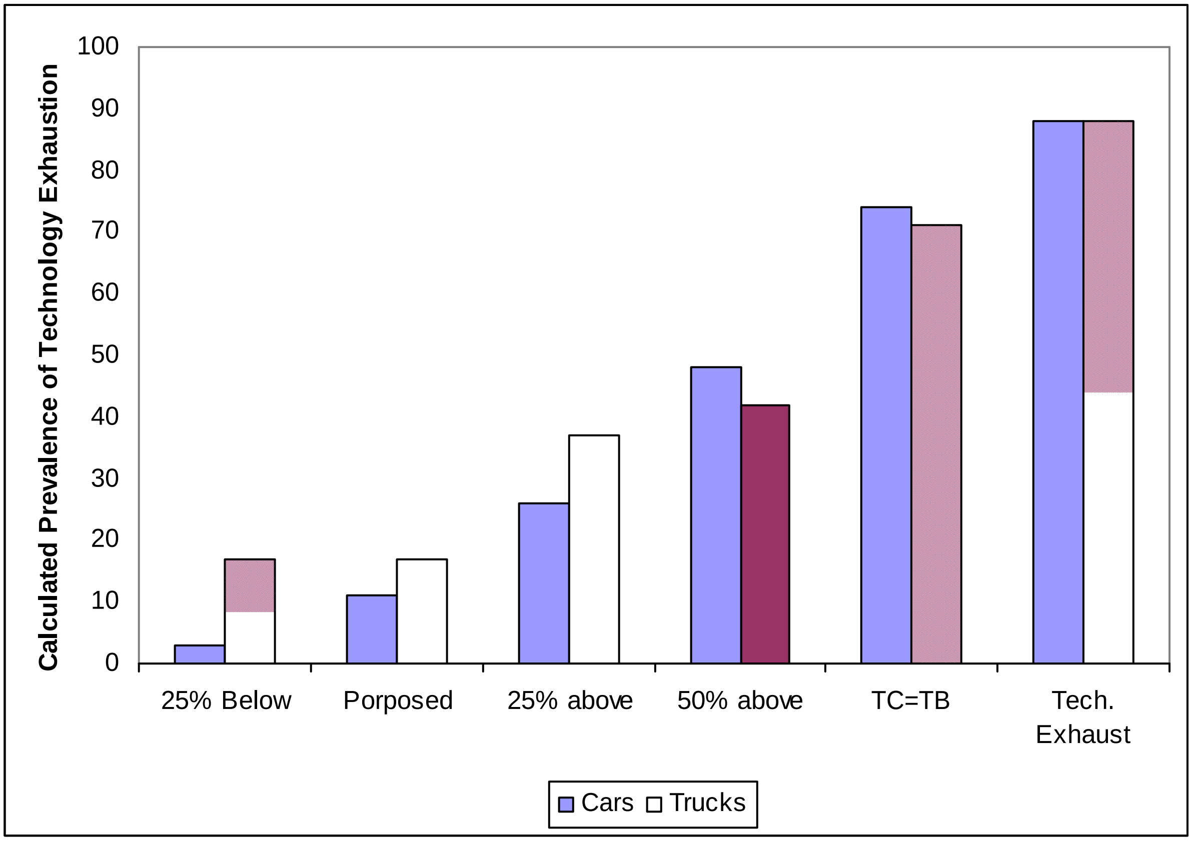
These predictions on the possibility that a significant percentage of automakers might fail to meet the standard carry us to the part of the model that is the least well documented and transparent. As noted in the comments, the projections of the limitation of the ability to adopt new technologies is based on a very thin body of knowledge about the veracity, relevance and predictive value of auto manufacturer product plans, recent changes in fuel economy and the practices of automakers in adopting fuel economy technologies.

There is also a question regarding assumptions about compliance strategies of auto manufacturers. NHTSA has set out to essentially ensure that automakers pay few fines, under the argument that when automakers miss the goal and pay fines, society does not get the benefit of increased gasoline savings. NHTSA's standard does not push the industry. This is evident in Exhibit A-4. NHTSA has set the rule at a level where only 11 percent of automakers and 17 percent of truck markets are not likely to meet the standard. Were NHTSA to refuse to move the standard to a level where half the industry can meet the standard, it lets the laggards drag the standard down and allows the definition of economic practicability to dominate the need for conservation.

---

[38] NPRM, p. 360.

Exhibit A-4:
Prevalence of Technology Exhaustion



Source: NPRM, p. 360.

Note that the percentage of automakers who miss the standard is only slightly higher than the results for "25% below proposed" than the proposed rule for cars, but identical for trucks. Those who fail to meet the standard are a set of manufacturers (Ferrari, Lotus, Maserati, Mercedes, Porsche and Volkswagen) who prefer to pay fines rather than comply.[39] Compliance for the others is not constrained by technological availability or the assumptions about the phase-in cap. In moving beyond the proposed level, NHTSA gives no weight to the

[39] PRIA, p. VI-1.

incentive value of fines as a motivator to do better (find new technologies or adopt existing technologies) more quickly.

> *In the more stringent alternatives, the Volpe model predicts that increasing number of manufactures will run out of technology to apply and, theoretically, resort to penalty payments. Setting standards this high is not technologically feasible, nor does it serve the need of the nation to conserve fuel. Paying a CAFE penalty does not result in any fuel savings.*[40]

This statement is overly simplistic and incorrect. Under all scenarios considered, some manufacturers can comply will all levels of the standard, so the payment of fines reflects manufacturer preferences and capabilities (and NHTSA's assumptions about them) rather than the absolute possibility of meeting the standard. Moreover, in at least two of the higher levels of standards, the majority of automakers are projected to not be at technology exhaust. The possibility that the threat of fines might give manufacturers incentives to try harder should not be dismissed. NHTSA's own analysis shows it is factually incorrect to say that setting higher standards does not serve the need of the nation to conserve fuel or to suggest that setting higher standards does not result in any fuel savings. In fact, every higher level of standard results in more fuel savings. The highest level of standard examined by NHTSA results in over 70 percent more fuel savings than NHTSA's proposed standard. The "50-50" standard that we show complies with technological feasibility, economic practicability, and gives proper consider to the need to conserve energy, saves 39 percent more energy than NHTSA's proposed standard,

We believe that the standard can be set at higher levels. A level at which half or more of the automakers are expected to be able to meet is feasible. The dictionary defines feasible

---

[40] PRIA, p. II-13.

as "(1) capable of being done, executed or effected: possible of realization."[41] When more than half the industry is projected to be able to meet the standard, it definitely seems to be "possible of realization." The minority of laggards has to try harder to catch up to the majority of the industry, but it does not mean it is not feasible. Setting the standard at a level that splits the automakers in half is a reasonable approach to feasibility.

The dictionary defines practicable as "(1) possible to practice or perform: capable of being put into practice, done or accomplished."[42] When more than half the auto industry is projected to be able to meet the standard, it definitely seems to be "capable of being put into practice." The minority of laggards has to try harder to catch up to the majority of the industry but that does not mean the standard is not practicable. Setting the standard at a level that splits the automakers in half is a reasonable approach to practicability.

The NPRM cites court rulings which support this view.

> *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. 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." 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.*[43]

The proposed rule does not appear to comport with this ruling. NHTSA puts considerable weight on this criterion. As the agency states

> *Conversely, the agency has tentatively concluded that, relative to the proposed standards, the more than doubling of risk posed by the 25% above proposed" alternative is not warranted, especially considering that this alternative is*

---

[41] *The New International Dictionary of the English Language: Unabridged* (Springfield MA: Merriam-Webster, Inc., 1989), p. 931

[42] New International Dictionary, p. 1780.

[43] NPRM, p. 45

estimated to significantly reduce net benefits, by $0.5b in MY2011 and, eventually, $4.3 b in MY2015.[44]

Although NHTSA mixes the two risks of technology exhaust and societal welfare criteria in this statement, this formulation puts the phase-in cap in the paramount position and NHTSA appears to reject a standard the over 70 percent of car makers and over 60 percent of truck makers are not at risk of failing to comply. This allows the laggards to set the standard, rather than setting the standard where the industry as a whole could comply.

Based on a proper conceptualization of the supply-side constraint NHTSA **can** set the standard much higher. Based on a proper conceptualization and balancing of economic considerations and the need to conserve energy, NHTSA **should** set the standard much higher. If the grounds on which NHTSA has failed to set the standard above the proposed level or even the "optimized plus 25%" level is the risk of technology exhaust, then it has done so illegally.

AUTO MARKET FAILURE AND THE FAILURE OF NHTSA'S MARKET MODEL

NHTSA's view of the market failure in the auto market is very narrow, generally admitting only a problem of externalities that are not internalized. This results in the failure of NHTSA to adopt reasonable standards that reflect the will of the Congress and the dire situation in which the U.S. finds itself.

Consumers generally have no direct incentive to value benefits that are not included in the price of fuel – for example, benefits such as energy security and

[44] NPRM, p. 362.

> *limiting global climate change. These are the market failures which EPCA requires NHTSA to address.*[45]

Given the rather dramatic market failures in the auto market in recent years, market failures that have little to do with the cited externalities, we suspect that there are other sources of market failure, like information problems, agency problems, perverse incentives, etc. Moreover, the problem is not limited to the demand-side of the market. There are imperfections in the supply-side.

Although NHTSA has built its entire analysis around the narrow view of market failure, it was confronted with conclusions in its own analysis that contradict that assumption. NHTSA discovers that there are fuel savings technologies that pay for themselves, but have not been moved into the vehicle fleet. Since this cannot be explained by the externalities market failure, there must be other market failures operating.

> *If some fraction of fuel economy improvements (as perceived and valued by vehicle purchasers) is large enough to exceed the increased vehicle cost (and result in an increase in vehicle sales), then what would be the nature of the market failure such that those levels of fuel economy would not exist but for a CAFE mandate? To better understand this issue, NHTSA seeks comment on the following question: What evidence or data exists that indicate the extent to which consumers undervalue fuel economy improvement? Under what circumstances is it reasonable to expect that a mandated increase in fuel economy would lead to an increase in sales?*

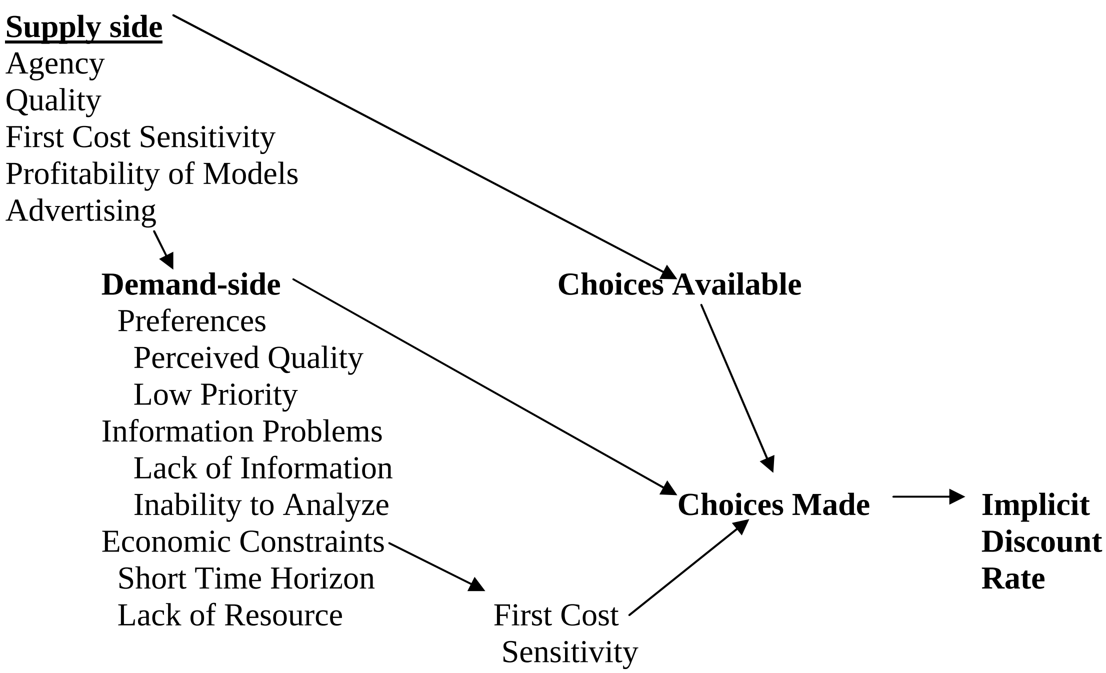
NHTSA's pro-industry view of the world blames the market failure on the consumer, when, in fact, the problem is the automakers. This is one of several reasons that NHTSA's reliance on auto industry plans and data and the extreme efforts to which it goes to "protect" the automakers from discomfort are misplaced.

---

[45] NPRM, p. 310.

The cars that are sold in the marketplace reflect not only what consumers want to but also, what automakers want to sell. Automakers spend millions on advertising and promotions to move the metal that makes the most profit for them. It is simply wrong to claim that all the advertising and marketing has no effect (see Exhibit A-5).

Exhibit A-5:
Imperfections in the Auto Market



Failing to recognize the imperfections on the supply-side leads NHTSA to an over reliance on automaker product plans. Thus, it is a much better representation of reality to say that the auto market undervalues fuel economy. The problem is not just the consumer. Indeed, the automakers may be a bigger part of the problem. If automakers are required to produce and sell more fuel efficient vehicles, they will have to change their advertising and marketing focus. With the automaker resistance to more fuel efficient vehicles dampened, the apparent market valuation of fuel economy will rise quickly. It is the automakers who have been at least as large a drag on fuel economy as consumers.

Auto makers prefer to sell certain models because they are more profitable. They prefer simple technologies that are less demanding to produce and maintain. They have a first cost bias, seeking to keep the sticker price low. They seek to influence the public to purchase the vehicles that best suit their interests.

On the supply-side there is an agency problem – a separation between the builder or purchaser of buildings and appliances and the user.   Suppliers may not choose to manufacture or stock efficient vehicles if they are less profitable, hoping that advertising and showroom persuasion can point consumers in the direction the manufacturers want them to go.

Consumers are influenced by advertising and my not perceive quality properly. The priorities afforded to any particular attribute are difficult to discern in a multi-attribute product. They lack the information necessary to make informed choices. The life cycle cost calculation is difficult, particularly when projections about future gasoline prices and vehicle use are necessary.

Even when they do consider efficiency investments, they may not find the more efficient vehicles to be available in the marketplace.

We view the apparent high discount rate attributed to consumers as the result of other factors not the root cause of the demand-side problem.   We do not accept the claim that consumers are expressing irrational preferences for high returns on efficiency investments; irrational because they appear to be a return that is so much higher than they can get on other investments they routinely have available. Rather, we view the implicit discount rate as a reflection of the fact that the marketplace has offered an inadequate range of options to consumers who are ill-informed and unprepared to conduct the appropriate analysis and who lack the resources necessary to make the correct actions.

There are two implications for NHTSA's analysis. First, CAFE standards correct market failures and therefore can result in economically beneficial outcomes (increases in sales). Second, CAFE standards address important supply-side market imperfections. They counter the tendency to want to produce low cost, energy inefficient vehicles that generate higher rates of profit. CAFE standards also give automakers an incentive to advertise and market more fuel-efficient vehicles. NHTSA's framework needs to fully reflect this alternative, more realistic view of the auto market.

Unfortunately, NHTSA has structured it analysis to put the automaker resistance to fuel economy increases in the driver's seat in several ways.

The product plans of the auto manufacturers play an important part in the overall outcome because they set the baseline from which NHTSA determines what the auto manufacturers can accomplish over a seven year period. Yet, those product plans reflect more about where they would like to drive the market with their advertising and marketing campaign than what they and the market are capable of. Over the past several years the plans of many of the automakers have been rather bad predictors of the market outcomes, at least judging by the numbers of unsold units piling up in the showrooms and lots and the large discounts the automakers have been forced to offer to move the metal. NHTSA presents no analysis of the fit between product plans and market behavior.

Automaker strategic reaction to the prospect of fines also plays an important role in the analytic framework. NHTSA allows the historical desire of automakers to avoid paying fines to pull down the level of the standard, by assuming that setting standards at a level that might cause automakers to pay fines does no good. NHTSA spares the rod and spoils the child. Fines are not only punitive; they are motivational. If NHTSA continually sets standards that are easy to meet to avoid the threat of paying fines, the automakers are never challenged to achieve much higher levels of fuel economy.[46]

On the consumer side, the evidence from the past several years is that the consumers are out ahead of the automakers. The automakers failed to anticipate the shift in demand away from gas guzzlers. This is clear not only in sales, but also in public opinion polls.

When recently asked in public opinion polls what they would like the mileage of their next vehicle purchase to be, respondents gave a median value of 30.6 miles per gallon.[47] The automaker product plans reviewed by NHTSA put the estimated fuel economy of the new vehicle sold in 2011 at slightly below 27 miles per gallon rising to slightly more than 27 miles per gallon by 2015. Over one quarter of the respondents to the survey said they want get over 35 miles per gallon, but only 1 percent of the models available achieve that level of fuel economy.

These observations are suggestive of underlying market patterns that are not reflected in the fabric of NHTSA's model. NHTSA recognizes that there might be other market

---

[46] NPRM, p. III-13, "In the more stringent alternatives, the Volpe model predicts that increasing numbers of manufacturers will run out of technology to apply and, theoretically, resort to penalty payments. Setting standards this high is not technologically feasible, nor does it serve the need of the nation to conserve fuel. Paying a CAFE penalty does not result in any fuel savings." Note that this quote classifies the phase problem as one of technological feasibility, when in the earlier reference called it a matter of economic practicability. Our earlier discussion makes the point that both practicability and feasibility are consistent with a standard that splits the auto manufacturers in half.

[47]

failures, but it does not explore them or let them enter into or influence the structure of its analysis.

NHTSA claims that the proposed standard "pushed many of the manufacturers in their applications of technology. NHTSA is proposing standards that it estimates will entail risk that some manufacturers will exhaust available technologies in some model years. However, the agency has tentatively concluded that the additional risk is outweighed by the significant increase in estimated net benefits to society."[48]

We do not see it that way. In fact, there is very little push here. On average, only one car manufacturer and one truck manufacturer are projected to run out of technology under the proposed rule,[49] but these are technologies that the majority of manufacturers actually can implement. NHTSA's proposed rule is a lot closer to the "least capable manufacturer" standard than an "industry average" capability standard.

Similarly, NHTSA claims that "the agency evaluated the costs and benefits described above and ensured the standards were achievable without the industry's being economically harmed through significant sales losses.'[50] NHTSA has gotten it backwards. It is more likely that the absence of significantly increasing fuel economy standards in the past half decade has led to significant sales loses, than *vice versa*.[51] NHTSA's timidity in proposing higher standards to protect the industry is misplaced. The industry needs tougher standards to be protected from its own, self-destructive tendency to under produce fuel economy.

---

[48] NPRM, p. 315.
[49] PRIA, p. VII-56.
[50] NPRM, p. 316.
[51] PRIA, p. VII-54, shows that the industry lost six percent of its sales and 16 percent of its employment between 2000 and 2005. The "50/50" scenario results in a job loss that is a small fraction of the losses between 2000 and 2005 (28,092 v. 215,600).

CONCLUSION

It appears that the binding constraints in the proposed rule are the phase-in cap and the social welfare analysis. While the compliance analysis (percent of automakers who fail) and the consumer payback analyses appear to be secondary (because they are not triggered at the level of the standard chosen), their conceptual and empirical flaws need to be corrected by NHTSA. Having written the proposed rule in a manner in which the three constraints could be binding, it is possible that these constraints could be invoked by NHTSA, or other parties, to argue that the standard should not be raised, even though one of the primary constraints is no longer operative. For example, if an increase in fuel prices results in a social welfare analysis that calls for a higher standard, NHTSA and/or other commenters might argue that the consumer benefit test or an automaker compliance criterion militates against setting a higher standard. In short, all of the potential constraints should be fully specified, properly defined and correctly measured independent of the level of the standard.

TECHNICAL APPENDIX B
EMPIRICAL FLAWS IN NHTSA'S ANALYSIS

The previous technical appendix has identified the major conceptual/definitional flaws in the NHTSA analysis that have a large impact on the level at which the standard was set. This technical appendix discusses the economic assumptions that affect the level of the standard.

THE PRICE AND VALUE OF GASOLINE

The Unreasonably Low Gasoline Prices and Undervaluation of Externalities Leads NHTSA to Set Unreasonably Low Standards

There is one empirical specification in the model that has an impact on the outcome that is as large as the conceptual issues discussed above – the price of gasoline. NHTSA also underestimated the external costs of gasoline consumption, which resulted in a further undervaluation of fuel savings. The low price of gasoline affects both the societal welfare analysis and the consumer payback analysis. The underestimate of the external costs of gasoline consumption affects the societal welfare analysis.

The parameters of the severe energy crisis in America have been written in the headlines of daily newspapers over the past five years. Gasoline prices have set record after record, now hovering around $4.00 per gallon. Prices have been driven ever higher by crude oil prices that have quintupled in the past five years. As the price of crude skyrocketed, with only modest changes in market fundamentals, market analysts have pointed to geopolitical factors as the cause.

> *Even as uncertainties abound about the fundamentals of the energy market, geopolitical tensions in the Middle East regained center stage after Israel's*

transportation minister and a deputy prime minister, Shaul Mofaz, said Friday that an attack on Iran's nuclear sites looked "unavoidable" if Iran did not abandon its nuclear program.

Iran is the second-largest oil producer within the OPEC cartel and exports nearly two million barrels a day. Because the world has few supplies to spare, any interruptions in Iran's exports could push prices to higher levels. The world currently has about three million barrels a day of spare capacity, and consumes 86 million barrels a day of oil.

The return of the Iranian risk premium calls for careful assessment of the potential oil supply impact of military strikes on Iran. [52]

The fuel economy standards proposed by the NHTSA do not reflect the fundamental reality of this crisis in several ways. NHTSA fails to base its analysis on a value of gasoline savings that is consistent with the real world.

NHTSA assumed that **the economic value of gasoline in 2015 will be $2.03 per gallon (in 2008 dollars) excluding taxes and $2.45 including taxes, the equivalent of the pump price.**[53] NHTSA assumes that **oil has no military or strategic value at all.**[54]

NHTSA uses a price of $2.34 for the societal cost-benefit analysis (because it excludes taxes but includes environmental and economic externalities, but no military or strategic externalities). For the consumer cost-benefit calculations, which include taxes, but not social and environmental costs, the price of gasoline in 2015 is approximately $2.45 per gallon. The highest price scenario NHTSA considered set the price of gasoline in 2015 at about $3.39 (in 2008 dollars), but it did not use those prices to set the standard. Thus, even in the high price scenario, the price of gasoline in 2015 is well below where current prices are and below short term forecasts for gasoline prices in 2008 ($3.52 per gallon) and for 2009 ($3.44 per gallon).

NHTSA believes that while cost for U.S. military security may vary over time in response to long-term changes in the actual level of oil imports into the U.S.,

---

[52] Jad Mouawad, "Oil Prices Take a Nerve-Rattling Jump Pass $138," *New York Times,* June 7, 2008, p. B-4.

[53] PRIA, p. VIII-20

[54] PRIAA, p. VIII-24.

> *these costs are unlikely to decline in response to any reduction in oil imports resulting from raising future CAFÉ standards for light-duty vehicles. U.S. military activities in regions that represent vital sources of oil imports also serve a broader range of security and foreign policy objectives than simply protecting oil supplies, and as a consequence are unlikely to vary significantly in response to changes in the level of oil imports prompted by higher standards.*[55]

The fact the statute had energy independence and security in its title should have alerted NHTSA to the likelihood that congress considers the military and strategic value of oil important. Mr. Markey, the floor manager, singled out several key groups whose support was "important contribution" to securing passage of EISA, among them "Securing America's Future Energy and the Energy Security Leadership Council, who brought together retired military officials and corporate CEOs to highlight the national and economic security dangers associated without growing dependence on imported oil."[56]There is a substantial policy and academic literature that believes oil has a military value.[57]

Not only did NHTSA conclude that oil has no military significance, in the sense that it concluded that reducing oil consumption and imports would not lower military expenditures, but it gave no weight to the qualitative impact of oil consumption and imports on national security, ignoring its own station that "Reducing dependence on oil imports from regions with uncertain conditions enhances our energy security and can reduce the flow of oil profits to certain states now hostile to the U.S."[58] The qualitative security and foreign policy aspects are

---

[55] PRIA, pp. VIII-24-VIII-25.

[56] Markey, Extension of Remarks.

[57] International Center for Technology Assessment, *The Real Price of Gasoline*, 1997, *Gasoline Cost Externalities: Security and Protection Services*, January 25, 2005; Lovins Amory, et al. *Winning the Oil Endgame* (Rocky Mountain Institute: 2004); Mark A. Delucchi and James J. Murphy, "US Military Expenditures to Protect the Use of Persian Gulf Oil for Motor Vehicles," *Energy Policy*, (36) 2008, and the numerous sources cited therein.

[58] PRIA, p. II-2.

quite important in the contemporary environment. As a recent effort to estimate “US Military Expenditures to Protect the Use of Persian Gulf Oil for Motor Vehicles< put it

> *“Expenditure on the military are only a portion of he entire relevant military or “security” cost of using oil, just the total social cost of pollution due to care is equal to the value of the resources devoted to controlling pollution (the control costs) plus the value of the resources damaged by whatever pollution still is emitted (residual damages), the total military or security costs or using oil is equal to the military “control” costs plus the dollar cost of whatever military or security problems remain in spite of or even due to, the military expenditures. These “residual” costs” costs include reduced flexibility in the conduct of US foreign policy, strains on international relations due to the activities of the US military and even due to competition for oil, anti-American sentiment due to the presence of the US military in the Middle East, political destabilization of the Middle East, and the nonfinancial human-suffering cost of war and political instability related to US demand for oil. Although to our knowledge nobody ahs ever quantified these costs, they are important. Indeed, one could argue that a primary motivation of many program and policies aimed at reducing US dependence on foreign oil is not to reduce military expenditures related to defending the Persian Gulf, but rather to mitigate come of the political and human costs associated with US demand for Persian Gulf oil. If this is right, then the “costs” that we have not estimated may be large relative to the military costs we have estimated.*[59]

A zero for the military and strategic value of oil reduction is simply wrong. NHTSA should have quantified what it could in the framework of the model. To the extent that there is a large and significant unquantifiable value, it should have oriented its considerations toward greater energy conservation. Thus, the decision to maximize economic value, with no consideration of the quantifiable military value of oil and at the expense of maximizing economic conservation, ignores the intent of the Congress in enacting the **Energy Independence and Security Act.**

---

[59] Dellucchi and Murphy, p. 2262.

The gasoline price assumption and the assumption that oil has no military or strategic value whatsoever renders the proposed rule unreasonable, but there are other ways in which NHTSA has failed to recognize the reality of the current situation.

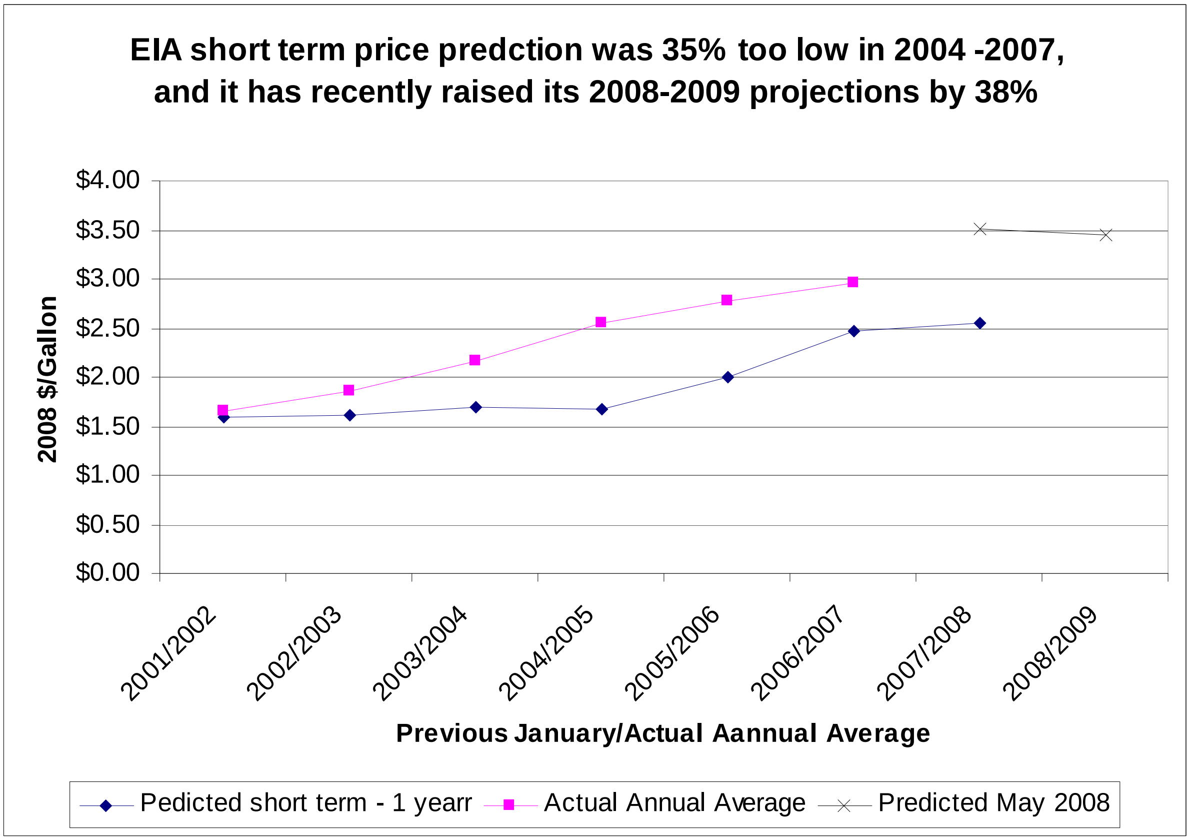
NHTSA'S SOURCE FOR ITS PRICES HAS CONSISTENTLY PROJECTED GASOLINE PRICES THAT ARE TOO LOW.

NHTSA has arrived at the low gasoline price assumption by relying on the Energy Information Administration forecast. EIA's projections of gasoline prices have been consistently low and NHTSA was not obligated to use those projections. It could have exercised independent judgment; for example, basing its standard on the EIA high price scenario.

EIA explains that they have an economic model of prices, and they expect more production to come on line to lower the price between 2008 and 2016. Unfortunately, their model has not been very good at predicting prices even one year in advance, much less over the past five years. Examining their short term price prediction one year ahead (e.g. the January 2003 prediction for the 2004 average price to the actual 2004 price), we find that they have been off by an average of 35 percent (see Exhibit B-1). Between January and May 2008, they increased the short term prediction by 38%.

However, their long term prediction (made in February 2008) for 2015 does not reflect this large upward adjustment (see Exhibit B-2). The exhibit shows that the earlier short term predictions and the long term predictions for 2015 tracked closely, so EIA should have adjusted its long term forecast, too.

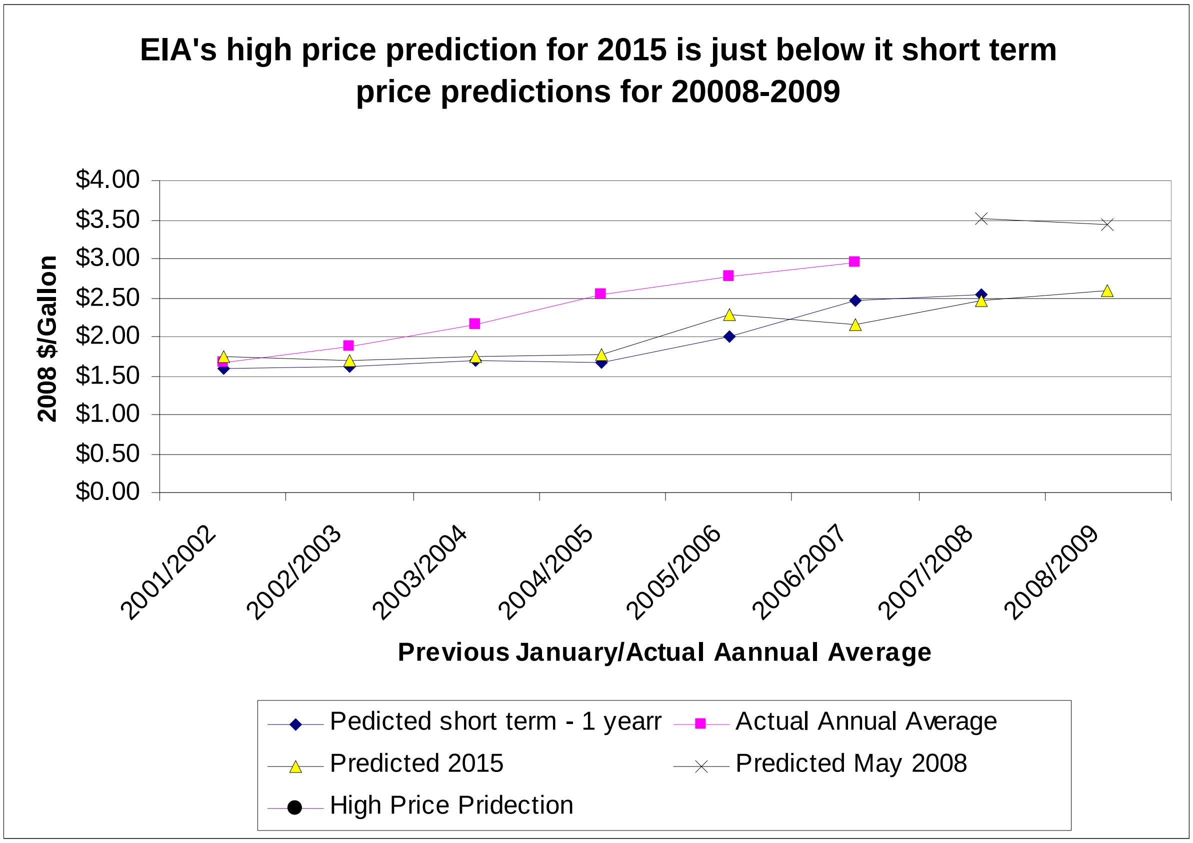
Exhibit B-1



Sources: Energy Information Administration, *Short Term Outlook, Monthly Energy Review,* various issues.

In fact, as tings currently stand, the high price scenario from February 2008 predicts a price for gasoline in 2015 that is just below the short-term price projection for 2009. Even though the high price scenario predicts essentially flat real gasoline prices between 2009 and 2015, it is much more consistent with the behavior of prices in the past half decade and the pattern of predicting 2015 prices equal to the predicted price of the next year price.

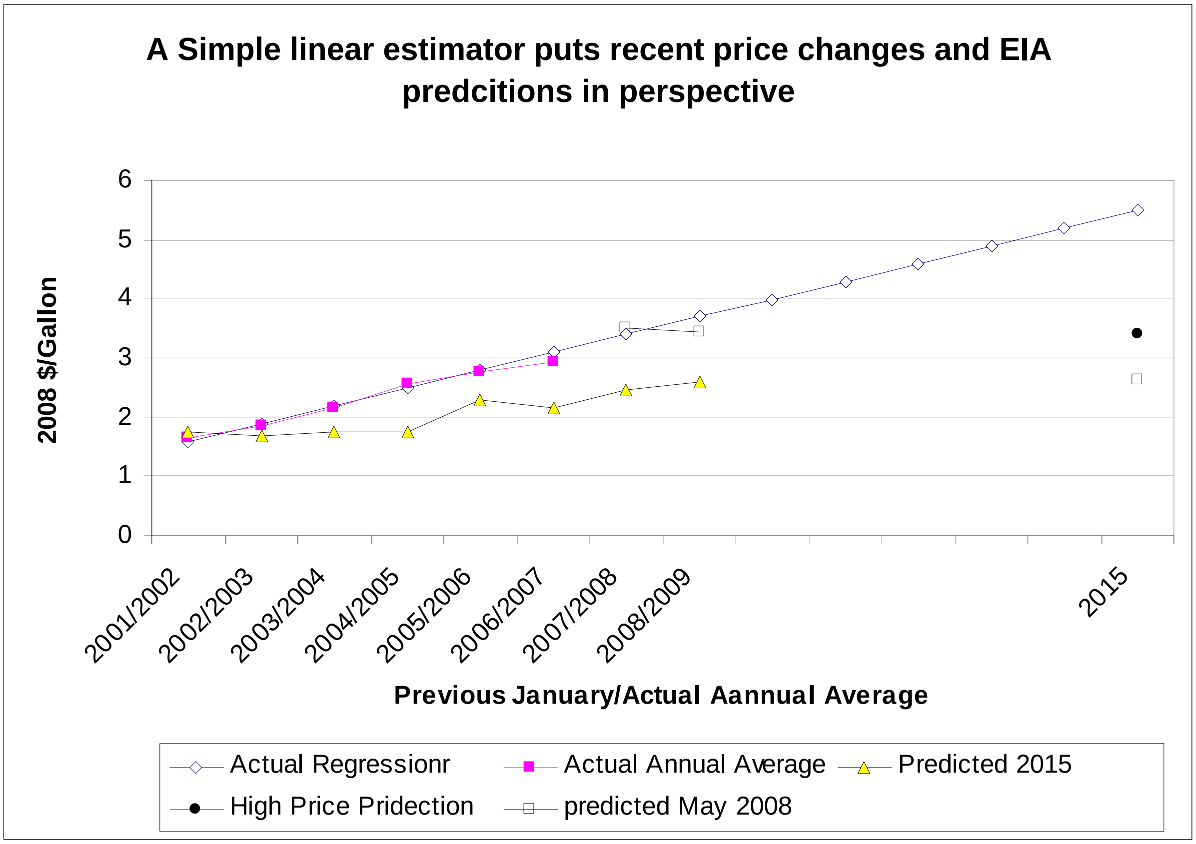
Exhibit B-2



Sources: Energy Information Administration, *Short Term Outlook, Annual Energy Outlook, Monthly Energy Review,* various issues.

Projecting the simple linear trend leads to very high price projections for 2015 – about $5.50 in 2008 dollars (see Exhibit B-3). That would put crude oil in the neighborhood of $200 per barrel. While such a figure would have seemed outrageous a short while ago, it is widely discussed by oil market analysts as a possibility for the price of crude within the next couple of years. We are not suggesting that the analysis should rely on such a high price estimate, but put in this context, EIA's high price scenario seems much more appropriate as the basis for NHTSA's economic analysis.

Exhibit B-3



Sources: Energy Information Administration, *Short Term Outlook, Annual Energy Outlook, Monthly Energy Review,* various issues.

DISCOUNT RATE

The second largest economic assumption that impacts the analysis is the discount rate. The rate at which NHTSA discounts fuel savings is too high and fails to reflect the importance of fuel savings.[60] NHTSA notes that discount rates can vary depending on the perspective taken. NHTSA has chosen a standard, high end economic assumption for the discount rate. This has the effect of emphasizing the importance of economic factors and

[60] PRIA, pp. 98-100.

capital goods at the expense of the need to conserve energy. NHTSA notes that the discount rate could be viewed either as a supply side, capital outlay issue or a demand side private consumption issue, but it chose to use the former, higher rate.

In selecting the 7 percent discount rate, NHTSA notes that "OMB Circular A-4 indicates that this rate reflects the economy-wide opportunity cost of capital."[61] It also states that this "is the appropriate discount rate whenever the main effect of a regulation is to displace or alter the use of capital in the private sector."[62] NHTSA also notes that OMB Circular A-4 also states that when regulation primarily and directly affects private consumption (e.g. through high consumer prices for goods and services), instead of primarily affecting allocation of capital, a lower discount rate may be appropriate. The alternative discount rate that is most appropriate in this case is the social rate of time preferences, which refers to the rate at which society discounts future consumption to determine its value in the present. As noted above, the real rate of return on long-term government debt, which has averaged about 3 percent over the last 30 years, provides a reasonable estimate of this value."[63]

NHTSA should have used an average of the two rates, or five percent. It then should have considered the two alternatives as sensitivity cases.

FIVE YEAR PAYBACK CONSTRAINT: AN UNSUBSTANTIATED ASSUMPTION THAT PLAYS AN IMPORTANT ROLE IN THE ANALYSIS

NHTSA uses a five year payback period to screen technologies. The importance of the five year payback analysis as the basis of the consumer constraint was noted in the

[61] NPRM pp. 224-225.
[62] NPRM, p. 225.
[63] NPRM, p. 227.

overview of NHTSA's approach in Technical Appendix A. Examining the details of the model suggests that the five year payback analysis plays a critical role.

> *The value of fuel savings over the first five years of a vehicle model's lifetime that would result under each alternative fuel economy standard is calculated using the projections of retail fuel prices described above. It is then deducted from the technology cost incurred by its manufacturer to produce the improvement in that model's fuel economy estimated for each alternative standard, to determine the increase in the "effect price" to buyers of that vehicle model. The Volpe model uses these estimates of effective costs for increasing the fuel economy of each vehicle model for the application of fuel economy-improving technologies in order to comply with stricter standards. The average value of the resulting increase in effective costs from each manufacturer's simulated compliance strategy is also used to estimate the impact of alternative standards on its total sales for future model years.*[64]

Thus, it appears that the five year payback constraint plays a critical role in ordering the technologies that are included in the fleet to comply with various levels of the standard.

The manner in which the consumer payback analysis is conducted in the overall analysis is unclear. However, at one point, NHTSA states that the consumer payback analysis is a simple, undiscounted analysis.

> *In estimating the value of fuel economy improvement that would result from alternative CAFÉ standards to potential vehicle buyers, NHTSA assumes that buyers value the resulting fuel savings over only part of the expected lifetime of the vehicles they purchase. Specifically, we assume that buyers value fuel savings over he first five years of a new vehicle's lifetime and that buyers behave as if they do not discount the value of these future fuel savings. The five-year figure represents the current average term of consumer loans to finance the purchase of new vehicles…*
>
> *The value of fuel savings over the first five yeas of a vehicle model's lifetime that would result under each alternative fuel economy standard is calculated using the projections of retail fuel prices described above. It is then deducted from the technology costs incurred by its manufacturer to produce the improvement in that model's fuel economy estimated for alternative standards, to determine the increase in the "effective price" to buyers of that vehicle. The Volpe model uses these estimates of effective costs for increasing fuel economy*

[64] NPRM, p. 191

of each vehicle model to identify the order in which manufactures would be likely to select models for the application of fuel economy-improving technologies in order to comply with stricter standards.[65]

When NHTSA estimated the impact on sales, which is presumably the result of the calculation made in analyzing the consumer's willingness to buy a vehicle, NHTSA contradicts this description stating that it discounted the fuel savings.

To estimate the average value consumers place on fuel savings at the time of purchase, we assume that the average purchaser considers the fuel savings they would receive over a 5 year time frame. We chose 5 years because this is the average length of time of a financing agreement. The present value of these savings are calculated using a 3 percent discount rate, which is more consistent with the real (after-inflation) rate that consumers receive from their own personal savings in banks, etc. than the 7 percent discount factor. We used a fuel price forecast that included taxes, because this is what consumers must pay. Fuel savings were calculated over the first 5 years and discounted back to the present value. The agency believes that consumers may consider other factors over the 5 year horizon when contemplating the purchase of a new vehicle. The agency added these factors into the calculation to represent how an increase in technology costs might affect consumers buying consideration…

These four factors together, the consumer considering he could get 32.8 percent back upon resale in 5 years, but will pay 10.4 percent for loans, 5.5 percent more for taxes and 8.0 percent more in insurance, results in an 8.9 percent return on the increase in price for fuel economy technology (32.8 percent -10.4 percent -5.5 percent -8.0 percent). Thus, the increase in prices per vehicle is multiplied by 0.911 (1-0.089) before subtracting the fuel savings to determine the overall net consumer valuation of costs on his purchase decision.[66]

It is possible that NHTSA treated the same stream of benefits differently for the purposes of different calculations. However, this is not like treating the consumer cost-benefit analysis differently from the societal cost benefit analysis. There is a logical inconsistency in saying that consumer decisions to buy vehicles reflects undiscounted treatment of fuel

[65] PRIA, p. V-79.
[66] PRIA, pp. VII-42, 43.

savings, but auto industry sales reflect discounted fuel savings. The two outcomes are the result of the same act and require one set of assumptions.

The critical role of the five year payback period is evident when NHTSA describes more explicitly how it interacts with the technology inclusion process.

> *The effective cost estimated to be considered by the manufacturer is calculated by adding the total incurred technology cost (in retail price equivalents or RPE), subtracting the reduction in civil penalties owed for noncompliance with the CAFE standard, subtracting the estimated value of the reduction in fuel costs, and dividing the result by the number of affected vehicles (the estimated value of the reduction in fuel costs represents the amount by which the manufacturer is expected to consider itself able to increase the retail prices of the vehicle based on the purchaser's consideration of the vehicle's increased fuel economy. This calculation considers the change in the discounted outlays for fuel (and fuel taxes) during a "payback period," specified and an input to the model)…*
>
> *Thus the system applies technologies until any of the following conditions are me: the manufacturer no longer owes civil penalties for failing to meet the applicable standard, the manufacturer has exhausted technologies expected to be available in that model year, or the manufacturer is estimated to be willing to pay civil penalties, and doing so is estimated to be less expensive than continuing to add technologies.*[67]

Here there is little doubt that the five year payback analysis is central to the setting of the standard. There is a fundamental inconsistency between claims that "the agency believes that the value of fuel savings resulting from more efficient operation over the entire lifetime of vehicles should be reflected in its analysis of the societal impacts that will determine the fuel economy standards."[68] Because the five year "payback period" was central to the analysis of technology inclusion, NHTSA never actually sees what the vehicle fleet would look like if the societal view of fuel savings is taken. What NHTSA actually does is evaluate the lifecycle fuel savings of a fleet fundamentally defined by a five year payback constraint.

---

[67] PRIA, p. V-56.
[68] PRIA, p. viii-18

The fact that in its societal welfare calculation NHTSA looks only at the full stream of fuel economy savings from the technologies that are constrained by the five year payback analysis means that the societal value of the lifecycle fuel savings cannot raise the level of the standard. It could only lower it.[69]

There are other problems with this analysis. Simple payback is one of the weaker economic concepts for evaluating investment, although it is frequently calculated. If the simple payback criterion is offered as an empirical statement about how consumers behave, it may escape the criticism it deserves as an analytic concept, but it has other fundamental problems. It is remarkable that there is not one shred of empirical or scientific evidence offered by NHTSA to support an assumption that plays such an important role in the analysis. NHTSA does not cite any studies or give any data to support the assumption. This is an unsubstantiated opinion, which NHTSA recognizes is purely opinion. .

> *We recognize that the period over which individual buyers finance new vehicle purchases may not correspond to the time horizons they apply in valuing fuel savings from higher fuel economy. However, NHTSA believes that five years represents a reasonable estimate of the average period over which buyers who finance their purchases of new vehicles – and thus must recognize – the monetary value of future fuel savings resulting from higher fuel economy.*[70]

[69] Thus, our understanding of the Volpe model based on these descriptions of the role of the five year payback period, calls into question NHTSA's claim that "NHTSA quantifies the need of the nation to conserve energy by calculating how much fuel economy a vehicle buyer ought to purchase, or rather, how much a vehicle buyer out to value fuel economy, based on both the fuel fuel prices and potentially estimable externalities (including enegy security, the benefits of mitigating a tone of CO_2 emissions, criteria pollutants emissions, noise, safety, and others) (NPRM, p. 310). These considerations are explicitly excluded from the analysis of the consumer purchase decision in the payback analysis, whch determines the technologies that are included in vehicles.

[70] NPRM, p. 191

Second, it is not clear that one must assume a payback for any component of an automobile purchase. But if one does, the logical connection is between the period of ownership and the payback, not the loan period.

Third, even if one looks at the ownership period, most alternative investment opportunities available to consumers do not yield a five year payback period; hybrids, many of which have payback periods of ten years or more, are flying off auto dealer lots.[71] Increasing the payback period by one year raises the value of the fuel savings substantially, by 20 percent.

The decision to include this criterion in the analysis must be supported and documented. Moreover, because it plays such a vital role NHTSA should conduct sensitivity analyses.

Fourth, in the payback analysis the cost of the technology should be the net of its resale value and the resale value should reflect the market value of fuel economy. NHTSA apparently has taken the former into account, but not the latter. NHTSA assumes a uniform resale value of 32.8% of the purchase price of the vehicle, regardless of the level of fuel economy. A 37.6 mpg car (the achieved average mpg of the "50=50" standard is going to have a higher resale value than a 28.4 mpg truck (the achieved average mpg in the NHTSA proposed standard) or a 34.7 mpg car. NHTSA has assumed they all have the same resale value.

---

[71] Jon O'Dell, "Soaring as Prices Shrink Hybrid Payback Period, Boost Small Car Sales and Sink Big Trucks," AT Edmunds.com Blog and Josee Valcourt, "Pricier Gasoline Makes Hybrids a Better Deal: Increased Fuel Savings Mean Quicker Payback on Vehicles that Command a Premium," *Wall street Journal,* June 12, 2008, report growing sales of hybrids and identify 13 hybrids, 8 of which have more than five year payback periods,

According to a recent CBO study, fuel economy is significantly reflected in the price of new and used cars. Between 2002 and 2006, larger fuel-inefficient vehicles tumbled in used car value by thousands of dollars, while smaller more fuel efficient vehicles rose. Even within narrowly defined comparisons (large SUV v. small or midsize SUV; luxury car v. full car; full-sized pickup v. small pickup truck) the difference is striking – a swing of over $3,000.

The assumption about the payback period and the failure to recognize that consumers and the market value conservations reflect NHTSA's pervasive failure to analyze market behaviors. Consumers and the market appreciate fuel economy a great deal more than NHTSA and the automakers appear to. [72]

REBOUND EFFECT

There is another fundamental problem embedded in the consumer payback analysis, although it also affects the societal welfare analysis. NHTSA assumes that consumers burn up 15 percent of the benefits of higher fuel economy by driving more. In other words, for every dollar saved through fuel economy, consumers spend 15 cents on driving.

The number is too high. On average consumers spend only 5 percent of their income on driving, one-third the figure that NHTSA assumes. The so called "rebound effect" is too large. Given that recent gasoline price increases have hammered household budgets and caused sharp cutbacks in purchases of other necessities, it is likely that energy savings would be less likely to be used for gasoline.

---

[72] PRIA, p. V-79

NHTSA's discussion of the studies on which it bases the rebound effect is wholly inadequate, failing to identify the specific studies and give key study characteristics, such as the date of the study and vintage of the data, which are critical to evaluating their appropriateness.[73] The recent CBO analysis of the impact of rising prices explains why the rebound effect would be expected to decline over time.

> *For a variety of reasons, consumers are currently only about one-fifth as responsive to short-run changes in gasoline prices as they were several decades ago. That decline in sensitivity has been attributed to growth in real income, which has rendered gasoline a smaller share of consumers' purchases from disposable income. Price sensitivity has also declined because a gallon of gasoline takes a car farther than it did in the past, in part because of fuel economy standards. Finally, the development of distant suburbs also has contributed by making some consumers more reliant on the automobile. The longer commutes are balanced by lower housing costs.*[74]

These same factors have undoubtedly led to a reduction in the rebound effect. NHTSA should use a rebound effect of no more than 5 percent in its societal welfare analysis.

The treatment of the rebound effect is incorrect or inconsistent in other ways. The rebound effect should not be applied in the analysis of individual consumer choices, but NHTSA appears to do so. How consumers choose to spend their fuel savings is a matter of personal choice and should not constrain the setting of the fuel standard. This personal choice plays an important role in NHTSA's analysis because fuel economy is constrained by a 5-year payback requirement. That is, technologies that do not pay for themselves in five years are not allowed to be included to set the level of the standard and NHTSA has subtracted the 15% rebound effect from the actual fuel savings. . The fact that consumers choose to spend their fuel savings on more driving should not be counted against the five year payback. If consumers use some of their money to set their thermostat up in the winter and down in the

---

73 PRIA, p. V-84 – studies not examined for time; p. V-85, adjusted to 2006, but not going forward

74 CBO, Effects of Gasoline Prices, pp. x-xi

summer, NHTSA does not subtract that from the welfare enhancing value of increased fuel economy enjoyed by the consumer. It could be argued that in the societal welfare analysis one should subtract the energy burned as a result of the change in thermostat behavior, since it has an effect on greenhouse gas emissions, but the rebound effect has no place in a consumer payback analysis. Consumers have been paid back the full value of the fuel savings; how they spend it is none of NHTSA's business. NHTSA has overestimated the payback period by 15 percent.

THE OVERALL IMPACT OF THE EMPIRICAL FLAWS IN NHTSA'S ANALYSIS

The empirical flaws in NHTSA's analysis can be quantified based on the sensitivity cases and recalculation of key parameters. Exhibit B-4 shows the calculation for both the consumer payback analysis and the social welfare analysis. It presents the percent increase in the value of benefits that would result from correcting each of the empirical flaws in NHTSA's analysis.

Exhibit B-4
The Undervaluing of Fuel Savings – Percent Increase in Benefits

Source of	**Consumer Payback**		**Societal Welfare**	
Underestimate	**Basis**	**Value**	**Basis**	**Value**
High Price Scenario	NHTSA	36	NHTSA	39
Rebound Effect	Excluded	15	5%	10
Discount Rate at 5%	na	na	5%	15
Resale Value	CFA/CBO	15%	15%	15
Military Value	CFA $0.30	na	CFA	11
Payback Period		**+?**		**+?**
Cumulative Total		80+		124+

The high price scenario reflects the difference in the NHTSA sensitivity analysis. The estimates for the rebound effect reflect our view that it should not be included in the consumer payback analysis and is too high in the societal welfare analysis. The discount rate reflects an estimate of the midpoint of NHTSA's 3% and 7% scenarios, taking vehicle miles and prices into account over the life of the vehicle. The resale value is based on the dollar value differences for the matched comparison within the CBO used car analysis expressed as a percentage of a new vehicles ($3,000/$20,000). The military value is based on our review of the literature.[75] We identify the payback period, but do not have an estimate for its impact on the analysis. While adding a year to the period increases the value of fuel savings by 20 percent, it is not clear how this would impact the values of the cost-benefit analysis, since its effect on specific technologies is difficult to predict. The effects are multiplicative and cumulative. Taken together, NHTSA's assumptions have the effect of dramatically undervaluing fuel economy. A proper set of assumptions would yield an estimate of net benefits that is twice as high.

. Because of the very complex nature of NHTSA's model, it is difficult to estimate precisely how the cost-benefit analysis would work out if the all of the empirical and analytic flaws were corrected. However, examining the various alternative scenarios analyzed by

---

[75] Mark Cooper, *50 by 2030: Why $3.00 Gasoline Makes the 50 Mile Per Gallon Car Feasible, Affordable and Economic,* (Consumer Federation of America, May 2006), pp. 14-15. Mark A. Delucchi and James J. Murphy, "US Military Expenditures to Protect the Use of Persian Gulf Oil for Motor Vehicles," *Energy Policy,* (36) 2008, provide an estimate that is in the range of $0.03 to $0.15) per gallon. The article treats the Gulf War and the Iraq war as 50 year events, when historically shooting wars in the area are decadal events and the U.S. has been involved in hostile military operations in the area one that much more frequent time frame since the break-up of the Soviet Union.

NHTSA, shows that the “50-50” standard is likely to be strongly supported by such an analysis. Exhibit B-5 shows the four alternatives considered by NHTSA discussed above, as well as two sensitivity analyses – a high fuel price scenario, and a low discount rate scenario.

The high fuel price and the low discount rate are run separately, but each individually moves the standard much closer to the “optimized + 50%” level. The high fuel price sensitivity analysis involved a fuel price of approximately $3.40 per gallon (in 2008 dollars) for 2015, so in our opinion it is a more realistic fuel price scenario, one that is not terribly high.

High fuel prices alone would justify moving to a much higher standard. Using the lower discount rate also justifies raising the standard substantially. Correcting the other flaws in the economic assumptions would reinforce this conclusion, although they individually do not have as large an effect.

Exhibit B-5:

Correcting Conceptual and Economic Flaws in the NHTSA Analysis

Standard/ Analysis	Standard (2015) Cars	Standard (2015) Trucks	2015 Cost Per Vehicle ($) Cars	2015 Cost Per Vehicle ($) Trucks	Societal View Fuel Savings (cumulative million gal)	Net Benefit (2015) (million $)
Proposed	**35.7**	**28.6**	**649**	**979**	**54713**	**11989**
High Fuel Prices	**42.4**	**29.4**	**2081**	**1373**	**76801**	**24324**
Low Discount Rate	**40.9**	**29.0**	**1915**	**1145**	**72902**	**8421**
50%- 50%	**39.5**	**30.9**	**1694**	**2041**	**76048**	**4437**
Fuel Savings at no Net Cost	**43.3**	**38.8**	**2367**	**2509**	**86635**	**3115**
Technology Exhaust	**52.6**	**34.7**	**3264**	**2785**	**94899**	**98**

Source: PRIA, Tables 5 and 6 for Proposed, low discount rate and Optimized + 50 and Tables IX-5a and IX-52a for High fuel costs.

The bottom line is quite clear,

If NHTSA adopted a properly balanced view of technological feasibility, economic practicability and the need to conserve energy ***<u>or</u>***

it used a more reasonable set of fuel price assumptions, ***<u>or</u>***

it used a consumer-oriented discount rate, ***<u>or</u>***

it corrected the groups of other flawed economic assumptions the undervalue fuel savings (rebound effect, resale value of fuel efficient vehicles, military and strategic value of gasoline consumption);

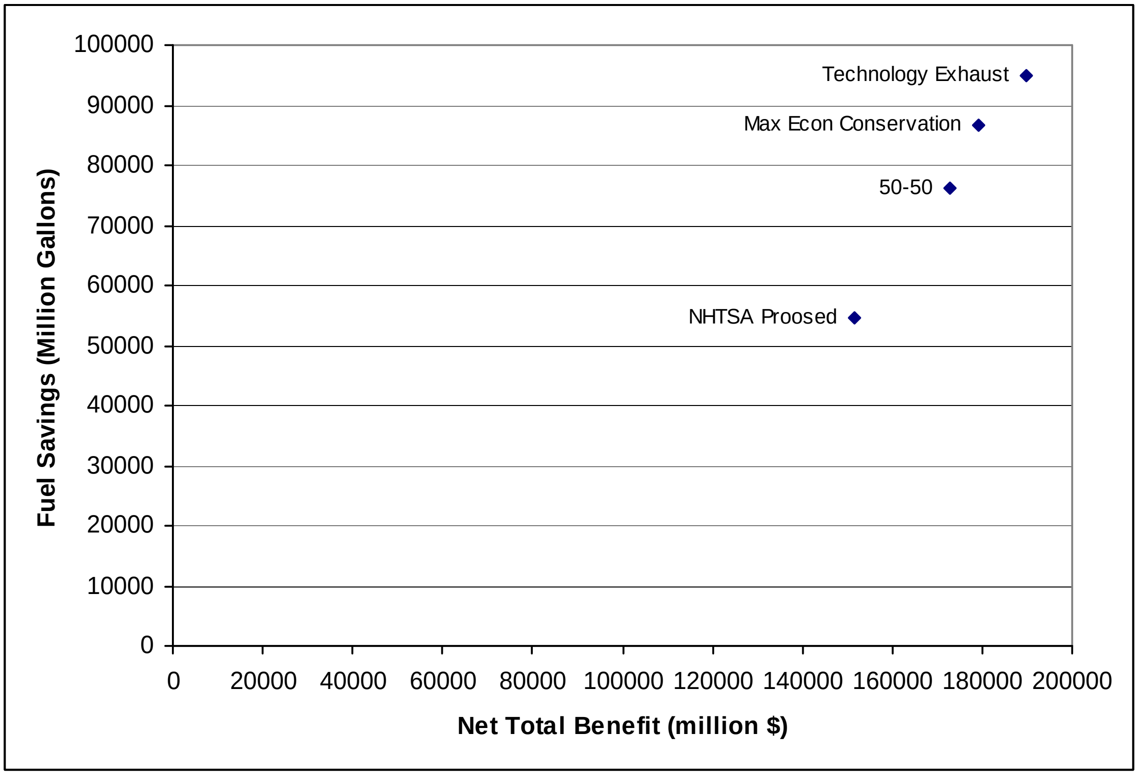
it would have set the standard at about the level of the "50-50" standard, thereby savings the nation 40 percent more gasoline while providing a substantial net economic benefit.

Because of the complexity of the analytic model, it is difficult to estimate what the outcome would be if NHTSA corrected all of the flaws in the model. The amount and value of fuel savings would rise significantly. Exhibit B-6 presents the results of an analysis that considers the effect of changing the economic assumptions as outlined in Exhibit B-4. . Exhibit B-6 shows that the all three of the higher standards have a higher net economic benefit than the proposed standard as well as higher levels of energy conservation. The "50-50" standard captures the bulk of the benefits that could be realized by raising the standard. In fact, with the value of benefits doubled, the "50/50" meets NHTSA's criteria of marginal benefits = marginal cost. The "50/50" scenario would also pass the consumer payback test since an 80 percent increase in benefits reduces the payback period to below five years for both cars and light trucks.[76] We have already argued that it passes a properly defined supply-side phase- in constraint.

---

[76] PRIA, p. IX-14, gives the following paybacks, which when adjusted for the four factors that underestimate the value of fuel savings are less than five years. The formula is cost/benefit,
Cars: C/B = 8.3; adjusted (8.3 * .85)/(1.36*1.15) = 4.5

Exhibit B-6:
Economic and Conservation Benefits with Modified Economic Assumptions



Source: PRIA, Exhibit 4b, 5b. 6; assuming benefits are increased by 95 percent (reflecting higher fuel prices, lower rebound effect, lower discount rate and military value, from Exhibit 1) and costs of conservation are decreased by 15 percent (reflecting higher resale value of more fuel efficient vehicles, from Exhibit 1).

CONCLUSION

It is clear that NHTSA failed to set the standard at levels that would achieve much higher levels of fuel savings because of its assumptions and decisions. While it might be argued that the two highest fuel savings scenarios (technology exhaust and total benefit equals total cost) give too much weight to the need to conserve energy or fail to take economic

---

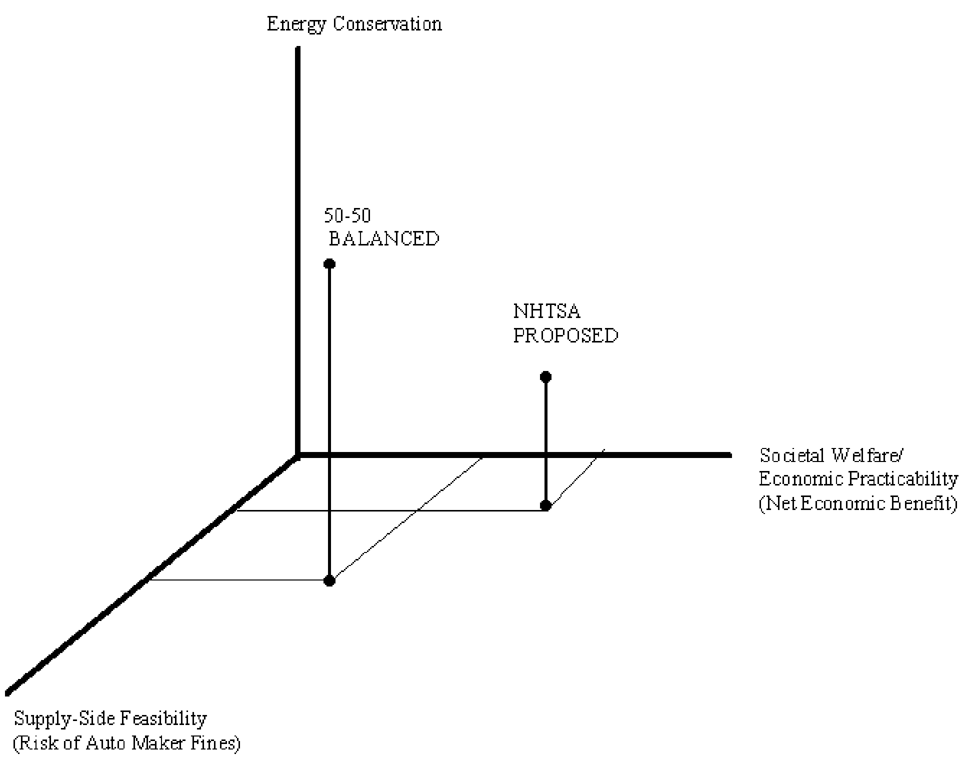
Trucks: C/B = 7.0; adjusted (7.0 * .85)/(1.36*1.15) = 3.8

practicability into account, the next three scenarios cannot be criticized in that way. In our view the "50-50" scenario strikes the proper balance between economics and the need to conserve energy. The fact that the high fuel price and low discount rate scenarios lead to roughly the same conclusion reinforces our belief that the standard can and should be set at this level.

As Exhibit B-7 shows, NHTSA has let narrow concerns about economic maximization and protection of less capable auto makers pull down the level of fuel economy and conservation. It has not balanced the statutory factors, but severely disfavored conservation.

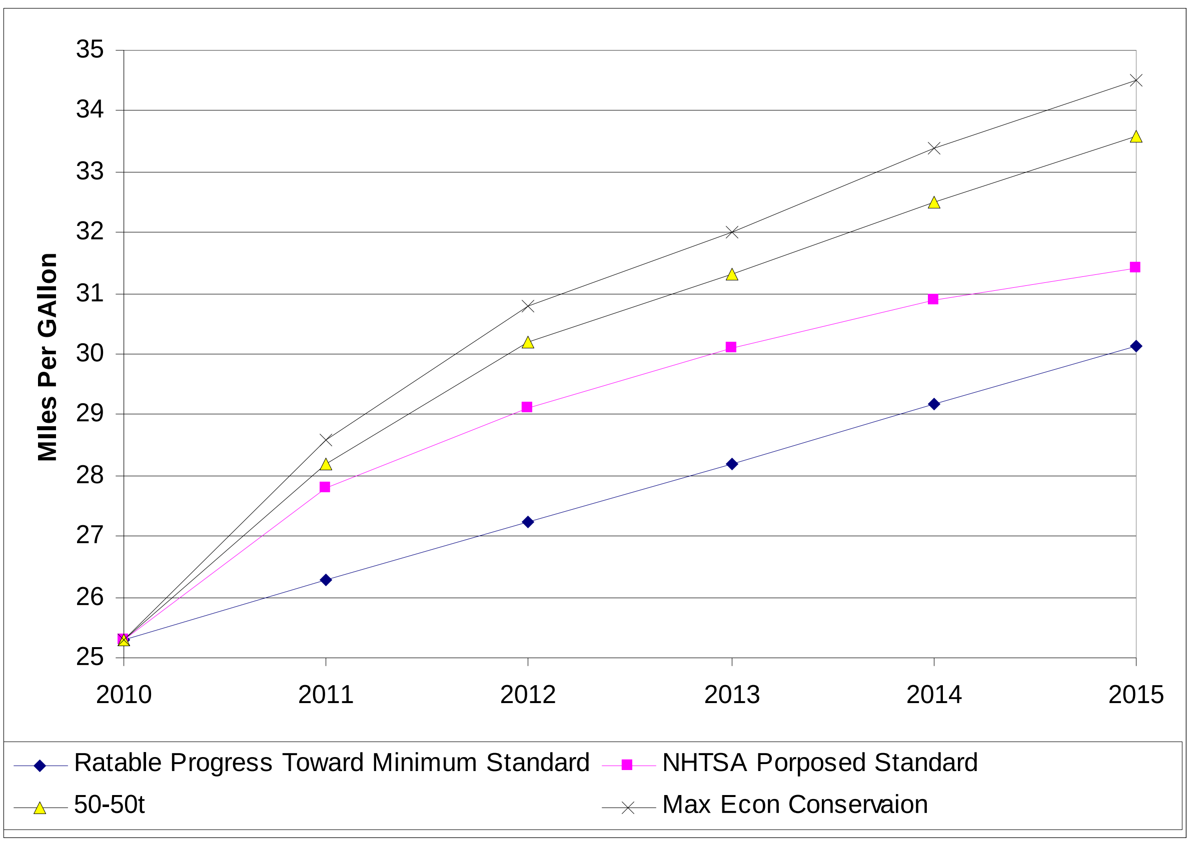
Exhibit B-7:

NHTSA has Failed to Properly Balance the Statutory Factors: Narrow Views of Economic Practicability and Technological Feasibility Undermine Energy Conservation



NHTSA has failed to reflect the urgency of reducing oil consumption and oil imports, choosing instead to raise fuel economy standards just about as little as it possibly could for the longest time it possibly could under the new statute. The central congressional charge to NHTSA is to set the standards at the **maximum feasible** level. Instead of increasing standards to the "maximum feasible" level as required by the statute and giving proper weight to the need to conserve energy, NHTSA measures itself by claiming to beat the "minimum allowable" and gives far too much weight to economic considerations. NHTSA's justification for its timidity rests on a series of analyses that suffer from an array of contradictions, faulty assumptions and uncertainties that render the proposed level of fuel economy patently unreasonable. The deficit builds quickly over time, as Exhibit B-8 shows.

Exhibit B-8:
Achieved Average Fuel Economy Under Various Standards



Source: Achieved mpg PRIA Table 1a, sales weight from PRIA VII 1a and 1b.

By 2013, NHTSA's proposed standard is capturing less than half of the difference between the minimum allowable progress and the maximum economic conservation standard level. By 2015, it is capturing a little over one-quarter. This is an analytic conclusion that supports the call for NHTSA to rescind its proposed standard for 2013-2015 made in our comments based on the paucity of data on which it based the standards for those years.

We reach this conclusion not based on a "difference of opinion" about what the agency should or could do, but on the fact that NHTSA's analysis is fundamentally flawed, so deeply flawed that it rises to the level of "arbitrary and capricious." NHTSA has systematically and repeatedly undervalued the benefits of increased fuel economy and reduced fuel consumption. In spite of massive uncertainties and gaps in its knowledge, it has rushed to write rules for as long as allowed by the law, when the public interest and the intent of Congress would be far better served by writing rules for the shortest period possible. Shortening the period covered by the propose rule would have allowed the agency to educate itself about the many important features of the fuel economy landscape about which the agency admits it is ill-informed.