Comments of the Center for Biological Diversity on the Draft EIS for Proposed CAFE Standards MY 2011-2015; 73 Fed. Reg. 37922; Docket No. NHTSA-2008-0060

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Authors: Mickey Moritz, Kassie Siegel, and Brian Nowicki
(contact: bnowicki@biologicaldiversity.org; 916-201-6938)

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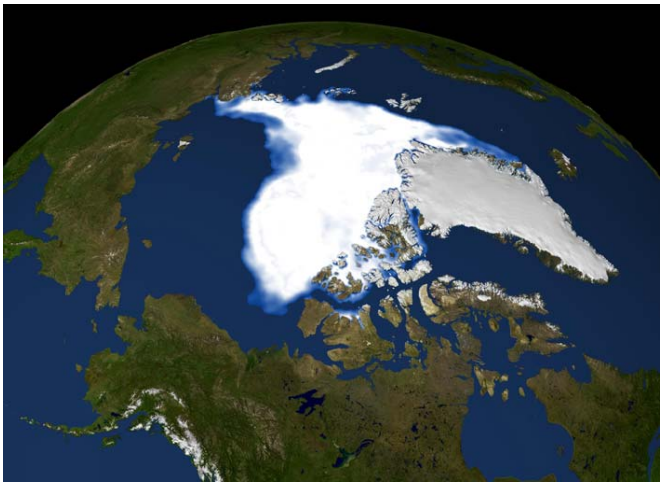

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I. Introduction

On July 2, 2008 the National Highway Transportation Safety Administration (NHTSA) published a notice of availability for the draft environmental impact statement (DEIS) for the proposed Corporate Average Fuel Economy (CAFE) standards for model years 2011-2015. 73 Fed. Reg. 37922. According to the notice, comments are due by August 18, 2008. Id.

The DEIS purports to respond to the Ninth Circuit's ruling in *Center for Biological Diversity v. NHTSA*, 508 F.3d 508 (9th Cir. 2007), overturning the standards for model years 2008-2011 and accompanying Environmental Assessment, in part for failing to consider the rule's impact on climate change, especially with regard to tipping points. *Id*. at 554. The rule at issue set "unreformed" light truck standards of 22.5 mpg for MY 2008, 23.1 mpg for MY 2009, and 23.5 mgp for MY 2010. 71 Fed. Reg. 17566, 17587 (April 6, 2006). In 2011, the standards were to be "reformed" so that fuel economy standards were based on vehicle footprint, resulting in an average fuel economy of approximately 24 mpg for MY 2011. *Id.* at 17624.

After these standards were struck down in *Center for Biological Diversity*, the NHTSA issued the current proposed rule to establish fuel economy standards for cars and light trucks MY 2011-2015. The proposed rule would result in the average fuel economy standards, in mpg, shown below.

Table 1: Proposed Fuel Economy Standards for MY 2011-2015 (in mpg). From 73 Fed. Reg. 24352, 24355 (May 2, 2008).

	MY 2011	**MY 2012**	**MY 2013**	**MY 2014**	**MY 2015**
Passenger Cars	31.2	32.8	34.0	34.8	35.7
Light Trucks	25.0	26.4	27.8	28.2	28.6
Average	27.8	29.2	30.5	31.0	31.6

Two months later, the NHTSA issued the instant draft environmental impact statement for the proposed rule (DEIS). 73 Fed. Reg. 37922 (July 2, 2008). The DEIS considers seven alternatives, from keeping fuel economy standards fixed at 2010 levels to a level defined by NHTSA as "technology exhaustion" pursuant to the Volpe model. See DEIS at 2-6 to 2-10. The fuel economy standards for MY 2015 under each alternative are shown below.

Table 2: CAFE Standards for the seven alternatives analyzed in the DEIS, from CAFE MY 2011-2015 Passenger Car and Light Truck PRIA (April, 2008). Each value is the harmonic average of car/light truck standards.

	MY 2011	**MY 2012**	**MY 2013**	**MY 2014**	**MY 2015**
Alternative 1	25.3	25.3	25.3	25.3	25.3
Alternative 2	27.1	28.0	29.4	29.8	30.2
Alternative 3 (preferred)	27.8	29.3	30.6	31.0	31.6
Alternative 4	28.5	30.6	31.5	32.2	33.0
Alternative 5	29.2	31.7	32.6	33.4	34.5
Alternative 6	30.6	33.9	34.4	35.7	37.3
Alternative 7	31.1	35.1	38.7	39.6	41.4

These comments supplement and incorporate by reference our July 1, 2008 comments on the proposed rule. The DEIS is fatally flawed as an informational document. As set forth fully below, its principal defects include the following:

- The DEIS does not conform to the statutory requirements of the National Environmental Policy Act, 42 U.S.C. §§ 4321 *et seq*. (NEPA) and the Energy Policy and Conservation Act, 49 U.S.C. §§ 32902 *et seq*. (EPCA);
- The NEPA analysis fails to comply with recent caselaw regarding environmental review of climate change impacts;
- The NHTSA has failed to consider the full, reasonable range of alternatives that is mandated by NEPA;
- The direct/indirect impacts analysis is incomplete, factually and procedurally flawed, and presented in a manner that unlawfully minimizes the apparent importance of the alternatives;
- The cumulative impacts analysis does not properly account for cumulative actions and is presented out of context;
- The NHTSA failed comply with the consultation provision of section 7 of the ESA;
- The inadequate environmental analysis is another example of the current Administration's active opposition to GHG regulations.

II. The NEPA Analysis Must be Conducted Consistent with the Underlying Statutory Scheme

The NEPA analysis must be conducted in a way that is both meaningful and appropriate given the underlying statutory scheme. The EPCA requires that NHTSA set fuel economy standards for each model year at the "maximum feasible" level, taking into account four factors: technological feasibility, economic practicability, the effect of other motor vehicle standards of the Government on fuel economy, and the need of the United States to conserve energy. 49 U.S.C. § 32902(f). The EPCA is a "technology-forcing" statute, whereby a challenging standard encourages technological innovation.[1] As part of the statutory balancing, NHTSA must necessarily determine what is "technologically feasible." The NHTSA has discretion to set standards somewhere below that level based on its consideration of the three other statutory factors, <u>if it is reasonable to do so.</u>

In December 2007, Congress passed the Energy Independence and Security Act of 2007 (Pub. L. 11-140, 121 Sat. 1492 (Dec. 18, 2007) (EISA)). The EISA eliminates the previous 27.5 mpg standard for passenger cars with a mandate that NHTSA set separate passenger car and light truck standards annually at the "maximum feasible level," with a <u>minimum</u> fleetwide fuel economy of 35 mpg by 2020.

The NHTSA has also violated NEPA because the NEPA analysis has not informed the EPCA balancing and the Volpe model – rather, the NHTSA has done a post-hoc EIS on the "black box" number from the Volpe model. The federal NEPA regulations are clear on the order in which decisionmaking must proceed:

[1] At the time of passage, the Senate Commerce Committee remarked that "[t]he establishment of fuel economy standards for the next 10 years creates the necessary climate for investment in automotive technology leading to substantial energy conservation." S.Rep. No. 179, 94th Cong., 1st Sess. 9 (1975).

> The statement shall be prepared early enough so that it can serve practically as an important contribution to the decisionmaking process and will not be used to rationalize or justify decisions already made (§§ 1500.2(c), 1501.2, and 1502.2). For instance: … ((d) For informal rulemaking the draft environmental impact statement shall normally accompany the proposed rule.

40 C.F.R. § 1502.5. *See also, Pit River Tribe v. U.S. Forest Service*, 469 F.3d 768, 785 (9th Cir. 2006) (reviewing relevant statutes and holding that a post-hoc EIS does not cure failure to complete an EIS before lease extensions were granted; "The purpose of an EIS is to apprise decisionmakers of the disruptive environmental effects that may flow from their decisions at a time when they retain a maximum range of options.").

The structure, methodology, and contents of the DEIS are at odds with the both NEPA and the underlying EPCA and EISA statutory scheme. See 40 C.F.R. § 1500.2(a). The DEIS has failed to analyze a reasonable range of alternatives, failed to adequately disclose the direct, indirect, and cumulative impacts of NHTSA's action, has presented the information in an inaccurate and misleading fashion designed to minimize the impact of the rulemaking, and is inadequate in numerous other ways as described fully below.

III. The NEPA Analysis Must be Conducted in Accordance with Applicable Caselaw, including *Massachusetts v. EPA* and *Center for Biological Diversity v. NHTSA*

Recent court decisions have shaped the context in which the NEPA analysis must be conducted with regard to global warming. The United States Supreme Court held in *Massachusetts v. EPA* that carbon dioxide and other greenhouse gases are "unquestionably 'agents' of air pollution" and unambiguously fall within the Clean Air Act's definition of an air pollutant. 127. S.Ct. 1438, 1460 n. 26 (2007). Furthermore, the Court held that the EPA could not avoid its statutory obligation to regulate greenhouse gases merely due to "some residual uncertainty" about the "various features of climate change." *Id.* at 1463. This holding underscores that priority that must be given to addressing climate change despite the lack of some details. The excessive use of "uncertainty" in the DEIS violates this mandate to act on what is already known.

The Court dismissed concerns about applying the statute to climate change, a phenomenon little known at the time of enactment: "[T]he fact that a statute can be applied in situations not expressly anticipated by Congress does not demonstrate ambiguity. It demonstrates breadth." *Id.* at 1462 (quoting *Pennsylvania Dept. of Corrections v. Yeskey*, 524 U.S. 206, 212 (1998)). Likewise, in the present case, both NEPA and EPCA are broad statutes that are well-suited to address climate change. Thus, the DEIS must thoroughly analyze greenhouse emissions and global warming.

An agency must regulate even if the result of the regulation will be only an "incremental" step towards solving the climate crisis. The Supreme Court noted that "[a]gencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop... [t]hey instead whittle away at them over time." *Mass. v. EPA* at 1457. Nonetheless, the court notes that "[j]udged by any standard, U.S. motor-vehicle emissions make a meaningful contribution to greenhouse gas concentrations and hence, according to petitioners, to global warming. *Id.* at 1457-58.

Moreover, the NHTSA's duty to set fuel economy standards in no way conflicts with the EPA's duty to regulate emissions from automobiles. "The two obligations may overlap, but there is no reason to think the two agencies cannot both administer their obligations and yet avoid inconsistency. *Mass. v. EPA* at 1462.

The NHTSA must be further guided by the Ninth Circuit's opinion in *Center for Biological Diversity*, 508 F.3d 508. The court found a proper alternatives analysis is crucial to properly assess the impact of a project on global warming. The court reprimanded the NHTSA for failing to adequately consider a reasonable range of alternatives: the NHTSA had presented only alternatives that were derived from its cost-benefit analysis and that covered a limited range of fuel economy standards. 508 F.3d at 551. The court explained that "[s]ince EPCA's overarching goal is energy conservation, consideration of more stringent fuel economy standards that would *conserve more energy* is clearly reasonably related to the purpose of the CAFE standards. Energy conservation and environmental protection are not coextensive, but they often overlap." *Id.* at 552.

The court also found the cumulative impacts analysis is particularly important: "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct." *Center for Biological Diversity*, 508 F.3d 508, 550. The Court faulted the cumulative impacts analysis for failing to "discuss the *actual* environmental effects resulting from those emissions or place those emissions in context of other CAFE rulemakings." *Id.* at 549 (emphasis in original). The court also noted that "the fact that climate changes is largely a global phenomenon that includes actions that are outside the agency's control… does not release the agency from assessing the effects of *its* actions." *Id.* at 550 (internal quotes removed).

An EIS was required because the effects of fuel economy standards "*may have* a significant impact on the environment." *Id.* at 553 (emphasis in original). The court expressed particular concern with regard to the non-linear aspect of "irreversible adverse climate change" or "tipping points" wherein a seemingly small change in emissions can evoke a dramatic climate response. *Id.* at 554. This indicates that seemingly small increments between alternatives can not be disregarded as insignificant.

While the court allowed the cost-benefit approach, it cautioned against reliance on earlier caselaw that supported use of the cost-benefit analysis: "[the cases] were decided two decades ago, when scientific knowledge of climate change and its causes were not as advanced as they are today. The need of the nation to conserve energy is even more pressing today than it was at the time of EPCA's enactment." *Id.* 530.

In addition, the Ninth Circuit warned against "undervaluing benefits and overvaluing costs of more stringent standards" in the cost-benefit analysis. *Id.* at 531. In particular, the court rejected the analysis because it failed to place a monetary value on the "most significant benefit" of reducing carbon dioxide. *Id.* The court denied uncertainty as a basis for failing to monetize carbon dioxide reductions: "while the record shows there are a range of values, the value of carbon emissions reduction is certainly not zero." *Id.* at 533.

IV. The DEIS Fails to Consider a Reasonable Range of Alternatives

The heart of an environmental impact statement (EIS) is the alternatives analysis. 40 C.F.R. § 1502.14. Yet, the NHTSA has unreasonably limited the considered alternatives so that the DEIS fails to capture the true range of possibilities. In particular, the DEIS fails because: (1) the range of NEPA alternatives is unreasonably constrained by the Volpe model; (2) the range of NEPA alternatives is unreasonably constrained by NHTSA's incorrect and unlawful assumptions regarding the model inputs, and (3) NHTSA has failed to consider one or more "technology forcing" alternatives.

A. The Volpe model unlawfully constrains the alternatives such that there is no true "technology exhaustion" alternative

The NEPA analysis must be conducted in a way that is both meaningful and appropriate given the underlying statutory scheme. The EPCA requires that NHTSA set fuel economy standards for each model year at the "maximum feasible" level, taking into account four factors: technological feasibility, economic practicability, the effect of other motor vehicle standards of the Government on fuel economy, and the need of the United States to conserve energy. 49 U.S.C. § 32902(f).

As part of the statutory balancing, NHTSA must necessarily determine what is "technologically feasible." While NHTSA has discretion to set standards somewhere below that level based on its consideration of the three other statutory factors, if it is reasonable to do so, NHTSA violates both EPCA and NEPA by failing to even consider or disclose what is truly "technologically feasible." An essential component of the DEIS must be disclosure of the "technologically feasible" fuel economy level, along with the environmental impact of choosing this level of fuel economy as compared to the NHTSA's preferred alternative and a reasonable range of additional alternatives. The DEIS fails to provide both the basic starting point for this analysis and the proper analysis that must follow.

"Technologically" is defined by Merriam-Webster's Dictionary as "of or relating to a capability given by the practical application of knowledge." Merriam-Webster Online Dictionary (2008) (definition 1b for technology). "Feasible" is defined as capable of being done or carried out." *Id.* (definition 1). Therefore, NHTSA must disclose what practical application of the knowledge [in the area of engineering] is capable of being done or carried out. NHTSA has failed to do so.

Table 3: Fuel economy standards for the "technology exhaustion" option, from CAFE MY 2011-2015 PRIA, Appendix A (April 2008).

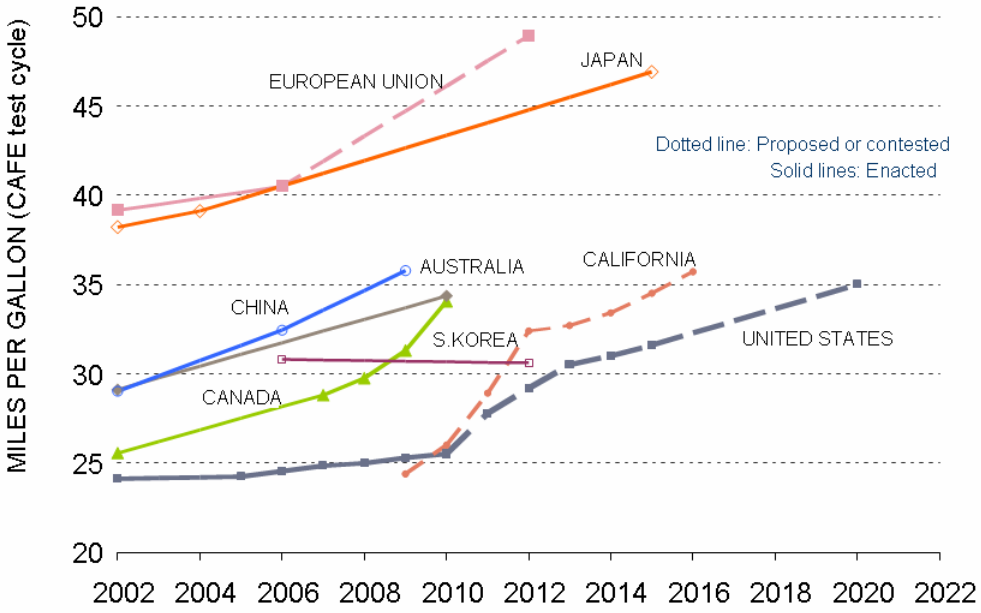
Year	Car Standard	Light Truck Standard	Combined Standard
2010	27.5	23.5	25.3
2011	38.6	25.9	31.1
2012	45.4	28.6	35.1
2013	48.9	32.2	38.7
2014	50.1	33.1	39.6
2015	52.6	34.7	41.4

NHTSA's "technology exhaustion" would result in average fuel economy of 31.1 mpg in 2011 to 41.4 mpg in 2015. It is clear that this cannot, by any stretch of the imagination, be equated with what is "technologically feasible." First, cars on the road in the US today already achieve approximately the same or better gas mileage than what NHTSA has defined as the combined fleet "technology

exhaustion" for model year 2015. These include the Toyota Prius (48/45; city/highway) and the Honda Civic Hybrid (40/45; city/highway).[2] Even more vehicles cars already achieve the "technology exhaustion" standard for the combined fleet in MY 2011: smartcar (33/41; city/highway); Mini Cooper (28/31); Toyota Yaris (29/36); Toyota Corolla (28/37); Nissan Altima Hybrid (35/33); Toyota Camry Hybrid (33/34); Hyundai Accent (27/32); Kia Rio (27/32); Mazda Tribute Hybrid 2WD (34/30); and Honda Fit (28/34).[3]

Second, NHTSA's "technology exhaustion" alternative results in fuel economy standards, even in 2015, which are below current standards in many other countries, and far below Japanese standards for 2015. In contrast, Europe and Japan had average fuel economy standards of approximately 40 mpg in 2006—over 15 mpg higher than U.S. standards. (ICCT 2007). Both Europe and Japan are predicted to continue increasing their fuel standards; even their high standards are not the technology maximum. That other countries have achieved higher fuel standards indicates that there are eminently feasible technology options available today that have not been included in the DEIS.[4]

Figure 1: Actual and Projected Fuel Economy for New Passenger Vehicles by Country/Region, 2002-2022. Source: *Passenger Vehicle Greenhouse Gas and Fuel Economy Standards: A Global Update*, ICCT (updated August 7, 2008).



By contrast, NHTSA's definition of "technology exhaustion" is the level that would "require every manufacturer to apply every feasible fuel saving technology to their MY 2011-2015 fleet." DEIS at 2-2. By what sleight of hand does NHTSA transform what is "technologically feasible" into

[2] Estimates from *Model Year 2008 Fuel Economy Guide*, DOE/EE-0321, *available at* http:www.fueleconomy.gov.
[3] Id.
[4] We note the substantial overlap in manufacturers of the European fleet and U.S. fleet (ICCT 2007:13), and that at least one manufacturer, Ford, has already declared its intention to "make big changes to the vehicles it sells domestically" and bring "six small cars made in Europe to the North American market (Smith 2008)".

something called "technology exhaustion" that is so much lower? The answer lies in the unlawful constraints of the Volpe model itself.

As discussed in our July 1, 2008 comments on the NPRM, the Volpe model makes a number of assumptions that are unreasonable and conflict with the EPCA statutory scheme. For example, the NHTSA assumes that the US fleet mix will not change in response to consumer demand for more fuel efficient vehicles or due to a change in regulatory requirements. 73 Fed. Reg. 24394. This assumption is particularly outrageous. First, auto manufacturers who have for decades deliberately manipulated the market with advertising, incentives, financing schemes, and other methods towards the least fuel efficient vehicles, continue to do so. (See, e.g. Chevrolet Tahoe Hybrid website; GreenCar.com 'Chevrolet Tahoe Hybrid Green Car of the Year;' Chrysler $3 gas banner; KCRA.com 'Chrysler $3 gas;' Ford Escape Hybrid website; Lyons 'Ford Guilt Free SUV'). Consumer preferences, nonetheless, are now shifting dramatically towards more fuel efficient vehicles in response to higher gas prices. (Cooper 2008). For a manufacturer to change its fleet mix in response to regulation is a method of compliance that must be considered in both the EPCA and NEPA analyses. Any precedent to the contrary is inapposite.

The NHTSA also assumes that manufacturers will not update their vehicle models more frequently than once every 5 years, and, "in most instances" has simply "accepted the projected redesign periods from the companies who provided them through MY 2013" 73 Fed. Reg. 24386. In other words, the underlying analysis for a fuel economy standard which is supposed to conserve energy by pushing manufacturers to develop new technology and innovate to meet challenging standards which may even "appear impossible" today, is constrained by the assumption that manufacturers will do nothing other than what they are already doing, at least for a period of five years. This clearly violates both EPCA and NEPA. On a related note, the the Volpe model generally does not apply a new technology until a given vehicle is due for a "redesign or refresh," and assumes that some technologies, such as hybrid vehicles, already in use today cannot yet be adopted. 73 Fed. Reg. 24386.

All of these unreasonable assumptions lead to NHTSA's exclusion of an essential piece of information from the DEIS: the technologically feasible fuel economy level. Thus, the NHTSA failed to consider a reasonable range of alternatives as required by law. *See, e.g., Friends of Southeast's Future v. Morrison*, 153 F.3d 1059, 1065 (9th Cir. 1998).

B. Even were the alternatives not unlawfully constrained by the Volpe model in the first instance, the NHTSA's use of unreasonable model assumptions prevented the consideration of a reasonable range of alternatives

Even were the Volpe model not fundamentally rigged to provide an unreasonably low result, the inputs used by NHTSA ensured that the fuel economy levels that resulted were artificially low, again resulting in NHTSA failing to analyze a reasonable range of alternatives.

The NHTSA also abuses its discretion to balance the four EPCA factors by using inaccurate and unreasonably constrained values in the Volpe model. As discussed below, in each and every instance when NHTSA faced a choice of inputs, it chose the level that would minimize the resulting fuel economy level. Even if one or more of the NHTSA's choices were otherwise lawful under EPCA and

the Administrative Procedures Act (APA), which they are not, the NHTSA's failure to disclose in the DEIS the impact of these input choices, and to provide an alternative based on choosing higher input numbers, violates NEPA as well.

Moreover, even if NHTSA's choice of the "optimized" alternative were otherwise lawful, the use of incorrect inputs in the model results means that even by the NHTSA's own twisted definitions, this alternative does not actually represent the point at which marginal benefits equal marginal costs. The NHTSA's inaccurate claim that it does violates NEPA's requirement to provide accurate information to the public.

1. The Use of a 7% Discount Rate is Unreasonable

One of the primary flaws is the use of a 7% discount rate. The DEIS acknowledges that discount rate and gasoline price have a significant impact on the cost-benefit analysis. Yet the DEIS adopts a 7% discount rate and does not present even the results for a 3% or lower discount rate. The significant influence of discount rate alone is reflected in the fact that the "optimized" fuel economy standard with a 3% discount rate is more than 50% higher than the "optimized" alternative presented in the DEIS. PRIA Appx. A at A-2, Table A-1. This important information is only available in the Preliminary Regulatory Impact Assessment (PRIA), which is insufficient. *Grazing Fields Farm v. Goldschmidt*, 626 F.2d 1068, 1072 (1st Cir. 1980) ("no indication in the [NEPA] statute that Congress contemplated that studies or memoranda contained in the administrative record, but not incorporated in any way into an EIS, can bring into compliance with NEPA an EIS that by itself is inadequate.").

The choice of a 7% discount rate is not supported by the evidence. As the DEIS states, OMB suggests the use of both 3% and 7% discount rates, with the 3% discount rate appropriate where the costs of regulations are likely to be passed on to consumers. DEIS at 3-60. The Volpe model assumes that costs will be passed to consumers. For instance, the cost of new technology is limited by consumer pay-back periods and willingness to pay higher vehicle prices. See, e.g., DEIS 2-1 (discussing "retail price equivalent"); DEIS Appx. C at V11-41 (discussing impact of higher costs on sales).

Other agencies have assumed discount rates of 3% in similar analyses. The EPA in its recent advance notice of proposed rule making for regulating greenhouse gas emissions under the Clean Air Act noted that changes in GHG emissions are "essentially long-run investments" that "yield returns in terms of avoided impacts over a period of one hundred years and longer. Furthermore, there is a potential for significant impacts from climate change, where the exact timing and magnitude of these impacts are unknown. These factors imply a highly uncertain investment environment that spans multiple generations." 73 Fed. Reg. 44354, 44414 (July 30, 2008). When there are important benefits or costs that affect multiple generations of the population, EPA and OMB allow for low but positive discount rates (e.g., 0.5–3% noted by U.S. EPA, 1–3% by OMB)." *Id.*

In recent testimony before the House of Representatives Energy Committee, Sir Nicholas Stern notes the inappropriateness of pure-time discounting in which future generations are valued less than the current generation (Stern 2008). He goes on to distinguish between current market rates, which reflect only near-term benefits, versus the value of "young or unborn" generations. *Id.*

The DEIS thus makes several crippling errors in its choice of discount rate. First, the NHTSA assumes that a substantial portion of the costs of the regulation will come from foregone capital investments by the auto industry. This is simply incorrect. All capital costs will be passed onto consumers in short order. Furthermore, the largest costs from the regulation come in the form of impacts from catastrophic climate change. This will most certainly be felt by consumers, both in this generation and the next. The choice of a 7% discount rate is based in part on assumptions regarding loan rates. DEIS Appx. C at VIII-2. Yet, this short-sighted context is entirely inappropriate. Given that the impacts of the alternatives are analyzed out to year 2100, the discount rate must also reflect this long time horizon for impacts.

2. The Cost of Fuel is Unrealistic

Another major determinant of the output from the Volpe model is the cost of fuel. DEIS at 2-2. The NHTSA used the EIA's Annual Energy Outlook Early Release Forecast to select fuel prices, and assumes future fuel prices ranging from $2.26 per gallon in 2016 to $2.51 per gallon in 2030. Considering that national average gasoline prices are currently $3.81 per gallon [5] and over a dollar higher than one year ago, there is every indication that the price of oil will continue to increase over the short term, and there is every indication that the price of oil will continue to remain in the short term higher than projected by the administration, this estimate is impossible to justify. It is important to note that these price projections are based in 2006 dollars, and include Federal, State, and local taxes. However, the estimated 2008 fuel price of $2.69 per gallon of gasoline in 2006 dollars, adjusted by a 3% estimated annual inflation rate, is approximately $2.85 per gallon of gasoline, far below the current prices and projections. The use of an inappropriate gasoline price projection greatly skews the results, since the savings in fuel expenditures are by far the largest components of the cost-benefit analysis, accounting for $2.27 of the $2.51 in net benefits from each gallon of gasoline reduced, overwhelmingly drives the conclusions of the cost-benefit analysis as constructed by NHTSA.

3. The Cost of Carbon has No Basis in the Facts

The NHTSA's methodology for the selection of an estimate of the value of reducing greenhouse gas emissions is arbitrary and designed to minimize the estimate. The Volpe model assumes that the value of CO_2 reductions is the midpoint between a so-called "high" of $14/ton CO_2 and a "low" of $0/ton CO_2. DEIS Appx. C at VIII-30. This valuation is flawed because: (1) it is based on an out-dated and otherwise flawed analysis; (2) the use of a $0 low value is unjustified; and (3) simply splitting the difference between two values does not take into account the distribution of economic projections for the cost of carbon.

The NHTSA relies entirely on the 2005 *Energy Policy* article, Tol (2005), as the source for the estimate of $14 per ton of CO_2, but fails to address the much higher estimates also reported by Tol. Tol (2005) states that "The marginal damages caused by a metric ton of carbon dioxide emissions in the near future were estimated in the [IPCC] Second Assessment Report at US$5-125 per tC." In addition, the NHTSA overlooks the fact that the studies cited in the Tol (2005) survey dated back as much as 18 years, to 1991, and 25 of the 28 studies cited were published more than five years ago. Considering that

[5] EIA current prices, *available at* http://www.eia.doe.gov/oil_gas/petroleum/data_publications/wrgp/mogas_home_page.html (value for August 11, 2008).

the understanding of climate change has expanded dramatically in the past five years, and that impacts of climate change are progressing much more rapidly than were previously projected, this represents a fatal flaw in the analysis. Of the 28 papers cited by Tol (2005), only three were published since 2003, only one of which was peer reviewed. That paper estimated the social cost of carbon as high as $14 per ton of CO_2. (Pearce 2003).

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change also refers to the Tol (2005) survey, but is careful to point out, on page 813 of Yohe (2007), that "[it] is likely that the globally-aggregated figures from integrated assessment models underestimate climate costs because they do not include significant impacts that have not yet been monetized…," and, on page 17 of Adger (2007), that "taken as a whole, the range of published evidence indicates that the net damage costs of climate change are likely to be significant and to increase over time." The NHTSA concedes this point: "[taken] as a whole, recent estimates of the SCC may underestimate the true damage costs of carbon emissions because they often exclude damages caused by extreme weather events or climate response scenarios with low probabilities but potentially extreme impacts, and may underestimate the climate impacts and damages that could result from multiple stresses on the global climatic system." DEIS Appx. C at VIII-28.

In fact, the IPCC, on page 813 of Yohe (2007), estimates the cost of carbon as high as $350 per ton of carbon ($97.67/ton CO_2), and states that "It is virtually certain that the real social cost of carbon and other greenhouse gases will increase over time; it is very likely that the rate of increase will be 2% to 4% per year."

The DEIS places great weight on the fact that the IPCC Fourth Assessment report cites to Tol (2005). Yet, the DEIS does not acknowledge the many other studies that the IPCC refers to. For example, the IPCC contrasted the Tol estimate of carbon costs with that of Downing (2005), which indicated that the lower benchmark of $50/tC ($13.95/t CO_2) was reasonable. Most importantly, the IPCC gives great weight to the estimates in the Stern Review 2007. As the most recent and most comprehensive analysis of the costs of climate change, the Stern Review is the best available information. As the IPCC notes, the Stern Review 2007 estimates the cost of carbon at $85/t CO_2. The NHTSA must re-calibrate the Volpe model results to reflect the actual range of values in the current literature.

The NHTSA also uses an impermissible value for the lower bound on the cost of carbon dioxide reductions. The DEIS acknowledges that the IPCC indicates that the costs of global climate change will be non-zero. DEIS Appx. C at VIII-30. But then it jumps to the amazing and illogical conclusion that "it does not necessarily rule out low or zero values for the benefit to the U.S. itself from reducing emissions." *Id.* This statement is completely erroneous. The evidence is clear that the U.S. will be severely adversely affected by climate change. Just a few examples: some of the most expensive real estate and most densely populated regions are along our expansive coastlines; the desert Southwest is gripped by drought and projected to continue to be; much of our fresh water is supplied by annual snowpack, which is already declining; forest fires are raging through most of the forested regions of the country; and human health, especially in the Southwest where there are large retired populations, will be affected by extreme heat events and in many other ways. Furthermore, our economy depends heavily on imports and exports from other countries. If the rest of the world is economically harmed by climate

change, the U.S. will undoubtedly pay. There is no doubt that the U.S. will suffer severe impacts along with the rest of the world: the cost of carbon is most certainly non-zero.

Finally, the DEIS uses an impermissible method for reducing the range of potential carbon costs to a single value. The DEIS takes the midpoint between its chosen "upper" and "lower" bound. But as emphasized by the IPCC there are numerous estimates of carbon cost. This constellation of carbon costs will have some distribution. It is very likely that the estimated values do not fall along a normal "bell" curve. Consequently, taking the midpoint between the extreme values does not reflect the true "consensus" value for the cost of carbon.

The NHTSA must first re-analyze the available and current estimates of the cost of carbon, with particular attention to the leading analyses in the Stern Review 2007. Next, the NHTSA must ascertain a proper non-zero lower bound for its estimates. Finally, the distribution of estimated values should be taken into account when a single value is selected for use in the Volpe model.

4. The Volpe Model Fails to Account for Changes in Fleet Mix and Market preference

The low CAFE standards have allowed United States automakers to pursue the profits associated with large, expensive trucks and SUVs, at the expense of the consumer and the environment. This market plan has proven untenable even to the automakers and their workers, with Ford posting an $8.7 billion loss in the second quarter of 2008, and GM closing four truck and SUV plants (NPR Big Three, Dwyer (NPR) Ford Shifts). Now the United States automakers are forced to attempt to catch up to consumer demand for higher fuel efficiency vehicles. One domestic automaker has attempted to obscure its paucity of fuel-efficient vehicles by offering consumers a special credit card that caps the cost of gasoline at $2.99 per gallon for three years (KCRA Chrysler $3 gas). Other domestic automakers have launched disingenuous advertising campaigns promoting trucks and SUVs with marginally higher fuel efficiencies, even though those higher-efficiency vehicles are being produced only in extremely small quantities and are not actually available in many markets (NPR Hybrid SUV, Ford Escape, Chevy Tahoe). That is, the U.S. automakers are currently responding to the changing market demand not by producing higher efficiency vehicles, but by offering advertising and gimmicks. This problem has been greatly facilitated by decades of stagnant CAFE standards, and can hardly be expected to be resolved by the Volpe model that relies so heavily on the marketing plans and short-sightedness of the automakers.

Fleet mix is a central component of average fuel economy and yet is absent from the Volpe model cost-benefit analysis. For instance, the Volpe model "does not attempt to account for…intentional over-compliance…Another possibility NHTSA and Volpe 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." Proposed CAFE Standards MY 2011-2015 at 73 Fed. Reg. 24352, 24393 (May 2, 2008).

This failure is particularly glaring in today's auto market. The media is full of stories of automakers that are facing poor economic returns on low-mileage vehicles and as a result shifting to smaller, more fuel-efficient models. Ford motor company, for instance, has plans to reduce SUV production and begin offering some of its European fuel-efficient vehicles for sale in the U.S. (Smith

2008). A recent report by the Consumer Federation of America indicates that the NHTSA's assumed fleet mix does not represent what consumers are actually buying (Cooper 2008). Furthermore, the average consumer desires a car that gets at least 32.7 mpg today (Cooper 2008), yet even the "technology exhaustion" alternative would only require an average fuel economy of 31.1 mpg in 2011. Including this shift in consumer demand in the Volpe model is essential to properly assess the potential for increased fuel economy in the U.S.

The NHTSA does not address the potential implications of a changing automobile market and to embrace its technology forcing mandate. The possibility that increasing consumer demand for more fuel efficient vehicles may affect the calculation of an individual automaker's CAFE under Reformed CAFE, and the opportunities available for individual automakers to take advantage of those changing demands through CAFE credits. 73 Fed. Reg. at 24393 & 24443. However, the proposed CAFE standards completely fail to consider the significant market advantage experienced by automakers that "pull ahead" to offer higher-efficiency vehicles.

In such a market, "overcompliance" can result in significant gains in market share and economic returns for innovative automakers. By failing to consider shifting consumer demand, NHTSA and the Volpe model significantly underestimate the economic benefits of increased efficiency vehicles, and artificially and inappropriately skew the cost-benefit analysis of developing and implementing efficiency technologies. Stated another way, NHTSA has illegally constrained its analysis by locking itself into the assumption that a manufacturer's fleet mix need not, and will not, change in response to the nation's need to conserve energy.

5. The Cost-Benefit Analysis Does Not Include All Available Technologies

The potential technologies for improving fuel economy are unreasonably limited. The extent to which the technology is unreasonably limited is amply illustrated by the fact that the "technology exhaustion" alternative barely reaches the current fuel economy standards in Japan and Europe, much less the projected fuel economy standards in Europe and Japan for 2015. *Supra* Table 3, Figure 1. A model that predicts maximal technology implementation to be unable to reach even current market standards in other countries is clearly not considering all available technologies.

Concrete examples of technologies that are unreasonably excluded are: electric vehicles, plug-in hybrids, and power-split hybrids. Electric vehicles are entirely excluded from the Volpe model. 73 Fed. Reg. at 24381, Table III-3. This is absurd considering that a major U.S. auto manufacturer produced and placed such vehicles on the road in the year 1996.[6] These vehicles were pulled from the market for commercial reasons over loud protests of drivers in 1999, and destroyed in 2003. (Biederman 2005). An auto manufacturer's commercial decision does not render a technology unsuitable for implementation—the only concern should be physical capability, which has been clearly demonstrated. Plug-in hybrids are also categorically excluded on the basis that they are not "market-ready" (73 Fed. Reg. at 24381), despite the fact that Toyota is planning to introduce plug-in hybrids by MY 2010. (Maynard 2008). The major U.S. auto manufacturers are also planning to offer similar vehicles around the same time. *Id.* Powersplit hybrids, like the Toyota Prius, are considered advanced technology that will not be available

[6] See http://www.sonyclassics.com/whokilledtheelectriccar.

under 2014. 73 Fed. Red. At 24381, Table III-3. This assumption is ludicrous given that the Toyota Prius has been sold in the U.S. since MY 2001 and is a top-selling vehicle.

Other technologies that are not yet commercially available, but could be if economy standards were sufficiently high, include replacement of spark-plugs with laser-pulse injection systems and engines that can switch between two-stroke and four-stroke modes. (Graham-Rowe 2008). Furthermore, the DEIS makes no mention of alternatives such as compressed-air vehicles. (Green Car Congress 2008).

There are abundant potential technologies for improving fuel economy that have not been included in the Volpe model. This leads to misleading and factually incorrect outputs from the model, and a failure to disclose basic relevant information under NEPA.

6. The Volpe Model Impermissibly Constrains Implementation Based on Manufacturer Development Cycles

The NHTSA has ignored the EPCA technology-forcing mandate by limiting technology implementation to manufacturer development cycles. As discussed in greater detail below in section IV(C), the EPCA is a technology-forcing statute. The principle of technology-forcing is that the market must be pushed to do more than it currently plans. Yet, the NTHSA disregards this principle when it limits technology implementation to manufacturer "redesign" and "refresh" cycles. 73 Fed. Reg. at 24385.

Manufacturers not only manipulate market demand as discussed above, but also respond to it. When economics demand, a manufacturer would certainly implement a change outside a normal development cycle. Similarly, if regulations required, automakers could make changes outside a normal development cycle. Development cycles are a product of commercial convenience, not practicability. As a result, they have no bearing on the considerations of technology implementation within the cost-benefit analysis.

In summary, in each and every instance discussed above, NHTSA unreasonably chose an input level that would depress the fuel economy level that resulted from the modeling. Then, NHTSA disclosed in the DEIS only the results of the modeling runs using these unreasonable input figures. NHTSA's modeling is arbitrary and capricious and violates NEPA (as well as the EPCA, as described throughout and in our July 1, 2008 comments on the proposed rule). Even if NHTSA's use of the Volpe model were otherwise valid (which it is not, as described above), at a minimum, NHTSA was required to consider alternatives based on modeling with reasonable inputs. In other words, NHTSA should also have disclosed the level of its so called "optimization" and "technology exhaustion" alternatives had the model been run with inputs that would have led to higher fuel economy outputs. NHTSA failed to do so.

Furthermore, the NHTSA makes the mistake of elevating the decisional process over the substantive character of the alternatives. As the court in *California v. Block* noted with regard to an EIS prepared under NFMA, "[a]lthough it is worthwhile to consider a broad range of variables in constructing policy alternatives, the procedure becomes meaningless if the variables are assigned

numerical values such that only a limited range of outcomes result." 690 F.2d 753, 769 (9th Cir. 1982). Here, NHTSA has limited its consideration, and range of alternatives, to the results of the model, yet those results are meaningless for a number of reasons, including the fact that the input values were simply incorrect. Thus, the range of values used as inputs to the Volpe model has unreasonably constrained the universe of alternatives under NEPA.

Moreover, as discussed above, the Volpe model arbitrarily constrains the universe of NEPA alternatives. The purpose of NEPA is to inform decision making, but application of a specialized tool designed for cost-benefit analysis indicates that a decision has already been made by the agency. If the cost-benefit analysis is applied to select alternatives, there is no potential for considering alternatives that may carry less environmental impact. Yet, the Volpe cost-benefit analysis was employed to define all alternatives, including the maximal technology alternative. This alternative was based on what the NHTSA "considered to be available" and based on market penetration rates defined in the Volpe model. DEIS at 2-10.

C. The NHTSA failed to include a "technology forcing" alternative

The EPCA is a "technology-forcing" statute, whereby a challenging standard encourages technological innovation. The EIS must consider alternatives in light of EPCA's technology-forcing character. As the court in *Center for Auto Safety v. Thomas* noted, "[t]he experience of a decade leaves little doubt that the congressional scheme in fact induced manufacturers to achieve major technological breakthroughs as they advanced towards the mandated goal." 847 F.2d 843, 870 (D.C. Cir. 1988) (overruled on other grounds); *see also Green Mt. Chrysler Plymouth Dodge Jeep v. Crombie*, 508 F. Supp. 2d 295, 358-359 (D. Vt. 2007) (discussing technology-forcing character of EPCA and the use of increased fuel efficiency to augment performance rather than mileage). As explained by the court in *Kennecott Greens Creek Min. Co. v. Mine Safety and Health Admin.*, "when a statute is technology-forcing, the agency can impose a standard which only the most technologically advanced plants in an industry have been able to achieve-even if only in some of their operations some of the time." 476 F.3d 946, 957 (D.C. Cir. 2007) (quoting *United Steel Workers of America, AFL-CIO-CLC v. Marshall*, 647 F.2d 1189, 1246 (D.C. Cir. 1980). With regard to a similarly technology-forcing statute, the Clean Air Act, legislative history indicates that the primary purpose of the Act was not "to be limited by what is or appears to be technologically or economically feasible," which may mean that "industries will be asked to do what seems impossible at the present time." 116 Cong. Rec. 32901-32902 (1970), 1 Legislative History of the Clean Air Amendments of 1970 (Committee Print compiled for the Senate Committee on Public Works by the Library of Congress), Ser. No. 93-18, p. 227 (1974); *see also Whitman v. American Trucking Associations*, 531 U.S. 457, 491 (2001).

Due to the technology-forcing nature of the statutory scheme, the NHTSA was required to include one or more technology-forcing alternatives in the DEIS. Such an alternative would include standards that may appear impossible today, but that would force innovation as industry strives to meet a challenging standard. NHTSA's "technology exhaustion" alternative, defined by the criteria "whether a particular method of improving fuel economy can be available for commercial application in the MY for which the standard is being established" (DEIS at 1-2) clearly cannot substitute for consideration of a technology-forcing alternative.

While NHTSA will likely argue that it was not required to consider a technology-forcing alternative because it has pre-determined that it would not select such an alternative, it is clear that all reasonable alternatives, even those falling outside the lead agency's jurisdiction, must be considered. *Natural Resources Defense Council. v. Morton*, 458 F.2d 827, 834 (D.C. Cir. 1972). Because EPCA is a technology-forcing statute, the failure to include a technology-forcing alternative was unreasonable and unlawful.

Having failed to include such an alternative, the NHTSA then failed to analyze the environmental impacts of a technology-forcing standard. This omission is particularly significant because such a technology forcing standard would have environmental benefits that not only amplify the ability of automakers to meet higher standards in later years, but that also ripple through the economy. NHTSA's failure to consider this important aspect of the analysis renders the DEIS inadequate.

V. The DEIS's Analysis of Direct and Indirect Impacts is Fatally Flawed and Designed to Minimize the Effect of NHTSA's Action

The failure to evaluate a reasonable range of alternatives is compounded by the DEIS's inadequate analysis of direct and indirect impacts. Fundamental purposes of the EIS include providing a meaningful discussion of the environmental problem, the agency's contribution to that problem, available solutions, and the agency's contribution to those solutions. The DEIS is lacking any such meaningful analysis. Instead, with regard to global warming, the analysis is systematically skewed in a way that minimizes both the severity of the problem and the NHTSA's contribution to it. The DEIS is lacking any discussion at all of solutions, and how the NHTSA's actions either contribute to, or detract from, the implementation of such solutions. These flaws render the DEIS worse than useless as an informational document, because it is affirmatively misleading to the reader.

A. The DEIS Systematically Understates the Severity of the Climate Crisis and Overstates Scientific Uncertainty

The NHTSA has failed to present, as it must, information and analysis in a way that provides meaningful insight into the relevant environmental problems and available solutions. The information in the DEIS on climate impacts is presented in a misleading manner and without appropriate context. Under NEPA an EIS must be written in "plain language" so that decisionmakers and the public can readily understand [it]." 40 C.F.R. § 1502.8. The ultimate purpose of an EIS is to inform decisions. To do so, the information must not only be comprehensible to non-experts, but also present the context for the information in a manner that elucidates and explains the importance of each aspect of the decision.

The DEIS fails in this regard because it presents the information on the impacts of climate change in a way that minimizes the apparent potential for substantial harm. Even more problematic is the minimization of the apparent influence of each alternative on climate change. Throughout the DEIS the impact of each alternative as well as the difference between alternatives is presented as insignificant and meaningless. Although the DEIS mentions many of the potential consequences of increased atmospheric CO_2, the data is presented in a disjointed manner and qualified as "uncertain." Yet it has been decades since there has been any real scientific uncertainty regarding whether climate change is occurring as a result of increasing concentrations of anthropogenic (Oreskes 2004).

The reality is that, as discussed in previous sections, there is a substantial risk of climate disaster if U.S. greenhouse gas emissions continue unchecked. This collision course towards climate disaster can be avoided through efforts to reduce quickly reduce emissions. The transportation sector is one of the largest sources of emissions, and therefore also an essential part of the solution. Stringent CAFE standards can be part of one of the most significant components of a national greenhouse gas emissions reduction program. This substantial opportunity, however, is never explained to the reader, but rather, the reader is left with the impression that NHTSA's actions will make very little difference one way or another. This is profoundly misleading and violates NEPA's disclosure requirements.

The statement of "uncertainty" is overused and abused throughout the DEIS. To avoid further analysis and consideration of environmental impact, the DEIS frequently presents background on climate change, but qualifies the information as "uncertain." In most instances this is uncalled for. The argument could be made that every piece of information in any EIS is uncertain, yet an agency is expected to make a good faith effort to consider impacts that are reasonably certain. While the IPCC may label the intensity of some effects as "likely" as opposed to "very likely," the effects are still just as certain as effects such as smog due to criteria pollutant emissions. For instance, the IPCC states that "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." (Alley et al. 2007). By overusing the uncertainty qualification, the DEIS fails to consider important impacts of climate change and obfuscates the issue so that the decisionmakers and public will not be able to adequately evaluate the balance of harms that may occur as a result of different alternatives.

One prime example of inadequate context and information is the analysis of abrupt climate change, or tipping points. The CEQ regulations require that an agency "describe the consequences of a remote, but potentially severe impact" based on credible scientific information. 50 Fed. Reg. 32234, 32237 (August 9, 1985). The DEIS acknowledges that the possibility of abrupt climate change exists, yet by asserting uncertainty downplays the significance of tipping points. This approach is untenable. While no one may be able to predict with certainty on exactly which date a threshold for abrupt climate change may be reached, there is ample evidence that unchecked greenhouse emissions will result in abrupt climate change. In fact, various studies have attempted to quantify when such a threshold may be reached. The most recent estimate by Hansen and colleagues is that prolonged time spent over 350 ppm CO_2 will result in catastrophic[7] impacts. Previous estimates considered 450 ppm the threshold for catastrophic climate change.

Given the certainty that abrupt climate change will occur above some level of atmospheric concentration, the alternatives must be analyzed in the context of avoiding catastrophic climate change.

B. The DEIS does not adequately address climate tipping points

[7] Although the climate literature often refers to "dangerous" levels of climate change to denote CO_2 concentrations above which climate impacts will be severe and irreversible, we use the term "catastrophic" here because current CO_2 levels have already surpassed the "dangerous" level of 350 ppm.

Among the many consequences of climate change, "tipping points" carry the greatest threat to wildlife, human welfare, and economic security. As such, it is of paramount importance that any federal action be executed in a manner that reduces the possibility of abrupt climate change.

The Volpe model is the sole decision-making tool used to balance the factors set out in the EPCA. It does not capture the costs of abrupt climate change or tipping points. One of the factors that NHTSA considers under EPCA when setting the fuel standards is "the need of the United States to conserve energy." Environmental implications of the need for large quantities of petroleum are included in this factor. One of the environmental effects of continued heavy petroleum consumption is the possibility of passing over "tipping point" thresholds, or catastrophic climate change.

Because this is an acknowledged possibility, it must be included in the NEPA analysis and the balancing of the EPCA factors. The DEIS concludes that the science surrounding tipping points is too uncertain to be included in the analysis. This is simply not true. It is well-accepted that there will be tipping points. (Meehl et al. at 775, 2007). A recent analysis of "tipping elements" indicates that contrary to the IPCC's conservative projections, there is a strong chance that tipping points will be crossed within this century. (Lenton et al. 2008). This study also indicates that it may be possible to identify thresholds for tipping points for the purposes of policy making. *Id.*

Furthermore, a recent study by Weitzman, an economics professor at Harvard, indicates that while traditional cost-benefit analysis can not properly capture the costs of climate change, including tipping points, a different analysis is more likely to capture the costs. (Weitzman 2007).

The economic impacts of climate change are astounding. The much-respected Stern Review, published in 2007, estimates that the costs of climate change will range from 5% to 20% of GDP. (Stern 2007). In contrast, the Stern Review estimated that rapid action to address climate change would only cost approximately 1% of GDP.[8] *Id.* In 2007, this would have corresponded to approximately $138 billion.[9] In contrast, the cost of inaction—abrupt climate change—has been estimated at over $400 billion.[10] (Bindschadler 2008). The message is clear: the U.S. can not afford to gamble with abrupt climate change.

Under all scenarios considered in the DEIS the atmospheric CO_2 concentrations would reach 550 ppm or greater—the "optimized" alternative would reach over 700 ppm. This is well above the threshold for abrupt and catastrophic climate change. As a result, no alternatives adequately address the need for deep reductions in CO_2 emissions.

The DEIS erroneously dismisses the potential for tipping points as an impact that will not occur this century and thus does not require consideration. The basis for this conclusory statement that abrupt climate change will not occur this century is a statement in the IPCC Fourth Assessment Report that

[8] As Sir Nicholas Stern explained in testimony before the House of Representatives Energy Committee, other major bodies such as the IPCC, McKinsey & Co., and the International Energy Agency have produced similar estimates. N. Stern, *Climate Change: Costs of inaction, Targets for Action* (June 26, 2008).
[9] National GDP obtained from file "gdplev.xls" downloaded from http://www.bea.gov/national/index.htm#gdp (last visited August 12, 2008).
[10] Cost for 1 m rise in sea level this century.

"[a]brupt climate changes … are not considered likely to occur in the 21st century, based on currently available model results." *See* DEIS at 3-53 (emphasis added; citing Meehl et al. 2007). Yet, it is well-accepted that climate models can not capture the dynamical processes that lead to climate instabilities and rapid shifts such as occur during abrupt climate change. See, e.g., DEIS at 3-52.

Model predictions consistently underestimate observed climate change, and thus very likely also underestimate when tipping points will occur. For a discussion and examples, see Hansen et al., *Target CO_2* at page 10 (2008). There are numerous examples of accelerated changes occurring well in advance of model predictions. One is the rapid rate of sea ice loss in the Arctic. The summer sea ice extent in 2007 shattered all records, dropping below the level that most models predicted would not occur until 2050.

Figure 2: Sea Ice Concentration for September 2007, along with Arctic Ocean median extent from 1953 to 2000 (red curve), from 1979 to 2000 (orange curve), and for September 2005 (green curve). September ice extent time series from 1953 to 2007 is shown at the bottom. Source: Stroeve et al. (2008: 13, Figure 1).

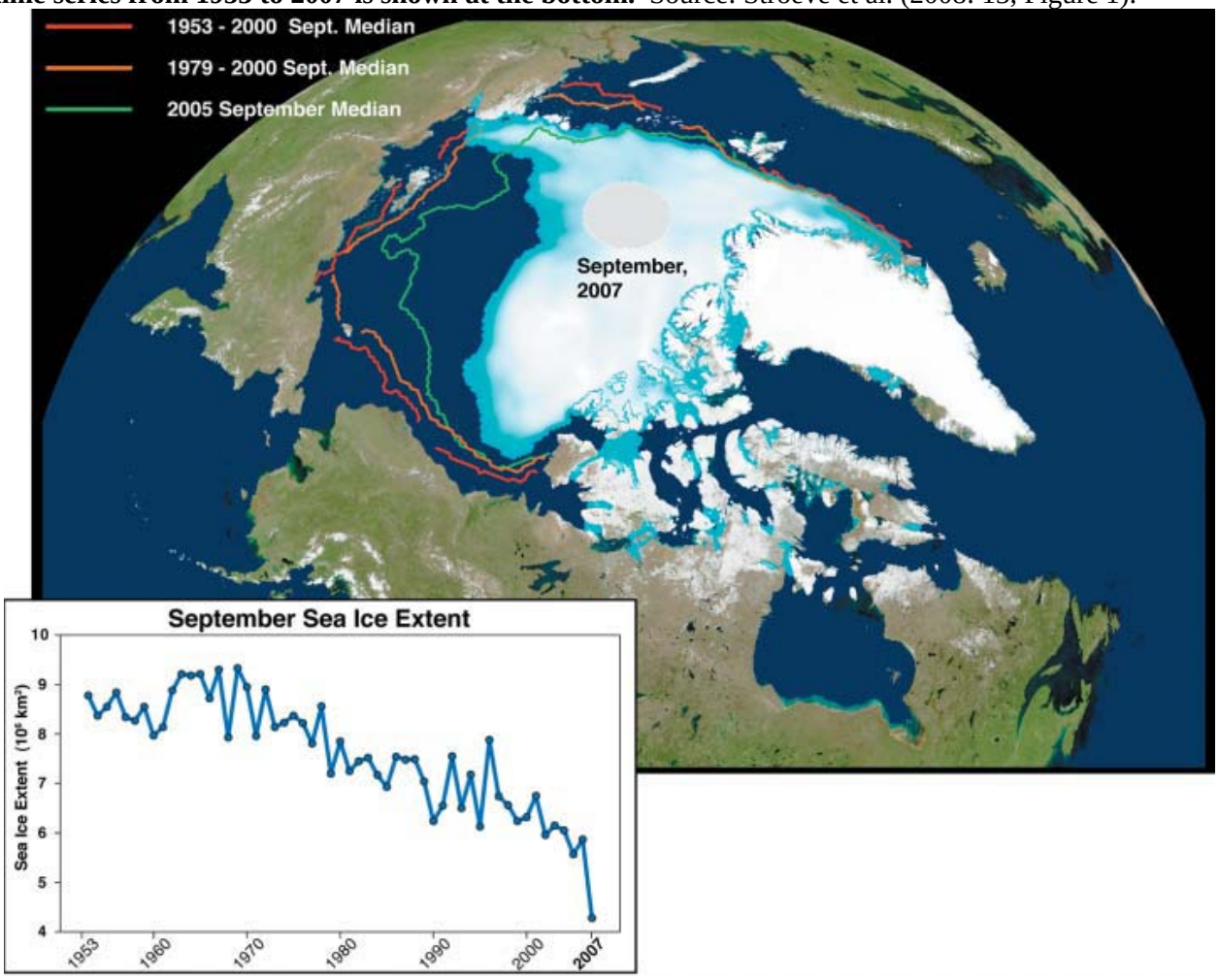
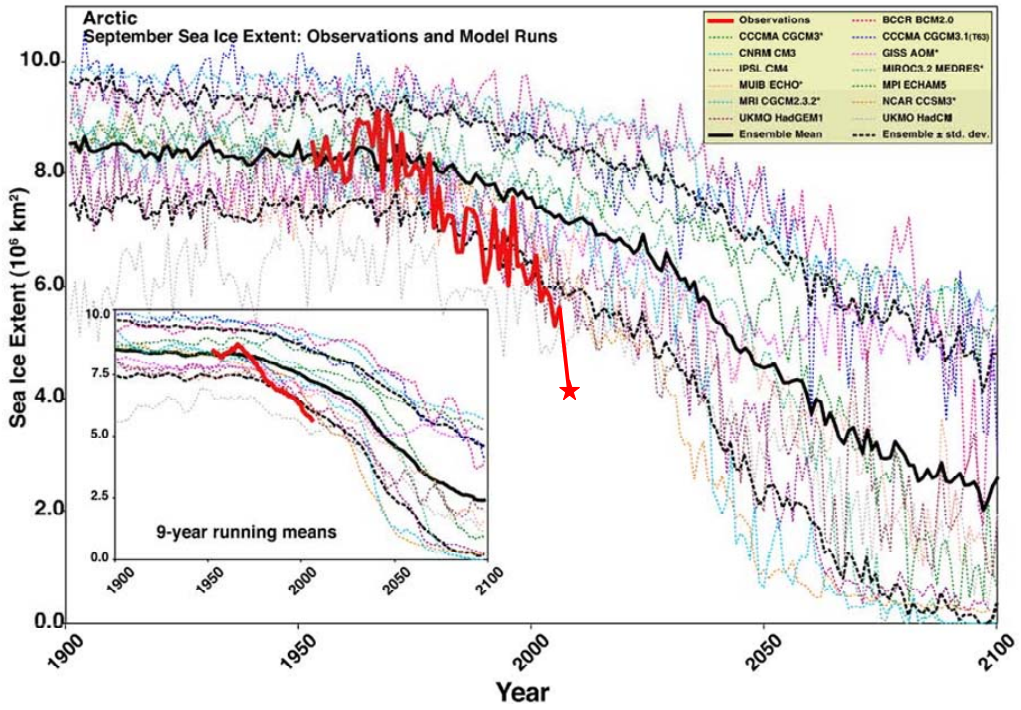


Figure 3: Arctic Summer Sea Ice Extent: Observations Compared to Model Runs. Source: After DeWeaver (2007); Stroeve (2007).



More recent models of Arctic sea ice predict that the Arctic could be sea-ice free by the summer of 2013. In a recent conference presentation, Professor Maslowski from the Naval Postgraduate School showed if current trends continue, the Arctic will be sea-ice free by 2013. (Maslowski et al. 2008). The summer sea ice predictions for 2008 suggest that the same precipitous decline may occur again,[11] with some scientists suggesting a 50:50 chance that the North Pole will be ice-free this summer.[12] Arctic sea ice is important both because of the albedo feedback effect and because sea ice melt leads to a warmer Arctic Ocean, which in turn accelerates the melt rate of the Greenland ice sheets.

The best basis for determining tipping points may be the use of paleoclimate data. Based on such data, Hansen and colleagues have estimated that remaining at CO_2 concentrations above 350 for a prolonged period of time is likely to invoke tipping points (Hansen et al. 2008). Paleoclimate data also indicate that in the past, at temperatures expected to be reached by 2100, Greenland and Antarctica contributed several meters to sea level. (Overpeck et al. 2006). The rate of rise at this temperature was approximately 1.6 m/century. (Rohling et al. 2008). Thus, the current CO_2 level of 385 ppm is not only "dangerous," but catastrophic and could lead to tipping points this century. No models, including those used by the IPCC, can capture the dynamic response of ice sheets or adequately predict current observations of sea level rise. (DEIS at 3-75; Rignot 2008).

[11] For up-to-date information on sea-ice extent, see the National Sea Ice Data Center (NISDC) Arctic Sea Ice News and Analysis, *available at* http://nsidc.org/arcticseaicenews/ (last visited August 12, 2008). The May 5, 2008 report explains why there is a greater than 50% chance that the sea ice extent for the summer of 2008 will actually be smaller than that in 2007. The August 11, 2008 report documents extensive, recent sea ice loss. The annual minimum will not occur until September.
[12] Alan Duke, *North Pole Could be Sea-ice Free this Summer, Scientists Say*, reported at CNN.com, *available at* http://www.cnn.com/2008/WORLD/weather/06/27/north.pole.melting/ (last visited August 12, 2008).

This is not an excuse, however, for the DEIS to dismiss this critically important issue. The DEIS cannot rely solely on model results to predict sea level rise. Instead, the prediction should be based on the sea level measurements from paleoclimate data, which indicate that in the past sea level was approximately 25 meters higher at temperatures only 2-3° C of warmer and atmospheric CO2 concentrations of 350 – 450 ppm. (Hansen 2007). For comparison, the DEIS predicts that temperature in 2100 under the A1B "business as usual" scenario will be approximately 2.7° C warmer. DEIS at 3-63, Table 3.4-5. Although the DEIS acknowledges that Rahmstorf (2007) has predicted a sea level rise of over 1 m by 2100, even his prediction does not capture the non-linearity of ice-sheet loss (Hansen 2007). If this non-linearity is taken into account, "business as usual" sea level rise this century is more likely to be on other order of 5 m (*Id*.; Overpeck et al. 2006).

Given the strong scientific evidence that sea level will rise by substantially more than predicted in the IPCC Fourth Assessment report, the EIS's analysis, both qualitative and quantitative, must be adjusted to account for the economic impacts of severe and abrupt climate change. It is certain that sea level will rise significantly this century, and assuredly at a rate much greater than that reported in the DEIS. Regardless of the actual numerical value, the amount of increase will be enough to constitute a major environmental and economic impact. Economic analyses exist to estimate the economic impact of such an event. (Stern 2007).[13] As a result, the DEIS must include the substantial economic cost in the cost-benefit analysis.

Reaching any single tipping point can bring severe economic and ecologic consequences. But perhaps more worrisome is the linkage between tipping points such that reaching one tipping point may in turn trigger a second. An example is the connection between Arctic sea ice and permafrost melt rates. Permafrost refers permanently frozen land; this surface stores large amounts of carbon. As permafrost thaws due to global warming, it releases carbon, often as methane. (Christensen et al. 2004). Methane has a global warming potential that is approximately 25 times greater than that of carbon dioxide over 100 years. The release of methane as permafrost thaws creates a positive feedback loop that may result in a climate tipping point. *Id.* Recent evidence indicates that the loss of Arctic sea ice, one tipping point, accelerates permafrost thaw, a second tipping point. (Lawrence et al. 2008). The multiplicative effect of reaching several tipping points on a similar time scale would drastically increase the costs associated with climate change.

C. The DEIS lacks any discussion of solutions

After summarizing an environmental problem, the next required task of an EIS is to discuss ways to reduce the project's impact and solve the problem. This rulemaking is particularly well suited for such an analysis since EPCA requires the fuel economy standard to be set at the "maximum feasible" level and higher fuel economy standards result in lower greenhouse gas emissions. Yet the failure to discuss solutions is one of the DEIS's most glaring failures.

In the bizarre and constrained world presented in the DEIS, there is no solution to global warming. The full range of alternatives considered by NHTSA, combined with NHTSA's assumptions, discussed below, result in atmospheric CO_2 concentrations of between 705.4 and 708.6 ppm. DEIS at 2-

[13] *Available at* http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_Report.cfm.

16. While global warming is indeed a daunting problem, presenting the analysis in this truncated form leaves the false impression that nothing can be done about it, violating both the letter and the spirit of NEPA. Leading scientists are able to tell us with a high degree of certainty that allowing CO_2 concentrations to rise to more than 700 ppm by the end of this century will result in catastrophic climate impacts. NHTSA has a mandatory duty to disclose in the DEIS what NHTSA can do to contribute to the solution.

NHTSA's failure to do so flows in many ways from its failure to discuss a reasonable range of alternatives and conduct an adequate impacts analysis, as discussed above. NHTSA's failure to discuss more stringent alternatives precluded it from discussing how much smaller the environmental costs of those more stringent alternatives would be. But NHTSA also continued to improperly skew the analysis in additional ways as discussed below.

D. The DEIS impermissibly limits the analysis to assuming that future fuel standards will remain fixed at 2015 levels

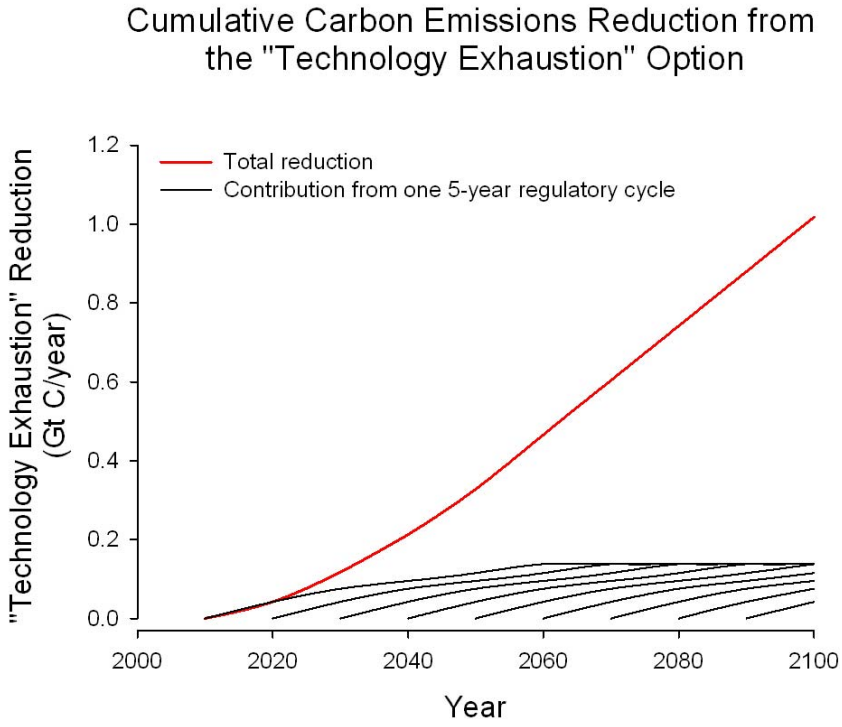
One of the ways NHTSA minimizes the apparent impact of its rulemaking is to limit its analysis to a world in which fuel economy levels become fixed beyond the last year of the current rulemaking. To limit the analysis to this assumption is inconsistent with the statutory scheme, which of course requires that (1) fuel standards for the combined fleet reach a minimum of 35 mpg by 2020 and (2) the NHTSA set fuel standards must be set at the "maximum feasible level" each year. 49 U.S.C. § 32902(a); (b)(2)(C). This regulatory regime requires NHTSA to continue to raise standards each and every year through 2100. While the NHTSA may have been free to calculate and discuss the resulting environmental impact that would result from fixing the standard beyond the current rulemaking, disclosing only this piece of information was clearly not sufficient, especially given the statutory scheme that requires the NHTSA to continue increasing fuel economy to the maximum feasible level each year.

While the DEIS that the standards for 2011-2015 will impact the 2016-2020 standards, the DEIS improperly limits its analysis to the environmental impacts from the emissions of just those vehicles in the MY 2011-2015. Limiting the analysis in this manner allowed NHTSA to minimize the apparent impact of its action, because despite the fact that the lifetime emissions of these five model years of US vehicles will be massive, even this large chunk of emissions can be made to incorrectly appear insignificant if it is compared to a large enough number. In order to give a complete picture of this aspect of the problem, NHTSA should have compared its alternatives for model years 2011-2015 not just to the emissions that would result if fuel economy standards thereafter remained fixed, but also to the emissions that would result if fuel economy standards continued to improve along the trajectories established by each of a reasonable range of alternatives. Had NHTSA done so, the impact of its action would have appeared in a very different light. This is particularly true since technology innovation today will both amplify the gains that can be made in the auto industry in the future, and will also have spillover effects into other sectors of the economy. The NHTSA was required to address these issues in the DEIS, but failed utterly to do so.

Because of the application of technologies developed in response to a valid, technology-forcing CAFE standards to other sectors of the economy and in other countries, there should be a non-linear increase in projected reductions with increased stringency of fuel standards. The DEIS should have

included an analysis of continual increases in fuel economy through year 2100. EPCA requires that *each year* the maximal fuel economy standard be established. It is certain that technology will continue to improve and thus that the maximum feasible fuel standards will continue to increase through 2100. As shown in the figure below, one way to estimate the emissions savings due to a continual increase in fuel economy would be to iteratively sum the projected reduction in CO_2 from the MY 2011-2015 standards (obtained from the difference between the "no action" and "technology exhaustion" alternative emissions in Table 3.4-2 of the DEIS) out to year 2100.

Figure 4: One potential mechanism for accounting for cumulative emissions reductions from continual compliance with the "maximum feasible" fuel standards requirement of EPCA. Each black line represents the reductions expected from a 5-year regulatory cycle. For illustrative purposes, the "technology exhaustion" reductions from DEIS Table 3.4-2 were used. The red line is the sum of reductions at each year. Year is shown on the abscissa, carbon emissions reduction per year is shown on the ordinate.



Employing this strategy results in a substantially greater effect than the artificial assumption in the DEIS that fuel economy will not improve after MY 2015. The cumulative carbon savings would be 39 Gigatons of carbon by year 2100, and a 15 ppm difference between "no action" and "technology exhaustion" in CO2 concentration in 2100. This value would be higher if the "technology exhaustion" option was not unreasonably constrained by the Volpe model. The DEIS doesn't include any information on this important issue.

The NHTSA then compounds the other errors in its analysis by presenting the effect of its action only as an improvement over the "no action" alternative, which NHTSA defines as leaving fuel economy standards unchanged. The true "no action" alternative is the technologically achievable fuel economy level. NHTSA's "action" is to reduce this level, based on its consideration of the other statutory factors. Therefore, NHTSA was required to disclose in the DEIS the additional greenhouse gas

emissions that will result from its decision to set fuel economy standards far lower than the technologically feasible level. The NHTSA failed to do so, instead continuing to portray its rulemaking merely as an improvement over the status quo, when in fact the opposite is true: it has proposed standards that are far lower than what is achievable with today's and future technology, and far lower than current levels in other countries. The true effects of this decision must be disclosed.

Again, while NHTSA may have been free to quantify the environmental impacts that would result from fixing fuel economy standards at 2011 levels, including only this information and then analyzing only the difference between doing nothing and NHTSA's proposal, rather than the difference between NHTSA's proposal and the technologically feasible fuel economy level, violated NEPA.

E. The analysis of climate change resulting from each alternative is flawed

In addition to the structural flaws discussed above, the numerical results from the climate impacts analysis are invalid. Two methods are used to model the impact of each alternative: MAGICC 4.1 and a "scaling approach." DEIS at 3-50 & 3-51. The results from MAGICC are flawed because an old version of the software was used; the scaling approach is misleading and mischaracterizes climate impacts. Furthermore, the inputs to the MAGICC model were incorrectly constrained, as discussed above, by the Volpe model and thus the results do not represent the true climate impact of each alternative.

1. The presentation of MAGICC results creates the misleading impression that there is no difference between the alternatives.

MAGICC is used to estimate the increase in CO_2 concentration, global mean temperature, and sea level rise. The DEIS uses the SRES A1B-AIM scenario as a "baseline." The only comparisons in the DEIS are among the three SRES "business as usual" scenarios: B1, A1B, and B2. This analysis, however, is incomplete because it ignores the fact that in order to avoid catastrophic climate impacts greenhouse gas concentrations must be quickly reduced back to below 350 ppm. SRES A1B-AIM results in CO2 concentrations of 715 ppm in year 2100—far above dangerous CO_2 levels. A more appropriate comparison would be one of the "WRE" stabilization scenarios that are included in the MAGICC software. These stabilization scenarios are provided for 350 to 750 ppm stabilization.

Regardless of the baseline that is selected, the numerical results do not accurately reflect the state of the science. The DEIS relies heavily on the IPCC's Fourth Assessment Report, published in 2007. The model version used for numerical analysis, however, is calibrated to the Third Assessment Report, which was published in 2001. The MAGICC software has been updated to reflect the values reported in the Fourth Assessment report; the newest version is MAGICC 5.3. This update has important changes from version 4.1. These changes include:

- Values for climate forcings were updated and two new forcings for nitrates and land use were included
- The stabilization scenarios now include stabilization strategies for non-CO_2 gases as well as CO_2

- The method of sea level rise was improved to be more consistent with the IPCC Fourth Assessment Report
- Default climate sensitivity was changed from 2.6° C to 3.0° C, in conformance with the Fourth Assessment Report

Most importantly, the modeling results should be presented with the disclaimer that non-linear responses are not included in the predictions. Emphasis should be placed on the fact that (1) the model does not capture actual sea level rise predictions because it does not include ice sheet dynamics and (2) the model does not include the impact of rapid increases in methane from widespread loss of permafrost.

2. The "scaling approach" is misleading and does not add any helpful information to the DEIS

The "scaling approach" used in the DEIS is intended to test the effect of intermediate emissions scenarios. This is accomplished through linear interpolation between the relative outputs of three SRES scenarios: B1, A1B, and A2. This same estimate can be obtained by designating a "GAS" file in MAGICC that has intermediate CO_2 emissions.

From the skeletal description in the DEIS, it appears that (in a nutshell) the process involves taking the difference between the annual emissions (inputs) and the outputs (temperature, sea level, CO_2 concentration) associated with each of the SRES scenarios. The percentage change from "baseline" emissions for each alternative is then used to scale the outputs from the baseline scenario. See DEIS at 3-50. At a minimum, the calculation explanation must be improved, preferably with step-by-step examples to make the calculation accessible to the general public, as required by NEPA.

The underlying assumption to this process is that a linear transform will adequately describe the response to a change in emissions levels. Yet, as acknowledged in the DEIS at 3-52, climate interactions are non-linear. To test the linearity of the change between SRES scenarios, we ran an intermediate scenario in which the input annual carbon emissions were set at the midpoint between B1 and A1B. We then plotted the output variables. Examples are shown below. The numerical differences between each of the SRES scenarios and the intermediate scenario were not symmetrical. This indicates that climate outputs are not linearly related to emissions levels, violating the assumption of linearity upon which the scaling approach is based.

As acknowledged in the DEIS, the climate system is non-linear. DEIS at 3-52. Thus, it is not surprising that a linear transform between SRES scenarios is an inaccurate approximation of climate response.

Of course, comparing the scaling approach to MAGICC outputs assumes that MAGICC has accurately approximated the dynamics of the climate system. It seems likely, however, that MAGICC is the superior approximation. The MAGICC simulation routine has been extensively used by the IPCC and subjected to peer review. In contrast, no citations are provided in the DEIS that indicate the "scaling approach" has been subjected to similar scrutiny. Thus, the NHTSA should consider the MAGICC outputs more reliable. Furthermore, the DEIS provides no explanation why the "scaling approach" was deemed necessary.

In the following two figures, outputs from MAGICC are plotted as a function of year. In each plot, the values on the y-axes represent the difference between an SRES scenario (either B1 or A1B) and an "intermediate" scenario. The intermediate scenario was generated by creating a MAGICC "GAS" file that has emissions for each year that are the average of the emissions for B1 and A1B. One would expect that if there was a linear relationship between the change in outputs due to a change in inputs (emissions/year), these lines would overlap.

Figure 5: **Difference in CO_2 Concentration between SRES Scenarios B1 and A1B and the "Intermediate" Scenario.**

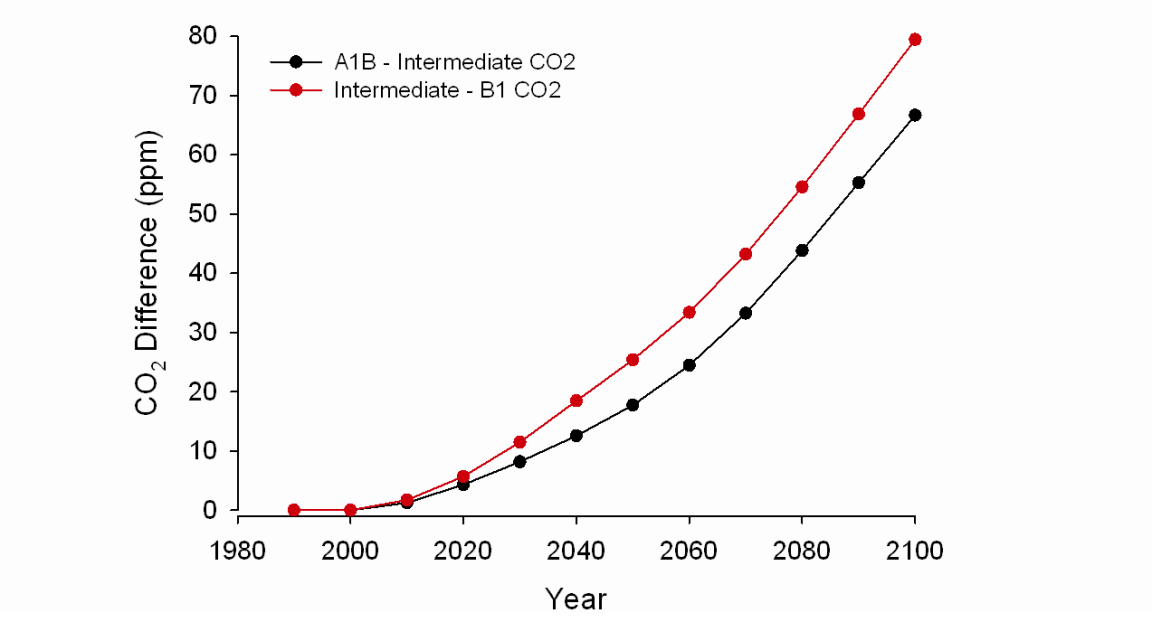
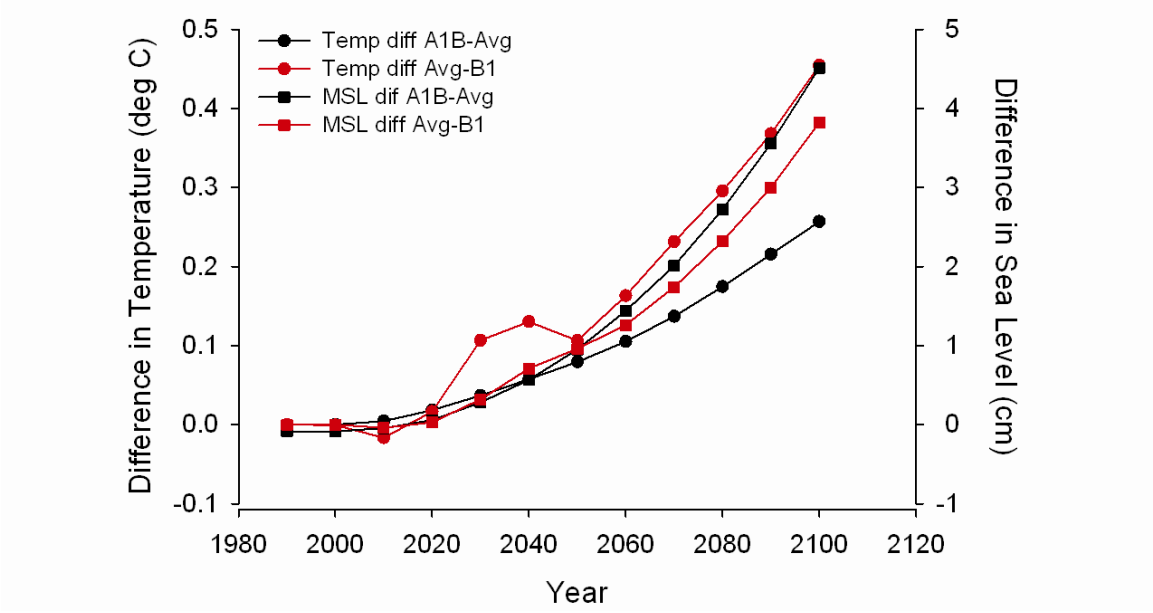


Figure 6: **Difference in Temperature and Mean Sea Level between SRES Scenarios B1 and A1B and the "Intermediate" Scenario.**



With regard to the scaling approach for temperature change, the results from the scaling approach indicate a smaller change in temperature at equilibrium than the MAGICC results [version 5.3]. Furthermore, if a comparison of temperature sensitivity is desired, this is easily accomplished by changing this one parameter in MAGICC. The "bounding analysis" for temperature change in 2100 is also unnecessary as one of the outputs of MAGICC is the temperature in year 2100. The temperature change for year 2100 as predicted by MAGICC is much larger than suggested by the "bounding analysis."

The "scaling approach" as applied to sea level is also misleading. First, MAGICC 5.3 reports increments of sea level rise of 0.1 mm – not 1 mm as reported in the DEIS. Thus, the MAGICC results can resolve sea level rise to the same precision as the "scaling approach."

The example of the scaling approach as applied to sea level and as illustrated in Table 3.4-14 is obscure and impossible to follow. Data appears to be missing from Table 3.4-14 (column 1) and the values do not appear to correspond to the steps outlined on page 3-77. This needs to be clarified so that readers can assess the validity of the numerical results. The value for sea level rise for "no action" corresponds to the midpoint for the B1 scenario (28.0 cm), not the A1B scenario (34.5 cm) that is purportedly represented in Table 3.4-14. If the steps provided on page 3-77 are carried out, it appears that the difference between alternatives for sea level rise is approximately double the range of values reported in Table 3.4-14.

Regardless, the approach itself is deeply flawed. First, using the IPCC estimates of potential sea level rise does not correct the shortcomings in MAGICC. The IPCC did not account for ice sheet dynamics in any of their estimates. As a result, any modeling or scaling attempt will not capture the most important components of sea level rise, as acknowledged in the DEIS at 3-76. As a result any attempt to estimate sea level rise from IPCC data will be deeply flawed. If a scaling approach is to be used, it should be based on paleoclimate data predicting the sea level rise associated with various temperature and CO_2 concentrations.

Second, the scaling approach purports to correct for "overstatements" due to inertia in the climate system. Yet any apparent "bias" is *created* by applying the "scaling approach" from the DEIS. If an accepted model such as MAGICC is employed, the effects of climate inertia will be properly accounted for without being overly represented in the results. Thus, the solution to "overstatements" of climate inertia is to avoid using the scaling approach.

Third, the scaling approach as applied to sea level change uses inaccurate values from Table 3.4-7, the temperature "scaling approach" results. When compared to the results from MAGICC at differing climate sensitivities, the scaling approach results in smaller differences in temperatures between alternatives. This in turn pollutes the results from the sea level scaling approach, making the sea level differences seem smaller.

F. The DEIS Fails to Adequately Address Ocean Acidification

The DEIS ignores one of the major, direct impacts of increased atmospheric CO_2: ocean acidification. Carbon dioxide is readily exchanged between the atmosphere and the sea surface. The increase in CO_2 is a direct result of human activity—fossil fuel burning. Due to the fact that the ocean has a carbonate buffer system, an increase in aqueous CO_2 reduces the concentration of carbonate while increasing the concentration of bicarbonate. The direct result is a decrease in ocean pH.

The reduction in free carbonate ions harms organisms that form calcium carbonate shells. There is a profound impact on the entire marine ecosystem due to the fact that many calcifying plankton, the basis of the food web, are severely affected by ocean acidification. Furthermore, organisms such as fish also experience direct effects from increased ocean CO_2, which include metabolic, immune, and reproductive dysfunction.

There is an extremely high level of scientific consensus regarding the destructive effects of ocean acidification. A recent comment letter signed by the top 25 marine scientists who study ocean acidification emphasized that the decrease in pH due to un-checked CO_2 emissions will be devastating and irreversible on human time scales (Caldiera and 25 others, 2007).

Ocean acidification has also been recognized by advisory bodies. For instance, the USCOP characterizes climate change as "among the most pressing scientific questions facing our nation and the planet." (USCOP Ocean Blueprint 2004). Furthermore, the USCOP report states that ocean acidification is impairing some organisms and has "potentially profound impacts on marine production and biodiversity." *Id.* The resulting recommendation is that scientific information be used to modify management strategies. Likewise, the Pew Commission discussed the myriad effects of climate change on marine life, including changes in ocean chemistry. The report stated that the Commission "feels strongly" that the U.S. must reduce its emission of greenhouse gases to limit injury to the marine environment. (Pew Oceans Commission Living Oceans, 2003).

The oceans have already taken up about 40% of the CO_2 that humans have produced since the industrial revolution, and this has lowered the average ocean pH by 0.11 units (Sabine et al. 2004). Although this number may sound small, it represents a significant change in acidity. The ocean takes up about 30 million metric tons of CO_2 each day (Feely et al., 2008). While preindustrial levels of atmospheric CO_2 hovered around 280 ppm (Orr et al. 2005)), they have now increased to 380 ppm; if current trends continue they will increase another 50% by 2030 (Turley et al., 2006). Over time, the ocean will absorb up to 90% of anthropogenic CO_2 released into the atmosphere (Kleypas et al. 2006).

Unlike future climate change, the pH change in response increased atmospheric CO_2 is relatively easy to predict because it involves basic chemical reactions and is unlikely to be affected by global temperature change (McNeil & Matear 2006). Thus, there is a strong consensus in the field that the oceans will undergo extensive acidification as the atmospheric CO_2 concentration rises.

Studies have established that anthropogenic CO_2 is the direct cause of the decrease in ocean pH. For instance, a tracer technique can be used to separate naturally occurring and dissolved carbon from that due to human activity (Gruber et al. 1996). Oceans absorb CO_2 more slowly than humans are currently releasing it. Current levels of anthropogenic CO_2 have virtually guaranteed that ocean pH will continue to decrease in the foreseeable future. Anthropogenic CO_2 emissions will result in a decrease in

oceanic pH of 0.4 units by 2100 according to a model based on "business as usual" IPCC scenarios (Caldeira & Wickett 2003). This would constitute a catastrophic pH level (Zeebe et al. 2008). Disastrous impacts to marine ecosystems can only be avoided with rapid reductions in CO_2 emissions. *Id.*

Despite the strong scientific consensus and direct connection between CO_2 emissions and oceanic pH, the DEIS treats ocean acidification as an indirect, cumulative impact. This is unacceptable. The ecological impacts of the proposed CAFE standards on ocean acidification must be fully analyzed. Ocean acidification is even more predictable than changes in temperature or sea level rise, for instance. Yet, the DEIS makes no effort to quantify the influence of the alternatives on ocean pH. Furthermore, the DEIS fails to consider the economic costs of the collapse of the ocean food web. This cost must be included in any cost-benefit assessment conducted by NHTSA to accurately reflect the proper balance between the costs and benefits of reducing CO_2 emissions.

G. The DEIS Fails to Analyze the Impact of Black Carbon

Although the DEIS quantifies CO_2 emissions, it utterly fails to address black carbon, an important short-lived pollutant that contributes to global and regional warming. Black carbon is produced by incomplete combustion and is the black component of soot. Although combustion produces a mixture of black carbon and organic carbon, the proportion of black carbon produced by burning fossil fuels, such as diesel, is much greater than that produced by burning biomass. The CAFE standards will affect both gas and diesel engines, and may result in a higher percentage of diesel-fueled vehicles. Thus, it is essential to consider the impact of the new standards on black carbon emissions.

Black carbon heats the atmosphere through a variety of mechanisms. First, it is highly efficient at absorbing solar radiation and in turn heating the surrounding atmosphere. Second, atmospheric black carbon absorbs reflected radiation from the surface. Third, when black carbon lands on snow and ice, it reduces the reflectivity of the white surface which causes increased atmospheric warming as well as accelerates the rate of snow and ice melt. Fourth, it evaporates low clouds. Notably, black carbon is often complexed with other aerosols such as sulfates, which greatly increases its heating potential. (Ramanathan & Carmichael 2008; Jacobson 2001).

Due to black carbon's short atmospheric life span and high global warming potential, decreasing black carbon emissions offers an opportunity to mitigate the effects of global warming trends in the short term (Ramanathan & Carmichael 2008). Black carbon is considered a 'short-lived pollutant' (SLP) because it remains in the atmosphere for only about a week in contrast to carbon dioxide, which remains in the atmosphere for over 100 years. Furthermore, the global warming potential of black carbon is approximately 760 times greater than that of carbon dioxide over 100 years (Reddy & Boucher 2007) and approximately 2200 times greater over 20 years (Bond & Sun 2005). It is estimated that black carbon is the second greatest contributor to global warming behind carbon dioxide (Ramanathan & Carmichael 2008).

Unlike traditional greenhouse gases, which become relatively uniformly distributed and mixed throughout the Earth's atmosphere, black carbon exerts a regional influence. The impacts of black carbon on a regional level include both atmospheric heating, as discussed above, and hydrological

changes. Hydrological changes occur due to alterations in cloud formation and heat gradients. *Id.* For instance, aerosol pollution has been linked to decreases in the summer monsoon season in tropical areas as well as the drought in the Sahel region of Africa. *Id.* Black carbon also impacts the drought-fire cycle. The more drought conditions prevail, the more forest fires burn, and the forest fires in turn emit massive quantities of black and organic carbon. The release of these aerosols intensifies the drought effect.

Another impact of black carbon is accelerated snowmelt; for instance, black carbon is likely contributing to the retreat of Himalayan glaciers and the resulting water shortage in areas of Asia. *Id.* When black carbon settles on snow, it makes the snow darker so that it absorbs more solar radiation. This directly leads to snow melt. In addition, local atmospheric heating due to black carbon increases the melting rate. These same effects may well be operating on mountain ranges in the U.S. such as the Sierra Nevada, which would reduce water availability throughout California, a highly populated region, at crucial times of the year.

Black carbon is also detrimental to human health. It has been linked to a variety of circulatory diseases. One study found an increased mortality rate was correlated with exposure to black carbon (Maynard 2007). The same is true for heart attacks (Tonne 2007). Another study found that residential black carbon exposure was associated with increased rates of infant mortality due to pneumonia, increased chronic bronchitis, and increased blood pressure (Schwartz 2007).

In developed countries, diesel burning is the main source of black carbon. Diesel emissions include a number of compounds such as sulfur oxides, nitrogen oxides, hydrocarbons, carbon monoxide, and particulate matter. Diesel particulate matter is approximately 75% elemental carbon. (EPA Diesel Health Assessment 2002). Furthermore, global inventories of emissions rates from a variety of sources exist to facilitate quantitative estimates. (See, e.g., Bond et al. 2004). Thus, it is crucial that black carbon be addressed in the DEIS.

1. Analyzing Particulate Matter is Insufficient to Address Black Carbon

Particulate matter (PM) refers to the particles that make up atmospheric aerosols. The primary constituents of PM are sulfates, nitrates, and carbon compounds. Sulfates and nitrates form in the atmosphere from the chemical reaction of sulfur and nitrogen dioxides. These may often be present as ammonium sulfate or nitrate salts. Carbon compounds may be directly emitted, e.g. black carbon emitted from combustion, or may form in the atmosphere from other organic vapors, e.g. oxidation of volatile organic compounds.

Because PM can be reduced through mitigation of other constituents of PM than black carbon, it is essential that black carbon emission reduction strategies be considered independently from PM reductions. The proportions of the constituents of PM vary over time and by location (see EPA Particle Pollution Report 2004). According to a recent series of surveys conducted at various U.S. cities under the EPA's "Supersite" program, black carbon was often only about 10% of total measured $PM_{2.5}$.[14]

[14] For an overview of the program and initial results see http://www.epa.gov/ttn/amtic/supersites.html

In contrast to total $PM_{2.5}$, diesel PM is composed largely of black carbon. Nonetheless, some diesel PM reduction strategies do not affect black carbon. For instance, diesel oxidation catalysts can reduce diesel PM emissions as a whole by approximately 20 to 40%, yet they do not decrease black carbon emissions (Walker 2004). In addition, while low-sulfur fuel will reduce sulfate emissions, in and of itself low-sulfur fuel will not reduce black carbon. Low-sulfur fuel is important because it *allows* for better technology to reduce black carbon. *See, e.g.* 69 Fed. Reg. 38957, 38995 (June 29, 2004). Yet those reductions can only occur once the technology has been implemented.

In summary, the climate and health impacts of black carbon are undeniable. The main source of black carbon in the U.S. is diesel. The CAFE standards may impact the diesel use if other regulatory mechanisms are not utilized. Thus, the cost-benefit analysis is incomplete because it does not include a monetization of the impacts of black carbon.

VI. The DEIS's cumulative impacts analysis is fundamentally flawed

A cumulative impact is defined under NEPA as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." 40 C.F.R. § 1508.7.

Global warming is the quintessential cumulative impact – the environmental problem caused by all contributing sources of greenhouse gas emissions together is far greater than that caused by any individual source. The purpose of the cumulative impacts section is to discuss the impact of the NHTSA's rulemaking on the problem overall when considered along with other actions. The NHTSA must place its action in the proper context in order to provide the reader with meaningful information about the impact of its action. For example, the DEIS should answer the question, "to what degree does the NHTSA rulemaking contribute to or hinder the achievement of the greenhouse gas emissions reductions necessary to avoid catastrophic climate change?" The DEIS fails utterly to do so.

The DEIS considered only a single factor in the cumulative impacts section beyond the rulemaking itself – the impact of fuel economy standards for model years 2016-2020. As discussed above, the impact of future fuel economy standards should have been incorporated into the analysis of direct and indirect impacts, as the level chosen by the NHTSA for one year will impact the level achievable in future years. Regardless, however, limiting the cumulative impacts analysis to only considering fuel economy standards for model years 2016-2020 is clearly inadequate on its face to comply with NEPA's requirements.

The DEIS must include a reasonable analysis of the combined impact of the NHTSA's rulemaking on U.S. transportation sector emissions overall, and U.S. emissions overall. For example, is the impact of the current rulemaking sufficient to ensure that the necessary emissions reductions from the U.S. transportation sector overall will be achievable? If the transportation sector does not achieve its "fair share" of necessary emissions reductions, after all, those reductions will have to come from a different sector. While the NHTSA will likely argue that it is difficult to conduct a cumulative impacts analysis for a problem such as greenhouse gas emissions, it is eminently feasible to do so. While the

NHTSA has some discretion in choosing the precise methodology of such an analysis, the agency was clearly not free to omit any such analysis altogether.

Recent scientific evidence indicates that to avoid tipping points and climate catastrophe, it will be necessary to reduce CO_2 emissions to 350 ppm (Hansen et al. 2008). This study uses the most comprehensive analysis to date of both slow and fast feedbacks on climate and reaches the conclusion that global CO_2 concentrations must be capped and reduced to 350 ppm to avoid dangerous and irreversible climate change. Much of the data is based on paleoclimate records, as opposed to computer modeling. The benefit of paleoclimate data is that the changes reflected in proxy measures actually occurred, as opposed to being predictions. The study provides evidence of large changes in sea level on decade time scales as well as past rates of sea level rise in excess of 1 m/century. Thus, a 350 ppm scenario should be included as context for analysis of cumulative impacts. This analysis is entirely possible because MAGICC, the software used to model the climate change impacts of each alternative, already includes various alternative scenarios in which future emissions are controlled so that atmospheric CO_2 concentrations do not exceed values ranging from 350 to 750 ppm.

Moreover, as discussed above, the DEIS is inadequate because it failed to take into account the real world iterative nature of fuel economy improvements, that is, the fact that fuel economy increases today contribute to the capacity for higher levels tomorrow. This DEIS's failure to analyze this crucial issue infected the cumulative impacts analysis as well.

VII. NHTSA must complete an Endangered Species Act Section 7 Consultation to ensure that its action will not jeopardize or adversely modify the critical habitat of any species listed as "threatened" or "endangered"

Congress enacted the Endangered Species Act ("ESA") to conserve endangered and threatened species and the ecosystems upon which they depend. 16 U.S.C. § 1531(b). The Supreme Court's review of the ESA's "language, history, and structure" convinced the Court "beyond a doubt" that "Congress intended endangered species to be afforded the highest of priorities." *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 174 (1978). As the Court found, "the plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, whatever the cost." *Id*. at 184.

Species are added to the lists of endangered and threatened species by the U.S. Fish and Wildlife Service (with jurisdiction over most terrestrial and freshwater species) and the National Marine Fisheries Service (with jurisdiction over most marine species) (collectively, the "Services"). A species is "endangered" if it "is in danger of extinction throughout all or a significant portion of its range." 16 U.S.C. § 1532(6). A species is "threatened" if it "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532(20).

Once a species is listed under the ESA, Section 7 requires all federal agencies to "insure" that their actions neither "jeopardize the continued existence" of any listed species nor "result in the destruction or adverse modification" of its "critical habitat." *Id.* at § 1536(a)(2). In addition, the "take" of listed species is generally prohibited. *Id.* at § 1538(a); 50 C.F.R. § 17.31(a). "Take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such

conduct." 16 U.S.C. § 1532(19). The Services may, however, permit "incidental" take on a case-by-case basis if it finds, among other things, that such take will be minimized and mitigated and that such take will not "appreciably reduce the likelihood of survival and recovery of the species." *Id.* at § 1539(a).

Section 7 consultation is required for "any action [that] may affect listed species or critical habitat." 50 C.F.R. § 402.14. Agency "action" is defined in the ESA's implementing regulations to include "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. Examples include, but are not limited to: (a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air." 50 C.F.R. § 402.02 (emphasis added).

This regulatory definition of "action" clearly encompasses NHTSA's rulemaking, since the emissions from the regulated automobiles unquestionably will cause "modification to the land, water, or air." The U.S. Fish and Wildlife Service's and National Marine Fisheries Service's Consultation Handbook, Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act (March 1998) explains the above terms and definitions. There can also be no question that the enormous volume of direct, indirect, and cumulative emissions from the regulated vehicles "may affect" listed species, and therefore the NHTSA must consult.

The NHTSA's rulemaking will impact species listed as threatened and endangered in several ways, yet the NHTSA has failed to initiate the required Section 7 consultations with the Services on its impact. The NHSTA must initiate and complete the required Section 7 consultations on the rulemaking, or it may be held liable for take of listed species from the impacts of its action, including increased greenhouse gas emissions and other emissions such as NOx.

On May 15, 2008, the U.S. Fish and Wildlife Service listed the polar bear as a threatened species throughout is range due to global warming. Endangered and Threatened Wildlife and Plants, Determination of Threatened Status for the Polar Bear (Ursus maritimus) Throughout its Range, 73 Fed. Reg. 28212-28303 (May 15, 2008). The NHTSA must consult on the impact of its rulemaking, and its proposal to set fuel economy standards far below what is technologically achievable, on the polar bear.[15]

[15] At the same time that the Secretary published the Final Listing Rule he also issued separate regulations, pursuant to Section 4(d) of the ESA, 16 U.S.C. § 1533(d), which authorize the widespread incidental take of polar bears and purport to exempt greenhouse gas pollutants from Section 7's consultation requirements. Endangered and Threatened Wildlife and Plants, Special Rule for the Polar Bear, 73 Fed. Reg. 28306-28318 (May 15, 2008) ("4(d) Rule"). In a section of the 4(d) Rule entitled "Consultation under Section 7 of the ESA," the Secretary alleges that "the best scientific data currently available does not draw a causal connection between GHG emissions resulting from a specific Federal action and effects on listed species or critical habitat by climate change, nor are there sufficient data to establish the required causal connection to the level of reasonable certainty between an action's resulting emissions and effect on species or critical habitat." 73 Fed. Reg. 28306, 28313. NHTSA must not rely on this rule as an excuse to forgo consultation because it is contrary to the best available science and the legal standards for Section 7 consultation. Moreover, exempting greenhouse gas emitting actions from Section 7 cannot be legally accomplished through section 4(d) of ESA. The Center and co-plaintiffs are currently challenging the 4(d) rule in court. See, e.g. Second Amended Complaint in *Center for Biological Diversity v. Kempthorne*, Civ. No. 08-1339 (CW) (N. Dist. Cal.).

On May 9, 2006, the National Marine Fisheries Service listed the staghorn and elkhorn corals as threatened due in part to increasing ocean temperature and ocean acidification due to anthropogenic greenhouse emissions. 71 Fed. Reg. 26852. The NHTSA must consult on the impact of its rulemaking on these coral species. The NHTSA must also consult on the impact of its rulemaking on the polar bear's and the corals' critical habitat, once such habitat is designated.

Global warming was cited by the U.S. Fish and Wildlife Service in its critical habitat rulemakings for the Quino Checkerspot and Bay Checkerspot butterflies. See 73 Fed. Reg. 3328-3373 and 72 Fed. Reg. 48178-48218. The NHTSA must consult on the impact of its rulemaking on these species and their critical habitat.

The NHTSA must not limit its consultation, however, to species like the polar bear, corals, and checkerspot butterflies for which anthropogenic greenhouse emissions were cited as a reason for listing or as an impact in the listing or critical habitat rules. The Center has identified 143 listed species for which a recovery plan has been adopted that specifically identifies climate change or a projected impact of climate change as a direct or indirect threat to the species, as a critical impact to be mitigated, as a critical issue to be monitored, and/or as a component of the recovery criteria. See Exhibit A. This is clear evidence that the NHTSA's rulemaking "may affect" these species. The NHTSA must consult on the impact of its action all listed species which may be affected.

While we are cognizant that federal agencies, for the most part, have not to date been complying with their obligation to consult on the impact of their greenhouse gas emissions on listed species, and therefore there may be some capacity building required for this consultation, this can in no way be used an excuse for continued non-compliance with the law. The direct, indirect, and cumulative impacts of setting fuel economy standards for all cars and light trucks nationally are extraordinarily significant, and therefore a large number of species may be implicated. Where, as here, the NHTSA's rulemaking is national in scope, the NHTSA should conduct a nationally focused consultation. Again, the NHTSA must not attempt to use the large scale of its action as an excuse for ignoring its environmental review duties, since the highly significant nature of the action only makes it more important to thoroughly review its impacts under all applicable laws. Nor can the mere fact that a large geographical area or large number of species be used an excuse for inaction. See, e.g., *Wash. Toxics Coalition v. EPA*, 413 F.3d 1024 (9th Cir. Wash. 2005) (upholding order requiring the EPA to consult on the impact of 54 pesticide ingredients on 25 species of fish.). If anything, a nationally focused consultation will provide the opportunity to most efficiently analyze the impact of the rulemaking on species and groups of species.

The rulemaking will impact listed species in ways beyond global warming and ocean acidification. For example, vehicles are a primary source of excess nitrogen in the environment. Excess nitrogen contributes to major environmental problems including reduced water quality, eutrophication of estuaries, nitrate-induced toxic effects on freshwater biota, changes in plant community composition, disruptions in nutrient cycling, and increased emissions from soil of nitrogenous greenhouse gases (Fenn et al. 2003). Nitrogen deposition therefore impacts species listed under the Endangered Species Act in a number of ways.

Nitrogen deposition has contributed to the severe decline of the threatened bay checkerspot butterfly, endemic to the San Francisco Bay Area. (Fenn et al. 2003). The bay checkerspot butterfly is restricted to outcrops of serpentine rock which are low in nitrogen and support a diverse native grassland with more than 100 species of forbs and grasses, including the butterfly's host plants. (Fenn et al. 2003). Nitrogen deposition in the soil creates a more hospitable environment for non-native grasses which crowd out the butterfly's host primary host plant, *Plantago erecta.* (Fenn et al. 2003). Nitrogen deposition and increasing non-native grass invasion has similarly acted in concert with global warming and drought to extirpate the Quino checkerspot butterfly in much of its range in southern California. (Fenn et al. 2003).

Nitrogen deposition also contributes to type conversion of Southern California's coastal sage scrub vegetation community to non-native grasslands, threatening a host of species listed under the Endangered Species Act including the California gnatcatcher (Fenn et al. 2003). Nitrogen deposition is a problem in desert ecosystems, as well. The threatened desert tortoise is also impacted by the increased spread of non-native plants with lower nutritional value for the species (Fenn et al. 2003). Protection and recovery efforts for many threatened and endangered species may therefore not succeed without regional and national level policies to reduce air pollution (Fenn et al. 2003).

The NHTSA must complete the required consultations on the impact of its rulemaking on species listed as threatened and endangered under the Endangered Species Act. The NHTSA remedy its violations of EPCA and NEPA, discussed throughout, which mask the true impact of the rulemaking, prior to completing the consultations so that the fundamental flaws in the EPCA and NEPA analyses do not infect the ESA analysis.

VIII. The NHTSA's Inadequate Analysis of its Unlawfully Low Fuel Economy Proposal is Reflective of the Current Administration's Opposition to the Regulation of Greenhouse Gas Emissions

The countless flaws and errors in the NHTSA's analysis are gravely troubling even when viewed in isolation, but are even more so when viewed in conjunction with other ongoing regulatory processes. The Bush administration has opposed all regulation of greenhouse gas emissions, and has resorted to extraordinary and illegal actions in order to block any such regulation. A brief review of other ongoing processes reveals this administration's truly unprecedented contempt for the law, and provides insight into how and why NHTSA released such a flawed proposal and DEIS.

In 2000, George W. Bush campaigned on a pledge to regulate carbon dioxide emissions as central component of his energy policy.[16] His administration's relentless opposition to such regulation, however, began immediately after he took office. In a March 13, 2001 letter, Bush proclaimed: "I do not believe, however, that the government should impose on power plants mandatory emissions reductions for carbon dioxide, which is not a 'pollutant' under the Clean Air Act."[17] Vice President Cheney said of Bush's campaign pledge, "It was a mistake because we aren't in a position today to…cap

[16] For example, on Sept. 29, 2000, while campaigning in Saginaw, MI, Bush said: "We will require all power plants to meet clean-air standards in order to reduce emissions of carbon dioxide within a reasonable period of time." http://thinkprogress.org/2006/07/07/co2-pledge/.
[17] http://www.whitehouse.gov/news/releases/2001/03/20010314.html.

emissions." That flip-flop set the stage for eight years of stubborn opposition to common sense and legally mandated controls for greenhouse gas emissions, as well as an ever expanding constellation of scandals.

The central scandal of the climate change arena is the administration's refusal to regulate greenhouse gas emissions pursuant to Section 202 of the Clean Air Act. The EPA's rejection of a petition from the International Center for Technology Assessment and others to regulate greenhouse gas emissions from automobiles caused years of delay but led ultimately to the Supreme Court's April 2007 ruling in *Massachusetts v. EPA*. In that decision, the high court ruled that carbon dioxide is a "pollutant" and ordered the EPA to determine whether it can "reasonably be anticipated to endanger public health or welfare." An affirmative answer, known as the "endangerment finding," would require regulation under the Clean Air Act.

The administration has thus far refused to release such a finding. Following the Supreme Court's ruling, the EPA produced a draft endangerment finding that concluded, according to notes produced by Senator Barbara Boxer's staff who viewed the document, that "elevated levels of [greenhouse gas] concentrations may reasonably be anticipated to endanger public welfare." (Senate EPW Staff Report 2008). While such a finding would have led to regulation, it is a vast understatement and addresses only the public welfare prong while omitting the public health prong.

Former EPA Associate Deputy Administrator Jason Burnett told Congress that EPA staff had hoped to win White House approval of the agency's finding by omitting discussion of health impacts, which the EPA has elsewhere admitted include increased heat-related illness and death, increased heart and lung illness from increased ozone levels associated with higher temperatures, increased spread of air and water-borne pathogens, and other impacts (Burnett Letter July 6, 2008; Burnett EPW Testimony July 22, 2008).

This omission is evidence of one of the most insidious results of the crushing political interference to which this administration has subjected virtually every major regulatory process: self-censorship among government employees. Many scientists and regulators now walk a tortured path between what a statute requires and what they think the administration might approve.

Not surprisingly, the appeasement approach didn't work with regard to regulation of greenhouse gas emissions from vehicles under the CAA. When the EPA transmitted the draft endangerment finding to the White House on December 5, 2007, the administration refused to "open the attachment," ultimately leading to Burnett's resignation. With the December 5 draft unopened, the EPA instead converted the endangerment finding into a bizarre advance notice of proposed rulemaking (73 Fed. Reg. 44354. "ANPR"). Even the ANPR, which is nothing more than a stall tactic to further delay regulation, was subjected to intense political manipulation. Between a May 30, 2008 draft and publication in the Federal Register, EPA's modeling inputs were changed in order to understate the benefits and overstate the costs of regulating greenhouse pollutants. Cf. May 30, 2008 Draft ANPR draft to 73 Fed. Reg. 44354.

EPA Administrator Stephen Johnson's announcement of the ANPR could easily have been lifted straight from a George Orwell novel. Johnson's statement, "I believe … the Clean Air Act, an outdated

law originally enacted to control regional pollutants that cause direct health effects, is ill-suited for the task of regulating global greenhouse gases," perfectly encapsulates this administration's contempt for the law, science, and "reality-based" governance.

The reality is that the Clean Air Act is our most successful law for protecting the air we breathe and, consequently, our health and welfare. Since the law's enactment forty years ago, emissions of toxic lead have dropped 98 percent, emissions of sulfur dioxide, a major component of acid rain, have fallen by 35 percent, and emissions of carbon monoxide – a once-common, and deadly, pollutant in the air above most American cities – have been reduced by 32 percent even though driving has increased. Moreover, the economic value of the air quality improvements has been many times greater than the cost of the regulations.

The Clean Air Act has ready-made provisions to regulate greenhouse gas emissions not only from automobiles, but also from power plants, ships, airplanes, offroad engines, and other sources. It is a senseless tragedy that Americans have been deprived of the benefits of applying the Clean Air Act's successful regulatory strategies to greenhouse pollutants while emissions from automobiles, ships, airplanes and other sources continue unabated.

The administration's opposition to regulation was driven home with letters from agency heads placed at the beginning of the ANPR. These letters show the raw politics that pervaded the administrative process. A letter signed by Mary E. Peters, U.S. Department of Transportation Secretary and three other agency heads asserts that it is simply not "desirable" to regulate greenhouse gas emissions. 73 Fed. Reg. 44362. Moreover, the letter asserts (incorrectly) that regulation could not possibly do any good:

> Petroleum product prices have doubled in two years, equivalent to a carbon tax of $200 per metric ton, far in excess of the cost of any previously contemplated climate change measure. Operators are searching for every possible operating economy, and capital equipment manufacturers are fully aware that fuel efficiency is a critical selling point for new aircraft, vehicles, and engines. At this point, regulations could provide no more powerful incentive for commercial operators than that already provided by fuel prices.

Id.

Finally, the agency heads make the breathtaking assertion that "the United States can only effectively address GHG emissions and global climate change in coordination with other countries, and by addressing how to regulate GHG emissions while considering the effect of doing so on the Nation's energy and economic security." 73 Fed. Reg. 44365. It is astounding that after eight years of the Bush State Department relentlessly blocking even any discussion of, let alone movement towards, mandatory international limits on greenhouse pollutants through the U.N. Framework Convention on Climate Change, that the any political appointee would have the gall to assert that domestic action cannot proceed prior to international action. It is nothing short of insane for the U.S. Transportation Secretary, while asserting that the "maximum feasible" fuel economy that can be achieved in the U.S. in 2015 is less than the current standard in China, to simultaneously assert that it is lack of international progress that is holding the U.S. back.

While the administration has refused to regulate greenhouse pollutants pursuant to Section 202 of the Clean Air Act, it has also blocked California's efforts to implement its Clean Vehicle Law (AB 1493, 2002) by refusing to issue the required waiver under the Clean Air Act. Administrator Johnson announced his decision to deny the waiver on December 19, 2008. It later emerged that Johnson had overruled the explicit conclusions of his professional staff (House Oversight Committee Memo May 19, 2008). Administrator Johnson then apparently lied to Congress about the process, prompting Congressional calls for an investigation by Attorney General Michael Mukasey and calls for his resignation. (Senators Boxer et al. letter July 29, 2008; Senate EPW Call for Resignation July 29, 2008).

And while the administration continues to assert, incorrectly, that regulation of emissions from automobiles is equivalent to the regulation of fuel economy, the administration has, of course, just proposed the current set of pathetically inadequate fuel economy standards, despite the Ninth Circuits invalidation of the last set of inadequate standards in *Center for Biological Diversity* less than 9 months ago.

The administration has continued to block progress on implementing solutions to global warming at every level, and has resorted to a level of censorship and suppression of science never before seen in this country. Well publicized examples include attempts at censoring the nation's top climate scientist, Dr. James Hansen, at NASA (Revkin 2006), suppression of the scientific assessment of climate change impacts in the United States required by the Global Change Research Act of 1990 (*see Center for Biological Diversity v. Brennan*, No. C-06-7062 SBA (N.D. Cal. August 21, 2007), extensive editing of climate change assessment documents by Philip Cooney (Revkin 2005) and political interference in the Endangered Species Act listing process for the polar bear.

Political interference in government climate science has become pervasive in the past five years. As the Union of Concerned Scientists found:

> In the summer of 2006, the Union of Concerned Scientists distributed surveys to more than 1,600 climate scientists working at seven federal agencies and the independent National Center for Atmospheric Research (NCAR), asking for information about the state of climate research at federal agencies. Scientists' responses indicated a high regard for the quality and integrity of federal climate research itself, but also identified broad and substantial interference in their work.
>
> The reality of global warming, including the role of heat-trapping gases from human activities in driving climate change, has been repeatedly affirmed by scientific experts. Every day the government stifles climate science is a day we fail to protect future generations from the consequences of global warming. It is crucial that climate scientists be allowed to accurately inform government decisions. For this to occur, the federal government must pursue reforms that prohibit political interference and misrepresentation of federal climate science research, and affirm the right of scientists to communicate freely with the media and the public….

I. Political Interference with Climate Science

Large numbers of federal climate scientists reported various types of interference, both subtle and explicit:

- 73 percent of all respondents* perceived inappropriate interference with climate science research in the past five years.
- 58 percent of all respondents personally experienced interference with climate science research in the past five years. This number increased to 78 percent among scientists whose work always or frequently touches upon sensitive or controversial topics. In contrast, only 22 percent of NCAR scientists personally experienced interference with climate science research.
- Nearly half of all respondents (46 percent) perceived or personally experienced pressure to eliminate the words "climate change," "global warming," or other similar terms from a variety of communications. This number increased to nearly three in five (58 percent) among respondents from the National Oceanic and Atmospheric Administration (NOAA).
- 46 percent of all respondents perceived or personally experienced new or unusual administrative requirements that impair climate related work.

II. Scientific Findings Misrepresented

Federal climate scientists reported that their research findings have been changed by non-scientists in ways that compromise accuracy:

- Two in five respondents (43 percent) perceived or personally experienced changes or edits to documents during review processes that changed the meaning of scientific findings.
- 25 percent perceived or personally experienced situations in which scientists have actively objected to, resigned from, or removed themselves from a project because of pressure to change scientific findings.
- 37 percent of respondents perceived or personally experienced instances in which their agency misrepresented scientists' findings.

III. Barriers to Communication

Agency scientists are not free to communicate their research findings to the media or the public:

- 52 percent of respondents said their agency's public affairs officials always or frequently monitor scientists' communications with the media. In contrast, only seven percent of NCAR respondents reported that same level of monitoring.
- Two in five respondents (39 percent) have perceived or personally experienced "fear of retaliation for openly expressing concerns about climate change outside their agency."
- 38 percent of respondents perceived or personally experienced "disappearance or unusual delay of websites, reports, or other science-based materials relating to climate."

- A majority of NASA respondents (61 percent) agreed with the statement, "Recent changes to policies pertaining to scientific openness at my agency have improved the environment for climate research," in sharp contrast to the 12 percent of non-NASA respondents who agreed with the statement. The high percentage among NASA respondents is most likely the result of a recent policy implemented at the agency that affirmed that the role of public affairs officers was not "to alter, filter or adjust engineering or scientific material produced by NASA's technical staff."

IV. Climate Scientists are Disheartened

While a large majority of respondents (88 percent) agreed with the statement, "U.S. federal government climate research is of generally excellent quality," respondents reported decreasing job satisfaction and a worsening environment for climate science in federal agencies:

- Two-thirds of respondents said that today's environment for federal government climate research is worse compared to five years ago (67 percent) and 10 years ago (64 percent). Among scientists at NASA, these numbers were nearly four in five (79 percent and 77 percent, respectively).
- 45 percent of all respondents said that their personal job satisfaction has decreased over the past few years. At NASA, three in five (61 percent) reported decreased job satisfaction.
- More than a third of respondents from NASA, and more than one in five (22 percent) of all respondents, reported that morale in their office was "poor" or "extremely poor." Among NCAR respondents, only seven percent reported such low levels of morale.
- Insufficient resources are a source of concern among respondents. More than half (53 percent) disagreed with the statement, "The U.S. government has done a good job funding climate research."

Survey Demographics

Surveys were sent to 1,630 scientists at the National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, U.S. Department of Energy, U.S. Department of Defense, U.S. Geological Survey, U.S. Department of Agriculture, and the independent (non-federal) National Center for Atmospheric Research (NCAR).

Responses came from 279 federal scientists and 29 NCAR scientists. One hundred forty-four scientists provided narrative responses. The response rate (19 percent) was fairly consistent across agencies. Eighty percent of the scientists who responded had earned a Ph.D. and 40 percent had completed some post-doctoral research work. A significant number of respondents (44 percent) had been with their agency for more than 15 years, and more than half had been there for more than 10 years.

(UCS 2006[18]; see also Oversight Committee 2008).

The administration has also repeatedly touted the discredited statements of a small number of pseudo-scientists funded by industry groups in order to sow doubt in the minds of Americans about climate change by manipulating the media (UCS 2007). This campaign has been extremely successful. Oreskes (2004) looked at 928 articles in the peer reviewed scientific journals dealing with climate change, and found 0% in doubt as to the cause of global warming (See also Oreskes 2006). Boykoff and Boykoff (2004) looked at 636 articles in the "prestige media" (NYT, WaPo, LA Times, WSJ) and found 53% of articles included a statement of doubt as to the cause of global warming.

It is readily apparent that the NHTSA's fuel economy proposal and DEIS violate the EPCA and NEPA. Yet when viewed in light of the administration's opposition to any regulation of greenhouse gas emissions and pervasive use of censorship and political interference to enforce its policies, the NHTSA's legal violations are all the more disturbing.

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X. Conclusion

Setting fuel economy standards for all cars and light trucks nationally is one of the single most important actions that the government can take to reduce greenhouse emissions. The NHTSA should correct the flaws identified above in the EPCA and NEPA analyses, and promptly propose and then finalize new fuel economy levels which actually achieve the "maximum feasible" level.

Thank you for the opportunity to submit these comments. Please contact Brian Nowicki at (916) 201-6938 if you have any questions or concerns.

Yours Sincerely,

Kassie Siegel
Climate, Air, and Energy Program Director

Anna "Mickey" Moritz
Climate Program Legal Intern

Brian Nowicki
California Climate Policy Director