



COMMENT ON EPA’S PROPOSED DETERMINATION ON  
APPROPRIATENESS OF MODEL YEAR 2022-2025 LIGHT-  
DUTY VEHICLE GREENHOUSE GAS EMISSIONS  
STANDARDS UNDER THE MIDTERM EVALUATION  
EPA–420–R–16–020

*Institute for Energy Research\**

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INTRODUCTION

On November 30, the EPA released a Proposed Determination that the Model Year 2022-2025 light-duty vehicle greenhouse gas (GHG) emissions standards remain appropriate, and that no rulemaking is necessary to amend them.<sup>1</sup> This move surprised those familiar with the regulation of emissions standards, because up until this time EPA had maintained that it would not release such a determination until mid-2017. (For example, this was the timeframe suggested by the timeline on EPA’s website, until the new announcement.) The move is particularly surprising because the comment period for last summer’s Technical Assessment Report was open through September 26, 2016. In other words, for EPA to have responsibly issued the Proposed Determination on November 30, its personnel must have carefully reviewed some 220,000 comments over the course of 47 weekdays—which includes Thanksgiving.

After reviewing EPA’s Proposed Determination, we do not believe that EPA has adequately addressed some of the important objections and/or concerns raised during the previous comment period (for the Technical

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<sup>1</sup> Environmental Protection Agency, “Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation.” November 2016. Available at: <https://www.epa.gov/sites/production/files/2016-11/documents/420r16020.pdf>.

Assessment Report). In this present comment, we will summarize some of the key outstanding issues that EPA has yet to satisfactorily resolve. Absent such a discussion, EPA has not justified its proposed determination of the appropriateness of the 2022-2025 emissions standards. This Proposed Determination is contrary to the current science and research.

There were several papers and lines of research that EPA entirely ignored in its Proposed Determination. The issues include: (1) the possibility that credit-constrained consumers are forced to postpone new vehicle purchases, thus using less fuel efficient vehicles than would be the case in the absence of the rules, (2) projections of significant harms to consumers by reducing their choice over vehicle attributes (including price), and (3) a study arguing that the assumption of homogeneous consumer valuation of fuel efficiency biases traditional estimates, leading many studies to exaggerate the amount of consumer “irrationality” in vehicle purchases.

Furthermore, there were several papers and lines of research that EPA discussed, but only inadequately. The issues include: (1) historical breaks in vehicle price indices, suggesting that the new standards increased prices for consumers, (2) an argument that the specific structure of the standards perversely gives an incentive for producers and consumers to switch to vehicles with a larger physical footprint, (3) the claim that gains in fuel efficiency would be offset by reductions in other desired vehicle attributes, (4) EPA’s own admission that the academic literature on consumer “irrationality” is at best mixed, and (5) the dubious “social cost of carbon” in policymaking and the negligible impact of the proposed standards on global climate change.

For these reasons, EPA’s proposed determination is fatally flawed and needs further review.

#### ***A. PAPERS AND/OR ARGUMENTS THAT EPA IGNORES IN ITS NOVEMBER 30 PROPOSED DETERMINATION***

There were many papers and specific arguments against the proposed rules that EPA did not mention in its November 30 Proposed Determination. The following list is by no means exhaustive, but instead merely illustrates some of the important omissions.

## 1. Wagner, Nusinovich, and Plaza-Jennings on Credit-Constrained Consumers

In a 2012 study, Wagner, Nusinovich, and Plaza-Jennings<sup>2</sup> argued that the higher prices for new vehicles due to the proposed standards would price some 3.1 million to 14.9 million households out of the new car market altogether. Therefore, these households would postpone the purchase of a new car that they otherwise would have made, and thus would likely be driving a less fuel efficient vehicle *because* of the stricter standards. EPA does not cite their paper in its November 30 Proposed Determination, though it was mentioned in Heritage Foundation Backgrounder #3096 that EPA *was* aware of (see discussion in Section B of this Comment).

## 2. Various Studies Predicting Significant Harm to Consumers

Several academic studies estimated the negative impact to consumers from stricter fuel economy standards. Generally speaking, one does not help consumers by imposing particular constraints on dimensions of product quality. *Other things equal*, consumers would of course want vehicles that were more fuel efficient. However, this goal competes with other desirable attributes, such as price, vehicle safety, cargo space, etc. By forcing manufacturers to increase attractiveness on one dimension (namely, fuel economy), the stricter standards make vehicles less attractive on other dimensions. In general, there is no reason to suppose federal regulations are better at matching consumer preferences than the consumers themselves, and so we have a general presumption that the new standards will make consumers *worse off*, all things considered.

Various studies have attempted to quantify this harmful impact in a dollar figure. (Note that the specific metric is the reduction in “consumer surplus,” which measures how much more a consumer would have been willing to pay for a product above the actual price.) For example, Whitefoot, Fowlie, and Skerlos (2011)<sup>3</sup> estimate that consumers could be harmed some \$59 billion

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<sup>2</sup> David Wagner, Paulina Nusinovich, and Esteban Plaza-Jennings, “The Effect of Proposed MY 2017-2025 Corporate Average Fuel Economy (CAFE) Standards on the New Vehicle Market Population,” National Automobile Dealers Association, February 13, 2012, available at: <http://www.nadafrontpage.com/upload/wysiwyg/The%20Effect%20of%20Proposed%20MY%202017-2025%20CAFE%20Standards%20on%20New-Vehicle%20Market.pdf>.

<sup>3</sup> Kate Whitefoot, Meredith Fowlie, and Steven Skerlos, “Product Design Responses to Industrial Policy: Evaluating Fuel Economy Standards Using an Engineering Model of Endogenous Product Design,” Table 10, Energy Institute at Haas Working Paper No. 214, February 2011.

annually due to the regulations in effect for MY 2014. EPA did not apparently review this study.

### **3. Bento et al. Argument on Consumer Heterogeneity in Preferences for Fuel Economy**

A major issue in fuel economy regulation is the extent to which consumers “rationally” pay for vehicles with higher fuel efficiency. In other words: Other vehicle attributes held constant, if a vehicle is expected to require \$100 less over its lifetime in (discounted present value of) fuel expenditures, how much more are real-world consumers willing to spend on it? \$10? \$50? The full \$100? Or even *more* than \$100 because they value fuel efficiency per se, beyond its instrumental value?

Although the EPA’s treatment in the Nov. 2016 Proposed Determination admits that the literature is quite mixed (see our discussion in Section B below), they appear to have ignored an important contribution to the debate. Bento et al. in a 2012 note<sup>4</sup> argue that the traditional techniques for evaluating consumer willingness-to-pay have unrealistically assumed *homogeneous* consumers. But if we more realistically model consumers as having heterogeneous tastes, where some consumers care very much about fuel economy while others do not, then the traditional estimates may be biased and thus exaggerate the amount of consumer “irrationality” in the valuation of fuel economy.

#### ***B. PAPERS AND/OR ARGUMENTS THAT EPA ADDRESSES INADEQUATELY IN ITS NOVEMBER 30 PROPOSED DETERMINATION***

In this section we review some important papers and/or arguments that EPA *did* explicitly address in its Proposed Determination, but in which its response was inadequate.

#### **1. Furth & Kreutzer Analysis of Price Trends That Point to Significant Price Increase Due to Increased Fuel Economy Standards**

In March 2016, Salim Furth and David Kreutzer of the Heritage Foundation published a critique of CAFE standards.<sup>5</sup> Their critique contained

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<sup>4</sup> Antonio M. Bento, Shanjun Li, and Kevin Roth. “Is there an energy paradox in fuel economy? A note on the role of consumer heterogeneity and sorting bias,” *Economics Letters* 115 (2012), pp. 44-48. Available at: <https://pdfs.semanticscholar.org/b035/2d4d1fe6312c4e6aa559dca3da05323bd7c7.pdf>.

<sup>5</sup> Salim Furth and David Kreutzer, “Fuel Economy Standards Are a Costly Mistake,”

several arguments and cited scholarly research that had predicted price increases for consumers due to higher fuel economy mandates, but for our present purposes we will focus on Furth and Kreutzer's use of *historical* price data. Specifically, Furth and Kreutzer used price data from the U.S. and abroad to argue that the stricter fuel economy standards had made American vehicle prices higher than they otherwise would have been. Although correlation is not causation, their ex post analysis is certainly consistent with the ex ante predictions from the academic literature.

First we will summarize some of Furth and Kreutzer's key findings, then we will quote EPA's response (in its recent Proposed Determination). As we shall see, EPA's response is inadequate for it misunderstands the data Furth and Kreutzer presented.

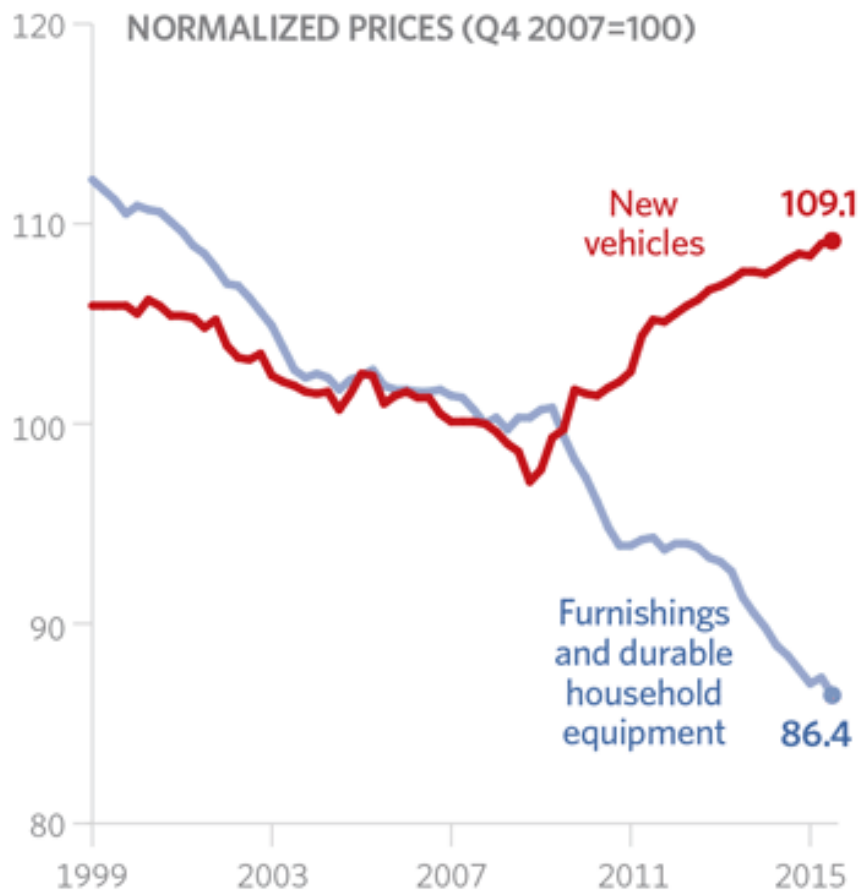
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Heritage Foundation Backgrounder #3096, March 4, 2016, available at: <http://www.heritage.org/research/reports/2016/03/fuel-economy-standards-are-a-costly-mistake>.

CHART 1

## Car Prices Rise Since 2009

Nominal prices of vehicles and household durables, adjusted for quality, declined gradually from 1999 to 2008. Starting in 2009, vehicle prices began rising while household durables prices continued to drop.



**Source:** U.S. Department of Commerce, Bureau of Economic Analysis, "National Data: Section 2 - Personal Consumption Expenditures: Table 2.4.4U. Price Indexes for Personal Consumption Expenditures by Type of Product (A) (Q) (M)," <http://www.bea.gov/iTable/iTable.cfm?ReqID=12&step=1#reqid=12&step=3&isuri=1&1203=2016> (accessed November 4, 2015).

Source: Chart 1 from Furth and Kreutzer (*Heritage Backgrounder 3906*), March 4, 2016

The “Chart 1” above is taken from Furth and Kreutzer’s original March 2016 study. Note that U.S. new vehicle prices gently declined through 2008, but then turned around and rose steadily thereafter. This is in contrast to prices of furnishings and durable household equipment, which continued their trend of descent over the whole period.

Additionally, the Furth and Kreutzer study uses international price data to show that something peculiar happened to the U.S. vehicle market to change the trend in vehicle prices pre- and post-2009. Specifically, the ratio of new vehicle prices to the overall Consumer Price Index steadily fell in the U.S. up through 2009, after which it was flat. In contrast, there was no sudden break in the pattern of this ratio in several Eurozone countries, Canada, or Australia. This suggests that something peculiar to the U.S. market was responsible, as opposed to a more fundamental shift in consumer preferences or technology.

To its credit, EPA specifically acknowledged the Heritage study’s arguments in its Proposed Determination. Unfortunately, EPA’s response is inadequate, for it simply misconstrues the nature of the price data that Furth and Kreutzer employed. Here is EPA’s reaction to their original March 2016 study:

A recent Heritage Foundation analysis by Furth and Kreutzer (2016) cites a similar set of price trends to argue that prices of new vehicles are higher by larger amounts (up to \$7100) than they would be if they had followed trends before 2009, trends in furnishings and durable household equipment, or trends in vehicle prices in the United Kingdom or in Australia. It implies that the standards created this divergence between the previous trend and current prices. This change in the price trend is unlikely to be due only, or even primarily, to the standards. **These price trends are based on the vehicles that people are buying, not on a constant vehicle model; that is, if people are switching from less expensive to more expensive vehicles, then price trends would increase, even if the prices of individual vehicles had stayed constant....**Without a good way to separate effects on prices due to the standards from other factors affecting prices, the Furth and Kreutzer (2016) assessment does not provide a sound basis for estimating the effects of the standards on vehicle prices. [EPA Proposed Determination, Nov. 2016, pages A-72 to A-73, bold added, footnote removed.]

Unfortunately, EPA’s response misunderstands the price data involved.

As Furth himself explains in a follow-up paper,<sup>6</sup> the data he and Kreutzer used were from a price *index*, which is exactly what EPA (correctly) insisted was the proper metric. Here is Furth spelling out EPA's misunderstanding:

Simply put, the EPA is wrong. The price index trends are based on constant vehicle models and consumers switching between vehicles do not drive price indices. The purpose of a price index is precisely to avoid confusing changes in purchases with changes in prices. Contrary to the EPA's assertion, if the prices of individual vehicles had stayed constant, the price indices would not have changed.

A price index gives the average of price changes of specific goods, not the average of the prices of all goods purchased.

...

Imagine a market where 100 expensive Maseratis and 100 cheap Fiats are sold in 2016. The price of Maseratis rises 10 percent and the price of Fiats stays constant, causing the market to shift to 80 Maseratis and 120 Fiats in 2017. A price index would show a price increase, due to the higher price of Maseratis, even if the average price paid decreased due to the switch to Fiats. [Furth, December 2016, endnotes removed.]

To drive home the distinction between the price *index* of U.S. vehicles and the average price *actually paid*, Furth in his December 2016 piece provided a chart of historical average car prices *paid*, over a period covering the pre- and post-2008 trends. We reproduce the chart below.

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<sup>6</sup> Salim Furth, "Regulation Continues to Increase Car Prices," Heritage Foundation Issue Brief #4639, December 2016, available at: <http://www.heritage.org/research/reports/2016/12/regulation-continues-to-increase-car-prices>.



CHART 1

### Real Average Price Paid Per Vehicle, Not Adjusted for Fleet Composition or Vehicle Quality



NOTE: Figures are in October 2016 dollars.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, Table 7.2.5S, [http://www.bea.gov/iTable/index\\_UD.cfm](http://www.bea.gov/iTable/index_UD.cfm) (accessed November 30, 2016).

IB4639 heritage.org

Source: Salim Furth, *Heritage Foundation Issue Brief #4639, December 2016*.

In contrast to the previous chart, this one shows sharp drops from the onset of the Great Recession and then the “cash for clunkers” program in the summer of 2009.

We can provide an additional consideration to lend support to Furth’s interpretation of the data, as opposed to the EPA’s. If Furth is right, then the two charts combined indicate that American consumers were *spending* roughly constant amounts (on average) for vehicles from 2002 up until the Great Recession, but that over this period they kept getting *better and better* vehicles for their money. Then, in the immediate aftermath of the financial crisis in 2008, Americans greatly restricted the amount they spent on vehicles, in part by switching to lesser-quality models. As the recovery ensued, Americans once again loosened their wallets, although now the upswings in actual prices paid were a reflection of higher fuel economy standards, rather than improvements on other dimensions.

In contrast, what would the narrative need to be, if EPA’s interpretation of Heritage’s price data were accurate? It would mean that in the period before the Great Recession, Americans year after year kept spending less and less out-of-pocket on vehicles. Then, from 2008–2015, EPA’s interpretation requires that Americans suddenly decided to spend higher and higher

amounts on vehicles, because Americans during and after the worst recession since the 1930s decided they wanted to splurge on getting fancier models.

Clearly, Furth's interpretation of the price data makes much more sense. We therefore agree with him, and conclude that EPA has ignored the significant change in the trends of *correctly calculated* vehicle prices that occurred around 2008–2009. Especially in conjunction with the international data that Furth and Kreutzer assembled in their March 2016 study, it is entirely reasonable to conclude that a large factor driving this upswing in U.S. new vehicle prices were the stricter fuel economy standards.

## 2. Whitefoot and Skerlos Argument of Perverse Incentives to Increase Vehicle Footprint

In a 2012 peer-reviewed publication,<sup>7</sup> Whitefoot and Skerlos argued that the specific structure of the stricter fuel economy standards would perversely give an incentive for manufacturers to produce vehicles with larger physical footprints. Inasmuch as larger vehicles are (other things equal) less fuel efficient, this result runs exactly counter to the ostensible purpose of the regulations. Although EPA acknowledged the Whitefoot and Skerlos argument, its response was hardly adequate.

For reference, here is the abstract of the Whitefoot and Skerlos (2012) article:

**The recently amended U.S. Corporate Average Fuel Economy (CAFE) standards determine fuel-economy targets based on the footprint (wheelbase by track width) of vehicles such that larger vehicles have lower fuel-economy targets. This paper considers whether these standards create an incentive for firms to increase vehicle size by presenting an oligopolistic-equilibrium model in which automotive firms can modify vehicle dimensions, implement fuel-saving technology features, and trade off acceleration performance and fuel economy. Wide ranges of scenarios for consumer preferences are considered. Results suggest that the footprint-based CAFE standards create an incentive to increase vehicle size except when consumer preference for vehicle size is near its lower bound and preference for acceleration is near its upper bound. In all other simulations, the sales-weighted average vehicle size increases by 2-32%, undermining gains in fuel economy by 1-4mpg (0.6-1.7km/L). Carbon-dioxide emissions from these vehicles are 5-15% higher as a result ( $4.69 \times 10^{11}$ - $5.17 \times 10^{11}$ kg for one year of produced vehicles compared to  $4.47 \times 10^{11}$ kg with no size changes), which is equivalent to adding 3-10 coal-fired power plants to the electricity grid each year. Furthermore, results suggest that the incentive is larger for light trucks than**

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<sup>7</sup> Whitefoot, Kate S., and Steven J. Skerlos (2012). "Design incentives to increase vehicle size created from the U.S. footprint-based fuel economy standards." *Energy Policy* 41: 402-411.

for passenger cars, which could increase traffic safety risks. [Whitefoot and Skerlos 2012, bold added.]

In its Proposed Determination, EPA addressed the specific Whitefoot and Skerlos finding, as well as the more general class of consumer vehicle choice models:

In addition to their effect on overall sales and production, the standards could affect the mix of vehicles sold. Consumer vehicle choice models estimate what vehicles consumers buy based on vehicle and consumer characteristics. In principle, such models could provide a means of examining the effects of the standards on both overall vehicle sales and the mix of vehicles sold. **Because the standards are based on the footprints of vehicles, shifts in the mix of vehicles sold do not necessarily affect automakers' ability to meet the standards, but they could affect total GHGs emitted.** Whitefoot and Skerlos (2012), for example, use a vehicle choice model combined with producer cost estimates to argue that the footprint-based standard provides some incentive for automakers to increase the size of vehicles in order to face a less stringent standard, and higher GHG emissions. **As discussed in Chapter 3 of the Draft TAR, the average footprint of vehicles has increased slightly since the standards have been implemented. As with sales, this effect is potentially confounded by a number of factors, such as previous trends, dropping gasoline prices and increasing consumer income that changes the mix of vehicles purchased.** In the 2017-25 LDV GHG RIA (Chapter 8.1.2), EPA provided an extensive discussion of consumer vehicle choice modeling as a way to estimate the effects of GHG/fuel economy standards on vehicle purchase decisions. In that discussion, **EPA found that, despite an extensive literature of consumer choice models, few researchers have compared estimates of key model parameters with those of others' models, and there have been few efforts to test the forecasting ability of those models.** As a start to addressing this gap in the literature, EPA had commissioned a study of the findings of these models on the role of fuel economy in consumer vehicle purchases and found highly varied results. At the time, **EPA concluded that the science of these models was not adequately developed for use in policy-making.** [EPA Proposed Determination, Nov. 2016, bold added, footnotes removed.]

As EPA's response makes clear, the *qualitative* prediction of the Whitefoot and Skerlos critique was borne out by history: "the average footprint of vehicles has increased slightly since the standards have been implemented." EPA is now merely questioning how *much* of that increase can be due to other factors, such as falling gasoline prices and rising consumer income. More generally, EPA concludes that models such as the one used by Whitefoot and Skerlos should be tested more fully before use in policy-making.

EPA's response sounds reasonable at first, but in context it is hardly sufficient. It is impossible to demonstrate the predictive power of models in

their ability to forecast the impact of a proposed rule, *before the rule is implemented*. The point of the Whitefoot and Skerlos (2012) article was that the new standards contained perverse incentives that would ironically *promote* larger vehicle footprints. It is true that the article contained quantitative estimates based on a specific model, but the broader lesson was a warning of unintended consequences. Even though the predicted effect occurred (at least qualitatively)—namely, vehicle footprint *did* increase with the implementation of the new regulations—it seems EPA is adopting the default position that the stricter standards were harmless, placing the burden of proof on the critics. To repeat, this is an unusual request, because if the critics are right then in an ideal regulatory environment they would have no experience to validate their models—the perverse regulations wouldn't have been implemented in the first place.

Before leaving this section, we should emphasize that there is solid economic logic behind the Whitefoot and Skerlos (2012) critique. For an analogy, suppose the federal government proposes to increase its tax on cigarettes by an additional \$1 per pack, in an effort to further reduce smoking. However, recognizing that heavy smokers might be unduly burdened by this steep tax hike, the new rules stipulate that if an individual buys an entire *carton* of cigarettes at a time, then the new tax works out to only 10 cents per pack. In this scenario, economists could write up a critique of the new rules, which perversely give an incentive for moderate smokers to start buying cigarettes by the carton, in order to minimize the impact of the higher tax. Even if it were true that the specific *quantitative* impact of the proposed new rules might be impossible to state with precision—after all, there are many variables affecting smoking patterns in the real world—nonetheless it would be obvious that the rules contained a perverse incentive, especially if we then observed a slight shift toward carton purchases and away from single-pack purchases.

Similar logic holds for the new fuel economy standards. By imposing a lighter mandate on vehicles with a larger footprint, the standards perversely give an incentive for manufacturers and consumers to shift into bigger vehicles, which—other things equal—have lower fuel economy. If the ostensible purpose of the standards is to reduce greenhouse gas emissions, this particular outcome is the exact opposite of what was intended.

### **3. Klier and Linn on Tradeoffs Among Vehicle Attributes**

As discussed in Section A, an obvious problem with federal fuel economy standards is that they increase product quality on one dimension which

necessarily must result in vehicles that are inferior on *other* dimensions (such as price, safety, and cargo space). After all, if there were no tradeoffs involved, then the government wouldn't need to *force* manufacturers to meet the higher fuel economy standards: the companies would already make the superior product with no downsides.

There were many studies that analyzed this phenomenon, including a 2016 article by Klier and Linn,<sup>8</sup> which argued that consumers were hurt by the stricter standards. Here is how EPA responded to the concerns raised by Klier and Linn, as well as similar studies that argued vehicle design was inferior—from the point of view of consumers—than would have been the case in the absence of stricter standards:

As discussed in detail in TSD Chapter 4.1.2, **these studies appear to have statistical flaws that reduce their usefulness in projecting future trends.** Chapter 2.3.3.2.1 of the TSD presents evidence that advanced technologies appear to have changed the relationship between acceleration and fuel economy. Fourth, EPA is not convinced that power would in fact continue to increase at the same pace over time in the absence of the standards. **In a survey conducted for DOE's National Renewable Energy Laboratory, only 9 percent of respondents wanted more power in their vehicles; 66 percent were satisfied with current levels, 17 percent said that they don't care about power, and 1 percent wanted less power.** [EPA Proposed Determination, Nov. 2016, page A-49, bold added.]

EPA's response is hardly enough to dispose of the serious objections raised by studies such as Klier and Linn (2016). It is not necessary for an academic to precisely predict future vehicle attributes before she can confidently explain that new regulations will make the vehicle different from what it otherwise would have been. Coupled with the presumption that individual consumers know their idiosyncratic tastes better than a one-size-fits-all rule, the clear implication is that consumer welfare is harmed and the only dispute is over the magnitude of the harm.

Regarding the DOE NREL survey, the matter is moot. If indeed some 84 percent of consumers don't want more vehicle power, then a decentralized market will provide them with what they want—and will also cater to the 9 percent who *do* want vehicles with more power. (We are taking for granted that the NREL survey accurately represents the desires of American consumers, even though these particular numbers strike us as dubious.) To reiterate, the objection is *not* that outside academics know consumer preferences better than policymakers. Rather, the objection is that *consumers*

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<sup>8</sup> Klier, T. and Linn, J. (2016). "The Effect of Vehicle Fuel Economy Standards on Technology Adoption." *Journal of Public Economics* 133: 41-63.

know consumer preferences better than policymakers.

#### 4. The Academic Literature Mixed on Consumer “Irrationality”

As discussed in Section A, one of the key “market failure” justifications for federal fuel economy standards has been the claim that consumers (for various reasons) do not fully value fuel efficiency when making vehicle purchases. It is absolutely critical to make such an argument, because otherwise even other “externality” interventions (such as anthropogenic climate change) would be more efficiently handled through other mechanisms, rather than top-down federal intervention into the specifics of automobile and truck design.

Given the importance of consumers “not knowing what’s best for them” when it comes to mandating stricter standards in fuel economy, it is somewhat shocking to read EPA’s discussion of the academic literature in its Nov. 2016 Proposed Determination:

If vehicle buyers are doing a good job of getting their efficient amount of fuel economy, their willingness to pay for additional fuel savings, revealed in their purchase decisions, should approximately equal expected additional future fuel savings over the lifetimes of the vehicles--that is, a payback period of the full vehicle lifetime. **A review of the literature sponsored by EPA looked at the range of estimates of the value of fuel economy in consumer purchase decisions in models of consumer vehicle purchase decisions; it found as many studies with undervaluation of fuel economy (that is, payback periods less than full vehicle lifetime) as there were studies with about-right or overvaluation (that is, payback periods equal to or exceeding vehicle lifetime).** The studies used in that review tended to emphasize modeling of vehicle purchase decisions rather than the role of fuel economy in those decisions. Some recent academic research has looked specifically at the question of the value of fuel economy. Busse et al. (2013) and Sallee et al. (2016) find that consumers appear to buy fuel economy that does approximate fuel savings over the vehicle lifetime; Allcott and Wozny (2014) find in contrast that the willingness to pay for fuel economy is about 3/4 of the expected future fuel savings. **Thus, consumers appear to take fuel economy into account when buying vehicles, but how precisely they do it is not yet clear.** [EPA, Nov. 2016 Proposed Determination, footnotes removed, bold added.]

The quotation above reveals that the EPA’s own literature review showed no prima facie reason to suppose that consumers were systematically undervaluing fuel economy when making vehicle purchases. And yet, despite this finding, EPA (obviously) is still convinced that the stricter standards are justified. Yet to reiterate, the only plausible way to justify *specific interventions into vehicle standards* (as opposed to other mechanisms) using

economic theory is to argue that consumers are not “correctly” spending their dollars in ways that elicit voluntary market provision of vehicle models that “pay for themselves” in terms of fuel efficiency. EPA’s discussion of the literature is thus devastating to its own Proposed Determination, yet EPA does not adequately explain why the 2022-2025 rules should survive.

## **5. The Dubious “Social Cost of Carbon” and Negligible Impacts on Climate Change**

As discussed in the prior subsection 4, one of the key “market failure” justifications for federal fuel economy standards has been the claim that consumers do not correctly value fuel savings. And yet, in its latest Proposed Determination, EPA has admitted that the scholarly literature is at best mixed on this crucial issue. Therefore, to justify intervention on standard economic grounds, it must be that some other “externality” comes into play. The obvious candidate is climate change due to greenhouse gas emissions.

However, there are serious problems with the use of the so-called “social cost of carbon” (SCC) in calculating the alleged harms of GHG emissions. It is not merely that the precise magnitude is indeterminate, but even the *sign* is in dispute, depending on some key parameters. Some of the most salient issues for policymaking purposes are the discount rate to be used in the analysis, whether to adopt a global vs. domestic perspective when counting damages, the sensitivity of the climate system to increased forcing, arbitrariness of the damage function used to model the harm from a given level of warming, and finally the interaction of interventions (which raise the price of carbon-intensive goods and services) with the pre-existing tax code. We at IER have raised all of these issues in our previous formal Comment on the use of the SCC for policymaking,<sup>9</sup> so we will not rehash our arguments here. We merely note that the Proposed Determination uses the SCC in various places to quantify benefits of avoided GHG emissions, despite the outstanding problems with the concept.

For example, in 2025 the proposed standards for MY 2022-2025 would yield an estimated 40.6 MMT CO<sub>2</sub>-eq. reduction in the emission of GHGs, according to Table C.53 of the Proposed Determination. Yet EPA reports that total U.S. emissions in 2014 were 6,870 MMT CO<sub>2</sub>-eq.<sup>10</sup> Thus in the year

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<sup>9</sup> Institute for Energy Research, “Comment on Technical Support Document; Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order No. 12866,” February 2014, available at: <http://instituteforenergyresearch.org/wp-content/uploads/2014/02/IER-Comment-on-SCC.pdf>.

<sup>10</sup> U.S. emission data from: <https://www.epa.gov/ghgemissions/sources-greenhouse->

2025, the proposed standards according to EPA's own projections would yield a reduction of 0.6 percent of total observed emissions (using the most recent levels as the baseline). In light of the significant harms to consumers and even perverse incentives that would arguably undercut the projected emissions reductions, it should give us pause that EPA's own modeling anticipates such paltry gains several years into the program. (EPA admittedly projects larger emissions savings decades into the new standards.)

Similarly, EPA in its Proposed Determination discusses in several places the (claimed) importance of limiting global warming to 2 degrees Celsius (if not 1.5 degrees), but the trivial impact of the stricter standards on, say, expected global temperature in the year 2100 is not highlighted. The American public would likely be very surprised to read the following discussion from a previous EPA analysis for the full 2017-2022 rule:

The results of the analysis demonstrate that relative to the reference case, projected atmospheric CO<sub>2</sub> concentrations are estimated by 2100 to be reduced by 3.29 to 3.68 part per million by volume (ppmv), **global mean temperature is estimated to be reduced by 0.0076 to 0.0184 °C**, and sea-level rise is projected to be reduced by approximately 0.074–0.166 cm, based on a range of climate sensitivities. The analysis also demonstrates that ocean pH will increase by 0.0018 pH units by 2100 relative to the reference case.<sup>11</sup> [EPA, bold added.]

To be sure, the miniscule temperature reductions—maxing out at less than two-hundredths of a degree Centigrade—by themselves don't mean a proposed intervention is unjustified. However, in light of the large potential consumer harms, and the uncertainties in the analysis, the tiny projected savings should make reasonable people question the wisdom of the proposed standards.

## CONCLUSION

EPA fails to justify its proposed determination. EPA has failed to include key research and undermine and contradicts the determination. There were several papers and lines of research that EPA entirely ignored in its Proposed

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[gas-emissions](#). Accessed December 30, 2016.

<sup>11</sup> Environmental Protection Agency & National Highway Traffic Safety Administration, *2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards*, 76 Fed. Reg. 74,854, 75,097 (Dec. 1, 2011).



Determination. The issues include: (1) the possibility that credit-constrained consumers are forced to postpone new vehicle purchases, thus using less fuel efficient vehicles than would be the case in the absence of the rules, (2) projections of significant harms to consumers by reducing their choice over vehicle attributes (including price), and (3) a study arguing that the assumption of homogeneous consumer valuation of fuel efficiency biases traditional estimates, leading many studies to exaggerate the amount of consumer “irrationality” in vehicle purchases.

Furthermore, there were several papers and lines of research that EPA discussed, but only inadequately. The issues include: (1) historical breaks in vehicle price indices, suggesting that the new standards increased prices for consumers, (2) an argument that the specific structure of the standards perversely gives an incentive for producers and consumers to switch to vehicles with a larger physical footprint, (3) the claim that gains in fuel efficiency would be offset by reductions in other desired vehicle attributes, (4) EPA’s own admission that the academic literature on consumer “irrationality” is at best mixed, and (5) the dubious “social cost of carbon” in policymaking and the negligible impact of the proposed standards on global climate change. For these reasons, the Proposed Determination is fatally flawed and should be finalized.