Memorandum

Subject:	Revisiting 2012 Analysis using Some Updated Inputs	Date:	March 30, 2020

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To: Docket Number NHTSA-2018-0067

In Section VI.B.1 of the *Federal Register* notice promulgating final Corporate Average Fuel Economy (CAFE) and CO_2 standards for passenger cars and light trucks produced during model years (MYs) 2021-2026, EPA and NHTSA respond to comments suggesting that the NPRM inadequately explained the scope of changes to the analysis relative to the 2012 final rule. This section of the notice identifies some of the more noteworthy changes to assumptions that critically influence total costs and benefits associated with both the baseline and other regulatory alternatives. This exploration relies on the version of the CAFE Model that was issued in conjunction with the 2012 final rule. Because some of the changes affecting this final rule (for example, market demand for fuel economy) could not be implemented in EPA's OMEGA model, the analysis presents results using only the 2012 version of the CAFE Model.

A. Value of Fuel Savings

The value of fuel savings in the 2012 rule was driven by two primary assumptions; the price of fuel for each gallon saved, and the willingness of buyers to increase vehicle fuel efficiency in the absence of regulation (characterized by the desired payback period). The 2012 final rule relied on fuel price projections from AEO2011. However, subsequent prices have been considerably lower than projected at the time (in many years lower than the Low Oil sensitivity case from AEO2011), and the current projection is now lower for all future years. The discussion evaluates the impact of replacing the fuel price projection in the 2012 analysis with the combination of realized fuel prices (for historical years) and the current projection from AEO2019 (in 2010 $/gallon, to match the original analysis). This alternative fuel price series was subsequently run through the 2012 version of the CAFE Model (as is the case throughout the discussion in Section IV.B.1), leaving all other assumptions identical to the analysis conducted in 2012. Using the combination of observed fuel prices since 2012 and the current AEO 2019 projection reduced the value of fuel savings in the last analysis by about $150 billion, or almost 30 percent.

The second assumption, that new vehicle buyers would not demand any additional fuel economy beyond the levels mandated for MY2016 in any future year, at any fuel price or available technology cost is even more significant. While all the studies that have examined this question in recent years (discussed in the preamble) have produced a range of estimates for the fraction of fuel savings valued by vehicle buyers,

none of those ranges contain zero percent, and several of them suggest more than full valuation (greater than 100 percent of future fuel savings) is possible. At the time of the 2012 analysis, nearly all manufacturers across all fleets had CAFE levels above their standard, and the industry as a whole exceeded the standard by almost 2 MPG.

In light of this, the assumption that the MY 2016 fuel economy levels would persist into the future at historically high fuel prices bears scrutiny. The current analysis assumes, conservatively, that new vehicle buyers will demand, and manufacturers will supply, fuel economy improvements that pay for themselves within the first 30 months of ownership (in the form of reduced fuel expenditures) even if a manufacturer is already in compliance with its standard. To evaluate the impact of this change on the 2012 analysis, the model inputs were modified[1] to allow any technology that "pays back" within 2.5 years of ownership to be applied, even after compliance has been achieved. Acknowledging that fuel economy was likely to improve in the baseline (MY 2016 standards carried forward indefinitely), when fuel prices were approximately $4/gallon in today's dollars, does not alter the number of gallons consumed under the augural standards, but reduces the difference between that consumption and the baseline in that analysis. In particular, the gallons saved by the augural standards decreases from about 180 billion gallons to about 50 billion gallons. Even under the higher fuel price projection used at the time, this change reduces the value of fuel savings from $525 billion to $140 billion, or by almost 75 percent.

Another model run combined these two changes (the current fuel price projection and non-zero demand for fuel economy), producing a value of fuel savings of $190 billion, higher than the payback period alone, but still less than half of the estimate in the 2012 final rule.

The run that incorporated this final rule's assumption about demand for fuel economy (2.5 years' of fuel savings), was also used to examine the impact on technology cost. As a consequence of additional fuel economy demanded in the 2012 rule's baseline (MY 2016 standards, continued indefinitely), the difference in technology cost attributable to the augural standards decreased. While the 2012 final rule estimated $140 billion in additional technology cost, this change reduced that amount by about half.

B.   The Social Cost of Carbon Emissions

Another change from the 2012 final rule assumptions is the use of a domestic SCC, rather than a global SCC. The domestic values used in the central analysis of the 2020 final rule were developed using similar methods to the global values used in 2012, but accounting exclusively for domestic impacts. After converting the domestic SCC values to $2010 (to match the dollar year used in the final rule), the global values were replaced in the 2012 central analysis and the model was re-run. This change reduced the benefits of carbon mitigation from $53 billion to $11 billion, attributable to the augural standards. However, this value is still based on all other assumptions being equal to their values in the 2012 analysis. As discussed at length in the preamble, the number of gallons saved under the augural standards was distorted by a fuel price projection that expected high prices in the near and long-term, and an analytical perspective that asserted there is no demand for fuel economy absent regulation. Combining the current (and historical) fuel price projections, with the non-zero payback period and the domestic SCC further reduced the benefits of carbon mitigation to $6 billion in the 2012 analysis.

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[1] The 2008-based-market-forecast file was modified by changing the payback period columns ("payback period" and "payback period (after compliance)") in the "Manufacturers" tab to equal 2.5 for all manufacturers.

C.   Safety Neutrality in the 2012 Final Rule

The 2012 final rule enforced a safety neutral solution by restricting the availability of mass reduction technology, which is statistically associated with an increase in fatalities for smaller vehicles and a decrease in fatalities for the largest vehicles, for the smallest vehicle classes and even specific models within other classes.[2] The model run supporting the current notice's discussion of this aspect of the 2012 analysis used the technology and market inputs from the 2012 central analysis, but modified them to allow mass reduction technology to be applied across all technology classes.

In order to accomplish this, the "SKIP" flags were removed from the "MR" (mass reduction) columns for all vehicles in the 2008-based-market file. Additionally, the technologies file was modified by setting "available" to "TRUE" for all levels of MR and all classes. Further, for the 2012 analysis, these technologies were coded as having 0% fuel economy improvement in the 2012 central analysis for smaller technology classes, ensuring the model would never choose them for those classes, even in any sensitivity cases that relaxed some restrictions. For the analysis discussed in the current notice, the "FC Improvement" columns for the smaller classes were populated by estimating improvement values based on effectiveness for the other technology classes.

Keeping all other inputs identical to their 2012 central values, the baseline fatalities (those resulting from the continuation of the MY 2016 standards) increase to 3,400 over the full lifetimes of MYs 2009 – 2025, and another 6,900 fatalities under the augural standards. This increase in fatalities results in a net social cost of $18 billion for the augural standards.

Inquiries regarding model inputs and outputs files from this analysis should be directed to Kevin.Green@dot.gov.

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[2] *Federal Register* / Vol. 77, No. 199 / Monday, October 15, 2012 / Rules and Regulations, at 62764, *et. seq.,* 62966, and 63047.