AUTOMOTIVE

WILL INCREASING FUEL ECONOMY STANDARDS REALLY MAKE CARS LESS SAFE? NHTSA AND THE EPA'S PROPOSAL TO FREEZE FUEL ECONOMY STANDARDS AT 2020 LEVELS

by Richard A. Wilhelm

In 2012, the EPA and NHTSA enacted new fuel economy standards for cars and light trucks for the 2016 through 2020 model years that increased year over year. They also proposed additional increases in those standards for the 2021-2026 model years. The increased standards were intended to both save energy and reduce the greenhouse gas emissions generated by fuel consumption.

The enactment of the proposed (augural) standards for 2021-2026 was conditioned on a required mid-term review by the agencies to determine if the factual basis and conclusions underlying them remained valid. That review was published in 2016 and, in the waning days of the Obama administration, the agencies determined that the augural standards would be enacted as proposed.

That decision was criticized by some groups on the merits and as rushed. The auto industry sought reconsideration of the decision by the Trump administration. The industry essentially wanted some wiggle room to be built into the standards, but did not publicly call for an outright reduction of the standards. The Trump administration agreed that reconsideration was appropriate.

On August 1, 2018, NHTSA and the EPA issued a Notice of Proposed Rulemaking for revised standards for 2021-2026.[1] The agencies proposed freezing the standards at the 2020 level with no further increases through 2026.[2] To the surprise of many, the agencies justified freezing the standards based on the argument that foregoing further increases would save lives. The emphasis on safety as the justification was amplified by the name given to the proposed standards – The Safer Affordable Fuel-Efficient (SAFE) Vehicle Rule for Model Years 2021-2026 Passenger Cars and Light Trucks.

So, why do the agencies assert that increasing fuel economy in new model year cars and trucks will result in more fatalities? They posit three arguments.

First, they assert the car manufacturers will improve fuel economy by reducing vehicle mass and light vehicles are not as safe as heavy vehicles in a crash. (newer vehicles will be less safe)

Second, they assert that the adoption of new fuel saving technologies will increase the price of new vehicles to the extent that fewer people will buy new vehicles which are safer and will continue to drive their older vehicles which are less safe. (fewer people will purchase newer vehicles which are safer[3])

Third, they assert that as fuel economy improves and the cost/mile to operate the car decreases, people will drive more increasing their likelihood of getting into an accident. (driving newer more fuel efficient vehicles will be less safe)

Ignoring the net effect of how these three assertions interact with one another, let's consider each in turn.

Newer Vehicles will be Less Safe

The agencies' first assertion is predicated on oft-cited studies that show that reducing the mass of lighter cars increases the risk of fatality while reducing the mass of heavier trucks decreases the risk of fatality *in certain accidents*. Certain accidents include accidents between passenger cars and heavier trucks. In those accidents, the occupants of the truck will fare better than the occupants of the car because the truck is the heavier of the two vehicles. If the mass of the truck is decreased and it becomes lighter relative to the car, the fatality rate of the occupants of the car declines. Similarly, if the mass of the passenger car decreases relative to the truck, the fatality rate of the occupants of the car increases. Overall, the greater the difference in mass, the greater the fatality rate in the smaller car and the smaller the fatality rate in the truck. The agencies concede that in other types of crashes, like rollovers and impacts with fixed objects, mass reduction may not be harmful and may be beneficial. Also, they agree that lighter more nimble and stable vehicles may be more likely to avoid a crash altogether.

The agencies considered the effect of mass reduction on safety when they proposed the augural standards in 2012 and again in 2016 when they conducted their mid-term review. They calculated the increase in fatalities that resulted from a 100 pound reduction in mass while holding the vehicle footprint constant.[4] Their results were as follows:

Table II-46 - Fatality Increase (%) per 100-Pound Mass Reduction While Holding Footprint Constant

Vehicle Class[3][06]	2012 Report Point Estimate	2016 Report/Draft TAR Point Estimate	2012 Report 95% Confidence Bounds	2016 Report 95% Confidence Bounds
Lighter Passenger Cars	1.56	1.49	+.39 to +2.73	-.30 to +3.27
Heavier Passenger Cars	.51	.50	-.59 to 1.60	-.59 to +1.60
CUVs and minivans	-.37	-.99	-1.55 to +.81	-2.17 to +.19
Lighter Truck-based LTVs	.52	-.10	-.45 to +1.48	-1.08 to +.88
Heavier Truck-based LTVs	-.34	-.72	-.97 to + .30	-1.45 to +.02

The results show that the risk of fatality associated with a 100 pound mass decrease in a lighter passenger car decreased slightly from 2012 to 2016 while the risk associated with a 100 pound mass decrease in a heavier truck increased. However, only the estimate for the lighter passenger car in 2012 was statistically significant at a 95% confidence level[5]. For 2016, none of the estimates are statistically significant at a 95% confidence level, although the estimate for the heavier truck is very close. Three of the results are significant at a 90% confidence level (lighter cars, CUVs and heavier trucks). Thus, the resulting estimates for 2016 have a greater level of uncertainty.

The agencies made similar calculations in 2018.

Table II-45 - Fatality Increase (%) per 100-Pound Mass Reduction While Holding Footprint Constant: MY 2004-2011, CY 2006-2012

	Point Estimate	95% Confidence Bounds
Cars < 3,197 pounds	1.20	-.35 to +2.75
Cars ≥ 3,197 pounds	0.42	-.67 to +1.50
CUVs and minivans	-0.25	-1.55 to +1.04
Truck-based LTVs < 4,947 pounds	0.31	- .51 to +1.13
Truck-based LTVs ≥ 4,947 pounds	-0.61	-1.46 to +.25

In the 2018 study, the increase in fatalities for lighter passenger cars again decreased. For heavier trucks, the estimate retreated somewhat.

For 2018, none of the results are statistically significant at a 95% or even a 90% confidence level. Two estimates are statistically significant at the 85-percent level (lighter passenger cars and heavier trucks). Estimates for heavier cars, the lighter truck-based LTVs, and CUVs and minivans are not significant, even at the 85-percent confidence level, even more uncertain still.

The increased fatality risk associated with mass reduction in lighter passenger cars has decreased from 2012 to 2018 (1.56 to 1.49 to 1.2 fatalities per 100 lb mass reduction). The decreased fatality risk associated with mass reduction in heavier trucks has fluctuated from 2012-2018 (-0.34 to -0.72 to -0.61 fatalities per 100 lb mass reduction). But, from 2012 to 2018, the estimates for both also became more uncertain. The question of whether it is appropriate to use these less certain estimates to support the proposed freezing of fuel economy standards at 2020 levels is left for someone else to answer.

Overall, the estimated increase in fatalities for lighter passenger cars was greater than the corresponding estimated decrease in fatalities for heavier trucks. Thus, on a net basis, mass reduction in both will lead to a slight increase in fatalities, all other things being equal. From this, the agencies conclude that the recommended alternative of no increase in the standards year over year, and thus no resulting mass reduction, will result in fewer fatalities. But, even this conclusion seems confounded by the results of their calculation of total occupant fatalities associated with the alternatives they considered. One of those alternative standards, a 1% increase year over year for passenger cars and a 2% increase year over year for light trucks, will result in fewer fatalities (173) than the agencies' preferred alternative of no increases year over year (160).

Fewer People will Purchase Newer Vehicles which are Safer

The agencies' second argument is premised on the uncontroversial proposition that if the price of a good increases it will become too expensive for some who will forgo purchasing the good. Under the agencies' version, putting new fuel-efficienct technologies on vehicles to meet the augural standards for 2021-2026, which they rhetorically characterize as "Unreasonable Fuel Economy Standards," will cause the price of those vehicles to rise "too far/too fast" which will "alienate consumers," who will forgo purchasing newer, safer cars. Also, the alienated consumers will keep their older, less safe, greenhouse-gas-generating vehicles instead of scrapping them. The net result it asserts is that more less safe vehicles will stay on the road increasing the risk of fatalities.

The agencies acknowledge that new cars are very expensive noting that the "average new vehicle transaction price recently exceeded $36,000 – up by more than $3000 since 2014 alone." They do not say to what that $3000 jump is attributable. Was it the cost of new fuel efficiency technologies adopted to comply with the 2016-2020 standards? Was it the cost of added vehicle content, like new infotainment systems. Was it due to a consumer preference for more expensive luxury vehicles? Or, was it due to the addition of new safety technologies such as automatic emergency braking or automated cruise control?

What is clear is that people are keeping their old cars longer. The average age of a car on the road in the US is now over 12 years. But, does this fact justify forgoing further increases in fuel efficiency standards? Not necessarily. It seems reasonable that people are keeping their cars longer because new vehicles are expensive period. They don't want or can't afford an expense of that magnitude regardless of the factors that make the prices so high. It seems a stretch to assert that they are keeping their old cars longer because of the added cost of some new safety feature or a feature that improves gas mileage. Also, if factors other than the addition of fuel-efficient technology are the principle driver of a new vehicle's price, should the agencies analysis singularly focus attention on the cost of new fuel-efficient technology? If the principle driver of the price is instead additional vehicle content, is it reasonable to lay the fault on the cost of fuel-efficient technology and use that fact to argue that fuel economy standards should be frozen at 2020 levels? The agencies' argument in this regard is subject to question.

Driving Newer More Fuel Efficient Vehicles will be Less Safe

NHTSA and the EPA's final argument is premised on the so-called "rebound effect" – if the cost of doing something, like driving, decreases, people will do it more. The more people drive the greater their exposure to accidents. Again, the concept of the rebound effect is not controversial. The issue that may be more controversial is the magnitude of that effect. Prior to 2018, the agencies took the position that increases in fuel economy will result in a 10% increase in vehicle miles travelled. They concluded that the augural standards will not decrease safety. In 2018, the agencies have changed their view and now consider the appropriate number to be 20% and reach the opposite conclusion. Both estimates are largely based on the same existing body of research. Despite this, they now claim their prior, lower figure is inconsistent with nearly all research on the magnitude of the rebound effect.

> [R]esearch on the rebound effect conducted since the agencies' original 2008 review of evidence almost universally reports estimates in the 10-40% (and larger) range, as Table-II-43 shows. Thus, the 20% rebound effect used in this analysis more accurately represents the findings from both the studies considered in 2008 review and the more recent analyses.

An independent report published by the Analysis Group on June 28, 2018 disagrees with NHTSA's new position.[6] The report notes that "many studies use methods and data that render them more relevant for use in setting national standards in the U.S."

> "[S]tudies that are more generalizable and relevant for this purpose are those that focus on data reflecting broad parts of the U.S., rather than analyses of travel patterns in other countries…..studies that rely on multi-year (time-series) data are more relevant than single year data based on surveys of households' travel."

The report goes on,

> Studies that analyze more robust time-series data "tend to show that the rebound effect has been decreasing over time as the baseline fuel economy has improved." They also suggest that the rebound effect tends to decrease as income increases. [parenthetical omitted] And they indicate that consumers' VMT is less sensitive to changes in fuel economy than to changes in fuel prices."

Overall, the report concludes,

> "The body of relevant literature on rebound effects … points to a lower rebound effect (such as 10 percent or lower). This supports the conclusion previously reached by EPA, NHTSA and CARB when they agreed upon standards that assumed a 10% rebound-effect in instances where the new standards would lead to a lower cost of driving."

In addition, the report criticized an industry-sponsored report challenging the agencies' estimation of a 10% rebound effect in 2016. That report assigned equal weight to the results of a number of rebound-effect studies and averaged them to argue that a 20% figure was more appropriate. The authors stated: "[I]t does not make sense to place the same weight on all the studies …. ignoring significant differences among them in terms of method and relevance. The problem with that approach is that it is a blunt and inappropriate methodology."

The agencies' decision-making in selecting the 20% value as being more representative of the results of published estimates in the 10-40% (and larger) range appears to be even less rigorous than a simple averaging. The debate about which estimate is correct will continue.

Conclusion

The general concepts underlying the above referenced arguments that NHTSA and the EPA make in support of their proposal to freeze fuel economy standards at 2020 levels are recognized concepts. However, that fact does not necessarily justify or support the agencies' ultimate conclusions about the safety effects of increasing fuel economy standards made using those concepts. The discussion in this article is intended to show that there are legitimate questions that should be asked and considered about those conclusions as the rulemaking process proceeds.

[1] The NPRM was not published in the Federal Register until August 24, 2018.
[2] NHTSA also considered other alternate revised standards in the NPRM. All were less stringent that the augural standards.
[3] Which seems to be a concession that newer vehicles will still be safer, perhaps just not as safe as they could be.
[4] NHTSA has determined that the vehicle's footprint, as determined by the width of the axles and the distance between the front and rear axle, was a more important factor in protecting occupants in a crash than vehicle mass. So long as you preserve the crush space around the occupants, changes in mass will have a less significant effect. Because of this, the FE standards established for 2016 and later model years were based on the vehicle's footprint. This was done specifically to encourage manufacturers not to decrease vehicle footprints to reduce weight.
[5] There is a 1 in 20 chance that the result is due to chance.
[6] Tierney and Hibbard, Vehicle Fuel-Economy and Air Pollution Standards: A Literature Review of the Rebound Effect. (June 28, 2018)

FOR MORE INFORMATION CONTACT:

Richard A. Wilhelm is Of Counsel in Dickinson Wright's Detroit office. He can be reached at 313.223.3550 or rwilhelm@dickinsonwright.com. Mr. Wilhelm is a member of the Firm's Autonomous and Connected Vehicle Practice Area.