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Environmental Protection Agency
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Consumers Union's Comments on EPA's Request for Comment on Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles; Request for Comment on Model Year 2021 Greenhouse Gas Emissions Standards
(Docket No. EPA-HQ-OAR-2015-0827)
Submitted via: www.regulations.gov

Introduction

Consumers Union ("CU"), the policy and mobilization division of Consumer Reports,[1] submits the following comments to the Environmental Protection Agency ("EPA") in the above-referenced matter. CU represents the interests of consumers and has provided comments on related public dockets for over a decade, including the setting of the 2017-2025 greenhouse gas and fuel economy standards in 2012, the Draft Technical Assessment Report ("Draft TAR") in 2016, and the final determination in 2017.[2] During the course of these rulemaking procedures and over the course of 2017, CU has collected 55,852 signatures in support of strong fuel economy standards.[3]

Both our subscriber and nationally representative surveys demonstrate overwhelming public support for continuing to strengthen fuel economy standards,[4] and our recent analyses indicate that doing so will improve consumer welfare through greater owner satisfaction,[5] and is unlikely to impact the entry-level price of new vehicles or affordability of used vehicles[6] (which constitutes 70 percent of light-duty vehicle purchases).[7]

Gradual improvements to fuel economy and emission standards, like those in place today, are part of a practical and tested program to reduce fuel consumption, improve the vehicle fleet, protect public health, and save consumers trillions of dollars in fuel

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[1] Consumers Union works for pro-consumer energy policies, health reform, food and product safety, financial reform, and other consumer issues in Washington, D.C., the states, and in the marketplace. Consumer Reports is the world's largest independent product-testing organization. Using its more than 50 labs, auto test center, and survey research center, the nonprofit rates thousands of products and services annually. Founded in 1936, Consumer Reports has over 8 million subscribers to its magazine, website, and other publications.

[2] EPA-420-R-17-001 January 2017 and EPA- HQ-OAR-2010-0799 2012 Comments, Sept. 21, 2016, https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-3511, Sept. 26, 2016 - https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-3997; Dec. 23, 2016, https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-6028; Comments, February 10, 2012, https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0799-9454.

[3] EPA-HQ-OAR-2015-0827-6028 December 2016, https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-6028 and additional signatures collected in February and October 2017 that are combined and included in the appendix.

[4] "Nearly 9 in 10 Americans want automakers to raise fuel efficiency, according to latest Consumers Union survey," Consumers Union. June 29, 2017, http://consumersunion.org/news/2017-fuel-economy-survey/.

[5] Investigation of Relationship between Fuel Economy and Owner Satisfaction, Consumers Union, June 2016, http://consumersunion.org/wp-content/uploads/2016/06/CU-MPG-Satisfaction-report-final.pdf.

[6] "More Mileage for Your Money: Fuel Economy Increases While Vehicle Prices Remain Stable." Consumers Union, March 15, 2017, http://consumersunion.org/wp-content/uploads/2017/03/Synapse-CU-Affordability-Report-3-15-corrected-1.pdf.

[7] *Id.*

costs.[8] Automakers have developed the technology to make better, safer, and more efficient vehicles, and federal agencies should continue to set standards at a higher level to continue this progress in increasing consumer savings and protection.

In addition to the environmental and health benefits, consumers are likely to see significant net savings from strong standards, especially light-duty truck buyers.[9] The comments below address the factors the EPA must consider in determining whether the MY 2022-2025 standards remain appropriate. They also address the new factors EPA has proposed considering in response to requests from automakers and whether they are already covered by existing factors or are inappropriate under the Clean Air Act.

1. EPA's Final Determination that the Standards for MY 2022-2025 Are Appropriate Should Stand

The final rule for greenhouse gas standards for MY 2017 and beyond was issued in 2012. The rule specified, and stakeholders agreed to, a mid-term review in 2018 for MY 2022-2025. In 2016, EPA issued a Draft TAR incorporating extensive research, data, and analyses that indicated that the program was on track to deliver substantial net benefits. In early 2017, the EPA issued a final determination confirming that the standards for MY 2022-2025 remained appropriate. EPA has since re-opened the docket to reconsider its final determination, an unnecessary step due to the fact that its own robust research showed the standards were appropriate and as described in sections below, external research and data show the standards are more feasible and affordable than anticipated in 2012.

a. The Extensive Record Supports a Final Determination that the MY 2022-2025 Standards are Appropriate

In the five years since the MY 2017 and beyond standards were finalized, data show that technology that can be used to meet the standards is now widespread and at lower cost than anticipated when the final rule was issued in 2012. Indeed, the feasibility and practicality of the standards is greater than anticipated and the consumer benefits of the standards still far exceed the costs.

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[8] Fuel economy improvements to cars and light trucks since 1975 have saved U.S. drivers more than a trillion gallons of gasoline (1.5 trillion) and about $4 trillion in fuel costs, *See e.g.* Greene and Welch, "A Trillion Gallons of Gasoline," 2017, http://bakercenter.utk.edu/wp-content/uploads/2017/08/OnPoint-5-2017.pdf.

[9] "Efficiency technology and cost assessment for U.S. 2025–2030 light-duty vehicles," International Council on Clean Transportation, March 22, 2017, http://theicct.org/sites/default/files/publications/US-LDV-tech-potential_ICCT_white-paper_22032017.pdf.

In their joint draft technical assessment report issued in 2016, EPA and NHTSA found, "A wider range of technologies exist for manufacturers to use to meet the MY2022-2025 standards, and at costs that are similar or lower, than those projected in the 2012 rule."[10] The Draft TAR drew from a multitude of robust research studies, including the National Academy of Sciences 2015 report on the state of technology and identified dozens of technologies, such as continuous variable transmissions, high compression engines, and 48 volt batteries, that are now cheaper than early estimates suggested. In evaluating the literature, the Department of Energy came to a similar conclusion, noting that, "...most of assessed technologies have better competitiveness than expected in terms of effectiveness and/or costs...".[11]

In addition to the increased availability of technology and lower costs noted in the Draft TAR, there have been even more positive developments on the technology front in the past year since the Draft TAR was issued. The technology needed to meet the standards for MY 2022-2025 is already available, and the standards can largely be met with improvements to vehicle design and the internal combustion engine powertrain. There are many pathways to compliance, even without accounting for advances in technology and manufacturing over the last five years.[12] According to EPA's Light-Duty Fuel Economy Trends Report from 2016, 17% of the MY 2016 fleet already meets MY 2020 targets, and 3.5% of the MY 2016 fleet (on a fleet-wide average basis) already meets or exceeds MY 2025 targets, as set in 2012.[13] And according to Union of Concerned Scientists' (UCS) analysis, there were at least two truck models (Ford F-150 and Ram 1500) in 2015 that could already meet the augural standards out to 2023.[14] Those models have further improved their fuel economy since the UCS analysis, with Ford announcing that its 2018 F-150 would improve both fuel economy and towing capacity.[15] In the 2016 EPA Trends Report, light trucks had demonstrated the greatest

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[10] Draft Technical Assessment Report (TAR), https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OXEO.PDF?Dockey=P100OXEO.PDF, at p. ES-2.

[11] Xie, Lin, and Nealer, Performance, Cost and Market Share of Conventional Vehicle Efficiency Technologies? A Retrospective Comparison of Regulatory Document Projections for the CAFE/GHG Standards, Transportation Research Board Annual Meeting Transportation Research Record, forthcoming. Available at: http://teem.ornl.gov/documents/publications/CAFE_then_now_regulatory_tech_review%2020170301_final_cleared.pdf.

[12] Draft TAR: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OXEO.PDF?Dockey=P100OXEO.PDF, at p. ES-2.

[13] "Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2016" EPA, November 2016, https://www.epa.gov/sites/production/files/2016-11/documents/420r16010.pdf, at p. 118.

[14] "Tomorrow's Clean Vehicles, Today." Union of Concerned Scientists. May 2015, http://www.ucsusa.org/sites/default/files/attach/2015/05/tomorrows-vehicles-today.pdf.

[15] Ford Motor Company. "New Ford F-150: Most Advanced F-150 Powertrain Lineup Ever Enables Best-In-Class Payload, Towing And Gas Mileage," News release, August 9, 2017.

annual improvement,[16] and while the EPA Trends Report for 2016-17 is not yet complete, many trucks are likely to have seen further improvement.

The technical record also demonstrates net consumer benefits that support the final determination finding the standards were appropriate. Using reasonable (but likely high) cost estimates and relatively low gas prices, the Draft TAR estimated net fuel savings of $24-$53B, even after the program costs were included.[17] The technical analysis conducted by EPA and NHTSA holds constant acceleration when calculating the costs of adding fuel efficient technology.[18] Therefore, all costs for greater fuel economy explicitly do not require trade-offs in performance, and the inclusion of trade-offs for performance would be inaccurate and improper in calculating the costs and benefits from the standards.

As further described below, these studies and the vast public record including EPA and NHTSA's past technical assessments, demonstrate that the standards for MY 2022-2025 remain appropriate.

b. Recent Data Related to EPA's Required Factors Affirms the Final Determination or Supports Stronger Standards

As shown below, recent data confirm that the current standards for MY 2022-2025 are affordable and feasible, save consumers money and have a neutral or positive impact on safety.

1) Factor: "The cost to producers and purchasers of new motor vehicles"

The net cost to purchasers of new motor vehicles under the current standards for MY 2022-2025 is negative because the standards result in average net savings for new car buyers, and immediate savings for many who finance their vehicle purchase. It would be inappropriate and inconsistent with the Clean Air Act to examine upfront investments in fuel economy technology without also examining the resulting benefits.

Independent analyses further support the existing record that meeting or exceeding targets for MY 2022-2025 set for the U.S. fleet in 2012 is technologically feasible with

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https://media.ford.com/content/fordmedia/fna/us/en/news/2017/08/09/new-ford-f150-most-advanced-powertrain-lineup-ever.html.

[16] https://www.epa.gov/sites/production/files/2016-11/documents/420r16010.pdf, at p. 123, table 9.2.

[17] Draft TAR, https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OXEO.PDF?Dockey=P100OXEO.PDF, at ES-12.

[18] Draft TAR, https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OXEO.PDF?Dockey=P100OXEO.PDF, at 5-224 to 5-225.

net savings.[19] A recent Union of Concerned Scientists report found that "the 2017–2025 federal fuel efficiency standards are on track to save the average new car buyer about $6,000 over the life of a new 2025 vehicle, even after paying for the cost of technology to improve fuel efficiency."[20] A 2017 ICCT study in particular estimates that the technology costs from EPA's former analysis are overstated by 37 percent, which indicates that net savings from the standards would be greater than predicted and that even higher standards would also yield net benefits.

The costs of the program are reasonable, and investing in fuel economy technology often pays for itself with a return on investment. Consumers Union commissioned a study from Synapse Energy Economics to identify the net costs and benefits car buyers are likely to experience once the 2025 standards are in place.[21] This study shows that increased fuel economy to meet the MY 2025 standards will lead to substantial net savings for both car and truck owners. Under mid-range assumptions from the 2016 Draft TAR, the report estimates that the new standard will save $3,200 per car and $4,800 per truck.[22] If a buyer pays cash for the new vehicle, payback for added efficiency technology occurs in 3 to 4 years. Assuming the vehicle is purchased using a loan or lease, the added monthly payment for fuel efficient technologies is more than offset by the fuel savings within the very first month of ownership.[23]

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[19] *See* "Efficiency technology and cost assessment for U.S. 2025–2030 light-duty vehicles," International Council on Clean Transportation, March 22, 2017. http://theicct.org/sites/default/files/publications/US-LDV-tech-potential_ICCT_white-paper_22032017.pdf. *See also* ACEEE comments at https://www.regulations.gov/document?D=NHTSA-2016-0068-0098, *See also* "Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles," National Academy of Sciences (2015) at https://www.nap.edu/catalog/21744/cost-effectiveness-and-deployment-of-fuel-economy-technologies-for-light-duty-vehicles.

[20] "Fuel Efficiency, Consumers, and Income (2017)," Union of Concerned Scientists, www.ucsusa.org/fuel-economy-low-income.

[21] "Fueling Savings: Higher Fuel Economy Standards Result In Big Savings for Consumers," Consumers Union, September 7, 2016, http://consumersunion.org/wp-content/uploads/2016/09/Fueling-Savings-Consumer-Savings-from-CAFE-2025.pdf.

[22] These results are based on a gasoline price forecast of $3.00–$3.50 per gallon for the decade beginning in 2025. Under a high gas price ($5.00–$5.50) regime, the net savings increase by nearly 80 percent for cars and 70 percent for trucks. In the unlikely case that gas prices decrease from today's prices—and remain low—the net savings would remain positive but decrease by about half the levels under base case gas prices.

[23] Using the average loan term of 68 months and average interest rate of 4.79% based on data from Experian.

Figure 3: Annual Car Compliance Costs and Fuel Savings (relative to MY 2016, assuming financing)

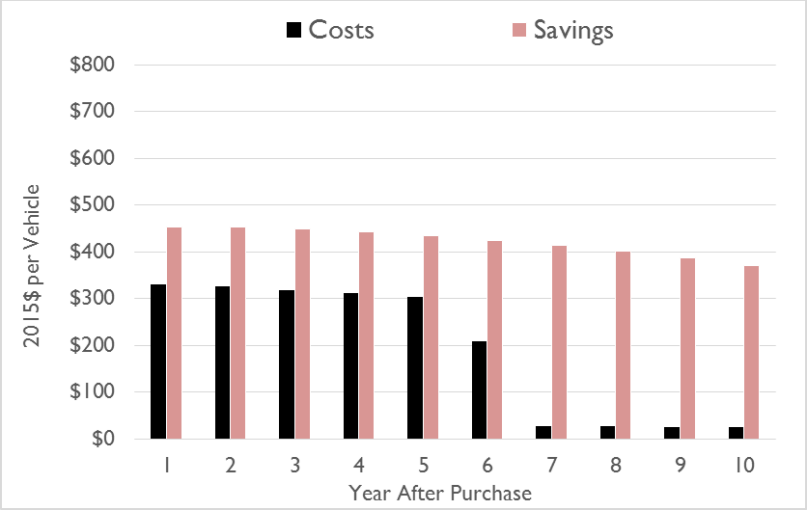

Figure 4: Annual Light Truck Compliance Costs and Fuel Savings (relative to MY 2016, assuming financing)

EPA should also include the costs to the U.S. economy if the American market lags behind in fuel efficient vehicles and technologies, while global markets are primed for increasing stringency of fuel economy. A recent Ceres report notes that, "In 1985, more than two-thirds of Detroit Three unit sales were in North America. By 2025, we project that only one-third will be sold in North America, while two-thirds of sales will be overseas."[24] If domestic automakers and suppliers (which employ more Americans than the automakers themselves) are part of a bifurcated market wherein U.S. fuel economy targets are lower than international markets, vehicles sold in the United States could

[24] "What's Driving the U.S Auto Industry's Financial Performance?" Ceres, August 7, 2017, https://www.ceres.org/sites/default/files/reports/2017-08/Ceres%20Analysis%208_10.pdf.

become more expensive due to manufacturing scale inefficiencies and missed opportunities for spreading out technology costs and development. In contrast, shared global platforms and powertrains could be good for American consumers, as higher volumes and standardized features help lower per-vehicle costs, and domestic automakers remain competitive in developing new technology instead of importing it. The costs of falling behind the global market and technology curves could be significant for producers and consumers.

2) Factor: "The feasibility and practicability of the standards"

The standards are feasible because a majority of the technologies able to meet the standards are already demonstrated in the marketplace across a wide range of vehicles, consumers value fuel-efficiency and want to see improvements in fuel economy in their next vehicle purchase, and the costs of the standards are outweighed by the direct consumer benefits.

a. The technology to comply with the standards is already in the market.

Many of the technological pathways identified in the Draft TAR are already demonstrated in the marketplace, while there are additional cost-effective technologies, such as CVT and Atkinson-cycle engines, that EPA did not include in its initial analysis, but are deployed in the current fleet. ICCT's summary of its analysis also indicates that the Draft TAR "failed to consider a number of technology advances that are already in production or close to production—such as E-boost, dynamic cylinder deactivation, variable compression ratio, and numerous thermal management strategies—and continued to overestimate the cost of some technologies."[25]

Automaker announcements over the past year also indicate that fuel-saving technologies are poised to see even greater market penetration in the very near future. Not content to rest on its SkyActiv laurels, Mazda announced in August 2017 that it has cracked the code on a variation of a homogeneous charge compression ignition (HCCI) engine, and will be introducing this technology in its 2019 line-up, greatly improving efficiency and showing that significant improvements to gasoline internal combustion engine are still going strong.[26] In a similar vein, Infiniti announced it will be introducing the "world's first production-ready variable compression ratio engine" that "combines the

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[25] German, John. "Technology Leapfrog: Or, all recent auto technology forecasts underestimate how fast innovation is happening," International Council on Clean Transportation, September 25, 2017, http://theicct.org/blogs/staff/technology-leapfrogging.

[26] "Mazda Announces Long-Term Vision For Technology Development, 'Sustainable Zoom-Zoom 2030'," Mazda News release, August 8, 2017, https://insidemazda.mazdausa.com/press-release/mazda-announces-long-term-vision-technology-development-sustainable-zoom-zoom-2030/.

power of a high-performance 2.0-liter turbo gasoline engine with the torque and efficiency of an advanced diesel powertrain – without the equivalent emissions."[27] General Motors announced that engine start-stop technology will be deployed in nearly all vehicles by 2020.[28] New technologies that combine cylinder deactivation and new 48V battery systems, called "Dynamic Skip Fire," may further boost engine efficiency.[29]

Toyota's highly efficient "Dynamic Force Engine" boosted the Camry's fuel economy by more than 20% without any kind of hybridization, and Volvo has indicated that it plans to make the 48V hybrid standard, taking advantage of two-thirds the benefits of full hybrids at one-third the cost.[30] According to ICCT, "The technologies announced by Toyota, Mazda, and Volvo are equally applicable to all vehicles, including sport utility vehicles, crossovers, and pickup trucks. Toyota notes that the Dynamic Force engine is 'currently being adapted to V-6 and V-8 engines, and it will also spread to trucks and utility vehicles,' and Volvo is adding its 48V hybrid system to every vehicle in its model lineup."[31]

b. Consumers value fuel economy and want to see fuel economy improve in their next vehicle more than any other attribute

In a nationally representative survey published in June 2017, Consumers Union found that fuel economy is the number one attribute vehicle owners would like to see improved.[32] Fuel economy topped the list of attributes that American drivers think have the most room for improvement, beating out: purchase price, connectivity, range, vehicle comfort, passenger room, safety, cargo space, reliability, horsepower, vehicle size, off-road capability, style, and handling. Fuel economy was flagged as needing improvement more than three times as much as horsepower, connectivity, or off-road capability, and more than four times as much as vehicle size. This finding was consistent regardless of vehicle type, and across low- to moderate- income vehicle owners. Every segment based on consumers' current vehicle type (small, midsize,

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[27] "Infiniti VC-Turbo Engine Technology," Infiniti USA, September 2016, https://www.infinitiusa.com/now/technology/vc-turbo-engine.
[28] Truett, Richard."GM plans stop-start fleetwide by 2020," Automotive News, May 23, 2016. http://www.autonews.com/article/20160523/OEM06/305239970/gm-plans-stop-start-fleetwide-by-2020.
[29] Cole, Craig, "New Cylinder Deactivation Tech Cuts Fuel Consumption by 5%," Autoguide.com September 20, 2017, http://www.autoguide.com/auto-news/2017/09/new-engine-tech-cuts-fuel-consumption-by-5-.html.
[30] German, John, "Technology Leapfrog: Or, all recent auto technology forecasts underestimate how fast innovation is happening," International Council on Clean Transportation. September 25, 2017, http://theicct.org/blogs/staff/technology-leapfrogging.
[31] *Id.*
[32] Press Release: "Nearly 9 in 10 Americans want automakers to raise fuel efficiency, according to latest Consumers Union survey," Consumers Union, June 29, 2017, http://consumersunion.org/news/2017-fuel-economy-survey/.

large, and pick-up truck) identified fuel economy as the number-one attribute that needs improvement, as did all household income segments under $100,000.

Thinking about your current vehicle, which aspects of this vehicle have the most room for improvement?	Total %	Household Income			Region				Political Party Affiliation	
		Under $50,000 %	$50,000-$99,999 %	$100,000 or more %	Northeast %	Midwest %	South %	West %	Republican %	Democrat %
Respondents selected UP to three responses										
Fuel economy	35	31	36	38	35	37	32	38	34	36
Purchase price	26	25	28	24	30	22	27	24	25	28
Passenger room	14	13	15	12	14	15	12	14	14	13
Range	13	14	16	11	12	12	16	11	12	14
Vehicle comfort	12	14	9	12	9	13	14	9	11	13
Cargo space	11	10	9	12	9	11	12	10	10	11
Horsepower	11	11	12	11	14	8	9	15	8	14
Connectivity	10	9	9	13	11	9	12	10	12	10
Off-road capability	10	11	9	10	13	4	12	11	12	9
Style	9	11	7	8	10	6	10	7	7	10
Reliability	8	11	7	5	11	7	6	9	7	9
Vehicle size	8	9	9	7	7	10	9	7	8	8
Safety	6	8	7	3	8	4	8	3	6	6
Handling	6	6	5	6	5	6	4	9	6	6
Base: Respondents who said their household owns a vehicle and they drive	892	300	289	302	150	197	339	205	400	457

In the same nationally representative survey published in June 2017, Consumers Union also found strong majority support for robust fuel economy standards.[33] Highlights from the survey include:

- 87% of Americans agreed automakers should continue to improve fuel economy.
- 73% of Americans agreed that government should continue to set higher standards for vehicle efficiency.
- 76% of Americans agreed that increasing average on-road fuel economy from 25 miles per gallon today to 40 miles per gallon by 2025 is a worthwhile goal.
- 79% of Americans agreed that making larger vehicles, such as SUVs or trucks, more fuel-efficient is important.
- 60% of Americans are willing to pay extra for a more fuel-efficient vehicle if they can recover the additional cost through fuel savings within 5 years.

[33] *Id.*

- The automotive brands perceived as the best overall were also those perceived as the best in delivering fuel economy.
- Compared to their current vehicles, over half (53%) of adult American drivers expect better fuel economy with their next car purchase.

c. Higher fuel economy is correlated with higher owner satisfaction.

As another measure of consumer interest in and benefits from better fuel economy, Consumers Union investigated the relationship between fuel economy and owner satisfaction, and the results of the two-part analysis showed that when holding other factors constant, higher fuel efficiency is positively associated with higher owner satisfaction.[34] Though many factors determine owner satisfaction, the analysis evaluated the relationship between owner satisfaction and the following vehicle attributes: fuel economy, acceleration, horsepower, reliability, CR's road-test score, and CR's tested price. All six attributes examined in the first analysis show significant association with owner satisfaction for cars and SUVs. Fuel economy was second only to reliability in the strength of the association with higher owner satisfaction. The dataset for this analysis included vehicles from model years 2012-2015, and so it includes many fuel-efficient technologies and designs that were identified in the joint TAR. While the analysis does not break out individual technologies, it seems clear that consumer welfare is likely improved from the shift to greater efficiency.

3) Factor: "Impact of the standards on reducing emissions, oil conservation, energy security, and fuel savings by consumers"

Fuel savings and oil conservation are realized by maintaining a robust standard. Greenhouse gas and fuel economy standards for MY 2022-2025 are projected to save 1.2 billion barrels of oil and deliver net fuel savings. In fact, EPA's analysis in the final determination, based on the Draft TAR found: "It is also notable that in all cases, the benefits (excluding fuel savings) and the fuel savings, each independently, exceed the costs. That is, the benefits exceed the costs without considering any fuel savings, and likewise fuel savings exceed the costs even without considering any other benefits."[35] Indeed the net benefits from the current MY 2022-2025 standards from fuel savings alone are estimated to be $26 billion to $56 billion, using a 7% and 3% discount rate, respectively.[36] Consumers do not want to waste fuel, but lower targets would negatively impact fuel savings.

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[34] "Investigation of Relationship between Fuel Economy and Owner Satisfaction," Consumers Union, June 2016, http://consumersunion.org/wp-content/uploads/2016/06/CU-MPG-Satisfaction-report-final.pdf.

[35] EPA final determination, at 7.

[36] *Id*.

Based on the latest data (2016), transportation accounts for 71 percent of oil use,[37] and cars and light-trucks account for 56 percent of transportation energy use.[38] While rising fuel economy standards have helped dampen demand, domestic gasoline consumption has continued to grow, and in fact, reached an all-time high this year.[39] While net imports have decreased over the past decade, oil extracted in the U.S. is sold on the global market (and not necessarily to Americans), and so Americans pay the price set by that market, regardless of domestic production versus imports. Because long-term commodity price forecasts are inherently unreliable,[40] EPA should consider the economic and security impacts of much higher gasoline prices in its cost-benefit analysis, in line with the price spikes nearing double current prices that have occurred an average of once every decade since the oil embargo.[41] The exclusive use of EIA forecasts is not sufficient.

Earlier this year, the EIA estimated a significant decrease in projected oil demand due to the fuel economy standards and trends, including the standards in place for MY 2022-2025. EIA noted, "The net effect of these fuel economy trends is that light-duty vehicle energy consumption is projected to decrease 12%, from 16.1 quadrillion British thermal units (Btu) in 2017 to 14.2 quadrillion Btu in 2025 in the AEO2017 Reference case, despite projected growth in vehicle-miles traveled of 5% over the same period.[42] Nearly all of this energy consumption reduction is in gasoline, with gasoline consumption by light-duty vehicles projected to fall from 8.7 million barrels per day in 2017 to 7.5 million barrels per day in 2025." EPA should calculate how changing these projected standards could increase consumption, and thus undermine the nation's need to reduce fuel consumption and fuel costs.

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[37] "Oil: Crude and Petroleum Products Explained," Energy Information Administration, 2017, https://www.eia.gov/energyexplained/index.cfm?page=oil_home#tab3.

[38] *Id.*

[39] EIA estimates that U.S. gasoline consumption reached a record high of 9.7 million barrels per day (b/d) in July 2017, EIA Short-Term Energy Outlook, Release Date: August 8, 2017, accessed August 8, 2017 at https://www.eia.gov/outlooks/steo/report/us_oil.cfm.

[40] Husain, Mr Aasim M., and Chakriya Bowman, Forecasting commodity prices: Futures versus judgment, No. 4-41, International Monetary Fund, 2004, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.165.6075&rep=rep1&type=pdf., at 3.

[41] U.S. Retail Gasoline Prices 1993-2017, accessed on August 8, 2017, https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMM_EPMR_PTE_NUS_DPG&f=M.

[42] "Fuel Economy Improvements Are Projected to Reduce Future Gasoline Use," Energy Information Administration, May 23, 2017, https://www.eia.gov/todayinenergy/detail.php?id=31332.

4) Factor: "The impacts of the standards on automobile safety"

Fuel economy and greenhouse gas standards are likely to have a neutral or positive impact on the safety of the passenger fleet. A recent study from researchers at NBER found that even before modern-footprint curves were adopted, the CAFE program had a positive impact on safety.[43] And there is a strong body of evidence showing that mass and size can be decoupled through the use of advanced high-strength materials, thus preserving or even enhancing safety while improving fuel economy by maintaining vehicle size while reducing mass.[44]

With the advent of modern foot-print based curves, there is no incentive to downsize vehicles, particularly smaller vehicles, which have more stringent targets. In fact, safety outcomes are likely to improve when light-duty truck standards increase by at least as much as passenger car standards, and stronger truck standards can enhance both safety and fuel savings benefits. On the flip side, there is the potential for negative societal safety impacts if the mass differential among vehicle classes increases, as shown by NHTSA's own prior analysis.[45] For example, if the standards incentivize manufacturers to lighten trucks at a slower rate than passenger vehicles or add weight to light trucks, then the net effect would be more fatalities and injuries. Light trucks have the greatest room for fuel efficiency improvement,[46] provide the greatest return on investment for improved fuel efficiency, and have the most weight to lose; all these factors indicate that increasing stringency for light trucks relative to passenger vehicles would enhance both safety and consumer value.

Improving safety is a critically important issue. But while fuel economy standards should be designed to improve or maintain safety, the biggest opportunities for improving safety lie with NHTSA's authority strengthen safety standards for cars and trucks and increase its efforts to decrease distracted driving. Safety outcomes in the

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[43] The Effect of Fuel Economy Standards on Vehicle Weight Dispersion and Accident Fatalities Antonio Bento, Kenneth Gillingham, and Kevin Roth April 10, 2017. http://environment.yale.edu/gillingham/BentoetaI_CAFEAttributesAccidents.pdf

[44] "Lightweighting Technology Development and Trends in U.S. Passenger Vehicles," International Council on Clean Transportation. December 16, 2016, http://www.theicct.org/sites/default/files/publications/ICCT_PVtech_lightweighting_wp2016-25.pdf; "Lightweight Materials for Cars and Trucks," Department of Energy. 2014, https://energy.gov/eere/vehicles/lightweight-materials-cars-and-trucks.

[45] Relationships between Fatality Risk, Mass, and Footprint in Model Year 2003-2010 Passenger Cars and LTVs, No. NHTSA-2016-0068, National Highway Traffic Safety Administration, June 2016, https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/2016-prelim-relationship-fatalityrisk-mass-footprint-2003-10.pdf at 8.

[46] "Annual Energy Outlook 2017." Energy Information Administration, January 5, 2017, https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf, at 94; "Fuel economy improvements are projected to reduce future gasoline use," Energy Information Administration. May 23, 2017, https://www.eia.gov/todayinenergy/detail.php?id=31332.

future are likely to be dominated by the rapid adoption of crash avoidance and advanced safety technology, not by changes to vehicle size or emissions standards.

2. Many Additional Factors Listed For Consideration by EPA Are Duplicative or Inappropriate, But Even Then The Data Support the Final Determination

a. Additional factor: "The extent to which consumers value fuel savings from greater efficiency of vehicles"

This should not be considered a separate factor, but rather is part of the feasibility and practicality analysis, and consumer valuation of fuel economy is discussed above under that section.

Some automakers may claim that their sales data show that consumers do not demonstrate a preference for better fuel economy in their purchasing habits. However, relying solely on sales data or OEM claims about consumer trade-off is misleading for several reasons: 1) consumer preferences are not easily discerned from a market constrained by limited information, a lack of perfect substitutes and other factors that constrain consumers, 2) sales are influenced by marketing and sales tactics that steer consumers towards vehicles that bring the highest profits for OEMs and dealers rather than those that maximize consumer welfare, and 3) most buyers purchase vehicles in the used vehicle market, and their choices are constrained by new car buyers' prior purchases even as the demographics and preferences of new and used vehicle buyers can vary widely.

b. Additional factor: "The distributional consequences on households"

A recent report from the University of Tennessee (UT) shows that "fuel savings to date have far outweighed the cost of fuel economy improvements for all U.S. income groups," and that "all income groups will also benefit from future fuel economy improvements, with the greatest gains as a percent of income going to the lowest income groups." [47] A recent report from the Union of Concerned Scientists found that "Improved vehicle efficiency saved low- to middle-income households up to an average of 2 percent of their income from 1980-2014," and "Fuel-efficient vehicles saved an average middle-income household as much as $17,000 from 1980 to 2014."[48]

In evaluating distributional impacts, EPA must consider all vehicle purchaser categories in order to appropriately estimate consumer welfare, especially buyers of used vehicles and buyers who finance their vehicle purchase. The vehicle market is dominated by

[47] Greene and Welch, 2017, at 4.

[48] www.ucsusa.org/fuel-economy-low-income

used vehicle sales purchased with a loan and is segmented by income, so it is essential to include these categories of vehicle buyers in EPA's cost-benefit analysis.[49] Two-thirds of used and new car buyers obtain loans for their purchase.[50] Modeling the impacts on a small portion of the market (e.g. new car buyers who pay in cash) would not capture the lifetime benefits of the standards for used vehicle buyers. Further, for those who finance their new and used vehicles, the added monthly payment for fuel efficient technologies is more than offset by the fuel savings within the very first month of ownership.[51]

New vehicle purchasers who pay with cash have relatively low price sensitivity to either vehicle or gasoline prices, as compared with used vehicle purchasers who finance their vehicle (and pay a larger portion of their income on gasoline than on monthly vehicle payments) and are therefore very sensitive to fuel cost fluctuations.[52] EPA's analysis of impacts should differentiate between high-income households, which are more often buying new vehicles and have relatively low price-sensitivity to purchase price and fuel costs, and low-income and moderate households, which are more often buying used vehicles and have a greater sensitivity to both purchase price and fuel costs). Assuming that low-income households are buying new vehicles and are highly sensitive to purchase price fluctuations in new vehicles would not reflect a realistic model of consumer purchasing behavior. Further, the economic gap between used car buyers, the purchasers of the vast majority of vehicles each year, and new car buyers highlights why EPA should emphasize the total, lifetime benefits, for consumers and society, from standards in evaluating economic and distributional impacts.

Stronger fuel economy standards are likely to provide positive effects for low- and moderate-income car buyers. Low- and moderate-income households are particularly sensitive to gas price changes, as they spend more on fuel as a percentage of their

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[49] Greene, David, "The Impact of Increased Fuel Economy for Light-Duty Vehicles on the Distribution of Income in the United States," Howard H. Baker Jr. Center for Public Policy. September 2016, http://bakercenter.utk.edu/wp-content/uploads/2016/09/Equity-Impacts-of-Fuel-Economy-Report_final.pdf.

[50] Federal Reserve's "Report on the Economic Well-Being of U.S. Households in 2015," dated May 2016, pp. 41-42, at https://www.federalreserve.gov/2015-report-economic-well-being-us-households-201605.pdf

[51] "Efficiency technology and cost assessment for U.S. 2025–2030 light-duty vehicles," International Council on Clean Transportation, March 22, 2017, http://theicct.org/sites/default/files/publications/US-LDV-tech-potential_ICCT_white-paper_22032017.pdf, at 6; "More Mileage for Your Money: Fuel Economy Increases While Vehicle Prices Remain Stable," Consumers Union. March 15, 2017, http://consumersunion.org/wp-content/uploads/2017/03/Synapse-CU-Affordability-Report-3-15-corrected-1.pdf.

[52] Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation: Technical Support Document, Environmental Protection Agency, November 2016, https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100Q3L4.pdf, pp. 4-47.

income than do higher-income households.[53] In fact, low-to-moderate-income households spend more on gasoline to fuel their vehicles than they do on the vehicle purchases, as shown by the Consumer Expenditure Survey (CES) survey data, and as noted in EPA's Technical Support Document (TSD) for its proposed determination.[54] Therefore, improvements to fuel efficiency deliver higher-than-average net benefits to low- and moderate-income households.

The majority of cars sold each year are in the used car market, accounting for about 70% of annual vehicle sales.[55] And according to CES data, households in the two lowest income quintiles are far more likely to buy used vehicles than new.[56] Fuel efficiency technology introduced in new vehicles makes its way to the used vehicle market and, as noted in the proposed determination, used vehicle buyers benefit from the depreciation of new vehicles, which reduces the cost of fuel economy technologies. The recent UT study demonstrates that used car buyers access fuel economy improvements at a lower cost than for new car buyers.[57] Fuel economy decreases very little over time, even as a vehicle depreciates, so used car buyers reap even greater net benefits, even after accounting for the fact that vehicles are driven fewer miles as they age. The UT study also found that savings on fuel, due to increases in fuel efficiency standards, amounted to 4.3% of annual income for the lowest income quintile but only 0.9% for the highest quintile.[58]

Further, used cars have become more affordable over time. Adjusting for inflation, average used car prices have fallen slightly over the last 20 years, even as cars have benefited from fleet-wide improvements to safety, fuel economy, performance, reliability and other attributes.[59] Indeed, EPA's Technical Support Document notes that any tradeoff between performance and accelerate may not be present with the adoption of

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[53] "More Mileage for Your Money: Fuel Economy Increases While Vehicle Prices Remain Stable," Consumers Union, March 15, 2017, http://consumersunion.org/wp-content/uploads/2017/03/Synapse-CU-Affordability-Report-3-15-corrected-1.pdf.

[54] Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation: Technical Support Document, Environmental Protection Agency, November 2016, https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100Q3L4.pdf, pp. 4-47.

[55] Used Vehicle Market Report, Edmunds.com, February 2017, https://dealers.edmunds.com/static/assets/articles/2017_Feb_Used_Market_Report.pdf

[56] Consumer Expenditure Survey, New and Used Vehicle Purchases by Income Quintile, 1995-2015, www.bls.gov/cex/.

[57] Greene, D. and J. Welch, "The Impact of Increased Fuel Economy for Light-Duty Vehicles on the Distribution of Income in the United States," 2016, http://bakercenter.utk.edu/wp-content/uploads/2016/09/EquityImpacts-of-Fuel-Economy-Report_final.pdf.

[58] *Id.*

[59] "More Mileage for Your Money: Fuel Economy Increases While Vehicle Prices Remain Stable, " Consumers Union, March 15, 2017, http://consumersunion.org/wp-content/uploads/2017/03/Synapse-CU-Affordability-Report-3-15-corrected-1.pdf.

new fuel saving technologies.[60] Fuel economy in particular has been improving since 2012, as both new and used vehicle sales have been at or near record highs. And while there has been a small increase in the real new-vehicle price on average, this increase has been largely driven by a trend towards larger vehicles and luxury features, and has not changed the price point for entry-level vehicles.[61]

This difference in the benefits and costs between new and used car markets highlights both that the full lifetime of benefits should be included in evaluating different alternatives, and that there are clear market imperfections in the new car market for which strong standards can help compensate.

c. Additional Factor: The impact of the standards on advanced fuels technology, including but not limited to the potential for high-octane blends

This factor is also part of feasibility and should not be a separate factor. The feasibility analysis should include higher compression ratio engines as a cost-effective way to boost efficiency.

Automakers are increasing engine compression ratios already, but could do much more with an engine co-optimized with higher octane fuel at a lower cost than many of the technologies to increase efficiency that were included in the TAR. Biofuels could be one tool to raise octane and could make it easier for use of alt-fuels than the current system under the Renewable Fuel Standard. A recent study from SAE confirmed that high compression ratio engines enabled by a high-octane low carbon fuel could improve efficiency at an affordable initial cost with net savings.[62]

Through industry and agency partnerships, The Department of Energy is pioneering research on co-optimizing fuels and engines to boost performance, lower GHG emissions, and boost fuel economy. Such efforts have the potential to reduce

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[60] Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation: Technical Support Document, Environmental Protection Agency, November 2016, https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100Q3L4.pdf, pp. 2-248-2-249.

[61] "Affordability of Vehicles Under the Current National Program in 2022-2025 for Detroit Three Automakers," Ceres, December 19, 2016, https://www.ceres.org/resources/reports/affordability-vehicles-under-current-national-program-2022-2025-detroit-three.

[62] Darlington, T., Herwick, G., Kahlbaum, D., and Drake, D., "Modeling the Impact of Reducing Vehicle Greenhouse Gas Emissions with High Compression Engines and High Octane Low Carbon Fuels," SAE Technical Paper 2017-01-0906, 2017, https://doi.org/10.4271/2017-01-0906.

emissions and improve fuel economy by 50%, thus helping to exceed fuel economy standards at lower cost, saving tens of billions of dollars a year in fuel costs.[63]

d. Additional Factor: "The availability of realistic technology concepts for improving efficiency in automobiles that consumers demand"

Similar to the other newly introduced factors, this should not be a separate factor, but should be considered part of feasibility, and technology availability and consumer demand for improvements are discussed above under that section.

The analysis in the TAR made technology cost assessments under the assumption of equivalent performance (acceleration)[64] and modeled technology penetration specific to vehicle class and size. Therefore, perceived trade-offs for size or acceleration have already been addressed. If there is a cost-effective technology or suite of technologies for each class of vehicle to meet the standards at the same level of acceleration, then these technologies are realistic by definition and tailored to the vehicles consumers demand, whatever size they may be. The standard was set specifically such that the standards can be met with existing technologies and does not require significant EV adoption for compliance. Historically, the auto industry has demonstrated the ability to meet reasonable targets at a lower cost than predicted while delivering consumers products they demand and analysis to date indicates this will be possible going forward.

e. Additional Factor: "The impact of standards on consumer behavior" including but not limited to consumer purchasing behavior and consumer usage behavior (i.e., impacts on rebound, fleet turnover, consumer welfare, etc.)

Similar to other newly introduced factors, this should not be a separate factor, but should be considered part of feasibility.

While rebound effects could offset a small percentage of the savings, the peer-reviewed literature on the rebound effect for efficiency gains generally shows that rebound effects above 10% represent outliers in the research.[65] Standard Office of Management and Budget (OMB) guidance, to use a range of 3 to 7 percent discount rate,[66] should be

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[63] "Co-Optimization of Fuels & Engines," Office of Energy Efficiency and Renewable Energy, https://energy.gov/eere/bioenergy/co-optimization-fuels-engines.
[64] Draft TAR, https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OXEO.PDF?Dockey=P100OXEO.PDF, at 5-224 to 5-225.
[65] Nadel, Steven, "The Rebound Effect: Large or Small?," American Council for an Energy-Efficient Economy, August 2012, http://aceee.org/sites/default/files/pdf/white-paper/rebound-large-and-small.pdf.
[66] OMB Circular 2003 at https://www.whitehouse.gov/omb/circulars_a004_a-4 [OMB 2003].

maintained in order to provide a range of net present values. In 2017, auto loans carry an average interest rate of less than 5 percent,[67] while inflation is projected to be on the order of 1.8 percent, yielding a real interest rate of about 3 percent, so the lower end of the range would be most appropriate. The lower rate should also be used given OMB guidance and the likelihood that the added cost of fuel saving technology will be passed onto consumers.[68]

Consumer welfare losses are unlikely to be realized as a result of the standards, given that as mentioned above, higher owner satisfaction is correlated with higher fuel economy, performance is held constant in assessing the program's costs,[69] and increases to VMT from a rebound effect are indicative of consumer welfare gains enabled by the savings from greater fuel economy.

3. The Standards for MY 2021 Remain Appropriate and Should Not Be Reconsidered

The standards for MY 2021 were set in the 2012 final rule, when they were evaluated and agreed upon by automakers and other stakeholders and were not part of the mid-term review. Changing the standard now after it was promulgated as a final rule would be unsupported by data, violate the spirit and text of the 2012 agreement, and likely to be a windfall for any automakers who would miss their 2021 targets and a penalty for automakers that planned to comply, not to mention a loss to consumers' projected fuel savings. And based on the TAR, and on all the new data listed above, MY 2021 standards remain feasible. Finally, proposing to change the standards for MY 2021 was not studied as part of the Draft TAR and thousands of hours of analysis that have gone into the mid-term review. Attempting to quickly propose a change to the MY 2021 standards in time to meet the April 1, 2018 deadline risks inadequate analysis and limited lead-time for implementation given automakers' plans for MY 2021 are already underway.

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[67] Strohm, Mitch, "June car loans remain surprisingly cheap," Interest.com, June 14, 2017, http://www.interest.com/car-loans/news/car-loans/.

[68] "The effects of regulation do not always fall exclusively or primarily on the allocation of capital. When regulation primarily and directly affects private consumption (e.g., through higher consumer prices for goods and services), a lower discount rate is appropriate, [OMB 2003].

[69] When the program costs were assessed as part of the agencies' Draft TAR, the analysis holds constant acceleration when calculating the costs of adding fuel efficient technology.Draft TAR, https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OXEO.PDF?Dockey=P100OXEO.PDF, at 5-224 to 5-225.

4. Additional Issues EPA should Consider

There are a number of costs that should be part of EPA's analysis, but seem to be excluded even in EPA's enumerated list of additional factors. Therefore, as part of EPA's cost-benefit analysis, EPA should consider the following impacts.

1. Consumer benefits may be eroded by automakers building to the tests that diverge from on-road efficiency and exploiting loopholes in ways that the agencies may not contemplate.
2. Off-cycle credits affect the overall consumer savings from the program, and the current process is not effective at establishing appropriate levels of credit due to insufficient research supporting the level of credit given both on a categorical and individual request basis, and insufficient resources for EPA or NHTSA to adequately evaluate automaker systems independently.
3. The degree to which consumer behavior may be affected by the marketing and sales tactics automakers and dealers use to shift consumer preference to higher profit vehicles affects program compliance and consumer savings.
4. The impact on total cost of ownership for low-and-moderate income vehicle buyers and buyers in the used car market.
5. The ability of standards to avoid industry job losses and economic losses resulting from gas price spikes.
6. The costs to the U.S. economy if the American market lags behind in fuel efficient vehicles and technologies, while global markets are primed for increasing stringency of fuel economy.

Conclusion

For the reasons stated above, including the net consumer benefits and lower cost estimates for the MY 2022-2025 standards, Consumers Union urges EPA to find that the MY 2022-2025 standards remains appropriate and to exclude reconsideration of MY 2021 as part of the mid-term review.

Respectfully Submitted,

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