



December 29, 2016

To: Environmental Protection Agency (EPA)

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Re: EPA Docket ID: EPA-HQ-OAR-2015-0827
Submitted via <http://www.regulations.gov>

These comments are submitted on behalf of Fuel Freedom Foundation, in response to the **Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation** issued on November 30, 2016.

Fuel Freedom Foundation is a non-profit 501(c)(3) organization that conducts research and advocates for policies that will increase diversity and promote market competition when it comes to transportation fuels, in particular for cars and light-duty trucks. Fuel Freedom believes that a more diverse fuel supply will help to achieve a number of important U.S. public policy goals:

- Improved national security by reducing our dependence on foreign oil
- Increased economic opportunities generated by greater deployment of U.S. domestic sources of fuel
- Improved public health by reducing emissions of toxic and criteria air pollutants
- Reduced emissions of greenhouse gases (GHG) that increase global warming

Consequently, Fuel Freedom supports the primary goals of the National Program standards under review in the Midterm Evaluation (MTE): improve average miles per gallon, reduce GHG emissions, and decrease petroleum use. Fuel Freedom also believes that transportation policies that further these goals can and should, at the same time, maximize the net benefits of the National Program. **Regulations should seek to minimize compliance costs, minimize consumer costs, advance consumer choice and market competition, enhance U.S. economic opportunities, and produce American jobs. The MTE provides an opportunity for the EPA to set a course to make progress on all of these, while raising fuel economy and lowering GHG emissions, in accord with its specific authority.**

National Program Benefits for Consumers and Industry

Fuel Freedom supports the combined Environmental Protection Agency (EPA), National Highway and Transport Safety Administration (NHTSA), and Air Resources Board (ARB) National

Program, and the EPA specifically, in its commitment to increase fuel economy and decrease tailpipe GHG emissions for 2022-2025, and recognizes the direct and indirect benefits to not only the environment, but to American consumers. Higher fuel economy means American families drive more miles per gallon, lowering their fuel costs.¹

However, **all** of the criteria listed above are vital to our national interests. Fuel Freedom believes that the EPA should not selectively favor specific vehicle technologies. Undue favoritism runs the risk of relying on technologies that may not be successful in the marketplace. **Instead, EPA must secure a place for the most cost-effective pathway(s) for automakers to comply with the standards. Cost-effectiveness not only minimizes consumer costs, but maximizes the net benefits of regulation.**

Changing Economic Realities Impact Compliance and Consumer Behavior

Since the 2022-2025 standards were established in 2012, the light-duty transportation sector has shifted, undermining some of the core assumptions of that time. Most notably, oil prices have dramatically decreased, and have remained low in relative terms for a sustained period. Consumer behavior in the interim has shown that vehicle choices are heavily influenced by fuel costs. Pricier alternative vehicle technologies have not been adopted by consumers as expected, despite generous incentives. Instead, consumers have shifted toward larger vehicles with internal combustion engines (ICEs) and away from smaller or alternative technology vehicles such as electric or hybrids. The Technical Assessment Report issued in July rightfully acknowledged the shift, and accordingly modified the projected vehicle fleet mix for the 2022-2025 period under review in the MTE.

This acknowledgement reflects that ICEs will dominate the roadways for decades to come, in the U.S. and around the world. That fact should not mean compromising either national public policy goals or the ability of automakers to provide the full range of vehicles to satisfy the needs of American drivers. Alternative technologies and automotive innovation can and should be encouraged within the National Program. Consumers that prefer alternative vehicle technologies should be able to purchase them. At the same time, EPA must give equal attention to facilitating ICE compliance with increasing standards. **That means a thorough analysis of the potential and relative costs and benefits of the full range of spark-ignition technologies, as well as consideration of the fuels that power them.**

Enabling Cost-Effective Solutions for the ICE Fleet

Engines and fuels work together in concert to determine the relative performance of a vehicle. Yet fuel economy and tailpipe GHG regulations have to date focused exclusively on vehicle technologies. Consequently, automakers have made great strides in advancing engine technology in the U.S. despite being limited by much lower octane fuel than in other parts of

¹ Consumers Union, *Consumer Savings from 2025 Corporate Average Fuel Economy Standards (CAFE)*, May 3, 2016

the world. But engine technology can only go so far. **To continue to advance ICE development, EPA must consider and address fuel. Better fuels have the potential to not only facilitate meeting the targets established for 2025, but to enable continued progress beyond.**

While inexplicably ignored in the MTE to date, higher-octane fuel is the most expedient pathway to meeting National Program goals with ICEs. Higher-octane fuel has been previously proffered by the EPA,² and recommended for a low-cost compliance pathway by the National Research Council.³ The benefits of high-octane fuels are documented by a robust body of research, including the Department of Energy's (DOE) taxpayer-funded Co-Optima program.⁴ **The wealth of credible, peer-reviewed information available justifies EPA undertaking a thorough evaluation of higher-octane-fuel and engine technologies enabled by it, in order to compare the relative potential benefits and costs to other vehicle technologies.**

Fuel Freedom Foundation Recommendations

As referenced in the Proposed Determination, Fuel Freedom believes that regulatory credits and/or incentives offered through the National Program should be expanded to include a broader range of technologies. Rather than encouraging only selective alternative vehicle technologies, program incentives or credits should also encourage progress toward a more diverse fuel market and/or the early adoption of internal combustion engine technologies with the greatest potential to achieve National Program goals. Ample existing research justifies including a discussion of program incentives to facilitate or accelerate development and market introduction of higher-octane-fueled spark-ignition engines.

While we believe that credits are best negotiated directly between EPA and the automakers, examples of incentives that can accelerate the development and market introduction of vehicles that can use higher-octane fuels include: Material compatibility with midlevel (E25-E40) or high alcohol fuel blends, or continuing flex-fuel vehicles credits in the light duty truck sector where alternative vehicle technologies are lagging in commercialization and market acceptance. **These or similar credits can encourage the use or adoption of high-octane fuels to facilitate compliance with the standards for 2022-2025, and also enable future improvements beyond that, to ensure continued incremental progress.**

It is important to note that the current gasoline offerings are not sufficient to meet the challenge. The highest-octane available at the pump is 91 or 93 on the anti-knock index (AKI), depending on location. Optimal fuel economy requires 95-96 AKI (or ~100 research octane number (RON)). In addition, the highest octane fuel today is marketed and sold as a 'premium' offering, and priced accordingly. The pump price does not reflect the relatively small

² EPA Tier 3 Notice of Proposed Rulemaking proposed a high-octane mid-level ethanol blend that "could help manufacturers that wish to raise compression ratios to improve vehicle efficiency, as a step toward complying with the 2017 and later light-duty greenhouse gas and CAFE standards" EPA, *Control of Air Pollution From Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards: Proposed Rule*, p. 29825, May 21, 2013

³ National Research Council, *Cost, Effectiveness and Deployment of Fuel Economy Technologies for Light-Duty Vehicles*, Recommendation 2.3, p. 84, 2015

⁴ U.S. Department of Energy, *Co-Optimization of Fuel & Engines*, Mar. 2016

incremental cost of production and transport of the fuel.⁵ It does not have to be this way. High-octane ethanol (~107 RON) is readily available in the market, mixes easily with gasoline, and is most often cheaper. Other octane sources will compete for market share, once the higher-octane market opportunity opens up.

Rather than a selective technology approach, the EPA should employ an all-of-the-above strategy, and look to fuels. ICEs continue to dominate the marketplace--and by all accounts will continue to do so for decades to come--despite continuing aggressive efforts to promote newer alternative vehicle technologies such as electric and hydrogen fuel cell vehicles. Consequently, EPA must develop policies to coax maximum benefits from these ICE vehicles. This means looking not just to vehicle technologies, but to the fuels that enable them. As a starting point, the EPA should thoroughly investigate the potential performance of spark-ignition engine technologies, including the full range of well-known, feasible technologies that could be enabled or improved by the use of high-octane fuels. **The robust body of existing research clearly shows significant potential fuel economy gains and GHG reductions of higher-octane fuels^{6,7,8} even when used in current vehicles.⁹ In addition, the U.S. has abundant energy resources that can be used to produce high-octane fuels^{10,11,12} and in the process create high-paying jobs.¹³ Displacing petroleum imports with these U.S.-produced fuels to supplement our existing domestic fuel supply is good for the economy, for fuel market competition, and for our national security.**

The attached Supplement contains more detailed comments and recommendations, which Fuel Freedom Foundation jointly submitted to EPA, NHTSA, and ARB in response to the Technical Assessment Report in September 2016. In addition, Appendix A lists more than 10,500 citizens who support high-octane fuel. Appendix B provides a bibliography of technical references that document the potential for high-octane fuels. **We urge the EPA to fully consider all of these along with the above comments when weighing agency actions related to the future of light-duty transportation.**

⁵ Hirshfeld, D., Kolb, J., *Refining Economics of U.S. Gasoline: Octane Ratings and Ethanol Content*, Aug. 21, 2014

⁶ West, B., Szybist, J., Theiss, T., et. al., *Summary of High-Octane Mid-Level Ethanol Blends Study*, Jul. 2016

⁷ Chow, E., Heywood, J., Speth, R., *Benefits of a Higher Octane Standard Gasoline for the U.S. Light-Duty Vehicle Fleet*, Apr. 1, 2014

⁸ Han, J., Elgowainy, A., Wang, M., *Well-to-Wheels Greenhouse Gas Emissions Analysis of High-Octane Fuels With Various Market Shares and Ethanol Blending Levels*, Jul. 14, 2015

⁹ West, B., Szybist, J., Theiss, T., et. al., *Summary of High-Octane Mid-Level Ethanol Blends Study*, p. 10, Jul. 2016

¹⁰ EPA, *Approved Pathways for Renewable Fuel*, Oct. 28, 2016

¹¹ Resources for the Future, Fraas, A., Harrington, W., Morgenstern, R., *Cheaper Fuels for the Light-Duty Fleet: Opportunities and Barriers*, Jan. 27, 2014 <http://www.rff.org/research/publications/cheaper-fuels-light-duty-fleet-opportunities-and-barriers>

¹² Light, M., *Natural Gas Based Liquid Fuels: Potential Investment Opportunities in the United States*, June 2014

¹³ Urbanchuk, J., *Contribution of the Ethanol Industry to the Economy of the United States in 2015*, Feb. 5, 2016