



## Ethanol is the Best High-Octane Fuel for Vehicle GHG Standards

On April 2, EPA issued its final determination on the appropriateness of model year 2022-2025 vehicle emissions standards, effectively triggering a new process to revise the standards for automakers. This process could be an opportunity for high-octane fuel to play a role in helping automakers reduce GHG emissions from automobiles.

With a blending octane rating of 113, American-made ethanol is the lowest-cost source of fuel octane on the planet, and with gasoline prices this summer expected to rise to their highest levels since 2014, surging close to \$3.00 per gallon during the peak driving season, adding ethanol would help bring down the cost of a new premium fuel. What's more, comparative research by the Department of Energy to find the most promising fuel to help automakers comply with future GHG standards shows ethanol ranks the highest.<sup>1</sup>

ACE members are encouraged that EPA has sought information on the “impact of GHG standards on advanced fuels technology, including...the potential for high-octane blends.”<sup>2</sup> We believe EPA should take steps to unlock the octane, efficiency, and environmental advantages of high-octane fuel from ethanol.

To be more exact, high octane fuel comprised of 25 to 30 percent (98 to 100 RON) ethanol is a cost-effective, low-carbon solution to successful implementation of the standards. Some oil refiners are in support of a transition to a new 95 RON (91 AKI) fuel approximate to today's premium (91-93 AKI) fuel. As we understand this concept, it would limit ethanol's contribution to just 10 percent by volume, falling short of the need to reduce tailpipe emissions and save consumers money at the pump. Increasing octane should not come at the expense of air quality, carbon emissions, or human health. According to both the EIA and AAA, premium gasoline today costs on average 50 cents per gallon more than regular unleaded.<sup>34</sup> It is foolish to move forward on a new high octane fuel which will impose these costs on American consumers by limiting ethanol's contribution.

Ethanol is already improving air quality and helping refiners boost the octane of finished fuel. Rather than modifying their operations to produce expensive octane from petroleum, most refiners make a sub-octane gasoline blendstock (84 AKI) and add 10 percent ethanol to make an 87-AKI finished fuel. Adding ethanol to boost octane saves them money and cuts back on refinery emissions.

Just as refiners have optimized to benefit from ethanol's octane value, automakers want to take advantage of how 25 to 30 percent ethanol can help them realize efficiency gains from technologies such as turbochargers and higher compression ratios in engines which recommend or require the use of high-octane fuel.

Since 2011, the Auto Alliance has been asking EPA to increase the octane rating of fuel: “...we also recommend increasing the minimum market gasoline octane rating, commensurate with increased use of ethanol. Adding ethanol to gasoline increases its octane rating. To attain necessary octane levels, it is important that refiners not be permitted to reduce base gasoline octane ratings in light of the additional octane contribution from higher ethanol.”<sup>5</sup>

Experts from the Department of Energy and Original Engine Manufacturers (OEMs) who study the relationship of fuels and engines believe high ethanol blends offer the most octane benefits.

<sup>1</sup> <https://transportationtodaynews.com/news/8229-ethanol-based-fuels-good-fuel-economy-environment/>

<sup>2</sup> Request for Comment on Reconsideration of the Final Determination of the Mid Term Evaluation of Greenhouse Gas Standards of 2022-2025 MY Vehicles. <https://www.gpo.gov/fdsys/pkg/FR-2017-08-21/pdf/2017-17419.pdf>

<sup>3</sup> <https://www.eia.gov/todayinenergy/detail.php?id=31732>

<sup>4</sup> <https://gasprices.aaa.com/state-gas-price-averages/>

<sup>5</sup> Letter from Mitch Bainwol, Alliance of Automobile Manufacturers, to The Honorable Lisa Jackson, EPA Administrator. October 6, 2011. (attachment A) <https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0799-9574>

In July 2016, three scientific laboratories operated by the Department of Energy released the Summary of High-Octane, Mid-level Ethanol Blends Study.<sup>6</sup> “The results of this study show that mid-level ethanol blends (E25-E40) could offer significant benefits for the United States. These benefits include an improvement in fuel efficiency in vehicles designed and dedicated to use the increased octane. The improved efficiency of 5-10% could offset the lower energy density of the increased ethanol content, resulting in volumetric fuel economy parity of E25-E40 blends with E10. Analysis of the market reveals that the automotive OEMs, consumers, fuel retailers, and ethanol producers all stand to benefit to varying degrees as high-octane fuel increases its market share.”

According to a study by J.E. Anderson of Ford Motor Corporation, “The high-octane rating of ethanol could be used in a mid-level ethanol blend to increase the minimum RON of regular grade gasoline. We estimate that large increases (4 to 7 points) in the RON of U.S. gasoline are possible by blending in an additional 10 to 20 percent by volume ethanol above the 10 percent ethanol already present.”<sup>7</sup>

BMW already recommends the use of E25 (98-99 RON) in some models of the MINI Cooper and other vehicles. BMW took this action in response to fuel economy requirements and says, “it is MINI’s intention that all new models will be E25 compatible.”<sup>8</sup>

Below are ACE’s recommendations to EPA with respect to GHG standards for 2022-2025 model year vehicles:

1. Approve an alternative certification fuel with 25 to 30 percent ethanol and a minimum octane of 98 to 100 RON so automakers can begin testing future engine technologies on a high-octane blend.
2. Establish a minimum octane performance standard for fuel of 98-100 RON. This will foster a marketplace which spurs competition and innovation to produce low-cost, high-octane fuels.
3. Update modeling and calculations so ethanol is no longer penalized with respect to fuel economy or emissions. First, correct the fuel economy equation (R-factor) used to certify vehicles operating on high-ethanol blends to at least 1.0. Second, consider crediting ethanol’s upstream GHG reductions or its displacement of petroleum as EISA 2007 permits. Third, correct the outdated MOVES2014 model used in calculating the GHG emissions of ethanol.
4. Restore credits to automakers for the manufacture of flexible fuel vehicles (FFVs) and consider a new incentive for future engines designed to achieve optimal efficiency on high-octane fuels.

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<sup>6</sup> Summary of High-Octane, Mid-level Ethanol Blends Study. July 2016. ORNL, NREL, ANL. U.S. Department of Energy. <http://info.ornl.gov/sites/publications/files/Pub61169.pdf>

<sup>7</sup> “High octane number ethanol-gasoline blends: Quantifying the potential benefits in the U.S.” Anderson, J.E. et al, Ford Motor Company. July 2012. <http://www.sciencedirect.com/science/article/pii/S0016236112002268>

<sup>8</sup> “MINI Cooper Shares E25 Know-How with BMW,” Canadian Report on Fuel Ethanol, Vol. 6, No. 5, September 14, 2016.