September 27, 2021

Michael S. Regan
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Docket ID Number: EPA-HQ-OAR-2021-0208

Submitted via www.regulations.gov

Request for Comments on Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards

Dear Administrator Regan:

On behalf of the members of the American Coalition for Ethanol (ACE), thank you for the opportunity to submit comments on EPA's revised 2023 and later model year light-duty vehicle greenhouse gas (GHG) emission standards.

ACE is a grassroots advocacy organization, powered by rural Americans from all walks of life who have built an innovative industry that delivers low carbon biofuel and food for a growing world. Our members include U.S. ethanol biorefineries, investors in biofuel facilities, farmers, and companies that supply goods and services to the U.S. ethanol industry.

The Biden administration has announced an ambitious plan to reduce economy-wide lifecycle GHG emissions by 50 percent (compared to 2005 levels) by 2030 and a larger goal of "net-zero" GHG emissions in the U.S. by 2050. We stand ready to support the fulfilment of these goals but need to make it clear the U.S. will not succeed in this endeavor unless steps are taken to reward farmers and biofuel producers for their ability to be part of the solution to mitigate climate change.

While it may be an inconvenient truth for some to accept, corn ethanol is a proven and cost-effective low carbon fuel playing an important role in reducing GHG emissions and air pollution from the transportation sector, evidenced by the fact the Renewable Fuel Standard (RFS) has cut GHG emissions by nearly 600 million metric tons since 2007, exceeding EPA's original expectation of 444 million metric tons.[1]

ACE members believe ethanol can and should be an even bigger part of the solution to climate change, but this depends upon the Administration's willingness to engage us on ethanol's role as a low carbon fuel through policies such as the RFS and the topic of this request for comments; how to reduce GHG emissions from future vehicles.

[1] Unnasch. S. (2019) GHG Reductions from the RFS2 – A 2018 Update. Life Cycle Associates Report LCA. LCA.6145.199.2019 Prepared for Renewable Fuels Association.

A recent study published by Harvard University, Tufts University and Environmental Health & Engineering Inc. scientists reinforces the fact that the GHG reduction benefits of corn ethanol have been significantly undervalued because some regulatory bodies refuse to apply or use the latest lifecycle science. The Harvard/Tufts study found that average corn ethanol reduces GHGs by 46 percent compared to gasoline and given improvements occurring in corn farming and within ethanol facilities, corn ethanol's carbon footprint will continue to decline over time.[2]

Nevertheless, there is a disconnect between this reality and the proposal by EPA to reduce GHGs from 2023 and later model year vehicles. Since nearly all the 270 million light-duty vehicles on U.S. roads today run on liquid fuel, it would seem reasonable that to significantly cut CO_2 emissions from their tailpipes, consideration must be given to the fuel powering the engines, including steps to replace fossil fuel with a lower carbon and higher octane fuel, such as ethanol. Unfortunately, and unbelievably, EPA's proposal fails to adequately address these important issues.

Instead, EPA impractically suggests vehicle GHG emissions can be reduced merely by plugging more cars into the grid, without much attention to how the electricity powering those cars is generated. When electric vehicles (EVs) are *actually* charged by low carbon power sources, they will play a role in reducing GHG emissions, but EVs comprise just 2 percent of all light-duty vehicles on the road today, and most of them are hybrid models that also operate on liquid fuels. In other words, even as EV sales increase, Americans will continue to rely on billions upon billions of gallons of liquid fuels for decades to come. Therefore, this proposal must place much greater emphasis on improving the quality of liquid fuel and the role low carbon, high octane ethanol can play in making significant GHG reductions in the near-term.

In January, the Rhodium Group released a compelling report indicating even under the most aggressive sales projections, EVs alone will not achieve net-zero transportation emissions by 2050.[3] Rhodium explained meeting this goal also depends upon decarbonizing liquid fuels and more stringent CAFE-GHG standards.

Many leading ethanol producers are on a trajectory to both net-zero and net-negative lifecycle emissions in the not-too-distant future. If the overarching goal is net-zero emissions by mid-century, let's start making progress *right now* by taking full advantage of the 15 billion gallons of domestically-produced ethanol available today as an affordable way to boost octane and meaningfully reduce GHG emissions from gasoline powered engines.

While it is regrettable EPA's proposal does not invite comments on the role high octane and low carbon fuels such as ethanol can play in helping automakers comply with GHG standards, it does invite comments on what should be done to promote more fuel efficient vehicles.

We have already discussed the incredible lifecycle GHG benefits of corn ethanol, but ethanol also delivers the highest octane rating for fuel at the lowest cost, allowing automakers to benefit by continuing to develop high-compression and fuel efficient engine technologies to reduce vehicle GHG emissions. We believe high octane, low carbon blends comprised of 25 to 30 percent ethanol would enable more fuel efficient vehicles, reduce GHG emissions, and reduce other pollutants.

It is in that spirit **we urge EPA to use this rulemaking to establish a minimum Research Octane Number (RON) rating for fuel in the range of 98 to 100 RON with 25 to 30 percent ethanol and**

[2] https://ethanol.org/news/news/2021/01/26/new-study-showing-corn-ethanol-reduces-carbon-emissions-by-nearly-50-percent-cites-ace-low-carbon-white-paper/

[3] https://www.rhg.com/research/closing-the-transportation-emissions-gap-with-clean-fuels/

provide automakers with a corresponding certification fuel for engine testing purposes. As part of this action, the Agency should finally phase-out the use of sub-octane blends (85 AKI) because automakers indicate this inferior low octane fuel can harm the engines in their vehicles. EPA has acknowledged that Section 211 of the Clean Air Act provides authority to control gasoline octane levels. EPA can set a minimum octane rating for fuel because low octane gasoline impairs engine manufacturer's ability to further increase compression ratios to reduce CO_2 emissions to meet the GHG standards and increases CO_2 emissions in legacy vehicles.

If the final rule does not establish minimum octane standard for fuel, EPA should immediately proceed to initiate a separate rulemaking on this issue.

Automakers have wanted EPA to increase the octane rating of gasoline for several years. Consider the following statements from automaker representatives and research findings from fuel and engine experts:

- In an October 6, 2011, letter to EPA from Mitch Bainwol, the President and CEO of the Alliance of Automobile Manufacturers at the time: "Furthermore, to help achieve future requirements for the reduction of greenhouse gas emissions, 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."[4]

- Dan Nicholson, Vice President of Global Propulsion Systems for General Motors (GM), said the following about high octane fuel at the 2016 CAR Management Briefing Seminars. "Higher octane fuels are the cheapest CO_2 reduction on a well-to-wheels analysis…Fuels and engines must be designed as a total system. It makes absolutely no sense to have fuel out of the mix of engine technology discussions."[5]

- Oak Ridge National Laboratory (ORNL) has found the use of 100 RON E25 and E40 in high-compression engines reduce well-to-wheel GHG emissions by 4 and 8 percent per mile, respectively, compared to E10. Total GHG emissions per mile were 8 percent lower for E25 and 17 percent lower for E40 when ethanol's upstream lifecycle GHG benefits were added.[6]

- According to a study by Jim Anderson of Ford Motor Company, "It appears that substantial benefits may be associated with capitalizing on the high octane rating of ethanol. We estimate large increases (4 to 7 points) in the RON of U.S. gasoline are possible by blending 10 to 20 percent by volume ethanol above the E10 already present."[7]

- Ford and General Motors experts indicate 98 to 100 RON fuel would result in a 7 to 8 percent efficiency gain in turbocharged port-fuel injected engines, a 5 to 6 percent efficiency

[4] 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

[5] "CAFE Standards: What's Biomass Got to Do with It?" Rebecca Chillrud. EESI. September 10, 2016.

[6] Oak Ridge National Laboratory. Summary of High Octane, Mid-level Ethanol Blends Study. ORNL/TM 2016-42, July 2016

[7] "High Octane Number Ethanol-Gasoline Blends: Quantifying the Potential Benefits in the U.S." Jim Anderson et al Ford Motor Company. July 2012.

gain in turbocharged direct injection engines, a 4 to 5 percent gain in naturally-aspirated port-fuel injected engines, and 3 to 4 percent gain in naturally-aspirated direct-injection engines. The same study found the maximum efficiency gain from 95 RON is merely 4 percent and limited strictly to turbocharged port-fuel injected engines.[8]

In addition to establishing a minimum octane rating for fuel, ACE encourages EPA to take a technology-neutral approach to the incentives and multipliers offered by the Agency with respect to low carbon fuel use in various vehicle technology. Unfortunately, EPA's proposal is considerably biased in favor of EVs over other vehicle/engine technologies. For example, under existing GHG standards the value of the multiplier used by the Agency to encourage the production of EVs falls from 2 (for model years 2017 through 2019) to 1.5 for model year 2021 and thereafter. But EPA's proposal would increase the EV multiplier to 2 again for model years 2022 through 2024. Instead of putting its thumb on the scale to favor EVs through multipliers and compliance credits, **EPA should establish a technology-neutral approach that also provides automakers with incentives to produce flexible fuel vehicles (FFVs) and vehicles designed to achieve optimal efficiency and reduced emissions on high octane ethanol blends**.

There are approximately 25 million FFVs in the U.S. today. The ideal way to transition from today's legacy fleet of internal combustion engines to new vehicles with advanced engine technologies designed to run optimally on a high octane fuel is to utilize FFVs as bridge vehicles that can provide immediate demand for midlevel ethanol blends. As a matter of fact, ORNL has investigated the use of high octane ethanol blends such as E25 and E30 in FFVs that are designed and compatible with ethanol blend levels from 0 to 85 percent and can therefore seamlessly and with OEM approval utilize midlevel ethanol blends.[9] Key findings from Oak Ridge include: "Experiments were performed with four FFVs using an E10 (92 RON) and E30 (100 RON) fuel. The two direct-injection FFVs demonstrated performance improvements for E30 compared to E10 of 2.5 to 3 percent, based on the 15-80 wide-open throttle acceleration time. Three of the four FFVs showed performance improvement with high-octane E30 compared to regular E10. (…) Marketing E25 or E30 to FFV owners as a performance fuel may enable greater utilization of ethanol in the near term and could help establish the refueling infrastructure to enable manufacturers to build dedicated vehicles designed for a high-octane midlevel ethanol blend."

FFVs using E85 significantly reduce lifecycle GHG emissions because the carbon emissions produced during the combustion of ethanol are largely recycled back in the growing of corn and other biofuel crops. Until 2015, EPA allowed automakers to use a 0.15 multiplier to account for this carbon regeneration and comply with CAFE-GHG standards. **We encourage EPA to reinstate this FFV multiplier or establish an incentive that is on equal footing with the EV credits in its proposal and establish a similar credit for vehicles designed to run optimally on midlevel blends of ethanol such as E25/30.**

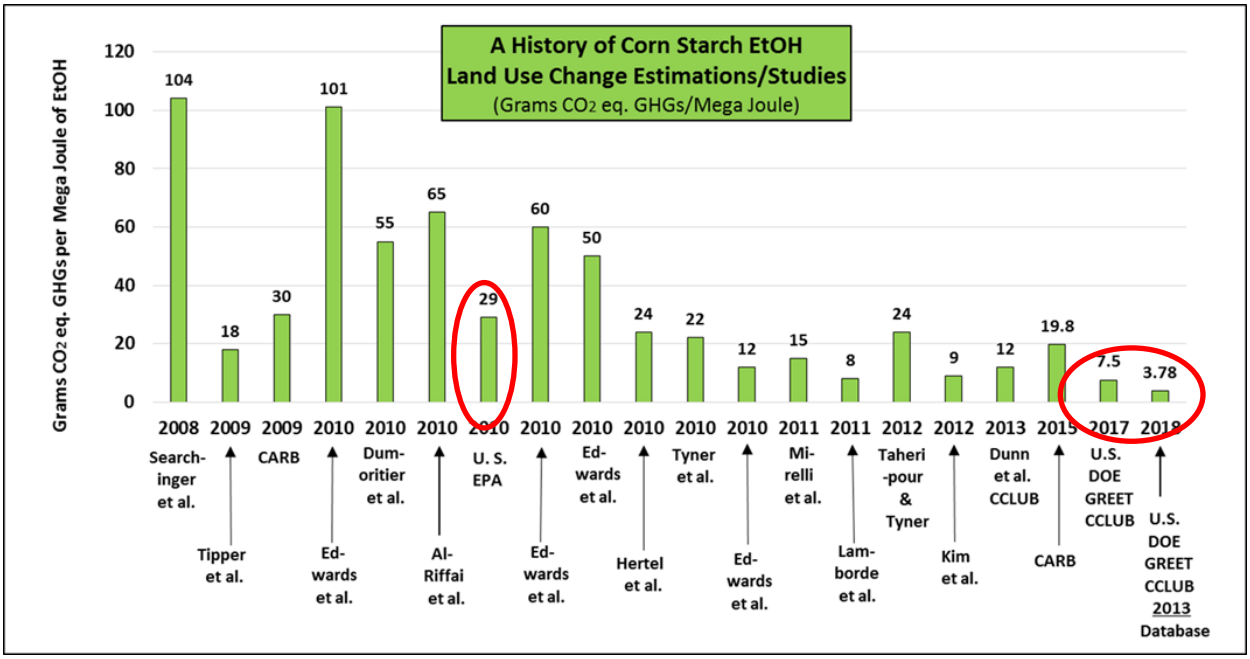
Vehicle incentives/credits are not the only area in which EPA seems to penalize technologies designed to operate efficiently on ethanol-blended fuel, indeed another inequity exists with the Agency's outdated fuel economy formula. In previous statements, EPA has acknowledged part of the fuel economy formula (the R-factor) unfairly penalizes fuel containing ethanol. Consequently, EPA is discouraging automakers from developing efficient engines that require higher octane ratings and

[8] "The Effect of Compression Ratio, Fuel Octane Rating, and Ethanol Content on Spark Ignition Engine Efficiency." Leone, Anderson, Davis, Iqbal, Reese, Shelby, and Studzinski. *Environmental Science and Technology*. 2015

[9] "Effects of High Octane Ethanol Blends on Four Legacy FFVs and a Turbocharged GDI Vehicle." Thomas, J, West, and Huff, S, U.S. DoE ORNL. March 2015.

higher ethanol content. EPA has previously said the 0.6 R-factor is erroneous and fails to achieve the statutory purpose of evaluating the fuel economy of fuels containing ethanol The auto industry has asked EPA for an R-factor of 1.0. In response, EPA has suggested the correct value may lie "between 0.8 and 0.9." **While ACE supports an R-factor of 1.0, an increase to 0.8 or 0.9 would represent an improvement.**

In the spirit of helping inform future EPA decision-making regarding the RFS and the lifecycle GHG emissions of corn ethanol generally, we feel compelled to once again point out that the approach the Agency takes regarding corn ethanol's lifecycle analysis is wildly outdated and fails to include the continuing advancements in this science documented by the Department of Energy's Greenhouse gas and Regulated Emissions and Energy use in Transportation (GREET) model. One of the most glaring discrepancies between EPA's outdated approach to lifecycle modeling and more recent versions of the GREET model is assumptions about the impact of land use change from ethanol production.



EPA's outdated modeling included in the final RFS (in 2010) assigns a 29-gram penalty to the overall carbon intensity (CI) of corn ethanol. Subsequent research on this topic, in addition to the fact that the U.S. has produced more than 15 billion gallons of corn ethanol (so actual land use changes can be observed), indicates a more accurate land use factor of between 4 and 8 grams. Even the California Air Resources Board (CARB), in its implementation of the Low Carbon Fuel Standard, has reduced the corn ethanol land use change assumption from the 30-gram penalty it originally applied in 2011 to a 19.8-gram factor today. While that is still inexplicably higher than what most research suggests should be the case, the fact remains CARB has at least tried to update their lifecycle analysis of corn ethanol while EPA has not.

Nearly three decades ago, Dr. Michael Wang at the Department of Energy's Argonne National Laboratory developed the GREET model. It is considered the gold-standard for calculating energy use, GHGs, and other regulated emissions that occur during the full lifecycle production and combustion of all transportation fuels. The assumptions used by Argonne scientists in GREET are under constant review and updates to the model occur frequently. GREET is used by the California Low Carbon Fuel Standard program and the Oregon Clean Fuels program and has more than 40,000 registered users worldwide. Like the results found in the recent Harvard/Tufts study, the latest (2020) version of the

GREET model indicates that average dry mill corn ethanol production reduces lifecycle GHG emissions by 45 percent compared to gasoline.[10] **ACE has repeatedly asked EPA to adopt the latest GREET model to make all GHG determinations for the RFS and we echo that recommendation in these comments.**

Emerging scientific research indicates the GHG carbon intensity for corn ethanol will continue to improve through advancements on-the-farm and in ethanol facilities. We would strongly encourage EPA to engage us on this topic.

Finally, while it is outside the scope of this rulemaking, **we encourage EPA to set the maximum statutory conventional renewable fuel volumes under the RFS in the 2021 and 2022 Renewable Volume Obligation (RVO) rulemaking and pursue every option at its disposal to ensure uninterrupted market access for E15. Further we strongly discourage EPA from retroactively reducing the RVO for 2020 as has been rumored.**

Unfortunately, decisions by the past two Administrations to side with oil refiners have undermined the RFS and slowed the replacement of petroleum with cleaner alternatives. In 2015, EPA illegally reduced annual RVOs based on improper interpretation of the RFS general waiver authority. ACE and others successfully challenged this action in the D.C. Circuit Court, and we are still waiting on EPA to comply with the court's order to replace those low-carbon gallons.[11] From 2017 through 2020, the Trump Administration abused the Small Refinery Exemption provision of the RFS to undercut biofuel use. In both instances, EPA chose the petroleum industry's bottom line rather than to faithfully execute Congress' directive to expand low-carbon renewable fuel use under the RFS.

In the near-term, a properly implemented RFS and year-round availability of E15 will meaningfully reduce the carbon intensity of the U.S. transportation sector by capitalizing on the existing vehicle fleet's ability to use lower-carbon biofuels.

Thank you for your time and consideration of these comments.

Sincerely,

Brian Jennings, CEO
American Coalition for Ethanol

[10] https://greet.es.anl.gov

[11] Americans for Clean Energy, Inc. vs EPA