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Request for comments on the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks

Dear Deputy Administrator King and Acting Administrator Wheeler:

On behalf of the members of the American Coalition for Ethanol (ACE), thank you for the opportunity to submit comments on the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks.

ACE is a grassroots advocacy organization, powered by people from all walks of life who have built an innovative industry that sustainably delivers clean biofuel and valuable food for a growing world. Our members include U.S. ethanol biorefineries, investors in biofuel facilities, farmers and commodity organizations, and companies that supply goods and services to the U.S. ethanol industry. More information about ACE and its members can be found at www.ethanol.org.

Through the SAFE rule, the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA) are proposing to modify existing Corporate Average Fuel Economy and tailpipe carbon dioxide (CO_2) emissions (CAFE-GHG) standards for cars and light trucks, with a proposed preference to freeze the standards at 2020 model year levels during the 2021 to 2026 model year timeframe.

ACE has been in dialogue with automakers, agricultural organizations, government researchers and many others to develop strategies and action plans to accelerate the transition of motor fuels to low cost, high octane biofuels such as ethanol. We are grateful EPA and NHTSA are seeking comment on how fuel such as 100 Research Octane Number (RON) E30 can help automakers meet CAFE-GHG standards. We are also encouraged EPA's position on high octane fuel is evolving. While the correlation between octane and fuel economy has been disregarded in previous rulemakings, the SAFE rule correctly recognizes that "gasoline octane levels are an integral part of engine performance.1"

Our comments focus on responding to questions the agencies posed in the notice of proposed rulemaking regarding the benefits of high octane fuels. We also provide specific recommendations for the agencies: 1) to remove regulatory barriers restricting market access to midlevel ethanol blends and 2) to facilitate the transition to high octane fuels and advanced internal combustion engine technologies by leveraging existing high blend ethanol stations and vehicles.

The benefits of high octane fuel for consumers

EPA and NHTSA pose several questions in the proposed SAFE rule about how increasing the octane of fuel will benefit consumers and automakers. The two primary ways to increase the octane of motor fuel involve further refining petroleum, which requires more intensive operations and higher refinery costs, or increasing the volume of ethanol in a gallon of gasoline. Consumers and automakers will both benefit most from increasing the percentage of ethanol in gasoline.

Ethanol has a blending octane rating of nearly 113 and trades at a steep discount to gasoline. In many wholesale markets today, ethanol costs at least 60 cents per gallon less than gasoline. Retail prices for blends such as E15 routinely run 3 to 10 cents per gallon under regular E10 and 30 to 50 cents per gallon less than ethanol-free unleaded gasoline. Similarly, retailers who offer midlevel blends such as E30 price the fuel 15 to 20 cents per gallon less than regular E10 and 45 to 65 cents per gallon under ethanol-free unleaded gasoline.[2] What's more, according to weekly production data, U.S. ethanol producers are operating at an annualized rate of nearly 16 billion gallons, underscoring the fact that plentiful supplies of fuel ethanol are available now as a low cost and low carbon source of high octane fuel.

Oil refiners have testified before Congress in support of a transition to a new 91 Anti-Knock Index (AKI) fuel which is approximately the same as 95 RON. As we understand this push by refiners, it would limit ethanol's contribution to just 10 percent by volume, failing to help save consumers money at the pump. The new 95 RON fuel being proposed by refiners is most like today's premium (91-93 AKI) fuel. According to both the EIA and AAA, retail premium gasoline costs on average 50 cents per gallon more than regular unleaded. Consumers will not purchase a new high octane fuel with that price tag.

High octane blends comprised of 25 to 30 percent ethanol would help bring down the cost for consumers compared to the premium-priced octane level advocated by oil refiners. In comments submitted to the agencies by the Illinois and Missouri Corn Growers Associations during the midterm evaluation (MTE), evidence was provided to show that from 2012 to 2040, the retail cost of a gallon of high octane E25 fuel would average 4 cents less than the cost of regular E10 gasoline.[3] The research

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[1] The Safer Affordable Fuel-Efficient Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks. https://www.govinfo.gov/content/pkg/FR-2018-08-24/pdf/2018-16820.pdf

[2] Research by American Coalition for Ethanol staff.

[3] Illinois and Missouri Corn Grower Associations, Midterm Evaluation Comments, EPA-HQ-OAR-2015-0827-9090, Oct. 5, 2017, (Darlington research)

supported by the Illinois and Missouri Corn Growers Associations also indicated that over the lifetime of a model year 2025 vehicle with a fuel economy of 45 miles per gallon, a consumer would save $132.23 at the pump by using E25 instead of regular E10. Illinois and Missouri Corn Grower Associations submitted another study to the agencies during the MTE which predicts consumers would save $155 and $695 in fuel costs over the lifetime of a model year 2025 vehicle by using E25 instead of regular and premium E10, respectively.[4]

Ultimately, the agencies will need to examine the costs and benefits of a high octane fuel for consumers. We believe your examination of the facts will show what leading university and refinery data indicate; the benefits to consumers are significant if the high octane fuel blends are comprised of 25 to 30 percent ethanol. In fact, MIT researchers concluded widespread use of 98 RON E20 fuel in optimized vehicles would result in $12.63 to $18.69 billion in annual fuel savings by 2040.[5] Additionally, MathPro estimated widespread use of 97 RON E30 could lower annual aggregate wholesale gasoline costs by $6.4 billion in 2025 and by $11.7 billion in 2035.[6]

The benefits of high octane fuel for automakers

Ethanol delivers the highest octane at the lowest cost, allowing automakers to benefit by continuing to develop high-compression engine technologies and other product offerings to achieve efficiency improvements and reduced emissions. By 2025, according to the Energy Information Administration (EIA), more than 80 percent of all new gasoline vehicles sold in the U.S. will feature turbocharged engines. To prevent fuel detonation ("knocking"), these engines with higher compression ratios need to run on fuels with a higher octane rating."[7]

Indeed, 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:

- Mitch Bainwol, President and CEO of the Alliance of Automobile Manufacturers, made the following request of then-EPA Administrator Lisa Jackson in an October 6, 2011 letter. "Furthermore, to help achieve future requirements for the reduction of greenhouse gas emissions, <u>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</u>

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[4] "Comparing the Cost of Two Different Grades of High-Octane Motor Fuel in Future High Efficiency Vehicles," Dean Drake et al.

[5] "Economic and Environmental Benefits of Higher-Octane Gasoline." Raymond L. Speth, 48 Envtl. Sci. & Tech. 6561-6566 (2014)

[6] "Analysis of the Refining Costs and Associated Economic Effects of Producing 92 AKI Gasoline in the U.S. Refining Sector." MathPro. (2012)

[7] "Vehicle efficiency spurs premium gasoline sales, octane demand." September 7, 2016. Reuters Market Analyst John Kemp.

reduce base gasoline octane ratings in light of the additional octane contribution from higher ethanol." [8]

- 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." [9]

- Oak Ridge National Laboratory (ORNL) recently 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. [10] Later on, our comments will elaborate on the lifecycle GHG benefits of ethanol.

- 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." [11]

- Ford, FCA, 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 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. [12]

The evidence is clear. High-compression turbocharged engines will tolerate today's gasoline but engine efficiency and GHG reduction benefits are maximized with high octane fuel containing higher ethanol blends. We have already explained why today's premium fuel is not a solution because it provides inadequate octane at a cost-prohibitive price for consumers and automakers. However, higher blends of ethanol can cost-effectively contribute to a higher RON and heat of vaporization, properties which make

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[8] 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

[9] "CAFE Standards: What's Biomass Got to do with it?" Rebecca Chillrud. EESI. September 10, 2016.

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

[11] "High Octane Number Ethanol-Gasoline Blends: Quantifying the Potential Benefits in the U.S." Jim Anderson et al. Ford Motor Company. July 2012 http://www.sciencedirect.com/science/article/pii/S0016236112002268

[12] "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 & Technology*. 2015

98 to 100 RON comprised of 25 to 30 percent ethanol the ideal high octane fuel for mass-market consumption.

BMW has acknowledged this fact and already recommends the use of E25 (98 to 100 RON) in many models of the MINI Cooper and other vehicles. BMW took the initiative due to the CAFE-GHG standards and said, “it is MINI’s intention that all new models will be E25 compatible.”[13]

In response to BMW making the MINI Cooper E25 capable, a recent study by scientists at ORNL evaluated the effects of E10 and E25 use in modern vehicles equipped with turbocharged direct-injection engines. Oak Ridge tested 92 RON E10 (meeting Tier 3 test fuel requirements) and 98 RON E25 in a 2015 MINI Cooper S and a 2016 Ford F150. Fuel economy with E25 improved for several test conditions in both vehicles in the OEM condition. Following the installation of higher compression ratio pistons in the Ford F150, MPGe was improved 5 to 6 percent with E25. A statistically significant reduction in particulate matter (PM) was measured on the cold LA4 test in the F150 as was a reduction in carbon monoxide (CO).[14]

ORNL joined with the National Renewable Energy Laboratory and Argonne National Laboratory to release a comprehensive “Summary of High-Octane, Mid-level Ethanol Blends Study” in 2016.[15] Their research examined the GHG emission benefits of high octane midlevel ethanol blends, knock-resistance and ethanol blends, the economics of ethanol, and marketplace issues such as retail and terminal infrastructure. “The experimental and analytical results of this study considered together show that high-octane fuel, specifically mid-level ethanol blends (E25 to E40), could offer significant benefits for the U.S. These benefits include an improvement in vehicle fuel efficiency in vehicles designed and dedicated to use the increased octane. The improved efficiency of 5 to 10 percent could offset the lower energy density of the increased ethanol content, resulting in volumetric fuel economy parity of E25 to E40 blends with E10. Most of the flexible fuel vehicles on the road today would be expected to have faster acceleration using high-octane fuel, which offers a marketing opportunity in the near term. Furthermore, dedicated high-octane fuel vehicles would provide lower well-to-wheel GHG emissions from a combination of improved vehicle efficiency and increased use of ethanol. Refinery modeling suggests that refiners could use higher levels of ethanol to meet potentially high market shares of high-octane fuel. Analysis of the high-octane fuel market and the primary stakeholders 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.”

Interestingly, Ford’s Leone found that if the minimum octane rating of the fuel available to customers was increased, it may be technically feasible to update, or “reflash” the engine calibrations on existing

[13] “MINI Cooper Shares E25 Know-How with BMW,” Canadian Report on Fuel Ethanol, Volume 6, No. 5, September 14, 2016.

[14] “Effects of High-Octane E25 on Two Vehicles Equipped with Turbocharged, Direct-Injection Engines.” Brian West, Shean Huff, Larry Moore, Melanie DeBusk, Scott Sluder. Oak Ridge National Laboratory. September 2018.

[15] 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

legacy vehicles (non-flexible fuel vehicles) to extract the most benefit from the improved fuel properties. A lesser gain would be realized on most, if not all, vehicles without a calibration change.[16]

Smoothing the transition to high octane fuel and advanced engine technologies

There are approximately 22 million flexible fuel vehicles (FFVs) in the U.S. today.[17] The ideal way to transition from today's legacy fleet 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.[18] 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."

In addition to the use of FFVs as a vehicle bridge, existing E85 stations can be leveraged to enable nationwide midlevel ethanol blend fueling. More than 4000 E85 stations exist nationwide as infrastructure assets that have been developed through a highly-effective and longstanding partnership between the public and private sectors to expand market access for midlevel ethanol blends.

With respect to refueling infrastructure, it should also be noted that in 2009, Underwriters' Laboratory (UL) approved a certification for the UL-87A listed standard to include 87A-E25, which addresses gasoline and midlevel ethanol blends up to E25 (including E15).[19] UL is currently examining results of tests using higher ethanol blends in E25-listed equipment which may enable the certification of refueling infrastructure up to E40 in the near future. Furthermore, all retail fuel dispensers supplied by Wayne Fueling Systems are now compatible with and UL-listed to E25 as a standard feature.[20] Finally, other dispenser manufacturers warranty their basic equipment for up to 15 percent ethanol and offer E25 compatible versions for a few hundred dollars extra per dispenser. Simply put, retail infrastructure is not cost-prohibitive for midlevel ethanol blends.

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[16] "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 & Technology*. 2015

[17] According to figures from HIS Markit there are 21,818,980 registered Flexible Fuel Vehicles in the U.S. as of 2018.

[18] "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.
https://www.fueleconomy.gov/feg/pdfs/ORNL_High_Octane_Legacy_Vehicles_Report%28final%29.pdf

[19] "UL Announces a New Certification Path for Ethanol Fuel Dispensers" August 10, 2009.
http://www.ul.com/newsroom/pressreleases/ul-announces-new-certification-path-for-ethanol-fuel-dispensers/

[20] "Wayne Standardizes Offering for All North American Retail Fuel Dispensers to E25" August 30, 2016.
https://wayne.com/en/press-releases/2016-08-30-wayne-standardizes-offering-for-all-north-american-retail-fuel-dispensers-to-e25/

Automakers need compliance flexibilities for FFVs and high octane fuel vehicles

Previously these comments discussed how the 22 million FFVs on U.S. roadways coupled with E85 stations can bridge the transition from today's legacy fleet to new vehicles with advanced engine technologies designed to run optimally on a high octane fuel. However, to make this a reality, the agencies will need to restore compliance flexibilities for FFVs and provide new crediting mechanisms for high octane fuel vehicles (HOFVs).

For a variety of reasons, compliance flexibilities have not been applied consistently among the various technologies and fuel sources and have been variable over time. For example, EPA credits OEMs with a 0 gram per mile emissions factor for all electric powered vehicles (EVs) rather than accounting for the GHG emissions associated with the electricity generation that powers the vehicles. EVs therefore benefit from having energy storage systems that allow the vehicles to be powered by the burning of fossil fuels at a remote location, while internal combustion engines are held accountable for their fossil fuel emissions. In another inconsistency, the CAFE and GHG programs both provided robust credits for FFVs through model year 2015, but these incentives have now vanished.

According to Finding One of EPA's Manufacturer Performance Report for 2016, the elimination of FFV crediting was a major contributing factor that caused the automakers to swing from exceeding GHG program requirements in model year 2015 to generating deficits in the program beginning in model year 2016.[21] The reversal of federal policy on FFV crediting was particularly costly to U.S. automakers who invested billions of dollars to develop and certify hundreds of different FFV models and manufactured tens of millions of these vehicles only to see crediting revoked. In response to the boom in FFV production, retailers began offering E85 at their stations (often with state and federal government support) to fuel this new class of vehicles. Unfortunately, EPA reversed policy at the same time station expansion and customer awareness was occurring. It is now clear that customers are embracing E85 fuel with the largest E85 market in the country showing 30 percent year-on-year growth. California exercises close oversight over E85 sales with the California Air Resources Board (CARB) mandating monthly reporting of all E85 sales by authorized distributors. CARB has confirmed its oversight program and the rate of growth in a letter to the largest E85 supplier in California, Pearson Fuels.[22] The growth in demand for E85 from FFVs in the nation's largest market is remarkable, surging from less than 6.5 million gallons in 2012 to almost 24 million gallons in 2017.

The primary reason E85 use is on the rise in California and across the entire country is price. As stated previously, in some wholesale markets, ethanol costs approximately 60 cents less per gallon than gasoline. At the retail level, U.S. FFV owners can fill up on E85 and save on average 30 percent compared to ethanol-free regular unleaded. FFV owners previously unable to fuel with E85 because of limited availability are just now being exposed to these price advantages, not to mention the fact using E85 in FFVs provide real-world benefits including meaningful GHG reductions, a boost to the farm economy, and improved energy security.

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[21] U.S. EPA, "Greenhouse Gas (GHG) Emission Standards for Light-Duty Vehicles: Manufacturer Performance Report (2016)," Key Finding #1, at https://www.epa.gov/regulations-emissions-vehicles-and-engines/greenhouse-gas-ghg-emission-standards-light-duty-vehicles#key

[22] March 6, 2018 letter from Alexander Mitchell, Manager, Emerging Technologies Section, California Air Resources Board regarding E85 use, to Graham Noyes, Noyes Law Corporation. This CARB letter is to be submitted as an exhibit to the comment of Pearson Fuels to this proceeding.

We encourage the agencies to re-affirm the value of the FFV manufacturing programs that the automakers have established by restoring a meaningful credit or multiplier for future FFV production and establishing new compliance flexibilities for HOFVs. A fair crediting system will save American motorists money at the pump, reduce automaker costs, recognize real world GHG and petroleum reductions, and re-establish continuity in federal policy in support of the U.S. ethanol and agriculture sectors.

Additional environmental benefits of ethanol support the need for high octane fuel

While we have documented how adding ethanol to gasoline is a low-cost way to boost octane and achieve fuel efficiency gains in the engine technologies that are beginning to dominate the marketplace, there are other tangible air quality and environmental benefits to ethanol which should be considered by the agencies. This is especially important because the draft Environmental Impact Statement accompanying the SAFE rule predicts that freezing the CAFE-GHG standards as proposed would increase emissions of criteria air pollutants.

The CAFE-GHG standards do not need to cause adverse health effects or sacrifice the environment if the agencies help pave the way for higher ethanol blends to play a central role in the commercialization of high octane fuel. In general, increasing the percentage of ethanol in gasoline reduces evaporative and tailpipe emissions (including harmful volatile organic compounds), displaces sulfur and cancer-causing emissions from benzene and other petroleum-based aromatics, and reduces the potential for smog.

Ethanol also provides superior lifecycle GHG emission benefits compared to gasoline from petroleum. Nearly three decades ago, scientists at the U.S. Department of Energy's Argonne National Laboratory developed the Greenhouse gas and Regulated Emissions and Energy use in Transportation (GREET) model. The GREET model is used to calculate energy use and GHG emissions that occur during the full lifecycle production and combustion of all current and potential transportation fuels. The assumptions used by Argonne are under constant review and updates to the GREET model occur frequently, with the most recent update released this month.[23]

As a requirement with enactment of the Renewable Fuel Standard (RFS), EPA also had to conduct modeling of the lifecycle GHG emissions for various categories of renewable fuels. However, unlike the Argonne GREET model, EPA has not reviewed or updated their original (2010) corn ethanol GHG assessments. At that time, EPA estimated corn ethanol's carbon intensity was approximately equal to gasoline and that it would take until 2022 to be 20 percent below gasoline. In comparison, Argonne's scientists estimated that corn ethanol lifecycle GHGs were already 20 percent below gasoline in 2010.

In the past, we have encouraged EPA to update its lifecycle assessment for corn starch ethanol, but the Agency has always ignored this request. Today, we instead urge EPA to simply adopt the latest GREET model estimation for the lifecycle GHG emissions of corn ethanol. As previously indicated, GREET is under constant improvement and reflects the best-accepted science.

[23] https://greet.es.anl.gov/index.php

GREET is the gold-standard but even it has shortcomings. Earlier this year, ACE published a White Paper titled "The Case for Properly Valuing the Low Carbon Benefits of Corn Ethanol."[24] The primary purpose of the White Paper is to highlight the scientific evidence proving the lifecycle GHG emissions of corn ethanol are far lower (cleaner) than currently assumed by the GREET model. The ACE White Paper dissects GREET and makes recommendations for updates to more accurately reflect the low carbon attributes of ethanol.

One of our White Paper recommendations is for Argonne to account for the direct effect that each biofuel feedstock crop has on soil carbon stocks because soil carbon plays a significant role in GHG mitigation and climate change. Two key measurable facts contribute to this reality. First, corn production yield improvements (measured in bushels per acre) have been responsible for increasing unharvested carbon-rich biomass residue from corn plants than from any biofuel feedstock crop in the U.S.[25] Second, the United States Department of Agriculture (USDA) estimates U.S. farmers have reduced intensive farming and tillage practices by almost 50 percent since the 1970s.[26] The measurable increases in soil carbon resulting from the combination of higher corn yields and reduced-tillage shrink the lifecycle GHG emissions of corn ethanol.[27] If the GREET model accounted for the direct effect corn has on soil carbon stocks, the model would calculate a credit of 20 grams of CO_2 per mega joule for corn ethanol and reduce lifecycle GHG emissions of corn ethanol to just 19 grams of CO_2 per mega joule.[28]

While Argonne has yet to account for the effect individual biofuel feedstock crops have on lifecycle GHG emissions, one of the most important updates made to the 2018 version of the GREET model includes improving the Carbon Calculator for land use Change from Biofuels Production (CCLUB). By adding "U.S. average" for a baseline tillage practice, the GREET model now accounts for the fact most corn production systems use no-till and reduced-tillage farming practices, as noted in ACE's White Paper. Argonne has determined the "U.S. average" appears to consist of 16 percent no-till, 59 percent reduced-till, and 25 percent conventional till. Under the 2018 update, GREET indicates the lifecycle GHG emissions of U.S. average corn ethanol are now just 52 grams of CO_2 per mega joule, which is approximately 50 percent cleaner than the lifecycle GHG emissions of gasoline. We strongly encourage EPA to adopt the latest GREET model assessment of the lifecycle GHG emissions of corn ethanol, which will show it emits approximately 50 percent less than gasoline.

In conclusion, high octane fuel in the 98-100 RON range comprised of 25 to 30 percent ethanol would benefit consumers and enable automakers to reduce GHG emissions and improve fuel economy. Anything short of 98 RON E25 fails to maximize engine efficiency, GHG reductions, and consumer savings at the pump.

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[24]"The Case for Properly Valuing the Low Carbon Benefits of Corn Ethanol." American Coalition for Ethanol. 2018. https://ethanol.org/ethanol-essentials/low-carbon-benefits-of-corn-ethanol

[25] "Estimating Source Carbon from Crop Residues, Roots, and Rhizodeposits using the National Grain Yield Database." Jane Johnson et al. *Agronomy Journal*. 93(3). 622-636. (2006)

[26] https://www.ers.usda.gov/publications/pub-details/?pubid=44030

[27] "Corn Yields and No-till Affects Carbon Sequestration and Carbon Footprints." David Clay, et al. *Agronomy Journal*. 104(3). 763-770. (2012)

[28] Page 23, Figure 22. "The Case for Properly Valuing the Low Carbon Benefits of Corn Ethanol." American Coalition for Ethanol." 2018. https://ethanol.org/ethanol-essentials/low-carbon-benefits-of-corn-ethanol

ACE members make the following recommendations for removing regulatory barriers restricting market access to high octane midlevel ethanol blends:

1. EPA should establish or promote a minimum octane fuel rating in the range of 98 to 100 RON with 25 to 30 percent ethanol. While our preference would be for EPA to set a minimum octane rating in the SAFE rule, we recognize the Agency could also simply issue a statement of support for increasing the octane of fuel to send a signal to OEMs and other market participants.

2. EPA should propose or invite automakers to propose a certification fuel which corresponds with a 98 to 100 RON minimum octane rating with 25 to 30 percent ethanol for engine testing purposes. As part of the Tier 3 rulemaking, EPA identified E30 and higher ethanol blends as fuels which could help automakers increase compression ratios in engines to comply with fuel efficiency standards.[29] Ford and the Auto Alliance concurred with EPA, noting that high octane fuel containing higher ethanol blends have the potential to enable more efficient engines. EPA also acknowledged in the Tier 3 rulemaking that it has the authority to announce a new certification fuel, such as E30, or grant an application request for such a test fuel from an OEM. Moreover, EPA should clarify that "commercial availability" is not a condition for the approval of a new certification fuel.

3. EPA should phase out 85 AKI octane fuel. As EPA establishes a new minimum octane rating, the agency should begin the process of eliminating 85 AKI fuel sales in high elevation areas of the country because it is harmful to engines. EPA has the authority to set a minimum octane level under CAA §211(c)(1) because low octane gasoline impairs automakers' ability to increase compression ratios to reduce CO_2 emissions and meet GHG standards.

4. In order to re-establish continuity and consistency in CAFE and GHG crediting, save consumers money at the pump, reduce automaker costs, and achieve petroleum and GHG reduction goals, the agencies should integrate the following compliance flexibilities into the SAFE Rule:

    a. Under the CAFE program, NHTSA should establish the following crediting mechanisms:
        - For HOFVs and FFVs - Apply a petroleum-equivalency factor to a midlevel or E85 ethanol certification fuel, based on the gasoline portion of the fuel (e.g., 0.75 for E25; 0.15 for E85).
        - For HOFVs - Allow dual-certified vehicles to weigh the midlevel ethanol certification fuel results equally with the gasoline fuel results when calculating fuel economy.
        - For FFVs - Allow dual-certified vehicles to weigh the E85 certification fuel and gasoline fuel results proportionally based on the ethanol usage rate (F-factor) when calculating fuel economy.

    b. To extend similar regulatory treatment in the context of the GHG program, EPA should implement an approach that includes the following elements:
        - For HOFVs and FFVs - Revise the carbon-related exhaust emissions (CREE) formula to recognize that the ethanol portion of the MLEB or E85 fuel generates no net

[29] Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards, 79, Federal Register 23, 414, 23, 528-29. April 28, 2014.

carbon emissions, because ethanol is derived from carbon-neutral biomass that absorbs atmospheric carbon dioxide[30]; and

- For HOFVs only - Provide an incentive multiplier to encourage the sales of next-generation high octane fuel vehicles, as EPA already does to encourage electric vehicles.[31]

c. The most recent F-factor determination extends only to model year 2016-2018.[32] To enable crediting of FFVs beyond model year 2018, EPA must extend the current F-factor to model year 2025, or immediately issue draft written guidance regarding a proposed F-factor for model year 2019 and subsequent years. Because the EIA lacks national data regarding E85 use in FFVs,[33] the F-factor determination should be based on the data from CARB that has been submitted to the CAFE-GHG rulemakings showing that E85 use in California FFVs has tripled over the last five years.[34]

5. EPA should take three steps to update modeling and calculations, so ethanol is no longer penalized with respect to fuel economy or emissions.

   a. Correct the fuel economy equation (R-factor) used to certify vehicles operating on high-ethanol blends to at least 1.0.

   b. Credit ethanol's upstream GHG reductions or its displacement of petroleum as EISA 2007 permits.

   c. Correct the outdated MOVES2014 model used in calculating the GHG emissions of ethanol.

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[30] This approach to CREE is consistent with CARB's Cap-and-Trade treatment of ethanol supplied to vehicles in California as carbon neutral, see CARB's "Biomass-derived Fuels Guidance," at https://www.arb.ca.gov/cc/reporting/ghg-rep/guidance/biomass.pdf?_ga=2.74886933.648477309.1529685841-1395274998.1525713939

[31] For multipliers established for EVs, etc., see footnote 887 at page 43461.

[32] Letter of Byron J. Bunker, Director of Compliance Division, Office of Transportation and Air Quality, U.S. Environmental Protection Agency, "E85 Flexible Fuel Weight Factor for Model Year 2016-2018 Vehicles," (November 12, 2014) at https://iaspub.epa.gov/otaqpub/display_file.jsp?docid=33581&flag=1 (hereafter "EPA E85 F Factor Guidance for 2016-2018")

[33] EPA stated in the most recent F-factor determination, "In the calculation, total energy, total ethanol, and E15 volumes are fixed as inputs, while the E10 and E85 volumes float in order to absorb the total ethanol volume (Figure 2)." A review of the analysis reveals that the only EIA data supporting a fixed input is total ethanol, and EPA is left to speculate regarding at what blend level it is utilized in the marketplace. See Letter of Byron J. Bunker, Director of Compliance Division, Office of Transportation and Air Quality, U.S. Environmental Protection Agency, "E85 Flexible Fuel Weight Factor for Model Year 2016-2018 Vehicles," (November 12, 2014) at https://iaspub.epa.gov/otaqpub/display_file.jsp?docid=33581&flag=1.

[34] Comment Submitted on Behalf of Pearson Fuels RE: EPA Docket ID No. EPA-HQ-OAR-2015-0827, at https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-6600

6. EPA should adopt the latest GREET model assessment of the lifecycle GHG emissions of corn ethanol.

Thank you for your consideration of these comments.

Sincerely,

Brian Jennings, CEO
American Coalition for Ethanol

cc: CARB