



Growth Energy™
Expanding America's Bioeconomy

January 15, 2024

Liane M. Randolph
Chair
California Air Resources Board
PO Box 2815
Sacramento, CA 95812
Via online submission

RE: Comments in Response to the Proposed Changes to the Advanced Clean Cars II Regulation

Chair Randolph and Members of the Board:

Thank you for the opportunity to comment on potential changes to the Advanced Clean Cars II (ACCII) regulation. Growth Energy is the leading voice of America's biofuel industry, representing 96 ethanol plants producing more than 9 billion gallons of bioethanol annually, and 114 associate members related to the production process, and tens of thousands of biofuel supporters around the country. Our members operate and support biomanufacturing facilities at the heart of America's bioeconomy, delivering a new generation of plant-based energy and climate solutions. Our industry is working to bring better and more affordable fuel choices for consumers, improve air quality, and protect the environment for future generations.

We appreciate the Board's efforts to transform California's transportation sector to make it more sustainable through greenhouse gas and emissions reductions. Our industry believes in these goals as well. Bioethanol has played a crucial role in transportation sector emissions reductions, and we believe it will continue to contribute to emissions reductions for decades to come. According to the Transportation Energy Institute, bioethanol has led all biofuels to have been among the largest contributors to the success of California's emissions reductions through the Low Carbon Fuel Standard (LCFS).¹ To that end, we continue to urge the board to consider the vital role bioethanol will play in achieving the state's emissions reduction goals and reducing costs for consumers.

As we have noted in previous comments, bioethanol is a primary solution for reducing carbon and air toxics emissions in the state's liquid fuel supply. Data from Environmental Health and Engineering shows that bioethanol reduces greenhouse gas emissions by an average of 46 percent compared to gasoline and can provide even further GHG reductions with the utilization of readily available technologies.² The board has previously

¹ https://www.transportationenergy.org/wp-content/uploads/2023/07/Decarbonizing-Combustion-Vehicles_FINAL.pdf

² <https://iopscience.iop.org/article/10.1088/1748-9326/abde08/pdf>

recognized the contributions bioethanol can make to carbon reductions. In 2011, CARB reported the average carbon intensity (CI) for ethanol at 88 g/MJ. Through the end of 2022, the average recorded CI for bioethanol has decreased to 59.21 g/MJ, a 33 percent reduction in CI.³ Additional CI reductions are anticipated as projects of diverse technological variety at ethanol biorefineries come on-line starting this year.

Expanded use of higher bioethanol blends will allow the millions of internal combustion engine (ICE) vehicles remaining on the road beyond the implementation of the Board's 2035 rule requiring all new vehicle sales to be zero emission vehicles to continue contributing to the state's GHG reduction goals.

Bioethanol's other environmental benefits are also noteworthy. As has been researched by the University of California, Riverside and the University of Illinois at Chicago, the use of more bioethanol and bioethanol-blended fuel reduces harmful particulates and air toxics such as carbon monoxide, benzene, and other harmful particulates.⁴ The benefits of ethanol in reducing particulate matter (PM) were recently confirmed by the U.S. Environmental Protection Agency's (EPA) work with Environment and Climate Change Canada.⁵ That study demonstrated that fuel with increased ethanol content showed the deepest reduction in PM compared to the baseline fuel with heavy aromatics.

E15 and the Current Light-Duty Fleet

As we have noted previously, we continue to urge CARB to further develop clear policies that recognize the realities of today's fuel market and examine how homegrown biofuels can immediately contribute to achieving GHG reductions. Today, nearly all gasoline in California—and across the U.S.—is blended with 10 percent bioethanol. E15, a blend consisting of 15 percent bioethanol, has been approved for use by the EPA in all passenger vehicles model year 2001 and newer, more than 96 percent of the vehicles on the road today. It is now for sale at nearly 3,250 locations in 31 states. Not only is E15 available in 31 states, but several states acknowledge the environmental and economic benefits of it such that tax incentives are available for fuel retailers who sell it.

³ <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>

⁴ https://ww2.arb.ca.gov/sites/default/files/2022-07/E15_Final_Report_7-14-22_0.pdf and <https://erc.uic.edu/wp-content/uploads/sites/633/2021/08/THI-UIC-Gasoline-Cancer-Risk-Paper.pdf>

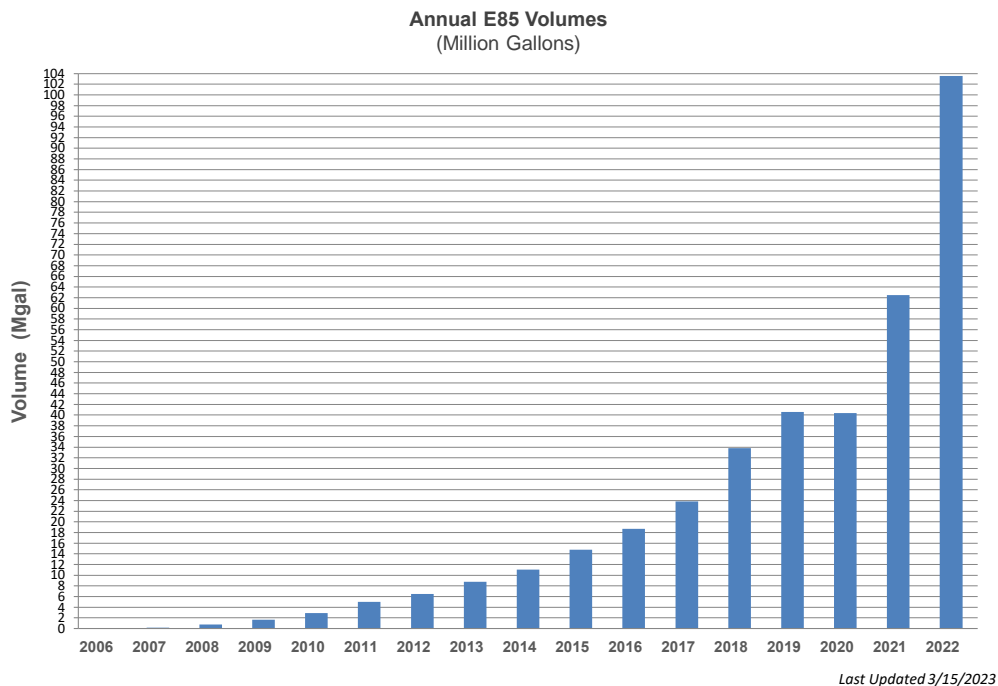
⁵ <https://www.epa.gov/moves/exhaust-emission-impacts-replacing-heavy-aromatic-hydrocarbons-gasoline-alternate-octane>

dispenser, 10-15 years, the vast majority of dispensers installed before 2008 have either been or are about to be replaced.

A study conducted by the Petroleum Equipment Institute in 2013 estimates the average conversion cost to a fuel retailer to provide E15 is \$1,000. This average number may now be even less as adoption of E15-compatible dispensers has been on-going since 2008.

E85 and Flex-Fuel Vehicles

Additionally, California’s existing approval of E85 has resulted in significant growth of it being used in flex-fuel vehicles (FFVs): more than 103 million gallons have been sold at 375 locations across the state in 2022 alone. Additionally, the current size of California’s FFV fleet stands at more than 1.3 million vehicles.⁹ The use of E85 will promote even greater reductions in GHG emissions and reductions of air toxics. We would continue to encourage CARB to implement policies that strongly incentivize and as necessary, require the production and use of flex-fuel vehicles, as well as continued investment in infrastructure for expanded access to E85 in the state. In doing so, the Board will be achieving multiple goals: improving air quality and GHG emissions, reducing the state’s dependence on fossil fuels, and providing consumers with an affordable choice to power their vehicles.



⁹ <https://afdc.energy.gov/vehicle-registration?year=2022>

High Octane/Midlevel Bioethanol Blends

As CARB considers the future fleet, it is important to consider the benefits of using higher octane fuels such as bioethanol in conjunction with more efficient engines. Growth Energy has been an industry leader in advocacy in this area, first commenting to both CARB and EPA about the need for higher octane, midlevel bioethanol blends when the GHG standards for vehicles were being first developed in 2012. At that time, we submitted a proposal for a 100 Research Octane Number (RON), E30 (30 percent bioethanol) fuel blend for both vehicle certification and for consumer use. The science supporting the benefits of a high-octane fuel -- specifically a midlevel ethanol blend in the E20 to E30 range in conjunction with a high compression ratio engine -- is not new and has been well explored by several national laboratories including Oak Ridge National Laboratory, National Renewable Energy Laboratory, and Argonne National Laboratory as well as automobile manufacturers and other scientific institutions. Bioethanol has a very high-octane number relative to other gasoline hydrocarbons, has a lower carbon content than the gasoline components it generally replaces, and has many other benefits that assist in combustion to increase engine efficiency and reduce both tailpipe GHG and criteria pollutant emissions.

To briefly summarize, multiple studies have shown that a high RON, midlevel bioethanol blend (e.g., 96-RON E20 or 100-RON E30) when paired with various higher compression ratio engines yield tailpipe CO₂ emissions reductions of at least 5 percent, which in most instances were also coupled with efficiency gains. Some studies also showed significant volumetric miles per gallon savings associated with the higher efficiency engines and a high-octane fuel. One study that was submitted to EPA in response to their Draft Technical Assessment Report (TAR) by Air Improvement Resources, "Evaluation of Costs of EPA's 2022-2025 GHG Standards with High Octane Fuels and Optimized High Efficiency Engines," showed that the use of a 98 RON, E25 would reduce the cost of a MY 2025 vehicle by \$400 and a popular crossover SUV by as much as \$873. Not only are the benefits of midlevel bioethanol blends well understood by the scientific community, but the automobile industry has for years acknowledged the importance of affordable, high-octane fuels coupled with high-compression ratio engines as important to attaining regulatory compliance and improving vehicle performance in the most economical manner possible.

When you examine the data, there are clear benefits of moving to a high-octane, midlevel bioethanol blend, such as E30, including vehicle engine efficiency, lower tailpipe emissions, and increased use of renewable fuel. We believe that the use of midlevel bioethanol blends will continue to drive investment in more efficient vehicles, as well as lower carbon biofuels.

Bioethanol/Fuel Cell Technology

Direct bioethanol fuel cells for the use in motor vehicle transportation have been in development by Nissan for some time. As recently as January of 2020, Nissan and Lawrence Berkeley National Laboratory have published research on the use of 100

percent bioethanol in fuel cell technologies and innovations.¹⁰ This technology not only meets zero emission vehicle requirements, but further eliminates particulates from tailpipe emissions. Using bioethanol in conjunction with a fuel cell would require less infrastructure change and investment and would help the state meet its ambitious goals for climate and vehicle. As CARB considers changes to policies on zero emission vehicles in conjunction with the LCFS, we would strongly encourage CARB to consider ways to further develop this technology for consideration.

As the board considers the proposed changes to ACCII, we would like to bring to the board's attention Growth Energy's comments to the EPA on the agency's proposed multi-pollutant emissions standards for model years 2027 and later light-duty and medium-duty vehicles. These comments, included after these comments, highlights the proposal's shortcomings and our recommendations to ensure biofuels are treated on the same level playing field as alternative technologies.

More broadly, we look forward to working as you work through the regulatory process to ensure the role of biofuels in making California's fuel mix more sustainable and help the state achieve its climate goals through the expanded use of bioethanol.

Thank you in advance for your consideration.

Sincerely,



Chris Bliley
Senior Vice President of Regulatory Affairs
Growth Energy

¹⁰ <https://eta.lbl.gov/publications/ethanol-internal-reforming-solid>



Growth Energy Comments on Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles

Docket ID: EPA-HQ-OAR-2022-0829

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July 5, 2023

TABLE OF CONTENTS

I.	Introduction	1
II.	The Benefits of Biofuels	3
III.	EPA Must Compare the Emissions from Electric Vehicles and Biofuels in a Rational Way	4
	A. The Proposed Rule Dramatically Misconstrues the Relative Lifecycle GHG Emissions of EVs and Biofuels.....	4
	B. There is No Rational Basis for the Disparate Treatment of EVs and Biofuels.....	6
	C. EPA Can and Should Conduct a Lifecycle Analysis for all Vehicles.	8
IV.	EPA Must Consider the Benefits of Biofuels and Higher Biofuel Blends Throughout the Rule.	10
	A. Other Pollutants	10
	B. Other Considerations	11
V.	The Proposed Rule’s Permanence and Stringency Make its Disparate Treatment of Biofuels and EVs More Problematic.	11
	A. The Impacts of the Proposed Rule are Much More Dramatic than in Previous Tailpipe Rules.	11
	B. The Proposed Rule is Arbitrary and Capricious and Outside of EPA’s Authority.....	12
VI.	EPA Should Establish or Expand Credits for Biofuels and Should Consider Other Measures to Encourage Greater Biofuel Use.	13
	A. Credits and Other Measures Under Section 202.....	13
	B. Options Outside of Section 202	14
VII.	Conclusion	15

I. Introduction

Growth Energy is the world’s largest association of biofuel producers, representing 93 biorefineries that produce nearly 9 billion gallons annually of low-carbon renewable fuel and 115 businesses associated with the biofuel production process. Growth Energy appreciates the opportunity to comment on EPA’s proposed Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles (“the Proposed Rule”).

While Growth Energy supports efforts to reduce emissions in the transportation sector, it cannot support the Proposed Rule. The Proposed Rule presents an unnecessarily constraining, binary choice between a static future of fossil-fuel-only vehicles and an improbable future of precipitously ramped-up electric vehicle (“EV”) production, sale, and use by 2032. But as EPA should already know, expanding the use of ethanol and other biofuels is a realistic and achievable third option that does not leave GHG emission reductions on the table.

Yet the Proposed Rule almost entirely ignores the GHG-reduction and other benefits of ethanol and other biofuels. Most significantly, it fails even to consider the upstream carbon *sink* that results from growing crops used in biofuels while simultaneously dismissing the upstream carbon *emissions* of building and powering EVs. EPA assesses the emissions lifecycles of two complex vehicle systems—EVs and internal combustion engine (“ICE”) vehicles—in a way that heavily puts the thumb on the scale in favor in EVs. First, although both EVs and ICE vehicles generate “upstream” emissions from vehicle and engine production and power generation, EPA dismisses this reality. Second, although ICE vehicles can run on a diverse range of fuels with vastly different GHG emissions profiles, EPA fails to consider this diversity when assessing “downstream” emissions from petroleum-based and biofuels-based vehicle systems. The result is a proposal that inaccurately treats EVs as if they generate zero grams per mile of carbon and just as inaccurately treats emissions from the use of biofuels the same as emissions from combusting petroleum fuels.

EPA’s failure to adequately incorporate the benefits of biofuels into its analysis of the comparative GHG emission profiles of EVs and ICE vehicles pervades the Proposed Rule. For example, EPA arbitrarily assumes that biofuels will stay at a constant percentage of the nation’s liquid fuel supply, ignores the potential of greater blends of biofuels in its cost and feasibility analyses, and fails to consider the potential for incentivizing greater biofuel use through credits. Of course, as the agency charged with administering the Renewable Fuel Standard, EPA is uniquely positioned to promote biofuels and increase their percentage of the nation’s transportation fuel supply, all in accordance with Congress’s understanding that renewable fuels must play a central role in reducing the impact of transportation-related GHG emissions.

The Proposed Rule’s blind spot for biofuels has major policy consequences. EPA misses an opportunity to further reduce emissions with a biofuel like ethanol that has 46 percent lower GHG emissions on average and is already in use in the vast majority of light-duty vehicles and fuels markets across the country. EVs are undoubtedly an important and growing technology, but not every consumer or business in the country can adopt EVs and not every electricity source in the country will be able to meet more stringent GHG emissions standards in the timeframe established in the proposal. The Proposed Rule thus would perversely incentivize EVs in regions

where electricity will continue to be generated from fossil fuels when incentivizing higher biofuel use in those areas instead could achieve greater emissions reductions.

The Proposed Rule is different in kind than EPA's prior tailpipe rules. For one, it makes permanent EPA's disregard of the upstream emissions of EVs, which prior rules promised would be temporary. And, more fundamentally, it will require manufacturers to primarily make EVs at the expense of ICE vehicles—including those that can use higher blends of biofuels. Effectively picking one greenhouse gas reduction technology to the exclusion of another is arbitrary and outside the scope of EPA's authority under Section 202 of the Clean Air Act. It is also inconsistent with Congress's directive in the 2007 EISA to establish and maintain a credit system for encouraging minimum levels of biofuel use.

There are several steps that EPA can and should take to address those deficiencies, both in the final rule and in other contexts:

- *First*, EPA should fix its system of scoring the emissions from vehicles, which both undercounts EV emissions and overcounts emissions from biofuels used in ICE vehicles. The most accurate way to do so would be by conducting a complete lifecycle analysis for BEVs—using the Argonne laboratory's GREET model or its equivalent—and compare that to a lifecycle analysis for ICE vehicles using various blends of liquid fuels. Alternatively, if EPA does not use a lifecycle analysis, it should at a minimum assign the portion of fuel used in ICE vehicles attributable to biofuels a value of zero g/mi in recognition of the fact that the carbon emitted from combusting biofuels is biogenic carbon sequestered from the atmosphere by crops.
- *Second*, EPA should account for the potential of higher blends of biofuels. At a minimum, EPA should use E15 as its test fuel and strongly promote E15 as an in-use fuel, because current ICE technology is capable of using E15. EPA should also adjust its methodology to account for increasing use of mid-level and higher-blend fuels such as E30 and E85. Fuels and vehicles act as a system, so naturally an improvement in fuels will help EPA achieve its emissions goals.
- *Third*, EPA should use credits to incentivize biofuel use in ICE vehicles. EPA can and should use its Section 202 authority to provide credits to manufacturers who create engines and other technologies that facilitate use of higher blends of ethanol and other biofuels. And, as part of or in addition to that program, EPA should award credits that are tied to actual use of biofuels in ICE vehicles.
- *Fourth*, EPA should also consider additional actions outside of Section 202 to further incentivize biofuel use. One such action would be to incentivize increased ethanol and other biofuel production through appropriate volumes under the Renewable Fuel Standard ("RFS") program. Another would be to establish a minimum octane standard and approve a high-octane, low-carbon mid-level ethanol blend, which would lower GHG emissions both by ensuring that ethanol makes up a greater part of the liquid fuel supply and by allowing auto manufacturers to manufacture more efficient engines.

II. The Benefits of Biofuels

In its extensive proposal and preamble, EPA included next to no analysis of the benefits ethanol and other biofuels. That omission is glaring because of the significant GHG-reductions and other benefits that biofuels offer.

To begin with, the carbon absorbed by agricultural crops when they grow means that the lifecycle emissions of biofuels are significantly lower than petroleum fuels. A recent meta-analysis by Harvard researchers that accounted for all aspects of the lifecycle emissions of corn ethanol concluded that ethanol reduces GHG emissions by **46 percent** compared to gasoline.¹ Recent developments in the biofuels industry, such as the increasing use of carbon capture and storage and clean power sources at biofuel production facilities, are helping to drive lifecycle emissions from biofuels even lower.² And innovative “climate smart” agricultural practices continue to increase yields while minimizing inputs and lower the GHG emissions from biofuels feedstock production as well.

Ethanol also has lower emissions of numerous other pollutants. To begin with, ethanol boosts octane in fuel without the harmful impacts of alternative octane-boosting fuel additives such as methyl tert-butyl ether (MTBE), lead, and aromatics (including benzene, toluene, ethylbenzene, and xylene) or olefins. Indeed, the level of aromatics in fuel decreases by about seven percent for every 10 percent by volume increase in ethanol content.³ Decreasing aromatics in fuel has direct impacts on tailpipe emissions, with higher-ethanol fuels resulting in lower emissions of black carbon (BC), particle number (PN), benzene, toluene, ethylbenzene, m/p-xylene and o-xylene (BTEX), and olefins.⁴ Using higher blends of ethanol also reduces total hydrocarbon (THC), carbon monoxide (CO), and particulate matter (PM) emissions. For PM emissions in particular, recent studies have demonstrated substantial benefits from higher blends of ethanol in fuel.⁵

Biofuels also provide significant flexibility in achieving GHG emissions goals because they can be used in existing ICE vehicles and fueled at existing gas stations. Consumers and operators of fleets around the country have the ability to use more biofuels. To the extent that some upgrades are necessary to facilitate storage and fueling with higher blends, the marginal cost of doing so is minimal. The carbon-reduction benefits of biofuels are therefore achievable in the near-term even without the massive expansion in electricity generation (and low-carbon electricity generation in particular) that will be required to power EVs.

¹ Scully, et. al., *Carbon intensity of corn ethanol in the United States: state of the science* 16 Environ. Res. Lett. 043001 (2021).

² Growth Energy, *Putting Carbon to Work: Biorefineries' Critical Contributions to Net-Zero*, <https://growthenergy.org/wp-content/uploads/2022/06/GROW-22019-Issue-Brief-Carbon-Capture-2022-06-22-R8.pdf>.

³ Kazemiparkouhi et al., *Comprehensive US database and model for ethanol blend effects on regulated tailpipe emissions*. 812 Science of The Total Environment 151426, (Mar. 2022).

⁴ MacIntosh, et al., *Response to Proposed Renewable Fuel Standard (RFS) Program Standards for 2023–2025*, Environmental Health & Engineering (Feb. 10, 2023).

⁵ See Karavalakis, Durbin, & Tang, Final Report, *Comparison of Exhaust Emissions Between E10 CaRFG and Splash Blended E15*, Prepared for: California Air Resources Board (CARB), Growth Energy Inc./Renewable Fuels Association (RFA), and USCAR (Jan. 2022).

In contrast, it is not as simple to convert to EV technology. Doing so at scale requires massive investments in both charging infrastructure and the electric power sufficient to support massive new electricity demand. Developing sufficient charging infrastructure can be difficult in rural areas and in locations where there are competing land uses. And developing additional electric power faces multiple challenges—the country will need significantly more electric capacity and, for EVs to have their intended GHG reduction benefits, that additional electric generation will need to be relatively low-carbon. For example, converting vehicles used in the Appalachian region rapidly to EVs and powering them by increasing loads on existing coal-fired power plants would not have the significant benefits claimed by the proposed rule.

So, while EVs should be a part of the solution to decarbonizing the transportation sector, they are not the complete answer and need additional time to develop. It is neither cost-effective nor optimal to reduce emissions by shifting almost all new cars to EV technologies at the rate contemplated in the Proposed Rule when biofuels are a proven, effective solution. EPA should not ignore the significant role that biofuels can play in both the near- and long-term as part of a low-carbon transportation system.

III. EPA Must Compare the Emissions from Electric Vehicles and Biofuels in a Rational Way.

A. The Proposed Rule Dramatically Misconstrues the Relative Lifecycle GHG Emissions of EVs and Biofuels.

The Proposed Rule's emission standard for GHGs is doubly inaccurate—it both severely underestimates emissions from EVs and overestimates emissions from biofuels. EPA has previously acknowledged the severity of its undercounting of GHG emissions from EVs:

The zero grams/mile compliance value for EVs ... does not reflect the increase in upstream GHG emissions associated with the electricity used by EVs compared to the upstream GHG emissions associated with the gasoline or diesel fuel used by conventional vehicles. For example, based on GHG emissions from today's national average electricity generation (including GHG emissions associated with feedstock extraction, processing, and transportation) and other key assumptions related to vehicle electricity consumption, vehicle charging losses, and grid transmission losses, a midsize EV might have an upstream GHG emissions of about 180 grams/mile, compared to the upstream GHG emissions of a typical midsize gasoline car of about 60 grams/mile. Thus, the EV would cause a net upstream GHG emissions increase of about 120 grams/mile (in general, the net upstream GHG increase would be less for a smaller EV and more for a larger EV).

75 Fed. Reg. 25,324.

And that estimate of 120 grams/mile for EVs' upstream emissions does not even account for emissions associated with production of batteries. Recent research has increasingly revealed that there are significant GHG emissions associated with the mining of materials for production

of batteries used in EVs.⁶ For example, mining nickel alone requires both significant fossil energy expenditures and GHG emissions associated with land use, including the clear-cutting of rainforest in Indonesia.⁷ When compared to production of an ICE vehicle on a cradle-to-grave basis, those emissions represent another source of emissions from EVs that are not addressed in EPA's assumption that EVs produce zero grams per mile of GHGs.

Indeed, a recent National Academy of Sciences ("NAS") assessment explained that an approach like EPA's fails to "fully capture" emissions from "the total light-duty vehicle system."⁸ NAS noted that one issue of that type of non-system-based analysis is that it would lead to inaccurate comparisons between vehicles using different fuels.⁹ And NAS further opined that:

[I]f deep GHG emissions reduction is a goal, then there will need to be consideration of not only onboard vehicle emissions, but also the emissions from related sectors, like electricity (for vehicle charging), and manufacturing (of vehicles and their materials and components). This motivates the need for life cycle thinking.¹⁰

Moreover, EPA has not acknowledged the inaccuracy of failing to account for the carbon absorbed by biofuel feedstocks when they are grown. Because all of the carbon emitted from a tailpipe is sequestered by crops while they grow, EPA's emissions values assigned to ICE vehicles using biofuels misses dramatically in the other direction.

The fundamental scientific reality that emissions from combusting biofuels is offset by crops' absorption of carbon is reflected in other EPA programs like the Renewable Fuel Standard program. There, emissions from combustion of biofuels in a vehicle are excluded in lifecycle analyses because "[o]ver the full lifecycle of the fuel, the CO₂ emitted from biomass-based fuels combustion does not increase atmospheric CO₂ concentrations, assuming the biogenic carbon emitted is offset by the uptake of CO₂ resulting from the growth of new biomass." 74 Fed. Reg. 24,904, 25040 (May 26, 2009). Similarly, the IPCC excludes emissions from combustion of fuels from biogenic sources when assessing national or sectoral carbon emissions. *See* 2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol. 2 at 2.3.3.4.

EPA's failure to recognize biofuels' upstream carbon benefits leads to absurd results in the context of the Proposed Rule. For example, a 2019 MIT study found that, when accounting for emissions from all aspects of a vehicle's manufacturing, fueling, and use, EVs emitted about 200 grams/mile over their lifetimes, compared to about 350 grams per mile for gasoline powered cars, for an emissions reduction of about 43 percent.¹¹ That emissions reduction is very similar

⁶ *See, e.g.,* Catherine Early, *The new 'gold rush' for green lithium*, BBC News (Nov. 24, 2020) <https://www.bbc.com/future/article/20201124-how-geothermal-lithium-could-revolutionise-green-energy>.

⁷ Jon Emont, *EV Makers Confront the 'Nickel Pickle'*, Wall Street Journal, June 4, 2023.

⁸ National Academy of Sciences (NAS), *Assessment of Technologies for Improving Light-Duty Vehicle Fuel Economy—2025-2035* at 13-416 (2021).

⁹ *Id.*

¹⁰ *Id.*

¹¹ Massachusetts Institute of Technology, *Insights into Future Mobility* (2019), available at <https://energy.mit.edu/wp-content/uploads/2019/11/Insights-into-Future-Mobility.pdf>

to the 46 percent reduction of 100 percent ethanol compared to petroleum.¹² Yet, the Proposed Rule would treat an EV as emitting *zero* GHGs while treating an ICE vehicle running on 100 percent ethanol as having the *same lifecycle GHG emissions as petroleum*.

Regional differences in electricity generation and the fuel efficiency of certain ICE vehicles can make the Proposed Rule’s comparison even more absurd. For example, driving a flex-fuel vehicle that can run on E85 would have significantly lower GHG emissions than using an EV in a state like West Virginia where electricity is generated largely from combustion of coal.¹³ Indeed, driving a highly fuel-efficient ICE vehicle or non-plug-in-hybrid like a Toyota Prius with higher blends of biofuels would compare favorably in those circumstances.¹⁴ Yet, the proposal would still treat EVs as emitting no GHGs and biofuels as achieving no emissions reductions.

B. There is No Rational Basis for the Disparate Treatment of EVs and Biofuels.

EPA is by no means constrained to consider only emissions from the tailpipe in Section 202 of the Act. EPA itself has already concluded as much, explaining in response to a comment on a prior tailpipe rule that:

EPA disagrees with Nissan that excluding upstream GHGs is legally required under section 202(a)(1). In this rulemaking, EPA is adopting standards under section 202(a)(1), which provides EPA with broad discretion in setting emissions standards. This includes authority to structure the emissions standards in a way that provides an incentive to promote advances in emissions control technology. This discretion includes the adjustments to compliance values adopted in the final rule, the multipliers we proposed, and other kinds of incentives.

75 Fed. Reg. at 25,437.

EPA’s statutory analysis is correct. Section 202(a) broadly authorizes EPA to establish “standards” applicable to harmful pollutants emitted from new motor vehicles. Despite the colloquial framing of rules promulgated under Section 202 as “tailpipe rules,” nothing about Section 202 constrains the standards EPA may set to apply strictly standards that affect the amount of a pollutant emitted from the tailpipe of a vehicle. In the past, EPA has used Section 202 to create a variety of types of standards and incentives related to non-tailpipe aspects of motor vehicle, like air conditioning efficiency credits and off-cycle credits.

Indeed, EPA has already created a methodology for accounting for upstream emissions from EVs; prior light-duty vehicle rules committed to begin accounting for upstream emissions above a certain cap in future years. *See, e.g.,* 77 Fed. Reg. 62624.

¹² Scully, et. al., *Carbon intensity of corn ethanol in the United States: state of the science* 16 Environ. Res. Lett. 043001 (2021).

¹³ See Massachusetts Institute of Technology, *Insights into Future Mobility* (2019), available at <https://energy.mit.edu/wp-content/uploads/2019/11/Insights-into-Future-Mobility>.

¹⁴ *Id.*

EPA provided the following example of how that emissions accounting would work for a Nissan Leaf:

- A measured 2-cycle vehicle electricity consumption of 238 watt-hours/mile over the EPA city and highway tests
- Adjusting this watt-hours/mile value upward to account for electricity losses during electricity transmission (dividing 238 watt-hours/mile by 0.935 to account for grid/transmission losses yields a value of 255 watt-hours/mile)
- Multiplying the adjusted watt-hours/mile value by a 2030 EV/PHEV electricity upstream GHG emissions rate of 0.534 grams/watt-hour at the power plant (255 watt-hours/mile multiplied by 0.534 grams GHG/watt-hour yields 136 grams/mile)
- Subtracting the upstream GHG emissions of a comparable midsize gasoline vehicle of 41 grams/mile to reflect a full net increase in upstream GHG emissions (136 grams/mile for the EV minus 41 grams/mile for the gasoline vehicle yields a net increase and EV compliance value of 95 grams/mile).

Id. at 82,822. While that methodology is a simplification of the upstream emissions to a certain extent, it is an easily workable estimate for the upstream emissions from EVs. EPA could and should, at a minimum, use that approach or a similar one to account for EV emissions for 2027 and later years in this rule.

Yet, EPA backed away from its promise to account for upstream emissions in the 2020 rule, and it has now proposed to make the continued lack of any such accounting “permanent.” 88 Fed. Reg. at 29,252. EPA articulated two purported reasons for doing so: (1) that its regulations have “functioned as intended” without any upstream accounting by “encouraging the continued development and introduction of electric vehicle technology,” and (2) that upstream emissions are “addressed by separate stationary source programs.” *Id.*

Neither of those justifications is a rational reason to continue deliberately underestimating the emissions from EVs. To begin with, while it is true that systematic underestimates of emissions incentivize EV development, this ignores the fact that they *disincentivize* development in other promising GHG-reduction technologies like biofuels. By incentivizing one technology to the exclusion of others, EPA is reducing an opportunity to develop different technologies that will be appropriate for more applications across the country.

And the fact that upstream emissions are addressed by stationary source permitting programs is no justification at all. Those programs help reduce emissions but do not eliminate them—EPA’s rule still fails to estimate the true lifecycle emissions from EVs even when considering that power plants must get Title V, PSD, and NSPS permits.

EPA also points out that, if it estimated upstream emissions from EVs, “it would appear appropriate to do so for all vehicles, including gasoline-fueled vehicles.” 88 Fed. Reg. at 29,252.

That’s right—EPA should compare apples to apples. But that additional burden of estimating another set of upstream emissions is no reason not to do it. By comparing the lifecycle emissions of EVs and the lifecycle emissions of ICE vehicles, EPA could much better align the incentives provided by its tailpipe rules with the real world.

C. EPA Can and Should Conduct a Lifecycle Analysis for all Vehicles.

The best way to address the Proposed Rule’s inaccurate assessment of emissions would be to conduct a lifecycle analysis for all vehicles covered by the rule. That analysis should fully assess the upstream emissions from production of the vehicle, the upstream emissions associated with the vehicle’s fuel source, any upstream sinks of carbon (*e.g.*, uptake of carbon by growing crops), and the emissions from the vehicle itself. Assessing emissions on that type of lifecycle, cradle-to-grave basis would ensure that all components of a vehicle’s emissions are appropriately accounted for and compared to other types of vehicles.

In particular, EPA should assess lifecycle emissions based on the Argonne National Laboratory’s Greenhouse Gas and Regulated Emissions and Energy Use in Transportation (“GREET”) model. GREET is a state-of-the art model for assessing lifecycle emissions that incorporates the latest scientific consensus on modeling and latest data and assumptions on important variables, like induced land-use change (“ILUC”). It is “continually updated by world-class researchers ... provides reliable calculations of life-cycle energy and emissions related to transportation, and accounts for a wide range of conventional and emerging energy systems and vehicle technologies.”¹⁵ Some other models currently in use include estimates for ILUC that are outside the scientific consensus on the “credible range” for land use change induced by crops like corn grown in the United States.¹⁶ GREET’s ILUC value for corn ethanol of 7.4 gCO₂e/MJ is solidly within the credible range of ILUC values identified in a recent meta-analysis by researchers at Harvard University.¹⁷

Tellingly, GREET is already used in numerous applications by EPA and across federal and state agencies. For example, it is a central component of the EPA’s assessment of lifecycle emissions under the RFS program. And it has been adapted by California’s Air Resources Board for use in assessing pathways under California’s Low Carbon Fuel Standard (“LCFS”) program.

When assessing lifecycle emissions of ICE engines under a GREET-based approach, EPA must appropriately and accurately consider the emissions of biofuels. In particular, to adequately assess the emissions of biofuels going forward, EPA should assume increasing use of biofuel blends in future years. While the prevailing mix of ethanol in the nation’s gasoline supply is currently E10, E15 is being increasingly adopted, and efforts to change to Reid Vapor Pressure (“RVP”) requirements are likely to further spur its adoption. EPA should also assume that increasing amounts of E30 and E85 can be used in the future. The marginal cost of converting

¹⁵ U.S. Department of Energy, *GREET: The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model* (May 16, 2019), <https://www.energy.gov/eere/bioenergy/articles/greet-greenhouse-gases-regulated-emissions-and-energy-use-transportation>.

¹⁶ Scully, et. al., *Carbon intensity of corn ethanol in the United States: state of the science* 16 Environ. Res. Lett. 043001 (2021).

¹⁷ See *id.* (identifying the credible range as between -1.0 and 8.7 gCO₂e/MJ).

fueling stations and other infrastructure to accommodate E85 is low, so its use could easily be expanded with appropriate incentives.

If EPA is unable to incorporate lifecycle analysis for all vehicles by the time it intends to publish the final rule, an interim alternative would be to simply treat the emissions from the biofuels used in ICE vehicle as zero grams per mile. That solution would be only a partial one because it would not compare, for example, the emissions associated with creating batteries for EVs to the emissions associated with constructing ICE vehicle engines. But it would at least address the glaring inconsistency of the treatment of EVs and the treatment of biofuels. And using such an assumption would be consistent with GREET, which treats the tailpipe GHG emissions from biogenic sources as zero because they net out with the carbon absorbed by crops. It would also be consistent with several of EPA's prior statements on emissions from biogenic sources, like its 2018 policy with respect to the combustion of woody biomass.¹⁸ If EPA adopts that short-term fix in this final rule, it should nonetheless finalize a system for conducting a lifecycle analysis as soon as possible, rather than waiting to incorporate it until the time period covered by the current rule ends after 2032.

One way to recognize the GHG benefits of biofuels would be to reinstate the Vehicle Conversion Factor ("VCF") for FFVs. Through 2015, EPA used the following formula through which the carbon emissions of FFVs were multiplied by the VCF to reflect the lifecycle greenhouse gas benefits of ethanol use. The formula, which was phrased in terms of Carbon Related Exhaust Emissions ("CREE"), was:

$$\text{CREE} = (F \times \text{CREEE85} \times \text{VCF}) + ((1 - F) \times \text{CREEgas})$$

40 CFR 600.510-12(j)(2)(iv)(B). Through model year 2015, the VCF was established at .15. This is appropriate given that the tailpipe emissions from the ethanol portion of E85 (nominally 85% of the fuel) can be considered to net out with the carbon sequestered by the corn used to produce the ethanol. As noted above, RFS calculations have assumed no tailpipe GHG emissions for ethanol when calculating lifecycle emissions for that reason. EPA should therefore use a VCF of .15 (based on the Congressional level set under the CAFE standards) or such other level as EPA considers reflects the lifecycle greenhouse gas benefits of ethanol.

Reinstating VCF for FFVs would be only one potential step. EPA should ensure that it accounts for the GHG emissions reductions of all biofuels, including those used in lower blends like E10, E15, and E30. The best way to do that would be to conduct a lifecycle analysis for EVs and a lifecycle analysis for ICE vehicles that examines the impact of different blends of biofuels, including projecting an increase in biofuel blending in future years.

EPA should ensure that its tailpipe rule maximizes emissions reductions and minimize costs. Appropriately accounting for the lifecycle GHG emissions of vehicles would eliminate unintended consequences like incentivizing fossil hydrogen over low-carbon biofuels. And it would align the incentives provided by EPA's tailpipe rule with an accurate calculation of

¹⁸ EPA, *EPA's Treatment of Biogenic Carbon Dioxide (CO₂) Emissions from Stationary Sources that Use Forest Biomass for Energy Production* at 6 (Apr. 23, 2018), available at https://www.epa.gov/sites/default/files/2018-04/documents/biomass_policy_statement_2018_04_23.pdf.

lifecycle GHG emissions so that the market can achieve the greatest emissions reductions in the most efficient way. For some vehicle needs and local markets, that may be investing in EVs, but in others it may be investing in vehicles with efficient ICE engines that can and do use higher biofuel blends.

IV. EPA Must Consider the Benefits of Biofuels and Higher Biofuel Blends Throughout the Rule.

In addition to treating biofuels unfairly and inaccurately when assessing GHG emissions compared to EVs, EPA systematically ignores the benefits of biofuels throughout the Proposed Rule. In the vast majority of the proposal, EPA assumes a binary choice between petroleum fuels and EVs. And when EPA does include any consideration of ethanol, it fails to explore the potential of higher blends—it assumes that all gasoline contains and will always contain at most E10.

A. Other Pollutants

In discussing the impacts of the rule on emissions of other pollutants, EPA entirely leaves out consideration of biofuels. As discussed above, ethanol has lower emissions of many pollutants than petroleum gasoline. Indeed, recent studies by the University of California Riverside and the University of Illinois at Chicago found that use of more ethanol and ethanol-blended fuel significantly reduces harmful pollutants such as particulate matter (PM), carbon monoxide, and benzene.¹⁹ Just as with GHGs, that failure renders EPA’s assessment of emissions of other pollutants inaccurate. And just as with GHGs, EPA misses an opportunity to reduce emissions through incentivizing biofuel use.

That failure is particularly egregious in the context of EPA’s efforts reduce aromatics in petroleum fuels that contribute to PM emissions. 88 Fed. Reg. at 29,401. As discussed above, ethanol has an excellent octane rating, and blending it into gasoline in greater quantities can therefore allow reductions in aromatics and associated PM emissions. EPA explicitly sought comment on ways to reduce aromatic content, but it completely ignored that increasing the ethanol content of gasoline is a simple way to do so that has significant benefits. Multiple studies continue to show that increasing ethanol content in gasoline reduces PM emissions.²⁰ Indeed, the benefits of ethanol in reducing PM were recently confirmed in EPA’s own work with Environment and Climate Change Canada.²¹ In that study, fuel with increased ethanol content showed the deepest reduction in PM compared to the baseline fuel with heavy aromatics. Growth Energy therefore urges EPA to explore the widespread use of higher ethanol blends to replace heavy aromatics to significantly reduce PM emissions.

¹⁹ Patrick Roth et al., *Investigating the Effect of Varying Ethanol and Aromatic Fuel Blends on Secondary Organic Aerosol (SOA) Forming Potential for a FFV-GDI Vehicle: Comparison of Exhaust Emissions Between E10 CaRFG and Splash Blended E15*, University of California Riverside (2018); Steffen Mueller, *The Impact of Higher Ethanol Blend Levels on Vehicle Emissions in Five Global Cities*, University of Illinois at Chicago Energy Resources Center (November 2018).

²⁰ Growth Energy has provided such studies in previous submissions to EPA, including our comment in support of EPA’s proposal to implement the “Request from States for Removal of Gasoline Volatility Waiver.”

²¹ EPA, *Exhaust Emission Impacts of Replacing Heavy Aromatic Hydrocarbons in Gasoline with Alternate Octane Sources* (Apr 2023), Dkt ID: EPA-420-R-23-008.

B. Other Considerations

EPA also continues to ignore biofuels in other parts of its proposal and preamble. To give just a few examples, EPA ignores biofuels entirely or fails to examine the impacts of different blends in the following ways:

- EPA considers impacts of the proposed rule on employment in the petroleum industry, but not in the biofuels industry. *Id.* at 29,393.
- EPA considers the energy security risks of petroleum fuels, but not the energy security benefits of biofuels. *Id.* at 29,388.
- EPA uses a Tier 3 test fuel that is 10 percent ethanol and makes no effort to quantify how GHG emissions reductions would be altered by different levels of use of E15, E85, or other biofuel blends. *Id.* at 29,240.

EPA is therefore failing entirely to look at an important consideration in numerous places throughout the proposal. That failure is inexcusable given that E15 use is currently increasing in use around the country, and EPA itself has undertaken to allow for year-round sale of E15. In the final rule, EPA should consider all of the benefits of biofuels—and consider the impacts of incentivizing adoption of higher blends—in each of its analyses of costs, benefits, and impacts.

In particular, EPA should ensure that its test fuel is not limited permanently only to E10. It should instead project increasing biofuel use going forward, and it could potentially test with multiple different blends based on different projected scenarios of biofuel adoption across the country. Doing so will ensure that the test fuel reflects the growing range of options for ethanol use across the country.

V. The Proposed Rule's Permanence and Stringency Make its Disparate Treatment of Biofuels and EVs More Problematic.

A. The Impacts of the Proposed Rule are Much More Dramatic than in Previous Tailpipe Rules.

While previous tailpipe rules have made similar mistakes in failing to properly estimate emissions from biofuels and EVs, the impacts of the Proposed Rule are much greater, for two reasons.

First, EPA's decisions in prior rules not to account for the upstream emissions of EVs were characterized as temporary. In 2012, EPA committed to accounting for upstream emissions above a certain cap for each automaker starting in model years 2022 through 2025. 77 Fed. Reg. at 62,822. EPA later extended the time period of not accounting for upstream emissions through 2026, but it still indicated that such treatment would be temporary. *See* 86 Fed. Reg. at 74,446. In contrast, the proposed rule is clear that EVs would be considered to emit zero grams per mile

permanently. 88 Fed. Reg. at 29,252. Permanence changes the nature of and basis for that decision.

There may have been some justification for previously treating EVs as emitting zero grams per mile on a temporary basis. When EVs were in their relative infancy and needed some assistance to become better established, EPA could credibly assert that it was rational to give EVs an additional boost relative to other vehicles by conducting a skewed assessment of their emissions. Similarly, it would have been understandable if EPA had needed some time after EVs were introduced into commerce on a wider scale to best determine how to calculate their upstream emissions. But both of those excuses are now gone. EPA has already had over a decade since it promised in 2012 to account for upstream emissions of EVs in the future, and manufacturers have had that same amount of time with a thumb on the scale in their favor to ramp up their production.

Second, the proposed rule's stringency makes the impact of EPA's failure to consider both the upstream carbon sinks of biofuels and the upstream carbon emissions of EVs much greater. To date, EPA's tailpipe rules have incentivized EVs at the expense of other technologies, but they have done so in a manner that left room for other vehicles and fuels to play an important part in meeting the country's transportation needs. Today, EPA is putting all of its eggs in the EV basket. The only compliance scenario EPA discusses in the proposal would require more than two-thirds of all new vehicles to be EVs by 2032 (and, if it continues on its current trajectory, the percentage will presumably climb from there). That dramatic shift to EVs is fundamentally different than in prior rules. It disincentivizes biofuel use, even where biofuels could help reduce GHG emissions and be more suited to certain applications, like providing a low-carbon option in areas without sufficient charging infrastructure or with a carbon-intensive electric grid.

B. The Proposed Rule is Arbitrary and Capricious and Outside of EPA's Authority.

EPA failed entirely to consider both the upstream emissions of EVs and the emissions reductions of biofuels as part of a rule that will shift new vehicle production dramatically towards EVs. By doing so, EPA "failed to consider an important aspect of the problem," a hallmark of arbitrary and capricious rulemaking under the APA. *Motor Vehicle Manufacturers Association v. State Farm Auto Mutual Insurance Co.*, 463 U.S. 29, 43 (1983).

Moreover, whether EPA has authority to require what amounts to a mandate to shift mainly to EVs across the country presents a "major question." *See West Virginia v. EPA*, 142 S. Ct. 2587, 2595 (2022). And Section 202 of the Clean Air Act does not provide the necessary "clear congressional authorization" for a regulation with such a fundamental economic and practical impact on U.S. citizen's lives. Section 202 gives EPA authority to set "standards" that relate to particular air pollutants, not the authority to pick an entire set of vehicles over another. 42 U.S.C. § 7521(a). But the latter is exactly what EPA is proposing. The proposal's very stringent standard, combined with EPA's decision to both underestimate the emissions from BEVs and overestimate the emissions from biofuels, means that the *only* way for auto

manufacturers to comply is to shift rapidly towards producing primarily EVs. If finalized in its current form, the proposal would exceed EPA's Section 202 authority under *West Virginia*.

EPA's proposal also conflicts with Congress's instructions to incentivize greater biofuel use in the 2007 EISA. That statute, which established the Renewable Fuel Standard ("RFS") program, requires refiners and importers of petroleum fuels to blend increasing percentages of biofuels into their products. *See* Clean Air Act §211(o), 42 U.S.C. § 7545(o). So, not only does Section 202 not give any indication that Congress delegated EPA authority to effectively mandate EV usage, Section 211(o) demonstrates that Congress spoke clearly to the contrary. EPA cannot ignore Congress's instructions in one part of the Clean Air Act to better fit its policy preferences under another part.

VI. EPA Should Establish or Expand Credits for Biofuels and Should Consider Other Measures to Encourage Greater Biofuel Use.

A. Credits and Other Measures Under Section 202

Simply addressing EPA's errors regarding the lifecycle emissions of biofuels and EVs will not sufficiently drive biofuel use in a manner consistent with Section 202 and the RFS. EPA should also establish credits that specifically reward auto manufacturers for taking measures to incentivize increased biofuel use.

EPA clearly has authority to issue such credits under Section 202. It has for years issued credits for various measures that reduce emissions that are not reflected in tailpipe emissions, including credits for efficient air conditioning and off-cycle credits. 88 Fed. Reg. at 29,246.

The simplest type of credits to incentivize biofuels are those that allow greater biofuel use in vehicles, such as flex-fuel vehicles ("FFVs") that can use E85 and higher blends of ethanol. EPA, along with the National Highway Traffic Safety Administration ("NHTSA"), has already established credits both under CAFE and Section 202 that provide an incentive for E85 use. 77 Fed. Reg. at 62,829. Those credits were initially awarded to FFVs regardless of the fuel they actually used, but were later adjusted to account for the amount of fuel actually used. In its 2012 rulemaking for MY 2017 and later years, EPA explained that:

In the final rulemaking for MYs 2012-2016, EPA promulgated regulations for MYs 2012-2015 ethanol FFVs that provide significant GHG emissions incentives equivalent to the long-standing "CAFE credits" for ethanol FFVs under EPCA, since many manufacturers had relied on the availability of these credits in developing their compliance strategies. Beginning in MY 2016, EPA ended the GHG emissions compliance incentives and adopted a methodology based on demonstrated vehicle emissions performance. This methodology established a default value where ethanol FFVs are assumed to be operated 100 percent of the time on gasoline, but allows manufacturers to use a relative E85 and gasoline vehicle emissions performance weighting based either on national average E85 and gasoline sales data, or manufacturer-specific data showing the percentage of

miles that are driven on E85 vis-[a]-vis gasoline for that manufacturer's ethanol FFVs.

EPA should, at a minimum, extend and expand upon existing credits for FFVs. Existing credits are limited in several ways—they do not provide an incentive for other technologies that facilitate biofuel use in vehicles, they do not incentivize investments in blending infrastructure or other non-vehicle equipment for biofuel use, and they do not incentivize greater use of biofuels in standard, non-FFV engines. EPA therefore should also develop additional credits that can further reduce GHG emissions by incentivizing greater biofuel use. To begin with, EPA could expand credits to include technologies that facilitate different biofuel blends, like E30, and investments that help facilitate fueling of vehicles with higher blends.

An even better system of credits would be to provide credits based on overall biofuel use in the manufacturer's fleet, regardless of whether the manufacturer manufactures FFVs or any specific technology. That type of credit would give manufacturers incentives to increase biofuel use in their fleet in any way possible—everything from making more FFVs, to making it easier for non-FFVs to run on higher blends, to facilitating investments in fueling with higher blends.

Given the discussion of various credit programs in the proposal and past FFV incentive programs, EPA can finalize a credit program based on biofuel use in this rule. But to the extent that EPA believes it would require an additional rulemaking proposal, EPA should propose and finalize such an incentive program as quickly as possible—it need not wait until the end of its currently proposed standards to develop an important additional mechanism for reducing greenhouse gas emissions while continuing to maintain options for multiple types of vehicles in our transportation system.

B. Options Outside of Section 202

EPA should also consider taking actions outside of Section 202 to further incentivize biofuels. To begin with, EPA should set robust renewable volume obligations under the RFS program for total and advanced biofuels. The RFS is one of America's most successful clean energy policies, and it has abundant potential to further reduce emissions. Yet, just a few weeks ago, EPA set the total and advanced volumes for 2023, 2024, and 2025 significantly below what the industry can achieve, despite Congress's desire that the RFS be a technology-forcing and demand-driving program. EPA must do more to help incentivize production of biofuels through the RFS, which means that it must set volumes going forward that expand market opportunities for higher blends like E15 instead of leaving readily available carbon reductions on the table.

Another such action would be to require a higher octane standard and approve a high-octane, midlevel ethanol blend. Growth Energy has been a leader on the need for higher octane, mid-level ethanol blends, first submitting a proposal for a 100 RON, E30 fuel nearly a decade ago. A higher octane requirement that incentivizes greater use of mid-level ethanol blends would reduce emissions by ensuring that a greater portion of the gasoline supply consists of ethanol. But that is not the only benefit—moving towards using a higher octane, mid-level blend would also enable automakers to optimize engines to improve efficiency by making engines smaller and

increasing the use of turbocharging.²² So, a higher octane standard would be a win-win that would reduce emissions of GHGs and other pollutants both by incentivizing more ethanol use and by facilitating more efficient engines.

VII. Conclusion

The proposed rule misses a significant opportunity to reduce GHG emissions through biofuels. EPA should adjust its proposal by: (1) accounting for the upstream emissions of EVs and the upstream carbon sinks of biofuels; (2) considering the potential for higher blends of biofuels in EPA's test fuel and throughout the rule; and (3) developing credit programs and other measures that incentivize greater biofuel use.

²² See, e.g., Oak Ridge National Laboratory, *Summary of High-Octane, Mid-Level Ethanol Blends Study* (July 2016), available at <https://info.ornl.gov/sites/publications/Files/Pub61169.pdf>.