



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 (ACCI) 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>

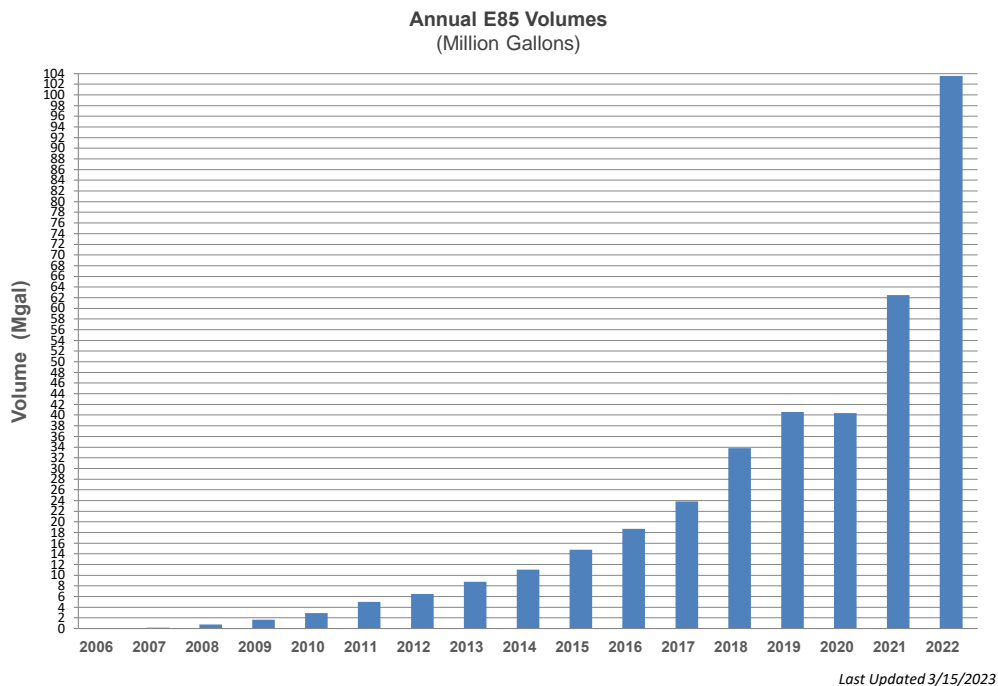
⁵ <https://www.epa.gov/moves/exhaust-emission-impacts-replacing-heavy-aromatic-hydrocarbons-gasoline-alternate-octane>

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>