



701 8th Street, NW, Suite 450, Washington, D.C. 20001

PHONE 202.545.4000 FAX 202.545.4001

GrowthEnergy.org

March 15, 2023

Dr. Cheryl Laskowski
Branch Chief, Transportation Fuels
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812
Via electronic mail

RE: Comments in Response to the February 22, 2023, Low Carbon Fuel Standard Workshop

Dear Dr. Laskowski:

Thank you for the opportunity to comment on the Air Resources Board's (CARB) latest Low Carbon Fuel Standard (LCFS) workshop held on February 22nd. Growth Energy is the world's largest association of biofuel producers, representing 91 U.S. plants that each year produce more than 8 billion gallons of renewable fuel; 107 businesses associated with the production process; and tens of thousands of biofuel supporters around the country. Together, we are working to bring better and more affordable choices at the fuel pump to consumers, improve air quality, and protect the environment for future generations. We remain committed to helping our country diversify our energy portfolio in order to grow more green energy jobs, decarbonize our nation's energy mix, sustain family farms, and drive down the costs of transportation fuels for consumers.

Growth Energy has previously submitted extensive comments demonstrating the vital role low-carbon biofuels and higher biofuel blends can play in meeting California's ambitious climate goals. As we have noted previously and reiterate here, biofuels have been among the largest contributors to the success of the LCFS program to date and are poised to continue to do so with appropriate updates to the program. Specifically in response to the discussion at the workshop, we strongly support and encourage the Board to update emission factors and lifecycle modeling to reflect the latest science, data, and information to appropriately capture the latest innovation in the biofuels industry. Additionally, as was further discussed, the state should move quickly to approve the use of E15 and, the Board should recognize the benefits of low-carbon farm practices and how they can be driven by policies like the LCFS.

We provide more specific comments reiterating these important points below:

Bioethanol's Environmental Benefits

As we have continued to advocate, a primary solution for cleaning up the liquid fuel supply is the promotion of additional use of bioethanol, from starch and cellulosic sources. According to recent data from Environmental Health and Engineering, today's bioethanol reduces greenhouse gas emissions (GHG) by an average of 46 percent compared to gasoline and can provide even further GHG reductions with additional readily available technologies.¹ In the existing light duty fleet, higher bioethanol blends can be immediately deployed to achieve GHG reductions, reduce harmful air toxics, and reduce consumer costs at the pump.

Already, we've seen biofuels provide the foundation for the LCFS. In fact, biofuels like bioethanol have generated more than 75 percent of LCFS credits. As recently as 2020, bioethanol was the largest LCFS volume and second-largest credit generator. Additionally, even with room to further improve GHG lifecycle modeling, the LCFS recognizes the significant improvement in bioethanol's carbon intensity. In 2011, CARB reported the average carbon intensity (CI) for ethanol at 88 g/MJ. Through the third quarter of 2022, the average recorded CI for bioethanol has decreased to 59.39 g/MJ, a 33 percent reduction in CI.² Additional CI reductions are anticipated as projects of diverse technological variety at ethanol biorefineries come online starting this year. In fact, during the presentation, it was noted that the carbon intensity of ethanol has been adjusted in the CATS model to reflect the historical downward trend. We appreciate CARB's recognition of this continued innovation in the industry and hope CARB will continue to update the program using the best and most up to date science.

¹ Environmental Research Letters: [Carbon intensity of corn ethanol in the United States: state of the science \(iop.org\)](#)

² CARB LCFS Data: <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>

Potential: Operations



Bioethanol's other environmental benefits are also noteworthy. The University of California, Riverside and the University of Illinois at Chicago, have concluded that the use of more bioethanol and bioethanol-blended fuel reduces harmful particulates and air toxics such as carbon monoxide, and benzene.³ To fully realize these and other important air quality benefits, CARB should implement a clear policy with a firm future for the role and growth of cleaner-burning, affordable bioethanol fuels.

Use of Higher Bioethanol Blends

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 U.S. Environmental Protection Agency (EPA) in all model year 2001 and newer passenger vehicles, more than 96 percent of the vehicles on the road today, and it is now for sale at more than 2,800 locations in 31 states. In fact, last summer where available, we saw E15 selling consistently for as much as nearly \$1 less per gallon than regular gasoline – that is meaningful consumer cost-savings.

³ University of California Riverside: [Comparison of Exhaust Emissions Between E10 CaRFG and Splash Blended E15 | California Air Resources Board](https://www.caarfg.com/wp-content/uploads/2018/04/UC-Riverside-Study.pdf) and <https://fixourfuel.com/wp-content/uploads/2018/04/UC-Riverside-Study.pdf>; University of Illinois at Chicago: <https://grains.org/wp-content/uploads/2018/11/Complete-Study-Summary.pdf>



Sheetz, Grandview Heights, OH June 26, 2022

While we were encouraged to see CARB post the final Tier I report for the multi-media evaluation of E15 as well as the positive emissions results for E15 from the recent testing done by the University of California-Riverside, it is time to expedite the state's approval of E15 for California consumers and to help drive further immediate GHG emission reductions. Just recently the Phoenix, Arizona area approved the use of E15 in its Cleaner Burning Gasoline (CBG) program, effectively leaving only California and Montana as the only two states who have not approved the use of E15. As staff noted during the workshop, the new CATS model can be used to model the use of E15. Growth Energy is working on such modeling and intends to provide the results to CARB when the project is completed in the next few weeks.

Additionally, the LCFS is helping to drive growth in the use of E85 in flex-fuel vehicles. The use of E85 will promote even greater reductions in GHG emissions and reductions of air toxics.

We also encourage CARB and other state agencies to push for policies that strongly encourage and incentivize the use of higher bioethanol blends such as E15 and E85, the production and use of flex-fuel vehicles, as well as continued investment in infrastructure for the expanded use of E85.



Mobil Station, San Diego, CA 4/6/2022

Biofuels, Land Use, Corn Oil, and Food Supply

We also believe CARB's concerns about the use of crop-based biofuels and their impact on land use are misplaced and unfounded. These fears have been largely based on outdated and flawed data. While CARB currently has an indirect land use change value (ILUC) for bioethanol of 19.8 gCO₂e/MJ, a review of the more recent science over the last 5 years indicates a decreasing trend in land use values with the newer data indicating values closer to 4 gCO₂e/MJ.⁴ The ILUC value should reflect the latest science that better addresses innovation and increasing yields in agriculture.

Related, we also believe that recent concerns about biofuel production on food cost and supply are unfounded. Our industry produces both food and fuel. Specifically, production of bioethanol results in a wide variety of co-products, perhaps the most significant of which is high-quality animal feed that contributes directly to the production of chicken, beef, pork, and other nutritious food. Specifically, one bushel of corn produces 2.8 gallons of bioethanol as well as 17-18 pounds of distillers dried grains (DDGS), a highly nutritious animal feed. Our industry produces nearly 40

⁴ Environmental Research Letters: [Carbon intensity of corn ethanol in the United States: state of the science \(iop.org\)](https://iop.org)

million tons of animal feed per year. That feed is supplied to food producers here in the U.S. and around the world. Additionally, the renewable CO₂ from bioethanol production is also critical for meat processing, beverage carbonation, and water treatment.

Data from the United Nation's Food and Agriculture Organization (FAO) as well as from the U.S. Energy Administration (EIA) also show in the graph below that the price of food is closely correlated with the cost of crude oil rather than the cost of corn.

The real culprit of higher food prices is higher crude oil prices & inflation

Crude oil prices are set on an international level and strongly impact the prices of other goods. As the price of oil rises or falls, the price of food follows closely.

Higher consumer prices and inflation are being driven by a post-COVID surge of demand for everything from [cars to housing](#), but economists agree that grocery prices are [driven by factors](#) like packaging, transportation, processing, and marketing — not the value of farm commodities.



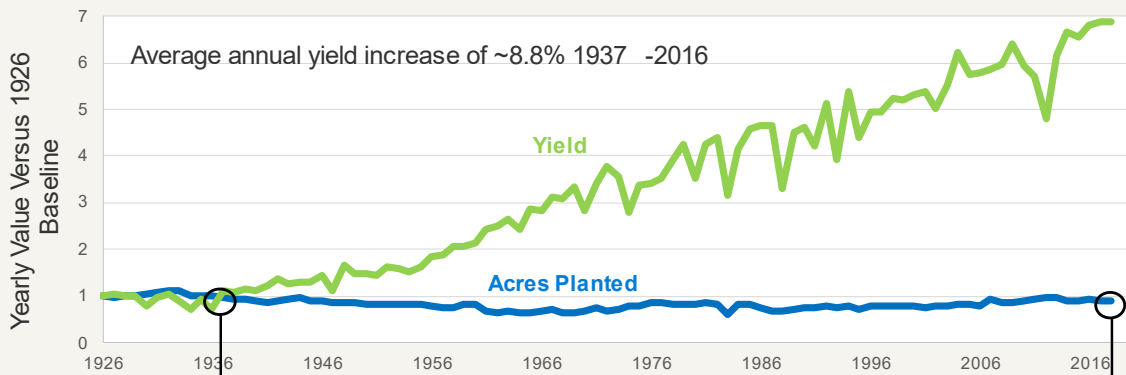
SOURCE – EIA, FAO/UN

Relatedly, we are particularly concerned about CARB's inclusion of corn oil in its evaluation of a possible cap on credits for diesel fuels from various virgin oil feedstocks. Corn oil is an important coproduct of the bioethanol production process that is then used to make other low carbon intensity, renewable fuels used for LCFS compliance. It makes little sense why it would be potentially capped for use.

Finally, as discussed previously relative to land use, farming practices like crop intensification and cover cropping have significantly improved the yield of all crops, further negating the impact of biofuel production on food crops. As the United States Department of Agriculture (USDA) and numerous others have noted, yields have (and continue to) climbed more than 700 percent while acreage has remained unchanged for the last century.

Through innovative, sustainable ag practices, we're producing more using less land

Yields have increased by 700%, while acres remained steady



By the late 1930s, harvested corn yield was no longer directly linked to corn planted.

Acres of total corn planted has generally plateaued, even into the late 2010s.

Source: USDA Crop Production Historical Track Records, 2019. (NASS data)

With respect to some of the other items under consideration for LCFS revisions, we offer comment:

Crediting for Field-based Farm Practices

Growth Energy strongly supports the appropriate crediting of on-the-farm field practices in the LCFS. The U.S. EPA estimates that five percent of national GHG emissions is from crop cultivation and energy. There has been a wealth of data including a recent study done by Argonne National Laboratory that show the possibility of a 35 percent reduction in carbon intensity through adoption of current best on-farm practices such as cover crops, strip tillage, reduced fertilizer use, and other innovations.⁵ With the LCFS' verification requirements, capturing these on the farm benefits for biofuel pathways is now more realistic and scalable. Allowing appropriate credit will help bioethanol producers continue to further innovate and lower their carbon intensity, while providing key incentives for farmers to adopt these effective conservation practices.

Carbon Capture and Sequestration

New innovations at biorefineries throughout the U.S. allow pure, biogenic carbon dioxide (CO₂) to be captured at a massive scale, and multiple projects are already underway that repurpose, reuse, or provide a permanent storage solution for the majority of that CO₂. We support and encourage CARB's continued allowance for credit generation from carbon capture, utilization, and storage (CCUS).

⁵ Argonne National Laboratory: <https://www.anl.gov/article/argonnes-pivotal-research-discovers-practices-technologies-key-to-sustainable-farming>

Correcting Electricity Usage in Wet and Dry Distiller Grain (DDGS) Pathways

The CALGREET 3.0 model currently distinguishes between wet and dry DDGS pathways for thermal energy but does not do so with regard to electricity use. Electricity use between wet and dry DDGS production is quite different. We recommend that CARB further distinguish electricity use as it does with thermal energy in its CALGREET 3.0 model.

Ethanol/Fuel Cell Technology

Direct Ethanol 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 ethanol in fuel cell technologies and innovations.⁶ 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. We would strongly encourage CARB to consider ways to further develop this technology for consideration.

More broadly, we look forward to working with CARB as you work through the regulatory process on revisions to the LCFS program and ensure the role of biofuels in making California's fuel mix more sustainable and help the state achieve its progressive 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

⁶ Lawrence Berkeley National Laboratory: <https://eta.lbl.gov/publications/ethanol-internal-reforming-solid>