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VIA ELECTRONIC FILING

Dr. Cheryl Laskowski,
Branch Chief, Low Carbon Fuel Standard Team
California Air Resources Board
Submitted via LCFS Comments Upload Link

RE: Comments on "Potential Regulation Amendment Concepts to the Low Carbon Fuel Standard"

Dear Dr. Laskowski:

Thank you for the additional opportunity to comment on the California Air Resources Board's (CARB) public workshop on Potential Regulation Amendment Concepts to the Low Carbon Fuel Standard (LCFS).

Gevo, Inc.'s (Gevo) mission is to produce energy-dense liquid hydrocarbons for drop-in transportation fuels such as gasoline, jet fuel, and diesel. Gevo's production process uses a combination of decarbonization technologies and sustainably-farmed feedstock to produce fuels with substantially reduced carbon intensity (CI) compared to fossil fuel equivalents. We broke ground on our first sustainable aviation fuel (SAF) production facility, "Gevo Net-Zero 1" (NZ1), in Lake Preston, SD, in September 2022. This facility will use a three-part strategy to produce low-CI SAF: 1) use locally-sourced corn feedstock from farmers engaged in sustainable agriculture to both reduce on-farm greenhouse gas (GHG) emissions and sequester CO₂ in the soil; 2) decarbonize the fuel production process by replacing conventional fossil fuel inputs with wind energy, renewable natural gas, and green hydrogen; and 3) use carbon capture and sequestration (CCS) technology to reduce emissions from the production process further. The Gevo approach attempts to decarbonize every step of the fuel's life cycle.

Based on the February 22 LCFS Workshop, Gevo offers the following comments regarding areas of support and concern for potential changes to the program.

LCFS needs to provide long-term market incentives to build capital-intensive low-carbon fuels projects, including advanced biofuel facilities that utilize crop-based feedstocks

Referencing the scenarios provided in the December 6 and February 22 workshops, Gevo reiterates our strong support for Scenario C in the California Transportation Supply (CATS) Model. Scenario C represents the fastest path to decarbonization without problematic feedstock limitations. Given California's recently adopted scoping plan, Scenario C achieves the needed reductions and pairs best with the plan's goals.

Potential Changes to Crop-Based Biofuels

Gevo has remained consistent in our opposition to limits on crop-based biofuels within clean fuel standards on the West Coast. Due to this consistency, we will reiterate our comments in our December 21 letter.

While the potential limits on oil feedstocks do not specifically impact the fuel Gevo will produce, it does send a negative message to the sustainable aviation fuel sector that future agricultural feedstock limits could be imposed. This creates uncertainty in the biofuel market we are trying to access and will impede our ability to expand the supply of low-carbon fuels rapidly. If feedstock limits on crop-based biofuels are enacted, it will have an immediate negative impact on SAF production and the ability to supply SAF into the California market.

Based on the principles of technology neutrality and scientifically-based GHG analysis, Gevo does not support mechanisms within the LCFS market placing any fuel at a disadvantage that is not grounded in life cycle analysis. The LCFS incentivizes fuels based on their actual and tangible greenhouse gas reductions. Restricting crop-based biofuels based on a choice of feedstock rather than greenhouse gas reductions lacks merit. It stifles substantial innovation and effort to reduce greenhouse gas emissions in the biofuels market. Artificial barriers to innovation prevent qualifying low-carbon fuels from helping California meet its carbon reduction goals.

The core structure and design of the LCFS program eliminates the need to exclude or limit specific feedstocks. The program uses a complete life cycle analysis to assess a fuel's carbon intensity. Based on this score, it establishes a value for the fuel, thereby disincentivizing any fuel that does not significantly reduce GHG. In particular, the LCFS disincentivizes feedstocks that lead to deforestation, land conversion, and negative food supply impacts by evaluating any induced land use change (iLUC) as a component of the CI score. The iLUC score currently makes up a substantial 20-30% of the CI benchmark for corn and soybean-based fuels, representing an already-significant penalty imposed on the fuel. Additional feedstock limits more than the iLUC score penalize biofuel producers twice for an issue already addressed in the LCFS. It is also out of alignment with the best data and science pertaining to potential land use conversion from biofuels. For example, the iLUC score for corn in CARB's Tier 1 calculators from 2015 is more than double what was published by Argonne National Lab's GREET-CCLUB in 2022.

The feedstock-agnostic approach works, and no other interventions are needed to limit biofuels in the system. Artificial and arbitrary limits on crop-based biofuels, notably biofuels that deploy significantly lower carbon strategies, directly oppose the market approach established a decade ago. As crop-based biofuels continue to develop in the U.S., California's access to lower carbon liquid transportation fuels will be negatively impacted through these types of limitations that ignore substantial and measurable GHG reductions of these biofuels, including SAF.

Gevo will produce a substantial amount of lower carbon Distillers Corn Oil (DCO) as an ethanol to jet manufacturer. We respectfully request clarification on whether CARB intends to include DCO within their limits as vegetable oil. We would strongly oppose this inclusion due to the secondary nature of this co-product in the ethanol production process and the low carbon intensity biomass-based diesel (BBD) it creates. DCO-based BBD is precisely the type of fuel CARB should be encouraging.

Potential Changes to Book-and-Claim for Hydrogen

Gevo supports expanding book-and-claim opportunities for low CI hydrogen. Hydrogen is essential for turning ethanol into jet fuel. As a net-zero plant, we intend to produce some green hydrogen on-site with excess wind capacity through water electrolysis. Book-and-claim capabilities provide Gevo with opportunities to purchase green hydrogen when we cannot make enough to meet the plant's needs or to sell our excess hydrogen to assist others.

This provision will improve the options for hydrogen producers and end users, spurring the growth of these projects by establishing multiple venues to use the product.

Gevo supports the Coalition for Renewable Natural Gas (RNG) positions concerning biomethane projects under the LCFS

In addition to our SAF and hydrogen production, Gevo owns and operates a dairy-manure biomethane capture and upgrading facility in northwest Iowa. This project actively produces pipeline-quality renewable natural gas and will seek LCFS registration in 2023. Gevo recently announced in our fourth quarter 2022 earnings call that we are already looking to expand this existing RNG project. Gevo plans to continue developing sites that benefit our Net-Zero (NZ) plants as we build future SAF production facilities. Additional RNG facilities are being modeled as part of that potential for the future – either for process gas at our NZ SAF plants or injection into the pipeline. Gevo is actively evaluating our RNG project and remains curious about others because 1) these projects provide substantial GHG reductions by capturing methane (a potent short-lived climate pollutant) emissions at existing dairies that otherwise would be released to the atmosphere and converting it to CO₂, and 2) have the potential to replace the use of petroleum or fossil fuel fuels at our plants.

Gevo does not see this RNG proposal as technology neutral. On the contrary, it will increase greenhouse gas emissions and negatively impact California's access to lower carbon SAF and renewable diesel. Minimizing the ability to book-and-claim RNG (requiring directionality) in 2028, removing new fuel pathways in 2030, and eliminating avoided methane in 2040 will have a chilling effect on renewable fuel production. Specifically, the innovation facilities like Gevo's NZ plants seek to reduce their CI scores by tangibly reducing GHGs through these projects.

Gevo is concerned that the potential changes in RNG will have unintended consequences that reduce the amount of RNG produced, increase fossil natural gas usage across the country, and cause more methane to be emitted into the atmosphere. All these scenarios increase GHG emissions in the United States.

These proposed changes are presented at a time when renewable fuel producers are embracing RNG to replace fossil natural gas in the transportation sector, lower concentrated animal feeding operation (CAFO) greenhouse gas emissions and reduce the carbon intensity of processes that historically have relied on fossil fuels – like making ethanol and SAF. Gevo has invested in a significant RNG project detailed above and has project timelines and contracts that depend on the longevity of this RNG project. By enacting an RNG proposal that does not allow for innovations past 2030 and ends avoided methane crediting in 2040, CARB risks stranding these assets and adding greenhouse gas emissions back into the atmosphere. At operations like Gevo's, these emissions can be approximated at 150,000 metric tons (MT) per year at full operating conditions. Over 20 years, this could amount to 3 MMT. It is no secret that these facilities are expensive and challenging operations to maintain, and Gevo relies upon CARB for long-term and stable incentives to keep these critical GHG-lowering facilities viable.

RNG is an area where Gevo anticipates continued involvement in the future because of all the vital greenhouse gas benefits that coincide with these projects when electrification isn't an option, and we require a replacement for fossil natural gas.

We disagree with CARB's proposal to impose regulatory changes to RNG facilities, especially while other projects don't see these restrictions. This proposal is confusing to producers who see CARB proposing expanded book-and-claim opportunities for low-CI hydrogen while limiting RNG. If CARB is modifying RNG book-and-claim opportunities now, it is plausible that low-CI hydrogen opportunities will be altered at a future date as well, stranding enormous investments made to satisfy the LCFS. This is a matter of direct concern to our business as Gevo also requires hydrogen for our SAF plants. CARB has also developed a comprehensive CCS permanence protocol that encourages the development of projects without a location or temporal limitations. The RNG changes put future investment in CI-reducing technology like CCS and low-CI hydrogen at risk by creating regulatory uncertainty in the program beyond RNG by having stakeholders

wondering what technologies will be targeted next. These technologies are responding precisely to the market signal that the LCFS was designed to send: that California will provide reliable value for lower carbon transportation fuels delivered to California in the manner prescribed by the program. To continue its record of successfully achieving this goal and enabling low carbon fuel expansion, the LCFS must be a reliable and stable program.

To reiterate, Gevo has designed our NZ1 SAF plant to de-fossilize the entire production process based on existing LCFS regulations, including the benefits that RNG provides. As we build NZ1 and consider additional plants, these proposed changes to how CARB treats RNG are particularly concerning. NZ1 is targeted for production in 2025, and changes to the book-and-claim regulation three years later are problematic for our long-term low-carbon strategy and the incentives we seek to support low-carbon innovations. NZ1 will also be producing SAF far beyond 2040 when avoided methane crediting is proposed to be eliminated.

Gevo intends to build many more plants over the next decade. As a result, these changes to RNG will impact our modeling, potentially increase GHG emissions at our facilities, and potentially modify our intent to expand RNG production to fuel our future facilities, which could have a carry-over effect on SAF by reducing the availability of one of the lowest carbon SAF in the market.

In summary:

- Avoided methane crediting should continue under the LCFS unless there is a viable replacement for existing infrastructure.
 - Avoided methane crediting makes agricultural RNG projects possible and incentivizes maximum greenhouse gas capture during RNG production.
 - Arbitrarily phasing out avoided methane crediting risks destabilizing investor confidence in LCFS and GHG reduction projects more generally. The LCFS has played a critical role in strengthening the business case for low-carbon fuels, and changes to LCFS crediting should be informed by the tangible GHG benefits of low-carbon fuel projects. Phasing out credits incentivizing methane reduction sends a message of arbitrary inconsistency to project investors.
- Book-and-Claim accounting for biomethane projects should continue without limitation or deliverability requirements to not penalize RNG unfairly compared to other initiatives.

- Instead of limiting RNG supply, CARB should consider LCFS changes that broaden the opportunity to use renewable gases and increase the pace of decarbonization. For example, CARB could adjust the rules to expand book-and-claim accounting to allow RNG to be used for process energy in biofuel production facilities serving California.¹

Overall, we encourage CARB to understand the broader implications of limitations on RNG projects related to the future of SAF. Gevo plans to supply fuel sufficient to meet one-third of the 2030 Grand SAF Challenge. The proposal by CARB starting in 2028, has adverse effects on our RNG and SAF projects.

Credit True-Up Needed to Ensure Project Success

Gevo supports providing a credit true-up to ensure RNG projects' total value is realized. The delay in fuel pathways has been attributed to a tangible economic loss from important methane avoidance projects like RNG. Therefore, True-up crediting should be required to provide the total value to RNG methane avoidance projects and ensure their financial success. We, like the RNG Coalition, believe this will relieve pressure from CARB's staff if there is certainty that the full value of a project will be realized regardless of when the administrative work is done to validate a project. After all, the most critical item is that emissions are being avoided, greenhouse gas emissions are being reduced, and companies should be rewarded.

Conclusion

Gevo supports this highly successful program and encourages CARB to be innovative in its life-cycle assessment (LCA) approach, explicitly recognizing all the carbon reductions associated with modern-day agriculture and renewable natural gas (RNG) projects.

Thank you for the opportunity to comment on the CARB workshops on "Potential Regulation Amendment Concepts to the Low Carbon Fuel Standard." We look forward to participating in this program as Gevo grows the production of SAF and other biofuels.

Respectfully,



Kent Hartwig



Karyn Jones

¹ We recommend building this option into the Tier 1 calculators.

Director of State Government Affairs



Gevo, Inc.

Director of Sustainability



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