

May 9, 2024

The Honorable Liane M. Randolph, Chair
California Air Resources Board
P.O. Box 2815
Sacramento, California 95812

RE: Updates to the Low Carbon Fuel Standard

Dear Ms. Randolph:

Indigo Ag, Inc. (Indigo Ag) appreciates the current and historic efforts by the California Air Resources Board (CARB) to reduce the greenhouse gas (GHG) emissions from transportation through the implementation of the State's Low Carbon Fuels Standard (LCFS). Since 2011, California's LCFS program has been tremendously successful and is a model for the nation and the world. Indigo Ag supports the continued evolution of the LCFS through the CARB rulemaking process. Of particular interest to Indigo Ag is the production of biofuels in the most sustainable manner.

In 2018, the Intergovernmental Panel on Climate Change (IPCC) published a Special Report on the impacts of a 1.5°C global warming above pre-industrial levels. This report found that achieving global carbon neutrality by mid-century is critical to avoiding the most catastrophic impacts of climate change.¹ Moreover, the IPCC Sixth Assessment identified land-based emissions mitigation as "the only [sector] in which large-scale carbon dioxide removal may currently and short term be possible" and that it is "crucial to limit climate change and its impacts."² The latest science finds that it is increasingly likely that the 1.5°C target will be exceeded³ and that large-scale GHG reductions are critical to meeting any state or global target.⁴

Already a leader in the response to climate change, CARB's 2022 Scoping Plan Update details sector-by-sector roadmaps for California to achieve carbon neutrality by 2045 or earlier. One critical

¹ IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3-24, <https://doi.org/10.1017/9781009157940.001>.

² Nabuurs, G.-J., R. Mrabet, A. Abu Hatab, M. Bustamante, H. Clark, P. Havlík, J. House, C. Mbow, K.N. Ninan, A. Popp, S. Roe, B. Sohngen, S. Towprayoon, 2022: Agriculture, Forestry and Other Land Uses (AFOLU). In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. <https://doi.org/10.1017/9781009157926.009>.

³ Mathews, D.H., Wynes, S. (2022) Current global efforts are insufficient to limit warming to 1.5°C. *Science* 376 (6600) 1404-1409. <https://www.science.org/doi/10.1126/science.abo3378>

⁴ Mace, M.J., Fyson, C.L., Schaeffer, M., Hare, W.L. (2021) Large-Scale Carbon Dioxide Removal to Meet the 1.5°C Limit: Key Governance Gaps, Challenges and Priority Responses. *Global Policy* 12 (51) 67-81. <https://doi.org/10.1111/1758-5899.12921>

roadmap is for the aviation sector, where the scenario includes a transition of 20 percent of aviation fuel demand to zero-emission technologies by 2045 and sustainable aviation fuel (SAF) for the other 80 percent.⁵

The agriculture sector can play a significant role in helping California meet the goal of generating SAF. Practices including optimizing fertilizer application, reducing tillage, using enhanced-efficiency fertilizers, double-cropping and planting cover crops have the potential to reduce the CI of fuels by more than 40 g CO₂e/MJ.⁶ These practices are not limited to their GHG benefits; they provide “additional ecosystem service benefits, including watershed protection, increased biodiversity, and improved soil health and fertility.”⁷

About Indigo Ag

Indigo Ag uses microbiology and digital technology to improve the quality, yields and environmental sustainability of agriculture. We continue to expand our expertise to streamline the ability of farms to tap into environmental markets. Using a combination of rigorous soil sampling, biogeochemical models and remote sensing (including satellite analytics), Indigo Ag can accurately determine the current carbon footprint of a farm and quantify the impacts of management changes over time. On February 26, 2024, Indigo Ag completed its third carbon crop consisting of 163,048 agricultural carbon credits. This brings the total number of credits generated to 296,662 since 2022. All of these credits were generated under the Climate Action Reserve’s Soil Enrichment Protocol. This third carbon crop further demonstrates the repeatability of this process, the potential for exponential growth, and the appeal for both farmers and carbon buyers. It also reinforces the ability of farmers, and the agriculture industry broadly, to have a real, measurable, and durable impact on one of the world’s largest carbon sinks. The credits were produced by farmers across 28 U.S. states, including existing and new farmers and new fields in their operations.

We have also quantified supply chain reductions and sold them to many of the largest food and agribusiness companies to meet the Scope 3 reduction targets for their supply chain. Quantifying Scope 3 reductions uses a life cycle analysis approach very similar to the approach the GREET model uses to quantify the carbon intensity (CI) of fuels. We have also expanded our partnerships with ethanol producers to help them track the source of the grain in the fuels they produce.

Support the reduction of impacts of agricultural practices in feedstock production

As stated on slide 58 of the presentation from the April 10 workshop, we strongly support the need to “Reduce other impacts of agricultural practices in feedstock production”. To meet this goal, CARB should continue to ensure that the fuels used in the LCFS program are produced in the most sustainable manner. The same practices that reduce the CI of biofuels also provide valuable co-benefits including reduced soil erosion, improved water quality, and enhanced soil health. We advocate for rigorous accounting methods that quantify the GHG emissions from crop-based feedstocks. We encourage CARB to expand the ability to quantify and incentivize the production of

⁵ CARB (2022) 2022 Scoping Plan for Achieving Carbon Neutrality. <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

⁶ Liu, X. et. al. (2020) Shifting agricultural practices to produce sustainable, low carbon intensity feedstocks for biofuel production. *Environ. Res. Lett.* <https://doi.org/10.1088/1748-9326/ab794e>

⁷ *ibid.*

low carbon feedstocks. Corn and other crops can be grown on a wide range of soils using a variety of farming techniques and inputs that significantly impact the CI of those fuels.

We encourage the Board to direct staff to dedicate time and resources to analyze the GHG and soil carbon sequestration opportunities for crop-based feedstocks and report back to the Board by the end of 2025. This focused research, analysis, and reporting by CARB staff will enable and inform potential expansions to the LCFS regulations to include climate-smart agricultural practices with the next update of the LCFS regulations.

There is significant opportunity to increase the adoption of climate-smart agricultural practices on U.S. farmland. A recent study found that no-till or strip-till is practiced on only 30 percent of cropland.⁸ Furthermore, these practices are not always maintained by farmers. While no-till practices were adopted on almost 8 million acres between 2012 and 2017, farmers on more than 5 million acres discontinued no-till during the same period for a net gain of only 3 million acres.⁹

Another practice that can reduce GHG emissions, the planting and cultivation of cover crops, has an even lower adoption rate than no-till. Only 5.1 percent of the approximately 300 million cropland acres planted cover crops in 2017.¹⁰

Finally, there is significant potential market for climate-smart fertilizers, also known as green and blue fertilizers. The production of fertilizer is responsible for 1 to 2 percent of global GHG emissions and the transition to the production of climate-smart fertilizers can reduce those emissions by as much as 99 percent.¹¹ Creating a price signal for these products is essential to their adoption and scale-up. The LCFS program has the potential to provide that strong and long-term incentive for farmers to implement no-till, cover crops, double-cropping, green and blue fertilizers, and other similar practices.

Support of increased LCFS targets

Indigo Ag supports the proposal by CARB to increase the CI reduction target to a 30 percent CI reduction by 2030 and a 90 percent reduction by 2045. Climate-smart agriculture will be critical in meeting these targets, particularly the 90 percent target. The increase in the State's targets will result in critical investment and reductions in transportation emissions, which represent the largest source of emissions in the State. The State targets are important because GHG emissions from transportation in California have shown multiple periods over the past decade where they have increased, including between 2014 and 2017 and 2020 and 2021.¹²

⁸ Pannell, D. J., & Claassen, R. (2020). The Roles of Adoption and Behavior Change. *Applied Economic Perspectives and Policy* 42 (1) 31–41.

⁹ Sawadgo, W., & Plastina, A. (2022). The Invisible Elephant: Disadoption of Conservation Practices in the United States. *Choices* 37(1) 1–13.

¹⁰ Wallender, S., Smith, D., Bowman, M., & Claassen, R. (2021). Cover Crop Trends, Programs, and Practices in the United States. <https://www.ers.usda.gov/publications/pub-details/?pubid=100550>

¹¹ Pals, M.J., Daoutidis, P. (2023) Optimizing Renewable Ammonia Production for a Sustainable Fertilizer Supply Chain Transition. *ChemSusChem* 16, e2023005.

¹² CARB (2023) California Greenhouse Gas Emissions from 2000 to 2021: Trends of Emissions and Other Indicators, p.14 https://ww2.arb.ca.gov/sites/default/files/2023-12/2000_2021_ghg_inventory_trends.pdf

Support feedstock CI scoring according to certification system standards

CARB is proposing that all crop-based feedstock used for LCFS fuel pathways must obtain third-party sustainability certification by January 1, 2028, under an approved certification system. These sustainability certifications include a rigorous GHG accounting for feedstock CI calculation. This is similar to the approach taken in European markets, which include a rigorous GHG accounting for feedstocks. For example, both the existing Roundtable for Sustainable Biomaterials (RSB) and the International Sustainability & Carbon Certification (ISCC) sustainability certification systems include methodologies that could be adopted to meet the requirements outlined in the proposed updates to the LCFS regulations in Section 95488.9(g).^{13,14} If CARB requires farms to go through the rigorous process of third-party sustainability certification, it should consider accepting a feedstock CI score that is calculated and verified in accordance with these certification system standards. This would provide a mechanism to incentivize farmers to adopt climate-smart practices, such as no-till and cover crops. Specifically, we ask the Board to direct staff to evaluate existing GHG calculation methodologies and develop guidance around feedstock CI calculation.

Expand climate-smart agriculture practices within CA-GREET

Agricultural crops are a significant source of feedstocks for fuels within the LCFS program. Crop-derived biomass-based diesel totaled almost 200 million gallons in the third quarter of 2023, up from about 50 million gallons in the first quarter of 2021.¹⁵

To produce these feedstocks in the most sustainable manner, we are requesting that the CARB allow for Tier 2 pathways to credit climate-smart farming practices that enable feedstock to be produced in a less carbon intensive manner. Specifically, we are encouraging CARB to recognize within the next update of the CA-GREET model CI reductions in feedstocks that result from adoption of climate-smart agriculture practices. In addition, we encourage CARB to include allowing the crediting of higher yields than the defaults in the GREET calculator. We recommend that the total feedstock CI reduction for a qualifying fuel pathway be based on the aggregate net reduction achieved for all the farming practices as compared to the Tier 1 CA-GREET calculator standard value for these feedstock CI components.

Prioritize climate-smart agriculture in SAF requirements

Finally, we are asking the Board to direct staff to investigate how the agriculture sector can be optimized to produce low-carbon biofuels to meet the state's SAF goal. Specifically, we are requesting the Board to prioritize policy discussions and the associated technical analysis related to low-carbon feedstocks to produce Sustainable Aviation Fuels (SAF). This technical analysis should include a thorough lifecycle analysis to determine the extent to which supplies of sustainable biofuels produced from various feedstocks can be expanded while not converting additional land to agricultural uses. To ensure the timely analysis of this information, we request that the Board direct

¹³ RSB GHG Calculation Methodology v2.3 (2017). <https://rsb.org/wp-content/uploads/2020/06/RSB-STD-01-003-01-RSB-GHG-Calculation-Methodology-v2.3.pdf>

¹⁴ ISCC EU 205 Greenhouse Gas Emissions (2021). https://www.iscc-system.org/wp-content/uploads/2022/05/ISCC_EU_205_Greenhouse-Gas-Emissions-v4.0.pdf

¹⁵ CARB. (2024) California Low Carbon Fuel Standard Workshop. <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

staff to report back to the Board by the end of 2025 on the results of lifecycle analysis and progress toward developing policies to encourage the production of SAF.

For the foreseeable future, liquid fuels will be required to power the majority of airflight thus necessitating a rapid expansion in the supply of SAF. In order to create demand for the fuels with the lowest actual CI possible, CARB needs to account for and incentivize climate-smart agricultural practices. Fortunately, the benefits of these sustainable agricultural practices go beyond their GHG savings, positively impacting our water, ecosystems, and soils.

CARB has been an international leader in developing and implementing programs to reduce GHG emissions across the California economy and the inclusion of climate-smart agricultural practices will continue the State's leadership throughout the country, especially in the Midwest where a large portion of the corn and soy are grown that support the LCFS. We thank CARB for this opportunity to offer these comments and look forward to continued collaboration to implement policies and strategies that further reduce emissions from the transportation sector.

Sincerely,

A handwritten signature in black ink, reading "Christopher M. Malone". The signature is fluid and cursive, with the first name being the most prominent.

Christopher M. Malone
Vice President, Market Development
Indigo Ag