



August 8, 2022

Rajinder Sahota
Deputy Executive Officer for Climate Change
California Air Resources Board
P.O. Box 2815
Sacramento, California 95812

RE: Updates to the Low Carbon Fuel Standard

Dear Ms. Sahota:

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. It is encouraging to see the state continue its leadership by considering increasing the State's carbon intensity (CI) reduction target to 25 percent or 30 percent by 2030. Indigo Ag supports the process and vision for amending the LCFS. Of particular interest to Indigo Ag is the production of biofuels in the most sustainable manner. The use of sustainably grown biofuels directly supports the State's transition to a carbon neutral economy.

About Indigo Ag

Indigo Ag uses microbiology and digital technology to improve the quality, yields and environmental sustainability of agriculture. We have recently expanded 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 June 29, 2022, Indigo Ag successfully generated nearly 20,000 carbon offset credits under the Climate Action Reserve's Soil Enrichment Protocol. These credits were generated by 175 farmers on more than one hundred thousand acres between 2018 and 2020. This is the first time a project of this kind has been created for field-based practices. Our Carbon by Indigo program has almost 5M acres enrolled our program and we are working on generating additional credits and projects in the coming year.

Increase LCFS target to 30 percent by 2030

Indigo Ag supports CARB increasing the CI reduction target to a 30 percent reduction CI by 2030 and encourage CARB to extend the program through 2040. The increase in the State's target will result in additional investment and reductions in transportation emissions, which represent the largest source of emissions in the State. This increase in the State target is important because, while the LCFS program reduced GHG emissions by 47.1 MtCO₂e between 2011 and 2018,¹ overall GHG emissions from transportation in California increased 6 percent between 2013 and 2017, making it the largest source of

¹ CARB (2019) Cleaner fuels have now replaced more than 3 billion gallons of diesel fuel under the Low Carbon Fuel Standard. Release number 19-22. <https://ww2.arb.ca.gov/news/cleaner-fuels-have-now-replaced-more-3-billion-gallons-diesel-fuel-under-low-carbon-fuel>



GHG emissions in the state.² Furthermore, the acres that have implemented practices, such as reduced tillage, have remained largely constant since 2005.³ A recent Indigo study of U.S. farmers conducted with a well-respected agricultural research firm found that more than 40 percent of corn/soybean growers would adopt two new management practices at \$61 an acre.

Strengthen LCFS by accounting for field-based practices

Agricultural crops are a significant source of fuel for the LCFS program. Biodiesel and renewable diesel usage increased from 1 percent in 2012 to 18 percent in 2017.⁴ Since crops are an increasing portion of the biofuels delivered to California, it is important that those crops be grown in the most sustainable manner possible. Unfortunately, the cultivation of crops to supply biofuels has left soils severely depleted. Cropland soils around the world have lost on average 26 percent of the carbon in the top 30 cm of soil.⁵ Fortunately, there are opportunities to restore this loss. According to a 2019 report, the National Academy of Sciences identified multiple conservation practices that can “increase carbon stocks in soils and are successfully practiced by progressive farmers and ranchers.”⁶ This can include practices such as optimizing fertilizer application, reducing tillage, using enhanced-efficiency fertilizers, and planting cover crops in the production of biofuels.

Furthermore, the proportion of vehicles requiring the use of liquid fuels will still be significant by 2045, the date California has set to become carbon neutral.⁷ However, according to CARB’s own analysis, 30 percent of cars and 23 percent of heavy-duty fleet vehicles will still be powered by liquid fuels in 2045.⁸ **The fuels used to power these vehicles must be produced as sustainably as possible** if California is going to reach carbon neutrality by 2045. A higher CI reduction target will certainly help us to reach that goal. But more action must be taken to encourage the farmers to produce fuels using the most sustainable practices possible.

CARB has the unique opportunity to encourage and incentivize sustainable agricultural practices by accounting for field-based practices in feedstock production. Field-based practices such as reducing tillage, fertilizer optimization, and cover cropping, can generate significant GHG reductions, protect watersheds, increase biodiversity, and improve soil health and fertility.

On December 7, 2021, CARB held a public workshop entitled “Potential Future Changes to the LCFS Program.” At the workshop, CARB stated that they are considering “site-specific agricultural inputs in fuel

² CARB. California Greenhouse Gas Emission Inventory: 2000 – 2017, 2019 edition, p.8
https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2017/ghg_inventory_trends_00-17.pdf

³ Claassen, R., Bowman, M., McFadden, J., Smith, D., Wallander, S. (2018) Tillage Intensity and Conservation Cropping in the United States. EIB-197. U.S. Department of Agriculture, Economic Research Service.

⁴ CARB. California Greenhouse Gas Emission Inventory: 2000 – 2017, 2019 edition, p.8
https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2017/ghg_inventory_trends_00-17.pdf

⁵ Sanderman, J., Hengl, T., Fiske, G.J. (2017) Soil carbon debt of 12,000 years of human land use. *Proceedings of the National Academy of Sciences of the United States of America* 114 (36) 9575-9580. <https://doi.org/10.1073/pnas.1706103114>

⁶ National Academies of Sciences, Engineering, and Medicine 2019. *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25259>

⁷ CARB (2022) CARB releases ambitious draft climate action plan to slash use of fossil fuels and reach carbon neutrality by 2045.
<https://ww2.arb.ca.gov/news/carb-releases-ambitious-draft-climate-action-plan-slash-use-fossil-fuels-and-reach-carbon>

⁸ Pournazeri, S. (2021) Vision for Zero Emission Transportation: Public Workshop Series to Commence Development of the 2022 Scoping Plan Update. https://ww2.arb.ca.gov/sites/default/files/2021-06/carb_sp_kickoff-transportation_june2021.pdf



pathway life cycle analyses.”⁹ We support this approach and strongly encourage CARB to credit field-based practices through the LCFS, to fully account for the impact that different agricultural practices have on our climate.

Furthermore, recent studies using the GREET model have calculated that these practices can reduce the CI of gasoline or diesel by as much as 44.4 g CO₂e/MJ.¹⁰ This translates into 1.75 metric tons per acre reduction.¹¹ The average price for LCFS commodities for the week of June 20, 2022 was \$108.52.¹² Therefore, a farm that implements practices that result in a 44.4 g CO₂e/MJ CI reduction could potentially generate as much as \$190 per acre for their practices. This is the most optimistic, yet least likely scenario, as it includes the highest emission reduction practices among the 192 considered in the research. Assuming a farmer implements practices that reduce GHG emissions by a third of the practices considered, the farmer would generate reductions of 0.58 metric tons per acre which would be valued at \$63 per acre. As we found in our study, these values are significant enough to dramatically increase the adoption of practices such as optimizing fertilizer application, reducing tillage, using enhanced-efficiency fertilizers, and planting cover crops.

As long as we rely on liquid fuels to power vehicles in California, we will need biofuels to avoid the use of fossil fuels. In order to generate fuels with the lowest carbon intensity possible, **CARB must account for and credit field-based practices.** We can no longer allow fossil fuels to further degrade our land and communities. Luckily, the benefits of these sustainable agricultural practices go beyond their carbon 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; the inclusion of sustainable 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,

DocuSigned by:

Brad Justice

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Brad Justice
Vice President, Emerging Opportunities
Indigo Ag

⁹ CARB. (2021) Low Carbon Fuel Standard. Public Workshop: Potential Future Changes to the LCFS Program https://ww2.arb.ca.gov/sites/default/files/2021-12/LCFS%2012_7%20Workshop%20Presentation.pdf

¹⁰ 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>

¹¹ See Appendix A for details on the calculation.

¹² CARB (2021) Weekly LCFS Credit Transfer Activity Reports. <https://ww3.arb.ca.gov/fuels/lcfs/credit/lrtweeklycreditreports.htm>