June 22, 2022

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

RE: Draft 2022 Climate Change Scoping Plan

Dear Ms. Sahota:

For more than 15 years the state of California has been a national and international leader in the fight against climate change. Farmers Edge applauds the significant efforts by the California Air Resources Board (CARB) starting with the implementation of programs originating out of the 2006 Global Warming Solutions Act (AB32) through the most recently published Draft 2022 Scoping Plan. One of CARB's programs that has exceeded expectations is the Low Carbon Fuel Standard (LCFS). According to the Draft 2022 Scoping Plan, the program has grown from "approximately 1.8 million gallons in 2011 to nearly 589 million gallons in 2020."[1] In addition, it has been copied by other states, such as Oregon and Washington, as well as countries from Australia to the European Union.

The state is continuing its leadership through its goal of becoming carbon neutral by 2045, or sooner. Farmers Edge supports this ambitious goal. As a part of meeting the goal we encourage CARB to modify the LCFS program to incentivize agricultural producers to produce biofuels that have been grown using agricultural practices to reduce greenhouse gas (GHG) emissions and remove carbon dioxide from the atmosphere. These practices will directly support the state's transition to a carbon neutral economy.

Farmers Edge is passionate about leading the next agricultural revolution by developing data-driven technologies that help farmers run efficient operations while producing more food for a rapidly growing global population. We are a respected leader in digital agriculture, delivering unprecedented value to stakeholders across the entire agricultural ecosystem. Farmers Edge provides growers and agricultural professionals not only with high-quality, accurate data, but also with field-level analysis, predictive modeling, and a world-class team of farm data scientists in established and emerging growing regions. Our Smart Carbon program helps farmers grow more using less inputs through smart farming practices powered by robust, real-time datasets and the most comprehensive on-farm digital infrastructure.

[1] CARB (2022) 2022 Draft Scoping Plan, https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents. 18.

To us, sustainability is the sum of all the steps required to make farming a viable, profitable and positive industry now and for years to come. To our growers, this means ensuring their land becomes a legacy contributing to the overall health of their local and the global communities.

Like its predecessors, the Draft 2022 Scoping Plan incorporates a variety of programs to reach carbon neutrality no later than 2045. The LCFS continues to be an essential component of that plan, shaping the market to produce low-carbon fuels. While Executive Order N-79-20 requires "100 percent of in-state sales of new passenger cars and trucks [to] be zero-emission by 2035" and for "100 percent of medium- and heavy-duty vehicles in the State [to] be zero-emission by 2045,"[2] the draft plan recognizes that "[Internal Combustion Engine (ICE)] vehicles from legacy fleets will remain on the road for some time, even after all new vehicle sales have transitioned to [zero emission vehicle] ZEV technology."[3] While the transition to ZEVs is occurring, biofuels with the lowest environmental footprint will be necessary to power the remaining ICE vehicles. We must ensure that those biofuels are produced with the lowest carbon emissions and environmental impacts as possible. Over the past decade, the biofuels encouraged through the LCFS have proven pivotal to the success of California's climate strategies. To meet the state's 2045 goal, increased attention on the cultivation of the feedstocks that generate biofuels is critical.

For nearly a century, ethanol has been blended with gasoline to reduce criteria air pollutants and boost octane levels.[4] As our knowledge of agricultural systems has increased, we have learned that croplands soils around the world have lost on average 26 percent of the carbon in the top 30 cm of soil.[5] Fortunately, more and more farmers realize the impacts of these practices and many, including Farmers Edge customers, are changing their practices to reduce these impacts. Research from the National Academy of Sciences has found many conservation practices that can "increase carbon stocks in soils and are successfully practiced by progressive farmers and ranchers."[6] In addition, 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]

The GREET model, currently used to calculate the carbon intensity (CI) of fuels for the LCFS, does not adequately reward farmers for implementing sustainable agriculture practices such as optimizing fertilizer application through a 4R nutrient management approach, reducing tillage, using enhanced-efficiency fertilizers, and planting cover crops. However, the model has the potential to calculate the reduced CI score and thereby incentivize those practices. Scientists

[2] Newsom (2020) Executive Order N-79-20. (https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf)
[3] ibid. 152.
[4] Gustafson, C. History of Ethanol Production and Policy. North Dakota State University. https://www.ag.ndsu.edu/energy/biofuels/energy-briefs/history-of-ethanol-production-and-policy.
[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] ibid.

from Argonne National Laboratory, creator of GREET, published a paper in July 2020, which demonstrated that field-based practices can reduce the CI of gasoline or diesel by as much as 44.4 g CO_2/MJ.[8]

Incentives to encourage the adoption of practices such as optimizing fertilizer application through a 4R nutrient management approach, reducing tillage, using enhanced-efficiency fertilizers, and planting cover crops is necessary because these practices have not been widely adopted. According to the 2017 U.S. Census of Agriculture, cover crops have only been adopted on about 4 percent (15 million acres) of U.S. cropland acres.[9] These practices have decades of research supporting their environmental benefits. Conversion from conventional tillage to no-till has proved to store more than 2 metric tons CO_2e per acre per year in published studies.[10,11,12] The planting of cover crops increases soil organic carbon while maintaining yields in long-term North American studies.[13,14] These practices also increase soil health, promote ecosystem health, and provide resilience to agricultural lands where biofuels are produced.

The importance of sustainably producing biofuels is echoed through both the Draft 2022 Scoping Plan and current state legislative and regulatory policies. Under the section entitled Proposed Strategies for Carbon Removal and Sequestration, the draft plan states that "there is no path to carbon neutrality without carbon removal and sequestration"[15] Senate Bill 27, also referenced in the draft plan, directs CARB "to establish specified carbon dioxide removal targets for 2030 and beyond."[16] The Transportation Sustainability section states that the state "must continue to support low-carbon liquid fuels."[17] It goes on to state that "existing refineries could be repurposed to produce sustainable aviation fuel [and] renewable diesel."[18] CARB's recommended Proposed Scenario highlights the necessary role of Natural and Working Lands (NWL) in meeting the State's climate neutrality goals. The plan prioritizes management actions on croplands that "reduce GHG emissions from these lands, protect ecosystems against future climate change, protect communities, and enhance the ecosystem benefits they provide to nature and society."[19]

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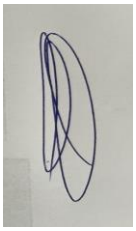
[8] Liu, X. et. al. (2020) Shifting agricultural practices to produce sustainable, low carbon intensity feedstocks for biofuel production. *Environ. Res. Lett.* https://doi.org/10.1088/1748-9326/ab794e
[9] USDA National Agricultural Statistics Service (NASS) (2021) 2017 U.S. Census of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/index.php
[10] Marland, G., West, T.O., Schlamadinger, B., Canella, L. (2003) Managing soil organic carbon in agriculture: the net effect on greenhouse gas emissions. *Tellus 55B*, 2 https://doi.org/10.1034/j.1600-0889.2003.00054.x
[11] Nicoloso, R.S., Rice, C.W. (2021) Intensification of No-Till Agricultural Systems: an Opportunity for Carbon Sequestration. https://doi.org/10.1002/saj2.20260
[12] Six, J. and Paustian K. (2014) Aggregate-associated soil organic matter as an ecosystem property and a measurement tool. *Soil Biology & Biochemistry 68*, A4-A9 http://dx.doi.org/10.1016/j.soilbio.2013.06.014
[13] Chahal, I., Vyn, R. J., Mayers, D., Van Eerd, L. L. (2020) Cumulative impact of cover crops on soil carbon sequestration and profitability in a temperate humid climate. *Scientific Reports*. 10 (13381). https://doi.org/10.1038/s41598-020-70224-6
[14] Olson, K., Ebelhar, S. A., Lang, J. M. (2014) Long-Term Effects of Cover Crops on Crop Yields, Soil Organic Carbon Stocks and Sequestration. Open Journal of Soil Science. 4, 284-292. http://dx.doi.org/10.4236/ojss.2014.48030
[15] CARB (2022) Op. Cit. 66
[16] SB 27 (Skinner, Chapter 237, Statues of 2021)
[17] CARB (2022) Op. Cit. 152
[18] ibid. 153
[19] Ibid. 42

We recognize the significant effort CARB staff has put into the development of the Draft 2022 Scoping Plan. The plan recognizes the important role of biofuels in meeting the state's climate neutrality goal. Because biofuels are important to meeting the state's goal, we encourage CARB to specifically state that the biofuels produced for the LCFS must be grown in the most sustainable and environmentally sensitive manner. The most effective and efficient way to incentivize these growing practices is by crediting field-based practices in the LCFS. Agricultural practices, such as optimizing fertilizer application, reducing tillage, using enhanced-efficiency fertilizers, and planting cover crops generate valuable GHG reductions and carbon dioxide removal as well as protect watersheds, increase biodiversity, and improve soil health and fertility.

For more than 50 years, CARB has been an international leader in developing and implementing programs to reduce GHG emissions. Incentivizing the crediting of agricultural land practices in the LCFS will continue the State's leadership. 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,



Rob Meijer
Executive Vice President of Corporate Development