January 7, 2022

Cheryl Laskowski
Branch Chief, Transportation
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

RE: Recommended LCFS Rulemaking Issue- Recognizing Soil Carbon Sequestration within CA-GREET

(Comment submitted electronically via Comment Submittal Form at https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=lcfs-wkshp-dec21-ws&comm_period=1)

Dear Ms. Laskowski,

This letter contains principles developed by a broad group of industry stakeholders including farmers, low carbon fuel producers, non-governmental organizations, and trade associations. We are writing to recommend that the California Air Resources Board ("CARB") recognize farming practices and other methods of soil carbon sequestration ("SCS") into the Low Carbon Fuel Standard ("LCFS") Rulemaking (the "LCFS Rulemaking"). Specifically, we are encouraging CARB to recognize SCS within the next iteration of the CA-GREET model that underlies the LCFS program.

In support of the recommendation, we are providing to CARB SCS principles and CA-GREET 4.0 Design Recommendations that have support across the wide range of stakeholders that are signatories to this letter. These principles and recommendations were originally developed through the work of Great Plains Institute ("GPI") and the work of stakeholder groups that GPI convened. The signatories of this letter have modified these principles and recommendations in order to align them with the existing regulatory structure of the California LCFS.

By quantifying SCS in CA-GREET and in LCFS pathways, CARB would take a leading role in incentivizing carbon smart farming practices in all locations that grow feedstock for LCFS fuel pathways, build knowledge regarding the short and long-term effectiveness of various SCS strategies, and speed fulfillment of California's aggressive decarbonization goals. According to the Intergovernmental Panel on Climate Change, soil carbon sequestration provides 89% of the global technical GHG emission mitigation

potential from agriculture.[1] This topic therefore warrants consideration in the LCFS Rulemaking.

California Policy Requires Decarbonization of the Transportation Sector

Pursuant to SB 32 and AB 197, California must reduce its GHG emissions 40% below 1990 levels by 2030 necessitating dramatic GHG reductions compared to current policies. Transportation emissions are the dominant GHG emissions source, constituting 41% of California's total GHG emissions of 425.3 $MMTCO_2e$. Transportation GHG emissions have clearly emerged as the most difficult sector to decarbonize with transportation's rising from 35% of California's GHG emissions in 2015 to 41% in 2018.[2]

Pursuant to Governor Brown's Executive Order B-55-18, California has a statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter in addition to statewide targets of reducing GHG emissions including SB 32 and AB 197.[3] In addition, the Executive Order provides that, "The California Air Resources Board shall work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal."

The Importance of Natural Solutions Including Soil Carbon

To identify negative emissions pathways that physically remove CO_2 from the atmosphere and strategies that can enable California to meet its goal of achieving carbon neutrality by 2045, the Lawrence Livermore National Laboratory developed a recently published report entited, Getting to Neutral, Options for Negative Carbon Emissions in California ("Getting to Neutral Report" or "Report").[4] The Getting to Neutral Report analyzed California's carbon neutrality goal and determined that it is necessary for the State to remove 125 million metric tons ("MMT") of carbon from the atmosphere each

[1] Smith, P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, S. Ogle, F. O'Mara, C. Rice, B. Scholes, O. Sirotenko, 2007: Agriculture. In Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, at p. 499 (emphasis in original), available at https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg3-chapter8-1.pdf (last viewed July 16, 2020) (hereafter, 2018 IPCC Agriculture Chapter).

[2] California Air Resources Board, "2022 Scoping Plan Update, Kick-off Workshop," June 8, 2021, at slide 4, at https://ww2.arb.ca.gov/sites/default/files/2021-06/carb_overview_sp_kickoff_june2021.pdf .

[3] Executive Order B-55-18, available at https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf

[4] Sarah E. Baker, Joshuah K. Stolaroff, George Peridas, Simon H. Pang, Hannah M. Goldstein, Felicia R. Lucci, Wenqin Li, Eric W. Slessarev, Jennifer Pett-Ridge, Frederick J. Ryerson, Jeff L. Wagoner, Whitney Kirkendall, Roger D. Aines, Daniel L. Sanchez, Bodie Cabiyo, Joffre Baker, Sean McCoy, Sam Uden, Ron Runnebaum, Jennifer Wilcox, Peter C. Psarras, Hélène Pilorgé, Noah McQueen, Daniel Maynard, Colin McCormick, Getting to Neutral: Options for Negative Carbon Emissions in California, January, 2020, Lawrence Livermore National Laboratory, LLNL-TR-796100, at p. 29, available at https://www-gs.llnl.gov/content/assets/docs/energy/Getting_to_Neutral.pdf (hereafter "Getting to Neutral Report," footnotes omitted).

year by 2045 in order to achieve carbon neutrality. The Report then determined the lowest cost and most productive pathways to create a negative emissions strategy and identified the three central pillars of the strategy:

1. *Capture and store as much carbon as possible through better management of natural and working lands.*
2. *Convert waste biomass to fuels and store the CO_2.*
3. *Remove CO2 directly from the air using purpose-built machines and store the CO_2.*[5]

The natural solutions encompassed by the Report include farming practices that increase the amount of carbon stored in soils. The Report found that, "These approaches are among the least expensive we examined, averaging $11 per ton of CO_2 removed from the atmosphere." The Report also recognized that these strategies have important co-benefits including improved soil health.[6] The Report went on to state:

> *Natural systems are always the first option for negative emissions, both due to their concomitant advantages (soil health, ecosystem services) and to their generally lower cost… Natural systems have the advantage that their system issues are perhaps the most simple, with the source of the CO_2 being the atmosphere and the ultimate sink being the natural system itself.*[7]

The Getting to Neutral Report specifically referenced the following Soil Carbon strategies: cover cropping, mulching, no-till farming, reduced-till farming, and compost application. Regarding scale of the opportunity, the Report found that:

> *Soils have lost approximately 130 billion metric tons of organic carbon (477 billion metric tons of CO_2 equivalent) to the atmosphere globally since the advent of modern agriculture. Reversing soil organic carbon losses by altering land management would sequester atmospheric CO_2 while also potentially delivering gains in soil fertility. Estimates of the near-term carbon storage potential of agricultural soils are in the range of approximately 0.08-1.85 metric tons of carbon per hectare per year, or 0.3-6.8 tons of CO_2 equivalent per hectare per year. In theory, increasing soil carbon stocks globally at these rates could sequester 1-4 billion tons of carbon (3.7-14.7 billion tons of CO_2) per year, with the potential to offset global temperature increase.*[8]

The Value of Regenerative Agriculture as a Natural Solution

Consistent with the Getting to Neutral Report, regenerative agriculture has tremendous momentum, is actionable today, and has great atmospheric carbon reduction potential.

[5] Getting to Neutral Report at p. 3.
[6] Id. at p. 4.
[7] Id. at p. 15.
[8] Id. at 22 (footnotes omitted).

According to the IPCC 2018 report, the global technical GHG emission mitigation potential from all agriculture exceeds 5 gigatons of CO2e per year. Per the Agriculture chapter's Executive Summary, "Soil carbon sequestration (enhanced sinks) is the mechanism responsible for most of the mitigation potential (*high agreement, much evidence*), with an estimated 89% contribution to the technical potential."[9]

In order to achieve these substantial reductions, market signals must be provided to farmers that there are economic rewards for better practices. California's LCFS program can provide a critical market driver for these impactful carbon smart agricultural practices. The United States Department of Energy's Argonne National Laboratory found deploying cover crop system in the upper Great Plains would result in increased carbon sequestration, reducing the carbon intensity of the agricultural production, and could generate a value of $279 per acre if allowed under the California LCFS program.[10]

Stakeholders are actively leveraging United States Department of Agriculture funds to establish a quantification and verification protocol that could support CARB's inclusion of on-farm carbon benefits. For example, the United States Department of Agriculture recently funded the Expanding Soil Health Through Carbon Markets Regional Conservation Partnership Program in South Dakota. This project incent farmers supplying corn to an ethanol facility to adopt climate-smart practices and pay for on-farm soil sampling and quantification of the resulting greenhouse gas (GHG) benefits at a grainshed level. This data and verification system can then be used as a basis for pathway approval under the California LCFS program.

Additionally, the data collected through this project will increase the confidence in current models used to quantify soil carbon sequestration and nitrous oxide emissions, and the impacts of crop yield, tillage intensity, and nutrient management on biofuel GHG emissions. Work is underway to expand upon the South Dakota project across a multi-state growing region and ethanol company grainsheds to refine quantification and modeling protocols based on localized factors including temperature, preciptiation, and soil type. The goal of this larger project is to increase scientific robustnessss regarding key soil carbon models that could be used more generally to set carbon intensity reductions in order to minimize the administrative burden of this program component.

Policy Benefits

Quantifying greenhouse gas emissions for biofuel feedstocks from farm practices (at the farm-level or on aggregate) and assigning corresponding carbon intensity scores has major benefits:

- It compensates farmers, on a purely voluntary basis, for climate-smart farming practices.

[9] 2018 IPCC Agriculture Chapter (full cite at footnote 1), at p. 499.
[10] https://iopscience.iop.org/article/10.1088/1748-9326/ab794e

- It creates an incentive for continuous improvement to advance sustainable farming practices sequesters carbon and offers improved yields.
- It improves water quality and soil health.
- It will help to achieve scale more quickly and offer significant near-term greenhouse gas emission reductions than any voluntary private carbon market programs with much less attractive carbon pries for farmers.

Principles

California's LCFS has the potential to achieve the policy benefits stated above by following the guiding principles below:

- On-farm conservation measures should be voluntary and not required. Greater participation will happen if structured as an incentive.
- Continuous improvements in climate-smart farming practices should be incentivized.
- Protocol design should strike a balance between precision and cost for farmers and producers. CARB working with industry should develop strategies for verification of practices that minimize cost where possible while still ensuring outcomes while leveraging significant on-going innvestments in the space.
- Protocol design should be updated during LCFS rulemakings to reflect the substantial capital investments occurring and the continuous improvements in technology being made.
- Greenhouse gas life cycle assessment including the assessment of climate-smart farming practices should be non-proprietary, transparent, verifiable, and repeatable.

Conclusion

The Getting to Neutral Report emphasizes that the first two necessary actions for California to take in order to achieve carbon neutrality by 2045 are:

1. *Scale up and accelerate implementation of natural solutions.*
2. *Ensure eligibility and economic viability of negative emission pathways under the State's climate programs.*[11]

The Getting to Neutral Report represents the most comprehensive and credible strategy document developed to date that charts a viable course for California to achieve carbon neutrality. Consistent with the Reports' recommendations, it is essential that CARB integrate the recognition of soil carbon sequestration into the state's most effective GHG reducing program for transporation fuels, the Low Carbon Fuel Standard.

[11] Getting to Neutral Report, at p. 7.

Thank you for your consideration of our input. We would welcome the opportunity to provide any further information that would be value to ARB on this subject.

Respectfully,

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Low Carbon Fuels Coalition

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American Coalition for Ethanol

Floyd Vergara
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