December 21, 2022

Cheryl Laskowski, Ph.D.
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Enabling N_2O reductions through the Low Carbon Fuel Standard

Dear Dr. Laskowski:

Thank you for the opportunity to comment on the November 9, 2022 Low Carbon Fuel Standard (LCFS) workshop. The LCFS is one of the most powerful climate policies in the world, and uniquely supports a wide array of innovative low carbon fuel production pathways. This can include pathways that significantly reduce emissions of N_2O, such as projects that Ductor develops. We encourage you to strengthen the program through the amendment process to ensure it continues playing this unique role – delivering deep emission reductions from expected, and unexpected, sources.

About Ductor

Ductor started in 2009 with the ambitious aim to create a solution that would help solve today's environmental challenges in the energy and agriculture sector. Today we build, own, and operate microbiological turnkey facilities, turning waste from the agricultural sector into sustainable fertilizers and biogas. With two plants in Mexico and Germany and numerous projects in the pipeline, we are living up to our purpose, and unlocking bio-resources to make food sustainable, and energy clean.

Ductor's technology transforms nitrogen-rich organic waste streams from agriculture, aquaculture and other organic sources into energy and fertilizers. We specialize in wastes that cannot be used directly in conventional biogas production processes, such as anaerobic digestion. These wastes are fed into the Ductor reactor where a patented process with a consortium of microorganisms converts them via fermentation into renewable, liquid nitrogen fertilizer and biogas. The remaining digestate is also upgraded into fertilizing and soil improving products.

Avoided methane accounting and book and claim provides pathway for reducing N_2O

As you undoubtedly appreciate, the LCFS is one of the only – and the most powerful – policies in the world to reduce potent short-lived climate pollutant emissions from the agricultural and waste sectors. This has been clearly demonstrated through the success in the dairy industry in rapidly developing projects in response to the LCFS's strong market signal, delivering significant and rapid methane reductions from a source that would otherwise likely go unaddressed. The use of book and claim accounting magnifies these benefits and emissions reductions from these most potent pollutants – expanding the reach and benefits of California's

LCFS. It also increases the availability and use of renewable natural gas in California and displaces fossil natural gas, which comes almost entirely from out-of-state sources itself.

Rather than making changes to this successful model, as proposed in Alternatives A and B in the workshop, CARB should build on it to achieve even greater emissions reductions from some of the hardest to reach sources and sectors, including N_2O from poultry waste. Like SCLPs, N_2O is a potent climate forcer, but as a long-lived gas, may pose even greater problems than methane, which dissipates from the atmosphere in about 12 years. N_2O has a 100-year global warming potential (GWP) of 273, meaning it is 273 times worse for climate over 100 years than CO_2 and about 10 worse than even methane.[1] Every molecule of N_2O emitted today will stay in the atmosphere for over 100 years, posing an ongoing, lingering climate change challenge.

The Final Scoping Plan acknowledges the challenge posed by N_2O, yet proposes little to address it. For example, the Scoping Plan notes:[2]

> In addition to SLCP emissions, some remaining non-combustion emissions are anticipated to persist in the coming decade… These include CO2 from industrial processes such as cement manufacturing, oil and gas extraction, and geothermal electric power; N2O from wastewater treatment, fertilizers, and livestock manure applied to agricultural soils; and other industrial, non-HFC GHG emissions.

Per the Scoping Plan, CARB expects essentially zero reduction in N_2O emissions from agriculture through 2045, *meaning emissions from N_2O in agriculture could represent a bigger source of emissions than energy-related emissions from buildings, industry or the power sector.*[3]

Yet, these emissions can be addressed. Ductor and others are committed to developing projects to address agricultural N_2O, and the LCFS provides the best – and perhaps only – scalable program to support these projects. We strongly encourage CARB to maintain a strong market signal and rules that allow these projects to move forward and address emissions from this potent source. That means continuing to allow book-and-claim accounting for biomethane and including avoided N_2O emissions accounting in biomethane pathways. We are opposed to proposals in Alternative A and B to limit book and claim accounting for biomethane and concerned about proposals in those alternatives to limit accounting for avoided methane emissions, which would set a dangerous precedent that could limit investment in projects relying on avoided emissions accounting for N_2O, as well.

Support strong carbon intensity reduction targets, in-line with Alternative C and ratcheting mechanism to capture additional opportunities

Finally, we support proposals to strengthen the carbon intensity reduction targets in the near, mid and long-terms under the program, to ensure the LCFS continues to serve as a driver of

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[1] https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

[2] Final Scoping Plan, pg. 240. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf

[3] Per Figure 4-19 in the Scoping Plan, agricultural N_2O accounts for about 7 $MMTCO_2e$/year now through 2045. By 2045, energy-related emissions in the electrical power, industrial and residential and commercial sectors are all less than 7 $MMTCO_2e$/year. https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-PATHWAYS-data-E3.xlsx

innovation and necessary project development. We support targets no less than those identified in Alternative C, and encourage CARB to evaluate additional scenarios to better align the program with state climate goals (for example, 40% reductions by 2030 and 100% reductions by 2045). We also support the conceptual proposal around a ratcheting mechanism that would automatically strengthen the carbon intensity reduction targets should there be an excess of credits. This will account for ongoing innovation in the market and unforeseen pathways entering the program, such as those Ductor proposes. We hope CARB will host additional workshops to evaluate even stronger targets than proposed in Alternative C and explore how a ratchet system might fit into the program.

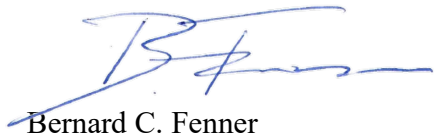
Summary

Thank you again for the opportunity to comment on the workshop. In summary, we support CARB maintaining a strong LCFS program so that it may continue serving as a driver of innovation and greenhouse gas reductions, including from pathways that will serve to address one of the most potent and intractable climate change challenges – N_2O emissions. Accordingly, we encourage CARB to specifically:

- Propose and adopt carbon intensity reduction targets no less than those identified in Alternative C
- Consider a ratcheting mechanism to capture additional greenhouse gas reduction opportunities that may be available under the program
- Support California's access to RNG and replace imported fossil natural gas by continuing to allow book and claim accounting for projects anywhere in North America (as proposed in Alternative C)
- Ensure that avoided N_2O emissions are allowed in the program, through at least 2045.
    - Should CARB choose to limit avoided methane accounting in the future, as proposed in Alternatives A and B, make clear that avoided N_2O will be included in the program.

We look forward to CARB formally kicking off the rulemaking process and continuing to participate in discussions about strengthening the LCFS. Please do not hesitate to reach out if you have any questions about Ductor or these comments.

Sincerely,



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