July 7, 2023

VIA ELECTRONIC FILING

Mark Sippola, Branch Chief
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: RNG Coalition Comments on June 14, 2023 Cap-and-Trade Workshop

Dear Mr. Sippola,

The Coalition for Renewable Natural Gas (RNG Coalition)[1] offers the following comments pursuant to the Joint Cap-and-Trade (C&T) Program Workshop (Workshop) held on June 14, 2023, by the California Air Resources Board (CARB) and the Quebec Ministry of the Environment, the Fight Against Climate Change, and of Wildlife and Parks.

We applaud the ongoing implementation of the joint California-Quebec C&T program as an important step toward curbing global greenhouse gas (GHG) emissions, in line with California's Scoping Plan. Our industry is working to transform North America's organic waste and energy sectors through the development and use of Renewable Natural Gas (RNG, also known as biomethane), biogas, and clean hydrogen. We believe that additional attention to these issues in the forthcoming C&T rulemakings is warranted and look forward to California's and Quebec's continued leadership on these issues.

About the RNG Coalition and the RNG Industry

RNG Coalition is the trade association for the renewable gas industry in the United States and Canada. Our diverse membership is comprised of leading companies across the RNG supply chain. Together we advocate for the sustainable development, deployment, and utilization of renewable gases, so that present and future generations have access to domestic, renewable, clean fuel and energy across North America.

The Role of Renewable Gases in Decarbonization

Renewable gases are an important near-term decarbonization strategy for all applications that currently utilize fossil-derived fuels and, in the long-term, will be necessary in energy applications which are not well-suited to electrification, as well as providing platform molecules for other fuels and products.

Our organization is primarily focused on renewable gases derived from organic waste feedstocks which can achieve compound benefits through (1) the displacement of anthropogenic carbon dioxide (CO_2) emissions from the combustion of fossil fuels, (2) the critical near-term GHG impact of methane (CH_4) capture and destruction, (3) biogenic carbon sequestration benefits due to net CO_2 removals from the

[1] http://www.rngcoalition.com/

atmosphere, and (4) additional air and water benefits that result from the improved management of organic waste. Recycling organic material in this manner is a key component of a circular economy.

Organic waste is a serious and growing issue, and climate and other environmental impacts from these wastes require an immediate and ongoing solution. Globally, municipal solid waste is expected to grow 69% from 2.01 billion metric tons (BT) in 2018 to 3.4 BT in 2050 (around 50% of which is organic waste).[2] Moreover, these trends are underpinned by an expected 25% population increase of 2 billion people between now and 2050.[3] Capturing waste biogas for use as renewable energy is a proven technology for reducing GHG emissions and addressing other challenges in the waste sector.

Renewable Gas Pathways Derived from Biogenic Feedstocks Offer Opportunities for Carbon Removal

When derived from biogenic waste feedstocks, all commercially available methods of producing renewable gases have excellent lifecycle greenhouse gas performance, exemplified by lifecycle assessment (LCA)[4] modeling developed by Argonne National Laboratory[5] and employed in venues such as California's Low Carbon Fuel Standard.[6] Moreover, some renewable gas projects capture and destroy a greater amount of GHG (as measured on a tons of carbon dioxide equivalency basis) than are emitted during the fuel's production and use, making it one of the few fuels available commercially today that can achieve a carbon-negative impact (i.e., better than carbon-neutral).

Furthermore, carbon-negative emissions technologies, and in particular those which operate based on the sequestration of biogenic carbon (e.g., bioenergy with geologic carbon capture and sequestration, biochar with soil carbon sequestration), present an opportunity to accelerate GHG reductions in the energy sector and/or provide useful platform molecules (CH_4, H_2, and non-fossil CO_2) for renewable chemicals. Employing such technologies will ultimately allow us to not only reach, but potentially move beyond carbon neutrality to a point where atmospheric carbon levels can be drawn down to stabilize Earth's climate, if needed.[7] To this end, our industry is working toward the implementation of carbon capture and sequestration at RNG and biogas production facilities, and to create carbon-negative renewable hydrogen or bioliquids as outlined in work conducted by Lawrence Livermore National Laboratory for California.[8]

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[2] https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

[3] https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html

[4] Lifecycle analysis is well established as the leading way to holistically compare greenhouse gas abatement options. It is frequently used for bioenergy (inclusive of biofuels), but also has a role in comparing many other types of GHG abatement. The term "life cycle" appears 240 times in the IPCC's *Climate Change 2022, Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.* https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf

[5] https://greet.es.anl.gov/

[6] For example, see the lifecycle analyses conducted by California's Air Resources Board: https://ww3.arb.ca.gov/fuels/lcfs/fuelpathways/pathwaytable.htm

[7] CARB is correct to explore this important issue, as discussed on Slide 22 of the Workshop presentation. https://ww2.arb.ca.gov/sites/default/files/2023-06/nc-CapTradeWorkshop_June142023_0.pdf

[8] LLNL, *Getting to Neutral: Options for Negative Carbon Emissions in California*, Baker et al., January, 2020, Lawrence Livermore National Laboratory (LLNL) https://gs.llnl.gov/sites/gs/files/2021-08/getting_to_neutral.pdf

California and Quebec should incorporate opportunities to recognize the net GHG sinks and avoided emissions created by biogenic renewable gas pathways. For example, almost all anaerobic digestion (AD) and landfill gas RNG projects have a relatively pure CO_2 stream that can be captured and sequestered (or utilized). Some agricultural feedstocks into AD facilities can transform nitrogen-rich material into RNG and digestate-derived renewable fertilizers that can have nitrous oxide (N_2O) benefits. Further, pyrolysis or gasification of woody materials to produce hydrogen (including direct pyrolysis of biomethane) or RNG can create solid carbon products that offer carbon removal benefits. Finally, many methane avoidance benefits of organic waste diversion RNG projects are not currently captured in the C&T accounting framework.

Other jurisdictions, including Quebec,[9] and voluntary systems have explored accounting for some of these benefits through offset protocols.[10,11] CARB has also already quantified many of these benefits either in the Low Carbon Fuel Standard[12] or for the purpose of using C&T funds under the California Climate Investments program.[13] We encourage CARB to explore incorporating the benefits of renewable gas production from biomass in the C&T incentive framework.

Require the use of M-RETS Renewable Gas Tracking System for RNG and Hydrogen

Digital infrastructure designed to support renewable gas transactions already exists and is ready to be paired with North America's C&T programs. Such systems are proven in Europe[14] and are designed to replace the necessity of tracking of "paper" records between a wide variety of counterparties involved in a high number of transactions. M-RETS[15] is a renewable energy credit and renewable thermal credit platform which is currently tracking RNG volumes for non-transportation markets, including California's renewable gas standard and for voluntary RNG procurement, and will likely be used in a number of other similar programs.

We suggest that California and Quebec incorporate the M-RETS system for renewable gas volumes procured for compliance under the Cap-and-Trade program as a way to standardize RNG tracking while eliminating concerns related to double-counting, ensuring transparency in volume origination, and allowing integration with other programs and markets.

[9] https://www.publicationsduquebec.gouv.qc.ca/fileadmin/gazette/pdf_encrypte/lois_reglements/2023A/106161.pdf

[10] Government of British Columbia, British Columbia Greenhouse Gas Offset Protocol: Methane from Organic Waste (2022). https://www2.gov.bc.ca/assets/gov/environment/climate-change/ind/protocol/methane_from_organic_waste_protocol.pdf

[11] https://www.climateactionreserve.org/how/protocols/ncs/biochar/dev/

[12] https://ww2.arb.ca.gov/resources/documents/carbon-capture-and-sequestration-protocol-under-low-carbon-fuel-standard

[13] https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/calrecycle_organics_finalqm_6-15-20.pdf

[14] https://www.ergar.org/abous-us/

[15] https://www.mrets.org/

CO_2 Emissions for Renewable Gases Must Continue to Be Treated Differently from Fossil CO_2

We support CARB calling out the need to use the best science on slide 7 of the Workshop presentation. Ensuring that science-based GHG accounting principles continue to be used within the California-Quebec C&T programs should be a top priority. Your leadership provides appropriate examples to other jurisdictions.

Related to that leadership, we were surprised to see a brief bullet on slide 29 of CARB's Workshop presentation mentioning potentially revisiting exemptions from compliance obligation of biogenic CO_2 emissions. This topic is complex and has prompted quite a bit of non-scientific misinformation about biofuels/bioenergy in other venues recently.

As it pertains to bioenergy, long-standing carbon accounting and climate science from organizations like IPCC,[16] World Resources Institute,[17] EPA,[18] and IEA[19] treat CO_2 emissions at the point of combustion as biogenic and accounted for separately from fossil CO_2. IEA notes that "IPCC distinguishes between the slow domain of the carbon cycle, where turnover times exceed 10,000 years, and the fast domain (the atmosphere, ocean, vegetation and soil), vegetation and soil carbon have turnover times in the magnitude of 1– 100 and 10– 500 years, respectively. Fossil fuel transfers carbon from the slow domain to the fast domain, while bioenergy systems operate within the fast domain." Waste feedstocks (human, animal, and food waste) used within the anaerobic digestion process are derived from plants that have been grown and harvested recently—well within the fast domain—recycling existing atmospheric carbon dioxide. This near-term circularity substantiates the carbon neutrality of CO_2 from RNG under IPCC principles.

There are two distinct GHG emission accounting approaches commonly used in regulatory programs for bioenergy/biofuels today: the "point-source biogenic CO_2 emissions are carbon neutral" approach and the "lifecycle" approach. When using a point-source approach, GHG emissions from bioenergy are assessed only at the point of use—such as in a home, business, vehicle, power plant, or industrial facility. When determining these point-source GHG emissions, the biogenic carbon dioxide produced from the combustion of a biomass-derived input is often assumed to be counteracted by the carbon dioxide that was recently removed from the atmosphere when the biogenic material was grown, and thus netted out of any final compliance obligation. The use of such a point-source framework is appropriate for calculating compliance obligation (i.e., where biogenic CO_2 at combustion is exempt)

[16] See PDF pg. 5 which states that "In the Energy sector, CO2, methane (CH4) and nitrous oxide (N2O) emissions from combustion of biomass or biomass-based products for energy are estimated, but the CO2 emissions are recorded as an information item that is not included in the sectoral total emissions for the Energy sector.": https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/2_Volume2/19R_V2_2_Ch02_Stationary_Combustion.pdf

[17] See PDF pg. 27 which states that "Direct CO2 emissions from the combustion of biomass shall not be included in scope 1 but reported separately.": https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

[18] See PDF pg. 16 which states that "[T]ailpipe emissions of CO2 from RNG fuels are considered carbon neutral because the carbon is biogenic, while tailpipe emissions of CO2 from fossil natural gas fuels are not.": https://www.epa.gov/sites/default/files/2020-07/documents/lmop_rng_document.pdf

[19] https://www.ieabioenergy.com/iea-publications/faq/woodybiomass/biogenic-co2/

under a C&T program that is primarily focused on emissions occurring within the borders of a jurisdiction.

LCA accounts for GHG emissions generated from a fuel's production through its end-use—the full life of the fuel.[20] The lifecycle approach for GHG emission accounting for biofuels can also be referred to as a "well-to-wheels" or "full fuel cycle" approach. This approach accounts for all of the GHG emissions produced or avoided from the production, collection and processing, transmission and delivery, and ultimate use of a fuel (including upstream sinks and final point-source emissions).[21]

When determining the lifecycle GHG emissions factor or carbon intensity (CI), the GHG emissions are summed across each stage, and the end user of the fuel is responsible for all emissions. A full lifecycle approach is appropriate for assessing the net global impact of bioenergy resources on a whole. It is also appropriate for use in regulatory programs design to ensure that the lowest carbon fuels or products are consumed in a jurisdiction (without regard to where the emissions occur geographically).

We generally support the use of standardized lifecycle CI scoring methodologies to ensure sustainability of biofuels/bioenergy. It's possible to use LCA to draw thresholds for exemption eligibility in C&T programs, if needed, but this will introduce significant additional complexity. The Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) model is already employed by California and other states' transportation decarbonization programs. A thermal sector GREET model has already been adapted by EcoEngineers[22] for use in Minnesota,[23] and LCA tools for bioenergy use in stationary sources could be developed/approved by CARB/Quebec in the C&T context, if necessary, but this would be a detailed undertaking.

Conclusion

RNG Coalition appreciates the opportunity to provide input on the Cap-and-Trade programs. Renewable gases (RNG, biogas, and renewable hydrogen) are important opportunities within the suite of technologies needed to decarbonize.

While the California and Quebec programs remain world leading examples of carbon pricing, they have not yet been strong drivers of renewable gas deployment, in part because the GHG benefits of such gases are not fully recognized in the current program framework. We hope the forthcoming rulemakings present an opportunity to better reflect these climate benefits.

[20] https://www.epa.gov/renewable-fuel-standard-program/lifecycle-analysis-greenhouse-gas-emissions-under-renewable-fuel

[21] These lifecycle scores often incorporate upstream use of fossil fuels to create or transport biofuels.

[22] https://www.ecoengineers.us/

[23] See Minnesota Public Utilities Commission Docket 21-324, searchable here: https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showeDocketsSearch&showEdocket=true

Sincerely,

/S/

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