July 9, 2021

Liane M. Randolph
Chair, California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: 2022 Greenhouse Gas Scoping Plan, Comments on June 2021 Workshops

Dear Chair Randolph,

The Coalition for Renewable Natural Gas (RNG Coalition)[1] offers the following initial comments pursuant to the development of California Air Resources Board's (CARB) 2022 Greenhouse Gas Scoping Plan (Scoping Plan or the Plan). CARB—in tandem with the sister agencies involved with the Plan—are long-standing leaders in developing policy to facilitate greenhouse gas (GHG) emission reductions across all sectors of the economy.

CARB's previous three Scoping Plans have each provided important milestones in worldwide efforts to address the critical issue of climate change, and we expect that this timely fourth iteration of the Plan will continue that trend of global leadership. Our industry looks forward to the process to develop a robust Plan and requests that the Plan contain a vision for a long-term role for renewable gases within the State's broader path to a carbon neutral California.

About the RNG Coalition and the RNG Industry

The RNG Coalition is the trade association for the RNG industry in the United States and Canada. Our diverse membership is comprised of leading companies across the RNG supply chain, including recycling and waste management companies, renewable energy project developers, engineers, financiers, investors, organized labor, manufacturers, technology and service providers, gas and power marketers, gas and power transporters, transportation fleets, fueling stations, law firms, environmental advocates, research organizations, municipalities, universities, and utilities. Together we advocate for the sustainable development, deployment, and utilization of RNG, so that present and future generations have access to domestic, renewable, clean fuel and energy in California and across North America.

Over the last decade, GHG policies in California have driven extraordinary growth within the RNG industry. There are now 157 operational RNG production facilities in North America with 155 under construction or in substantial development[2] compared to only 30 developed between 1982 and 2011.

Initial growth in the industry was driven by renewable power programs, such as California's Renewable Portfolio Standard (RPS). More recent development has been incentivized by transportation decarbonization programs, including the Unites States Environmental Protection Agency's Renewable Fuel Standard and CARB's Low Carbon Fuel Standard (LCFS). RNG is also increasingly being used to

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

[2] Based on RNG Coalition's production facility data as of April 22, 2021: https://www.rngcoalition.com/rng-production-facilities

decarbonize natural gas end-use applications in non-power stationary sectors, marked by the emergence of new gas utility procurement programs for RNG, such as the framework under consideration by the CPUC under Senate Bill 1440.[3,4]

While California's historical efforts to incentivize RNG resources has been critical to the industry's development this far, there remains significant space for our industry to grow, and to provide California with a stronger "tool in the toolbox" toward achieving carbon neutrality. Given the potential for RNG to assist in decarbonization of a variety of sectors, we look forward to strong cross-agency and cross-sectoral coordination in the forthcoming Plan to maximize the benefits of RNG development and utilization.

Environmental Benefits and Long-Term Role of RNG in California

Given the successful initial efforts in California to promote GHG reductions through the development and use of RNG; extensive recent modeling commissioned by CARB, CEC and other agencies outlining the necessary role of renewable gaseous fuels; and increased attention by California's energy utilities, environmental groups, municipalities, waste management and agricultural firms to RNG and organic waste issues; RNG derived from biologic wastes deserves significant near-term attention within the Scoping Plan as a well-proven, cost-effective technology available today at commercial scale.

Use of Renewable Gases is Necessary to Reach California's Environmental Goals

Renewable gases—both biomethane and hydrogen—are important near-term decarbonization tools for any and all applications which currently utilize fossil-derived fuels and, in the longer-term, will be a necessary resource for any applications that have certain reliability requirements, or which are not well suited to electrification.[5] There have been a number of studies in recent years—including those presented in the June 2021 Scoping Plan kickoff workshops[6]—outlining the benefit and necessity of renewable gases as part of balanced decarbonization strategies.

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[3] See the CPUC staff's recent whitepaper on this topic: https://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Gas/SB1440_Staff_Proposal_FINAL.pdf

[4] in tandem with similar efforts from California's Pacific Coast Collaborative partners. For example, see Oregon Public Utilities Commission's adoption of RNG procurement rules under Oregon Senate Bill 98: https://apps.puc.state.or.us/orders/2020ords/20-227.pdf

[5] Bataille et al., *A Review of Technology and Policy Deep Decarbonization Pathway Options for Making Energy-Intensive Industry Production Consistent with the Paris Agreement.* https://www.sciencedirect.com/science/article/abs/pii/S0959652618307686

[6] For example, the *Driving California's Transportation Emissions to Zero* study (April 2021) from the UC Institute for Transportation Studies states that, "RNG plays a valuable role in a comprehensive decarbonization policy: It yields a valuable energy product, as well as soil amendments, and reduces the uncontrolled emission of methane from decomposing organic matter." https://escholarship.org/uc/item/3np3p2t0 (See page 264.)

CARB's work on carbon neutrality (conducted by E3) shows significant growth in biomethane and hydrogen use in all scenarios. See Figure 5 of *Achieving Carbon Neutrality in California*, Energy and Environmental Economics for the California Air Resources Board, October 2020. https://ww2.arb.ca.gov/sites/default/files/2021-06/e3-uci-rhodium_sp_kickoff_june2021.pdf

The studies presented at the June workshops align well with conclusions reached by Columbia University's Center on Global Energy Policy in a recent study[7] focused on the use of the existing gas system in a carbon neutral world. Notably, the authors state that:

> *"[R]etrofitting and otherwise improving the existing pipeline system are not a choice between natural gas and electrification or between fossil fuels and zero-carbon fuels. Rather, these investments in existing infrastructure can support a pathway toward wider storage and delivery of cleaner and increasingly low-carbon gases while lowering the overall cost of the transition and ensuring reliability across the energy system. In the same way that the electric grid allows for increasingly low-carbon electrons to be transported, the natural gas grid should be viewed as a way to enable increasingly low-carbon molecules to be transported."*

The RNG industry does not claim to be able to solve the daunting challenge of fully decarbonizing all sectors alone, but we know that renewable gases will be a significant contributor to this effort. In understanding RNG's role, it is important to consider both the well proven technology readiness level of various methods of making RNG today, such as Anerobic Digestion (AD), and the flexibility provided by RNG's full fungibility with all conventional gas applications. In the long run, RNG can be directed to the end-uses where it is most needed, serving in tandem with technologies that require time to scale and achieve production cost reductions (e.g., electrolytic hydrogen, heavy duty electric vehicles) or that involve the turnover of long-lived capital stock (e.g., electrification of building space and water heating).

RNG's Role in Achieving Emission Reductions from Organic Wastes

As exemplified by CARB's prior iterations of the Scoping Plan, the Short Lived Climate Pollutant Reduction Strategy[8] and the procurement target framework outlined by CPUC in the recent SB 1440 whitepaper,[9] California has extensively considered the intersection between RNG's benefits in the waste, agricultural, and energy sectors in prior policy development. To maximize the benefits of RNG development across all sectors, the Scoping Plan should continue to build and expand upon this important cross-sector strategy.

CARB's June 2021 Scoping Plan Kickoff Presentation[10] focused on addressing short-lived climate pollutants as required by SB 1383,[11] including the state's goal of reducing methane emissions 40% by 2030. 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

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[7] Blanton et. Al, *Investing in the US Natural Gas Pipeline System to Support Net-Zero Targets* https://www.energypolicy.columbia.edu/research/report/investing-us-natural-gas-pipeline-system-support-net-zero-targets?utm_source=Center+on+Global+Energy+Policy+Mailing+List&utm_campaign=38d4ab05a7-EMAIL_CAMPAIGN_2019_09_24_06_19_COPY_01&utm_medium=email&utm_term=0_0773077aac-38d4ab05a7-102456873

[8] https://ww2.arb.ca.gov/sites/default/files/2020-07/final_SLCP_strategy.pdf

[9] https://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Gas/SB1440_Staff_Proposal_FINAL.pdf

[10] https://ww2.arb.ca.gov/sites/default/files/2021-06/carb_sp_kickoff_june2021.pdf

[11] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1383

grow 69% from 2.01 billion metric tons (BT) in 2018 to 3.4 BT in 2050 (around 50% of which is organic waste).[12] Moreover, these trends are underpinned by an expected 25% population increase of 2 billion people between now and 2050.[13] California needs to help pioneer the development and commercial deployment of commercially viable technologies to address this waste challenge.

In tandem with waste reduction efforts, RNG development and utilization will also be a primary solution for solving California's (and the nation's) leading biogenic methane emissions sources—livestock manure management and landfilled organics.[14] Methane is a short-lived climate pollutant that—when assessed over a 20-year timeframe—is up to 84 times as potent as a greenhouse gas as carbon dioxide.[15] Addressing these methane challenges rapidly through RNG production will simultaneously create a significant amount of useful low carbon fuel.[16]

Generally speaking, RNG provides an incentive to better manage organic waste by providing an associated revenue stream for those who handle the waste, such as municipalities and farmers. RNG production through anaerobic digestion of materials such as food waste, animal manure, and wastewater also yields valuable by-products. After the elimination of pathogens, digested solids can be recycled for productive uses such as animal bedding,[17] and AD converts nutrients into a form more accessible by plants than raw manure, allowing for an effective organic fertilizer.[18] Overall, recycling and using the by-products of waste through AD for RNG production processes creates a more environmentally responsible and sustainable circular economy. Therefore, RNG derived from AD of organic wastes should be thought of as a no-regrets near-term solution that eliminates a dangerous short-lived climate pollutant.

Carbon Intensity of RNG

All commercially available methods of producing RNG from organic waste feedstocks have excellent greenhouse gas performance, exemplified by carbon intensity (CI) modeling employed by California's

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

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

[14] Manure management and landfills make up 47% of California's methane emissions and 26% of U.S. methane emissions. See: https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_2000-18ch4.pdf and https://www.epa.gov/ghgemissions/overview-greenhouse-gases

[15] Myhre, G. et al., *Anthropogenic and Natural Radiative Forcing*. https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf

[16] The consulting firm ICF estimates that 65% of landfills with gas collection systems in place, 60% of landfills without collection systems in place, 80% of EPA candidate landfills, 60% of technically available animal manure, 50% of wastewater treatment plants with a capacity of over 3.3 MG/D, and 70% of food waste available at $100/dry ton can be turned into RNG by 2040. Just these AD-ready feedstocks would produce approximately 1,425 t/Btu of RNG, covering approximately 8.4% of 2019 U.S. residential, commercial, and industrial natural gas demand (16,948 t/Btu). Additional renewable gas volumes could also be produced through non-AD processes. See: https://gasfoundation.org/wp-content/uploads/2019/12/AGF-2019-RNG-Study-Full-Report-FINAL-12-18-19.pdf and https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm

[17] U.S. EPA. (2020, August 18). The Benefits of Anaerobic Digestion.

[18] Id.

LCFS program.[19] Moreover, some RNG 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 combustion, making it one of the few fuels available commercially today with a carbon-negative impact (i.e., better than carbon-neutral). There remain thousands of landfills, wastewater treatment facilities, and livestock operations across North America—including many in California—where raw biogas (methane) is being flared, or worse, is uncollected and escaping fugitively into the atmosphere. Pursuing increased development and utilization of RNG will incentivize improved management of these waste streams while simultaneously providing a flexible, renewable energy resource.

Because of the breadth of technological options to make renewable gases, the RNG industry has long advocated for employing metrics to assess the GHG emissions from each RNG production pathway. We believe that a lifecycle analysis (LCA) is the most appropriate method of doing so because it accounts for all greenhouse gas emissions benefits and disbenefits[20] from a given RNG production pathway. These various emissions steps are then combined to produce a CI score for each production pathway. A common tool for calculating RNG CI scores is the GREET model[21] created by Argonne National Lab, which is widely accepted among both regulatory agencies and the scientific community, most notably by CARB in the LCFS.[22]

Pathway-specific CI scores for RNG production facilities range from low-carbon to carbon-negative.[23] While it would be technically possible to produce RNG with a higher CI than conventional natural gas—due to methane leakage, energy consumption, or other factors—this is not the current practical reality at real-world RNG facilities in the U.S. today.[24]

As the nation's electricity grid sees an increased amount of zero-carbon electricity generation, the CI for all RNG pathways which utilize grid electricity will decrease. This means that the RNG pathways which are currently low-carbon (due to upstream electricity inputs from the current grid) will move increasingly toward zero-carbon as their upstream energy inputs are derived from a greater and greater share of renewable electricity, and those which are currently carbon negative will produce even greater benefits. Modeling CI based on these important interactions clearly illustrates the immediate and long-term benefits of RNG deployment, and the use of such a framework in a consistent fashion across all policies promoting RNG will provide an incentive for RNG producers to maximize their greenhouse gas benefit.

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

[20] For example, benefits may include avoidance of upstream emissions while disbenefits may include leakage, energy usage, and non-CO_2 combustion emissions.

[21] See more information about Argonne National Lab's GREET model: https://greet.es.anl.gov/

[22] GREET can easily be modified to provide CI scores for stationary uses of RNG, as is required in other jurisdictions' RNG utility procurement program. For example, the California Public Utilities Commission (CPUC) required Southern California Gas Company and San Diego Gas and Electric to use a modified version of GREET to measure the Carbon intensity of procured RNG. See CPUC Decision 20-12-022 dated December 17, 2020.

[23] See information on LCFS Pathway Certified Carbon Intensities: https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities

[24] RNG Coalition does not support the utilization of RNG produced through high-CI methods.

Preliminary RNG Policy Considerations for Consideration in the 2022 Scoping Plan

Because of cross-sectoral interactions and (perceived) complexity of GHG LCA of RNG projects, designing successful RNG policy is not always easy.[25] However, California's agencies have been responsible for several programs which have become world-leading methods of promoting GHG reductions through RNG.[26] For these successes to continue, we recommend that the plan carefully consider the following preliminary policy recommendations related to RNG:

- ***Develop Targeted Renewable Gas Procurement Programs for all Gas Customers (or by Sector).*** Like the RPS and LCFS have successfully done for power and transportation fuels, establishing a policy (or policies) that decarbonize all gas end uses should be a critical goal of this iteration of the Scoping Plan. RNG procurement programs for core gas customers—as initiated by SB 1440—in a manner consistent with CPUC's recent whitepaper represent an excellent starting point for this crucial aspect of promoting RNG use. Such programs will be a necessary component of meeting California's 2030 methane reduction targets and waste diversion goals outlined by SB 1383.

  Furthermore, it is important for CARB to further assess, in this iteration of the Scoping Plan, how renewable gas use can best be incentivized for non-core gas customers (such as the large users in the industrial sector). This could be accomplished either through expansion of the LCFS to cover a limited set of non-transportation end uses of gas, expansion of SB 1440 to include all utility and non-utility suppliers of gas (including those that primarily serve non-core customers), or through new industry-specific policies.[27] Designing policies for large industrial gas users may be more challenging because of concerns about economic and emissions "leakage" should out-of-state competitors not face similar requirements. However, from the RNG industry's perspective it's critical that a clear vision be presented in this iteration of the Plan on which tools will be relied upon—and how they will interact—to fully decarbonize gas supply to all end uses in the state.

- ***Strengthen the LCFS through 2045 in line with the Statewide Economy Wide Goal of Carbon Neutrality.*** It will be crucial for CARB to strengthen LCFS carbon reduction targets from 2031 through 2045. The majority of growth in RNG driven by California recently has been due to this program and for this growth to continue the industry needs surety with respect to the stringency of targets post-2030.

- ***Align GHG Accounting Across all Programs Promoting RNG.*** The greenhouse gas accounting in RPS (and BioMAT) programs should be adjusted to better align with the LCFS and other emerging programs which utilize LCA and CI scoring in evaluating GHG reductions from RNG.

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[25] For an excellent primer on how RNG fits as a decarbonization strategy we recommend the recent work from the World Resources Institute, entitled *Renewable Natural Gas as a Climate Strategy: Guidance for State Policymakers.* https://www.wri.org/publication/renewable-natural-gas-guidance

[26] As discussed above, CARB's LCFS program, in tandem with California's Renewable Portfolio Standard, have been some of the biggest historical drivers for our industry.

[27] Such as the type of program envisioned by SB 596 (2021, Becker) which would incentivize carbon reduction in the cement sector from a variety of technologies, including RNG. See: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB596

Achieving the SB 100 goals will likely require dispatchable sources of renewable power. Such flexibility can be provided by renewable gases.

- ***Consider All Renewable Gas Feedstocks.*** This Scoping Plan presents an important opportunity to examine all feedstocks that can be converted into renewable gases in the long run, some of which have large co-benefits. As described above, the state has closely looked at how some organic wastes can be treated through anaerobic digestion to reduce methane, but that is not the full universe of potential bio-feedstock for renewable gas production. While continuing the successful deployment of AD, this Plan should also develop a framework to promote the utilization of organic wastes/residues that are not well suited to AD.

  The best long-run use of these materials may be to convert them to create either carbon-negative renewable hydrogen (when coupled with carbon capture and sequestration) or bioliquids, as outlined by the work done by Lawrence Livermore National Laboratory.[28] This process has the potential to facilitate several ancillary environmental benefits, including reducing wildfire risks and the negative impacts of openly burning agricultural waste. This would align with the work proposed in SB 18 (Skinner, 2021)[29] and the ongoing work by CEC[30] on the production of renewable hydrogen.[31]

In summary, based on the large variability in RNG feedstocks, project location, uncertainties surrounding emerging technologies, and the benefits of a storable and dispatchable resource in various sectors, the highest and best use of the bioresources that can be converted to RNG is not yet known but the fact that we must use these feedstocks constructively should no longer be in question. Given that the highest and best use of this low carbon resource will likely change over time with the evolution of our energy system, it remains important to continue to incentivize and develop well-coordinated programs to promote RNG use across all sectors. We have faith that the Scoping Plan is the appropriate venue for all agencies involved to tackle these tough issues and develop keystone policies to promote the needed growth of a decarbonized gas supply.

Conclusion

RNG Coalition looks forward to working with CARB and other stakeholders in developing the 2022 Scoping Plan. Our industry is poised for continued growth in California, and globally, as leading

[28] LLNL, *Getting to Neutral: Options for Negative Carbon Emissions in California*, Baker et al., January, 2020, Lawrence Livermore National Laboratory (LLNL) https://www-gs.llnl.gov/content/assets/docs/energy/Getting_to_Neutral.pdf

[29] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB18

[30] On July 1, CEC held a workshop to examine technology advancements to scale hydrogen production in California. This work is part of CEC's efforts to solicit information needed to develop the CEC's EPIC 4 Investment Plan and to develop a Hydrogen Roadmap and Strategic Plan for a Decarbonized California. At the workshop various experts and CEC staff explained and expressed support for a broad variety of pathways for producing renewable/green hydrogen—including pathways producing hydrogen from biological sources. https://www.energy.ca.gov/event/workshop/2021-07/electric-program-investment-charge-2021-2025-investment-plan-scoping

[31] In the long-run, H_2 production with CCS may be preferable as it avoid concerns about purpose-created methane but in the near-term gasification/pyrolysis projects should not be prohibited from producing methane if they can demonstrate strong CI performance.

jurisdictions look to address climate change and increase the resiliency of our energy systems. We thank CARB for your leadership on RNG, organic waste reduction, short lived climate pollutants and for creating policies which will serve as an example for other jurisdictions, both domestically and internationally on these issues.

Sincerely,

/S/

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