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Rajinder Sahota
Deputy Executive Officer
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RNG Coalition Feedback on California Air Resources Board 2022 Greenhouse Gas Scoping Plan – Draft Scenario Inputs

Dear Ms. Sahota,

The Coalition for Renewable Natural Gas (RNG Coalition)[1] offers the following feedback on the draft modeling scenarios and assumptions (Scenario Inputs)[2,3] presented by California Air Resources Board (CARB) during the Public Workshop (Workshop) held on September 30 pursuant to the development of CARB's 2022 Greenhouse Gas Scoping Plan (Scoping Plan or the Plan).

We appreciate the opportunity for continued engagement during this process as CARB's modeling decisions in this Scoping Plan will be used to inform energy policy decisions in California and throughout North America. With that in mind, the goal of this exercise should be to pinpoint the most holistic, expedient, and realistic pathway to achieving carbon neutrality while facilitating other benefits for human and environmental health. We believe that, as presented, the breadth of the current scenarios considered can accomplish that goal, and respectfully offer our feedback in the following comments.

General Feedback on Draft Scenario Inputs

Foundationally, RNG Coalition continues to support CARB's stated goal of maximizing all sinks to achieve net-negative carbon emissions while aiming for carbon neutrality no later than 2045. As we have discussed previously, and as world renowned organizations such as Lawrence Livermore National Laboratory[4] and the International Energy Agency[5] have pointed out, bioenergy—including bioenergy with carbon capture and storage (BECCS)—is an important pathway to achieving these goals. This becomes increasingly true if California wishes to target carbon neutrality in 2035—a goal which the RNG industry supports conceptually, but only under a narrow set of conditions.

Overall, RNG Coalition believes the assumptions put forward for Scenario 2 appear to be more holistic and balanced than that offered in Scenario 1. If the ambitious path to achieve carbon neutrality by 2035

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

[2] https://ww2.arb.ca.gov/sites/default/files/2021-09/carb_presentation_sp_scenarioinputs_september2021.pdf

[3] https://ww2.arb.ca.gov/sites/default/files/2021-09/Draft_2022SP_ScenarioAssumptions_30Sept.pdf

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

[5] International Energy Agency, *Net Zero by 2050: A Roadmap for the Global Energy Sector*, May, 2021. https://www.iea.org/reports/net-zero-by-2050

is to be chosen, utilizing all technology options (as described in Scenario 2) is likely the only possible path to reach that rapid pace of decarbonization. Scenarios 3 and 4, which incorporate more modest timelines toward carbon neutrality, offer a more reasonable amount of time to undertake the required major shifts in order to achieve the goal of full neutrality. After an initial review of these 2045 Scenario assumptions, they seem more feasible from a broad technology deployment perspective, but we understand that they may be perceived to be misaligned with the urgency of the climate crisis.

To achieve any of these scenarios, given the current extent of gas technologies and infrastructure currently in place, we continue to urge that CARB should view RNG as broadly applicable for all end uses in the near-term, while keeping in mind a goal of directing RNG to its highest and best uses in long-term. Slide 9 from CARB's September 30 presentation suggests that alternative gases should be used only for industrial heat. We do not necessarily oppose this long-term outcome, if it is ultimately determined by real-world experience that this is the highest and best use for RNG and renewable hydrogen. However, any limits on near-term end uses for RNG is counterproductive to reducing methane from organic wastes as fast as possible today when there is so much conventional gas demand remaining in all sectors.

In Scenario 1, which would exclude bioenergy used in combustion applications, we recommend more clearly shifting the assumptions to consider how RNG could be used to produce energy through electrochemical means (e.g., utilizing fuel cell technologies) in the long run. Across all scenarios, CARB should show that organic waste feedstocks can be transitioned from RNG in the near term to renewable hydrogen[6] and/or electricity in the long run. However, looking at accelerated electrochemical use[7] of the RNG resource in Scenario 1 could help make clear that such technologies are currently significantly more expensive than traditional combustion devices and may struggle to be available at the required scale to maximize the methane abatement from RNG by 2035, but that they are promising long-term strategies for reducing local air emissions from RNG use.

Scenarios that Do Not Achieve Existing State Law with Respect to Methane Abatement Should Not be Considered

In all scenarios, it should be critically important to maintain pressure on reducing methane emissions. This is underscored by the recent Intergovernmental Panel on Climate Change's (IPCC) report, which identifies "methane capture and recovery from solid waste management" as one of the best "short-term 'win-win' policies,"[8] and the joint U.S.-EU Methane Pledge, targeting a 30% reduction by 2030.[9]

Further, global methane reductions are clearly most advantageous as a near-term GHG reduction strategy. The 2021 Global Methane Assessment, from the United Nations Environment Programme and

[6] To the extent that hydrogen trends toward 100% by 2045, that supply should remain inclusive of biological feedstocks. This is again a crucial concept to incorporate given the potential for BECCS to serve as an important piece of the pathway to carbon-negativity.

[7] Pathways for RNG in the natural gas, hydrogen, electricity, and biochemical feedstock sectors should be holistically considered throughout this exercise to ensure that California will be maximizing methane controls, carbon-negative emissions, and the circularity of our economy while minimizing local air pollutants.

[8] IPCC, 2021. *Climate Change 2021: The Physical Science Basis. Chapter 6. Short-Lived Climate Forcers.* https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_06.pdf

[9] https://www.state.gov/joint-u-s-eu-statement-on-the-global-methane-pledge/

the Climate and Clean Air Coalition,[10] shows that human-caused methane emissions can be reduced by up to 45 percent **this decade** and that there are powerful local air pollution co-benefits from methane reduction, finding that:

> *"Because methane is a key ingredient in the formation of ground-level ozone (smog), a powerful climate forcer and dangerous air pollutant, a 45 per cent reduction would prevent 260 000 premature deaths, 775 000 asthma-related hospital visits, 73 billion hours of lost labour from extreme heat, and 25 million tonnes of crop losses annually."*

These findings align well with ongoing short-lived climate pollutant (SLCP) reduction strategies already underway due to existing law in California.[11] The hard work on this topic by CARB,[12,13] the California Department of Resources Recycling and Recovery,[14] and others must not be abandoned in any portion of the scenario analysis or the full Plan.

Electrification and RNG Buildout Likely Occur on Different Timescales

Inherent in considering the most effective near-, mid-, and long-term allocations for RNG and potential other uses for its associated waste feedstocks, CARB must consider the extent and rate at which certain applications will be electrified. RNG Coalition does not oppose electrification in any sector, however, we recommend CARB include realistic projections for the rate of electrification of these sectors within the Scoping Plan. Ultimately, the amount RNG needs to be used directly in each sector will be a function of the chosen carbon neutrality timeline as well as the projected rate and extent of electrification of long-lived vehicles, appliances, and other equipment.

For example, in the building sector, prior comprehensive studies from several jurisdictions throughout the United States conducted by one of CARB's lead modelers—Energy and Environmental Economics (E3)—including in New York[15] and California,[16] consistently show significant demand for fossil-derived natural gas remaining until 2045-2050, even in high-electrification scenarios.[17] We are unclear as to

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[10] CCAC and UNEP, 2021, *Global Methane Assessment* https://www.ccacoalition.org/en/resources/global-methane-assessment-full-report

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

[12] https://ww2.arb.ca.gov/our-work/programs/slcp

[13] CARB, 2021, *Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions* (Draft) here: https://ww2.arb.ca.gov/resources/documents/draft-2030-d-l-ch4-analysis

[14] https://www.calrecycle.ca.gov/organics/slcp

[15] E3, *Pathways to Deep Decarbonization in New York State.* https://climate.ny.gov/-/media/CLCPA/Files/2020-06-24-NYS-Decarbonization-Pathways-Report.pdf. In the "High Technology Availability" pathway from this work ~200 tBtu of gas usage remains in the building sector in 2050, see page 25.

[16] E3, *Achieving Carbon Neutrality in California.* https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf. This work achieves full phase out of gas use in the building sector by 2045 in the most aggressive electrification scenario ("zero carbon energy"), see page 36.

[17] California Energy Commission, 2019, *The Challenge of Retail Gas in California's Low Carbon Future,* https://ww2.energy.ca.gov/2019publications/CEC-500-2019-055/CEC-500-2019-055-F.pdf E3 (and others) show that natural gas in California's residential, commercial, and industrial sectors is still ~1,000 tBtu in 2050 in the high-building-electrification case, see pg. 35.

what has changed, relative to prior recent work from E3, to make it potentially viable to achieve full electrification of buildings by 2035. The reality is that electrification is a longer-term strategy when compared to methane abatement through RNG deployment and that both have important roles to play.[18]

In the building sector it is simple (within the modelling) to project that all gas appliances are replaced with electric appliances at end of life, as noted in Scenarios 2-4. However, this obfuscates the real-world challenge of convincing individual actors to do so. Most individuals are generally predisposed to replace existing appliances with a new appliance of the same fuel type—unless prohibited by law from doing so—due to perceived hassle and cost of fuel switching,[19] especially when lacking critical energy services, such as hot water and space heating, due to broken appliances.

Early Retirement, Emissions Leakage, and Energy Demand Vanishing Should Not be Modeled

Incenting early retirement of functional equipment/appliances/vehicles (as considered in Scenario 1) will be extremely challenging. So much so that we question its viability as a policy tool at scale. It will clearly be hard to motivate individuals to replace functional appliances and vehicles in a cost-effective way.[20] There is also likely an embedded emissions impact from early retirement of functional appliances and equipment (due to an increased rate of manufacturing emissions, likely outside of California) that may not be well captured in the current modeling tools.

Further, with respect to Scenario 1, the outcome that various industrial "facilities close because non-combustion alternative not available" should not be seen as a viable outcome, as it is a classic example of emissions leakage—pushing the problem beyond California's borders—which is counter to the legislative framework the Scoping Plan must be created under.[21]

Similarly, for the aviation sector, the outcome that "50% of aviation fuel demand not met in 2035 because non-combustion alternative not available" should not be considered a viable scenario unless it is explained by realistic technological solutions or viable behavior changes[22] that replace the need for this energy/travel demand. More realistically, to address the needs of the industrial, aviation and marine sectors a strategic mix of RNG, renewable hydrogen, and other advanced biofuels should be used in the out years, even in Scenario 1.

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[18] Both electrification, efficiency, and RNG deployment can be done in a complementary fashion to decarbonize the energy services currently served by conventional natural gas.

[19] These challenges are reinforced in common consumer news sources about appliance turnover. For example, see: https://www.consumeraffairs.com/homeowners/gas-vs-electric-appliances.html

[20] For example, in a 2010 study prior efforts to motivate early retirement of aging combustion vehicles with more efficient combustion vehicles had implied costs of over $450 per ton of carbon dioxide equivalent. See: Knittel, Christopher R., The Implied Cost of Carbon Dioxide Under the Cash for Clunkers Program (August 31, 2009). Available at SSRN: https://ssrn.com/abstract=1630647 or http://dx.doi.org/10.2139/ssrn.1630647

[21] Per Section 38562(b)(8) of the CA Health and Safety Code, in adopting regulations to reduce GHGs CARB is required to minimize leakage to the extent feasible.

[22] Perhaps expansion of video conferencing, virtual events, etc.

Conclusion

RNG Coalition appreciates the opportunity to participate and continue to provide comment throughout this Scoping Plan development process. We are encouraged by the ongoing discussion of a variety of decarbonization policies under which RNG has the potential to contribute significant GHG reductions and other environmental benefits within California, including through the various end-uses under consideration by CARB within the Scoping Plan.

Sincerely,

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Sam Wade
Director of Public Policy
Coalition for Renewable Natural Gas
1017 L Street #513
Sacramento, CA 95814
(916) 588-3033
sam@rngcoalition.com