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BAC Comments on Renewable Gas Chapter in Volume III

Additional submitted attachment is included below.

January 27, 2022

The Honorable J. Andrew McAllister
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: 2021 IEPR, Volume III – Renewable Gas and Hydrogen (Docket 21-IEPR-01)

Dear Commissioner McAllister:

The Bioenergy Association of California (BAC) submits these comments on Volume III of the *Draft 2021 Integrated Energy Policy Report*, focused on the gas sector. BAC appreciates the Commission's recognition that California will continue to need gas for reliability and other purposes. BAC also supports the focus on moving to renewable and decarbonized gas, but is concerned about several legal and factual errors in the chapter on renewable gas and hydrogen. Above all, BAC urges the CEC to correct the following errors and omissions:

- The definition of biomethane should be corrected to be consistent with state law, which includes the gas from noncombustion biomass conversion as well as anaerobic digestion.
- The definition of renewable hydrogen should include hydrogen from all RPS eligible resources, especially carbon negative hydrogen from organic waste, not just electrolytic hydrogen.
- The discussion of renewable gas costs should include costs per ton of carbon reduction, not just fuel costs, since the goal is to decarbonize the gas sector.
- The section on firm renewable power from gas should include biogas in addition to hydrogen.

The Bioenergy Association of California represents more than 90 public agencies, local governments, private companies, and others working to convert organic waste to energy to meet the state's climate, clean energy, wildfire reduction, waste diversion, and air quality goals. BAC's public sector members include cities and counties, local air districts, environmental agencies, waste and wastewater agencies, research institutions, community and environmental groups, and public utilities. BAC's private sector members include bioenergy developers, technology providers, waste industry, food processing, agriculture, investors, privately owned utilities, and more.

BAC submits these comments on the Renewable Gas and Hydrogen sections of Volume III to ensure that it is consistent with state law and to maximize opportunities to decarbonize the gas sector.

1. Renewable Gas

BAC urges the CEC to make several changes to the chapter on Renewable Gas to ensure that it is consistent with state law and internally consistent. The most important issues are:

A. The Definition of Renewable Gas is Inconsistent with State Law and Internally Inconsistent in Chapter 4.

The Commission should correct the definition of renewable gas to be consistent with state law and to be internally consistent. Chapter 4 incorrectly states that:

> "Renewable gas, also known as biomethane, is biogas that has been upgraded to pipeline quality standards."[1]

This statement is incorrect for several reasons. First, renewable gas is much broader than biomethane. Under state law, the definition of renewable gas also includes biogas in addition to biomethane. In fact, state law explicitly includes both biogas (raw biogas) and biomethane in the term "renewable gas." For example, SB 1383 requires the Commission to adopt recommendations for the development and use of "renewable gas, including biomethane and biogas" and refers to renewable gas repeatedly with the inclusion of both biogas and biomethane.[2]

State law also does not require that all renewable gas, or even all biomethane, be upgraded to pipeline quality gas. That is only a requirement for gas that will in fact be injected into the state's common carrier pipelines and makes no sense for gas that may be used onsite or transported via truck or train. This would contradict multiple CPUC Decisions that allow biomethane, biogas and renewable hydrogen to be used in the Self-Generation Incentive Program, which incentivizes behind the meter power production and therefore does not require upgrading renewable gas to pipeline quality (unless it is directed biogas that will be injected into a common carrier pipeline). It also contradicts state law that requires new, small-scale bioenergy facilities that use biogas for power production (which does not need to be upgraded to pipeline quality).[3]

The definition of renewable gas is also inconsistent with later sections in this same chapter, which discuss the potential for renewable gas from biomass conversion and

[1] Draft 2021 IEPR, Volume III, page 58.

[2] Health and Safety Code section 39730.8(b). See also sections (c) and (d), which include both biomethane and biogas as forms of renewable gas.

[3] SB 1122 (Rubio, 2012), codified in Public Utilities Code section 399.20(f)(2).

renewable hydrogen. For example, on pages 62 and 65, the Draft describes the potential for renewable gas production from biomass and states that:

> "Conversion of woody biomass into **renewable gas** is one future possibility for producing greater volumes of **renewable gas**. Gasification and pyrolysis are two technology options for biomass conversion to **renewable gas**."[4]

The Commission should correct the definition of renewable gas to be consistent with state law and internally consistent. BAC urges the Commission to adopt the following definition:

> Renewable gas is gas that is generated from a renewable (RPS eligible) feedstock, including biogas, biomethane, and renewable hydrogen.

B. <u>The Definition of Biomethane is Inconsistent with State Law</u>

The definition of biomethane used in Chapter 4 is also inconsistent with state law, which includes both the gas from anaerobic digestion and the gas from the noncombustion thermal conversion of organic waste in the definition of biomethane. Chapter 4 limits the definition and discussion of biomethane to only the gas from anaerobic digestion, which is a small fraction of California's biomethane potential.

Public Utilities Code section 650 defines biomethane as follows:

> (a) The methane is produced from the anaerobic decomposition of organic material, including codigestion.
> (b) The methane is produced from the noncombustion thermal conversion of any of the following materials, when separated from other waste:
> (1) Agricultural crop residues.
> (2) Bark, lawn, yard, and garden clippings.
> (3) Leaves, silvicultural residue, and tree and brush prunings.
> (4) Wood, wood chips, and wood waste.
> (5) Nonrecyclable pulp or nonrecyclable paper materials.
> (6) Livestock waste.
> (7) Municipal sewage sludge or biosolids.

The Commission should include the full definition from Public Utilities Code section 650 in Chapter 4 and should include a discussion of the potential to convert biomass resources to biomethane, biogas and hydrogen. While there is some discussion of biomass resources, it is not included as a source of biomethane nor is the discussion in any way complete.

[4] Draft 2021 IEPR, Volume III, page 65.

This is especially important since 80 percent of California's biomethane/biogas potential is from biomass resources, as the table below illustrates. To meet the state's climate goals, it is critical to include biomass resources in addition to the resources that can be converted through anaerobic digestion. This is also important since the CPUC has just issued a Proposed Decision in the biomethane procurement proceeding (R.13-02-008) that calls for procurement of 88 billion cubic feet of biomethane annually and includes biomethane from biomass conversion, as required by AB 3163 (Salas, 2020).

California's Renewable Gas Potential from Organic Waste

Feedstock	Amount Technically Available	Billion Cubic Feet Methane	Million Gasoline Gallon Equivalents	Tons of Hydrogen (assuming 85% conversion efficiency)
Landfill Gas	106 BCF	53	457	
Animal Manure	3.4 M BDT	19.5	168	
Wastewater Treatment Gas	11.8 BCF	7.7	66	
Fats, Oils and Greases	207,000 tons	1.9	16	
Municipal Solid Waste (food, leaves, grass)	1.2 M BDT	12.7	109	
Municipal Solid Waste lignocellulosic fraction)	6.7 M BDT	65.9	568	
Agricultural Residue (Lignocellulosic)	5.3 M BDT	51.8	446	
Forest, Sawmill, Shrub & Chaparral Residues	26.2 M BDT	256	2,214	
BIOGAS POTENTIAL		**468.5**	**4,044**	**4,038,793**

80% of CA's organic waste is cellulosic (not suitable for compost or AD)

Source: Rob Williams and Stephen Kaffka, UC Davis, presentation to the California Energy Commission on 1/30/17; Lawrence Livermore National Lab assessment of forest, sawmill, shrub & chaparral residues, Jan2020

C. The Description of SB 1383 is Inaccurate

Chapter 4 provides an incomplete and misleading description of SB 1383 (Lara, 2016), the state's Short-Lived Climate Pollutant law. Chapter 4 states that SB 1383 set methane reduction and landfill diversion targets, but that is only part of what the law does. First, the law set requirements – not just targets – and for both black carbon and methane reduction. SB 1383 requires a 50 percent reduction in black carbon and a 40 percent reduction in methane by 2030. It also requires a number of incentives to reduce dairy methane emissions and to increase the production and use of renewable gas, including both biogas and biomethane.

Providing an incomplete description of SB 1383 is misleading as it incorrectly narrows the scope of the discussion (again) to only those renewable gas sources that help to reduce methane emissions and ignores the potential for renewable gas production to reduce black carbon emissions from forest and agricultural waste that would otherwise be open burned, the two largest sources of anthropogenic black carbon emissions in

California. It also ignores the potential for renewable gas to displace diesel, which is the third largest source of black carbon emissions in California.

The description of SB 1383 in Chapter 4 should be corrected to include both the black carbon and the methane reduction requirements and the discussion of how renewable gas can help achieve these should be broadened to include biomass use and diesel displacement as ways to reduce the top three sources of black carbon emissions in California.

D. Cost Comparisons Should Include Cost Per Ton of Carbon Reduction

The Chapter on renewable gas contains some helpful cost data, but most of it focuses on the costs per MMBtu of renewable gas and ignores the costs or cost-effectiveness of carbon reductions from renewable gas. This makes for a misleading presentation on the relative costs and benefits of renewable gas. The reason to increase renewable gas production and use is not because it is less expensive than fossil fuel gas – it is to reduce carbon emissions from the gas, power, manufacturing, agriculture, food processing, and other sectors. Any evaluation of costs should, therefore, include a discussion of the costs per ton of carbon reduction and how that compares to other carbon reduction measures.

The California Air Resources Board provides this information in its 2021 report to the Legislature on the state's climate investments.[5] That report makes clear that investments in renewable gas are the most cost-effective of all the state's climate investments, reducing carbon emissions at the tiny cost of $9 and $10 per ton.[6]

The Commission should, therefore, include data on the costs per ton of carbon reduction from renewable gas, not just the cost per MMBtu of gas, which ignores the value of renewable gas to decarbonize California's energy sector.

E. The Discussion of Firm Renewables Should Include Biogas and Biomethane, as well as Hydrogen.

BAC is glad to see the Commission focus on the importance of firm renewables, but that discussion should not be limited to hydrogen.[7] Biogas and biomethane are also renewable gases that can provide firm renewables and in fact are already doing so under the BioMAT program, which requires 250 MW of bioenergy from distributed scale facilities. The potential for firm renewable power from biogas and biomethane is

[5] California Air Resources Board, *California Climate Investments – Annual Report to the Legislature,"* issued April 2021. Available at: https://ww2.arb.ca.gov/sites/default/files/classic//cc/capandtrade/auctionproceeds/2021_cci_annual_report.pdf

[6] Id., Table 2, pages 17-18.

[7] Draft IEPR, Volume III, page 70.

significant and should be included in any discussion of firm renewable power from renewable gas.

2. Green Hydrogen

BAC urges the Commission to correct the definition of green hydrogen in the Draft IEPR. Volume III, Chapter 4 defines green hydrogen as the hydrogen produced by splitting water using renewable electricity. That is the definition in state law of "green electrolytic hydrogen" only, not all green hydrogen.[8] If the Legislature had wanted to define all green hydrogen in this way, it would have done so. It was only defining green electrolytic hydrogen as a subset of all green hydrogen.

Green, or renewable, hydrogen can also be produced from organic waste, including both biogas and biomass. In fact, California allocated $50 million to the Department of Conservation for pilot projects to demonstrate forest biomass to hydrogen and other biofuels. The CPUC also allows hydrogen from biomass conversion in the SGIP program and allows hydrogen from biomethane in the BioMAT program. It would make no sense to exclude these from the definition of green hydrogen provided in the IEPR.

It also makes no sense to exclude the only carbon negative form of hydrogen – which is hydrogen derived from organic waste – from the definition of green hydrogen. According to Lawrence Livermore National Lab, converting organic waste to hydrogen with carbon capture and storage can provide significant carbon negative emissions and can do so quite cost-effectively using existing technologies. In fact, a recent report by LLNL on getting to carbon neutrality found that bioenergy with CCS can provide two-thirds of all the carbon negative emissions needed to reach carbon neutrality by 2045 and recommends production of hydrogen as the most beneficial end use of organic waste.[9]

The Commission should adopt a definition of "green hydrogen" therefore that includes hydrogen from all renewable (RPS eligible) resources. BAC recognizes that some conversion processes, such as steam methane reformation, may emit carbon dioxide, but those emissions can be offset by upstream reductions in methane or black carbon (avoided methane or black carbon emissions from organic waste that would otherwise be landfilled, piled and burned, or piled and left to decay). In that case, the resulting hydrogen is still carbon negative or very low carbon on a full lifecycle basis. With biomass conversion to hydrogen, the conversion process uses gasification or pyrolysis and has lower emissions than steam methane reformation. In either case, the Commission could include a performance-based definition of green hydrogen that includes all RPS eligible feedstocks and ensures a net reduction in carbon emissions on a lifecycle basis rather than omitting hydrogen from organic waste altogether.

[8] SB 1369 (Skinner, 2018) defines "green electrolytic hydrogen," not all green hydrogen. Public Utilities Code section 400.2.

[9] Lawrence Livermore National Lab, "*Getting to Neutral – Options for Negative Carbon Emissions in California,*" 2020.

BAC urges the Commission, therefore, to revise the definition of green hydrogen to include all renewable feedstocks and not to make “green hydrogen” synonymous with “green electrolytic hydrogen,” which would undercut several existing programs and policies to convert organic waste to hydrogen to reduce SLCP emissions and provide carbon negative emissions.

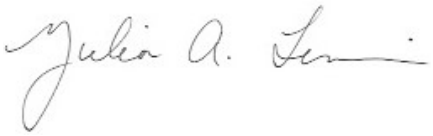
BAC recommends that the Commission adopt the following definition of “green hydrogen”:

> Green hydrogen is hydrogen generated from RPS (SB 100) eligible feedstocks, including renewable electricity used to split water and organic waste feedstocks that, when converted to hydrogen, provide a net reduction in carbon emissions on a lifecycle basis.

Conclusion

BAC appreciates the inclusion of a chapter on renewable gas in the *2021 IEPR*, but it is essential to provide definitions of renewable gas, biomethane, and hydrogen that are consistent with state laws, policies, and programs. The definitions should include all RPS eligible resources and should certainly not exclude renewable gas derived from organic waste, which can provide the only carbon negative form of renewable gas or power that also cuts Short-Lived Climate Pollutants.

Sincerely,



Julia A. Levin
Executive Director