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BAC Comments on Clean Hydrogen Draft Solicitation

Additional submitted attachment is included below.

June 9, 2023

Docket
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Comments on Draft Solicitation Concept for Large-Scale Centralized Hydrogen Solicitation (22-ERDD-03)

To the California Energy Commission:

Thank you for providing the opportunity to submit comments on the Draft Solicitation Concept for Large-Scale Centralized Hydrogen. The Bioenergy Association of California supports the Draft Concept because it is technology neutral and focused on hydrogen produced from renewable resources. Including hydrogen produced directly from RPS eligible resources, such as biomass and biogas, as well as green electrolytic hydrogen will ensure that the solicitation promotes the most beneficial sources of hydrogen. BAC recommends, however, that the final solicitation be explicit about including RPS eligible biomass and biogas as feedstocks that can be converted directly to hydrogen and not just used for electrolytic hydrogen.

The Bioenergy Association of California (BAC) represents more than 100 public agencies, local governments, private companies, utilities, non-profit organizations, and others working to convert organic waste to energy to meet the state's climate change, clean energy, wildfire reduction, landfill reduction, and air quality goals. More than a dozen BAC members are currently developing organic waste to hydrogen projects in California, including:

- Projects that have received funding from the Department of Conservation to convert forest waste biomass to carbon negative hydrogen with carbon capture and storage;
- Projects that will convert organic waste diverted from landfills to meet the waste diversion requirements of SB 1383;
- Projects that will convert landfill and wastewater biogas to hydrogen; and
- Projects that will convert dairy manure to hydrogen to meet the methane reduction requirements of SB 1383.

BAC supports the Draft Solicitation, with one recommended clarification described below, because it provides a technology neutral definition of clean hydrogen that is limited to RPS eligible resources, including hydrogen produced directly from biomass and biogas.

1. The Commission Should Explicitly Include RPS Eligible Biomass and Biogas that are Converted Directly to Hydrogen.

BAC supports the eligibility criteria in the Draft Solicitation, but urges the Commission to clarify that RPS eligible biomass and biogas can be converted directly to hydrogen, not just used as feedstocks for electrolytic hydrogen. The Draft Solicitation defines clean hydrogen as either 1) hydrogen produced from water using RPS eligible resources, or 2) hydrogen produced directly from RPS eligible resources. The second part of the definition indicates that biomass and biogas, both of which are RPS eligible resources, can be converted directly to hydrogen without having to be converted to electricity first. Otherwise, the second part of the definition would be redundant with the first part and unnecessary. It would be helpful, however, for the Commission to be explicit that RPS eligible biomass and biogas can be converted directly to hydrogen so that there is no ambiguity in the final solicitation. Alternatively, the solicitation could provide examples of eligible projects to clarify that projects that convert biomass or biogas to hydrogen directly (without having to produce electricity as an interim process) are eligible.

2. Including Hydrogen from RPS Eligible Biomass and Biogas is Consistent with Federal and International Recommendations.

Including hydrogen that is generated directly from RPS eligible biomass and biogas is consistent with recommendations from both the U.S. Department of Energy (DOE) and the International Energy Agency. The federal Infrastructure Investment and Jobs Act of 2021 requires DOE to accelerate development of clean hydrogen and explicitly includes biomass as an eligible resource.[1] The legislation also requires DOE to set a carbon intensity standard for eligible hydrogen.[2] DOE's draft guidance on the Clean Hydrogen Production Standard proposes that the Clean Hydrogen Production Standard include hydrogen from diverse resources that have a "lifecycle greenhouse gas emissions rate of not greater than 4 kilograms of CO2e per kilogram of hydrogen."[3] The draft guidance on CHPS also states that "DOE may give preference to projects that mitigate upstream fugitive emissions, use a cleaner electricity generation mix, employ high rates of carbon capture and sequestration, or blend fossil fuels with renewable natural gas or low-carbon biomass."[4] This proposed guidance explicitly includes biomass and renewable natural gas, also known as biomethane or biogas. In addition, biogas and biomass projects can mitigate upstream fugitive emissions – methane from decomposing waste

[1] 42 U.S.C. 16166(b).
[2] Id.
[3] *U.S. Department of Energy Clean Hydrogen Production Standard (CHPS) Draft Guidance*, issued November 2022, at page 2.
[4] Id. at page 3.

at landfills, dairies and wastewater treatment facilities and black carbon from open burning of forest or agricultural waste – and biogas and biomass projects can employ carbon capture and sequestration.[5] In other words, including biomass and biogas as eligible feedstocks meets multiple priorities in DOE's draft guidance.

Both DOE and the International Energy Agency (IEA) also recommend setting a lifecycle carbon intensity based standard to define clean or renewable hydrogen. US DOE proposes 4 kg CO2e/kg of hydrogen and states that biomass and biogas converted to hydrogen can meet this standard.[6] While IEA does not recommend a specific carbon intensity threshold, it does recommend using carbon intensity as the primary assessment tool for hydrogen development policies.[7] Like DOE, IEA also finds that biomass can provide very low carbon hydrogen and, in some cases, can provide carbon negative emissions.[8]

BAC urges the CEC to be consistent with DOE and IEA recommendations to explicitly include biomass and biogas as feedstocks that can be converted directly to hydrogen without having to generate electricity for electrolytic hydrogen.

3. Hydrogen from Organic Waste Reduces Short-Lived Climate Pollutant Emissions, the Most Urgent Climate Solution.

Climate scientists agree that the reduction of SLCP emissions is the most urgent climate solution because it begins to benefit the climate right away, unlike fossil fuel reductions that take decades to begin to benefit the climate. As the United Nations Environment Program stated, cutting methane and other SLCPs is the strongest lever we have to slow climate change in the next 25 years.[9] The California Air Resources Board has also determined that reductions in SLCP emissions are critical to meet the state's climate goals and begin to cool the climate right away.[10] CARB has also found that methane and other SLCP reductions can provide cost-effective carbon reductions and near-term benefits for public health as well as the climate.[11]

In California, organic waste causes 87 percent of the state's methane emissions and more than 90 percent of its black carbon emissions (including emissions from wildfire),[12] so it is impossible to meet the requirements of SB 1383 or SB 32 without reducing landfilling, pile and decay, and open burning of organic waste. SB 1383 requires a 40

[5] Stanford Center for Carbon Storage and Center for Carbon Removal, *Pathways to Carbon Neutrality in California – the Bioenergy Opportunity*, April 2022, at page 1.
[6] Id. at page 3.
[7] International Energy Agency, *Towards hydrogen definitions based on their emissions intensity,* 2023.
[8] Id. at page 8.
[9] United Nations Environment Program, *Urgent Steps Must be Taken to Reduce Methane Emissions This Decade,* May 6, 2021 Press Release.
[10] *Short-Lived Climate Pollutant Reduction Strategy*, adopted by the California Air Resources Board, March 2017, at pages 1 and 22.
[11] California Air Resources Board, *2022 Climate Change Scoping Plan*, at page 10.
[12] *2022 Climate Change Scoping Plan for Achieving Carbon Neutrality*, issued by the California Air Resources Board on November 15, 2022.

percent reduction in methane emissions and a 50 percent reduction in black carbon emissions by 2030,[13] further underscoring the urgency of these reductions to meet the state's climate goals.

Converting organic waste – RPS eligible biomass and biogas – to hydrogen will help California to meet the requirements of SB 1383 and address the most urgent climate issue, which is the reduction of SLCP emissions.

4. Hydrogen from Organic Waste Can Provide Carbon Negative Hydrogen.

In addition to reducing SLCP emissions, hydrogen from organic waste is also the only form of hydrogen that can provide carbon negative emissions that will be essential to reach carbon neutrality. Numerous studies have found that California will need significant carbon negative emissions to achieve carbon neutrality since many emissions cannot be entirely eliminated. Lawrence Livermore National Lab found that Bioenergy with Carbon Capture and Storage (BECCS) can provide two-thirds of all the carbon negative emissions needed for California to reach carbon neutrality by mid-century.[14] LLNL also found that converting California's organic waste to hydrogen is by far the most beneficial way to provide carbon negative emissions from organic waste and that it provides a cost-effective way to generate carbon negative emissions.[15] CARB's *2022 Climate Change Scoping Plan* also found that BECCS is an essential way to provide carbon negative emissions needed to reach carbon neutrality.[16]

Numerous other studies have confirmed LLNL's analysis, including recent studies by Stanford and Princeton Universities. Stanford's Center for Carbon Storage issued a report in 2022 that BECCS can provide significant carbon negative emissions and that if California used all of its organic waste for energy with CCS, it would reduce California's total carbon emissions by 8 percent.[17] Princeton University, in its study on Net Zero America, also found that BECCS will be critical to achieve carbon neutrality and that hydrogen generated from biomass and biogas with CCS will be an essential part of that.[18]

5. Hydrogen from Forest Waste Biomass Helps to Reduce Wildfires.

Converting forest waste biomass to hydrogen also helps to mitigate California's wildfire crisis and to restore healthy resilient forests that can sequester carbon. Wildfires have an enormous impact on public health and safety from the fires themselves and from the pollution that they emit. Wildfires also cost ratepayers billions of dollars annually, from

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[13] Health and Safety Code section 39730.5

[14] Lawrence Livermore National Lab, *Getting to Neutral – Options for Negative Carbon Emissions in California,* January 2020. LLNL-PRES-795982.

[15] Id.

[16] See, *2022 Climate Change Scoping Plan*, Table 2-3, on page 96.

[17] Stanford Center for Carbon Storage and Center for Carbon Removal, *Pathways to Carbon Neutrality in California – the Bioenergy Opportunity*, April 2022, at page 1.

[18] Princeton University, *Net Zero America*, 2021.

the direct impacts they cause to human life, buildings, and infrastructure, as well as the costs of Public Safety Power Shutoffs and other measures to reduce wildfire risks and mitigate their impacts.

California has entered into an agreement with the U.S. Forest Service to remove forest fuel on one million acres annually to reduce wildfire risks and restore healthy, resilient forests. In the *2022 Climate Change Scoping Plan,* CARB has proposed increasing that amount to 2.3 million acres annually, in part to return California's forests to carbon sinks rather than net emitters of carbon. These measures will generate tens of millions of bone dry tons of forest waste biomass that can provide feedstock for renewable hydrogen production. When coupled with carbon captures and storage or utilization, that hydrogen will be carbon negative.

The Department of Conservation received $50 million for projects that convert forest waste to carbon negative, advanced biofuels. Of the eight grants that DOC has made for planning and permitting of these projects (stage 1 of the funding), six projects are going to convert forest waste to hydrogen.

The Energy Commission's clean hydrogen solicitation should be consistent with DOC and should further the State's efforts to reduce wildfire risks and restore healthy, carbon sequestering forests.

6. Hydrogen from Organic Waste Helps to Reduce Pollution from Open Burning, Dairies and Landfills.

Hydrogen from organic waste protects public health in many ways besides reducing emissions from wildfires. Converting diverted organic waste to hydrogen helps to reduce air pollution and odors from landfills, dairies and wastewater treatment facilities. A recently approved project in Richmond California, which will convert diverted organic waste to hydrogen and use landfill gas for process energy, will reduce air pollution and the associated cancer risk in the surrounding community up to 6,000 feet from the project.[19] The project will reduce pollution from the landfill itself, the landfill flare, and the diesel trucks that serve the landfill. These are enormous benefits in a highly Disadvantaged Community. Converting agricultural and forest waste to hydrogen instead of piling and burning it also reduces air and climate pollution from pile burning and open field burning. According to the Air Board and CAPCOA, the association of local air districts, converting biomass to energy cuts methane, carbon monoxide, and particulate matter by 98 to 99 percent compared to open burning of that biomass waste.[20]

Hydrogen derived from organic waste provides the greatest benefits for air quality because it reduces air pollution from the landfilling or burning of that waste, in addition to reducing air pollution from fossil fuel use.

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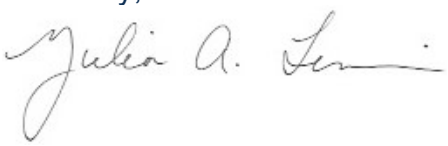
[19] See,

[20] *California Forest Carbon Plan*, adopted by CalEPA and CNRA in 2017, at pages 130, 135; *CAPCOA Biomass Policy Statement.*

For the reasons above, BAC supports the Draft Solicitation, which includes all RPS eligible feedstocks and is technology neutral, but urges the Commission to clarify that the solicitation includes hydrogen produced directly from biomass and biogas, not just used to generate electrolytic hydrogen.

Sincerely,



Julia A. Levin
Executive Director