



September 19, 2023

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

**Re: Comments on the SB 1075 Hydrogen Report**

Dear Ms. Sahota:

The Bioenergy Association of California (BAC) appreciates the opportunity to submit these comments on the joint agencies' September 5 workshop to begin development of the SB 1075 report on green hydrogen. BAC strongly supports the Administration's efforts to accelerate clean hydrogen development and many individual BAC members are developing projects to produce or use hydrogen generated from organic waste and biogas. As the Air Board has recognized, clean hydrogen will be essential to meet California's climate change, renewable energy, and air quality goals.

BAC represents over 100 public agencies and private companies working to convert organic waste and biogas to low carbon, renewable energy, including hydrogen. BAC's public sector members include cities and counties working to meet the waste diversion requirements of SB 1383, waste and wastewater agencies and associations, research institutions, community and environmental groups, and a publicly owned utility. BAC's private sector members include energy technology firms, project developers, the waste industry, agriculture and food processing companies, investors, an investor owned utility, and others.

BAC submits the comments below to ensure that the SB 1075 report meets the goals of the legislation and furthers the most urgent climate, public health and public safety needs.

**1. The Air Board Should Adopt a Definition of "Green" or "Renewable" Hydrogen that Includes Organic Waste and Biogas.**

BAC appreciates that the GO-Biz, CARB, and CPUC presentations at the September 5 workshop all included references to biogenic sources of renewable hydrogen.<sup>1</sup>

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<sup>1</sup> GO-Biz presentation, slides 9-12, at September 5 workshop; CARB presentation, slides 8-9; CPUC presentation, slide 12.

Importantly, CARB’s presentation showed that biogenic hydrogen will be the largest source of clean hydrogen in 2030 and provide more than one-third of all the hydrogen used in California in 2045.<sup>2</sup> It will be difficult or impossible to achieve those levels of production, though, without a clear definition of green or renewable hydrogen that includes hydrogen from organic waste and biogas. As the Air Board knows, the definition of green or renewable hydrogen is controversial and being debated at both the state and federal level. Lack of clear definitions is creating uncertainty and challenges that are slowing the development of green hydrogen. The Air Board should, therefore, adopt a definition of green or renewable hydrogen for use in the SB 1075 report and beyond, and that definition should explicitly include organic waste and biogas as eligible feedstocks and sources of process energy.

a. SB 1075 Requires Inclusion of Organic Waste and Biogas Feedstocks.

SB 1075 explicitly includes organic waste and biogas as eligible feedstocks for green hydrogen. As SB 1075 states, “It is the intent of the Legislature to develop a leading green hydrogen industry in California in order to . . . support forest management, short-lived climate pollutant and waste management goals . . .”<sup>3</sup> SB 1075 also references the Lawrence Livermore National Lab report on getting to carbon neutrality that found that California’s waste biomass streams could generate 4 million tons of green hydrogen annually.<sup>4</sup> And SB 1075 notes that “Capturing and productively using methane, and productively using wood waste, to displace fossil fuel use to generate electricity and for transportation fuel can help eliminate short-lived climate pollutants while also reducing harmful exposure to diesel particulate matter and other air quality pollutants.”<sup>5</sup>

The Legislature would not have included multiple references to organic waste, methane capture, wood waste, waste biomass, forest management, etc. in SB 1075 if it had not intended to include these organic waste and biogas feedstocks in the SB 1075 report. The SB 1075 report must, therefore, include organic waste and biogas to meet the Legislature’s express intent to support forest management, methane reduction, and waste management goals.

b. Hydrogen from Organic Waste Provides the Greatest Climate and Air Quality Benefits.

At the September 5 workshop, Tyson Eckerle of GO-Biz stated that we should “leverage hydrogen to best meet our climate goals.” Hydrogen from organic waste and biogas can provide greater climate benefits than any other form of clean hydrogen because only biogenic hydrogen reduces SLCP emissions and can provide carbon negative emissions.

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<sup>2</sup> CARB presentation at the September 5 workshop, slide 9.

<sup>3</sup> SB 1075 (Skinner, 2022), Section 1 (b).

<sup>4</sup> SB 1075, Section 1, finding 16.

<sup>5</sup> SB 1075, Section 1, finding 5.

Climate experts around the world, including CARB, have recognized that reducing SLCP emissions is the most urgent step we can take to address climate change because it is one of very few measures that benefits the climate right away.<sup>6</sup> According to the *2022 Climate Change Scoping Plan*, 86 percent of California’s methane emissions come from organic waste and the vast majority of black carbon emissions comes from wildfires and open burning of forest and agricultural waste.<sup>7</sup> Both the *Short-Lived Climate Pollutant Reduction Strategy* and the *California Forest Carbon Plan* found that converting that organic waste to bioenergy instead cuts black carbon and methane emissions dramatically. According to the *Forest Carbon Plan*, converting forest waste to energy cuts both black carbon and methane by 98 percent compared to open burning or wildfires.<sup>8</sup>

Biogenic hydrogen is also the only form of hydrogen that can be carbon negative. The Legislature recognized this explicitly in SB 1075, finding that the “Lawrence Livermore National Laboratory report, ‘Getting to Neutral,’ highlights gasification of biomass to hydrogen as the most promising strategy for achieving negative carbon emissions in California.”<sup>9</sup> The *2022 Climate Change Scoping Plan* also highlights the need for BECCS – bioenergy with carbon capture and sequestration – as an important strategy to provide carbon negative emissions needed to reach carbon neutrality by 2045 as required by state law.<sup>10</sup>

CARB has also found repeatedly that the state’s investments in organic waste to energy are the most cost-effective of all the state’s climate investments, reducing carbon emissions for a small fraction of the cost of most other types of climate investments. In particular, CARB’s recent reports have found that investments in dairy digesters and diverted organic waste projects cut carbon for the tiny cost of just \$9 and \$10 per ton, respectively, which is less than one-fifth the average cost of carbon reductions using the Greenhouse Gas Reduction Fund.<sup>11</sup>

Hydrogen from organic waste and biogas also helps to cut air pollution from wildfires, pile and burn of forest or agricultural waste, landfills, and dairies. Hydrogen from forest waste helps to reduce the risk and severity of wildfires, which are now a major source of air pollution in California, as well as controlled burns in the forest and pile and burn of biomass removed from the forest. Using agricultural waste also reduces pollution from open burning or decay of that waste. And converting dairy manure or diverted organic waste to hydrogen helps to reduce methane emissions – a precursor to smog as well as a powerful SLCP – and other air pollutants from dairies and landfills.

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<sup>6</sup> *Short-Lived Climate Pollutant Reduction Strategy*, adopted by the California Air Resources Board, March 2017, at pages 1 and 22; see, also, <https://www.unep.org/news-and-stories/press-release/global-assessment-urgent-steps-must-be-taken-reduce-methane>.

<sup>7</sup> *2022 Climate Change Scoping Plan*, at page 226, Figure 4-12.

<sup>8</sup> *California Forest Carbon Plan*, adopted by CalEPA, CNRA, and CalFire in 2017, at pages 130 and 135.

<sup>9</sup> SB 1075, Section 1, finding 16.

<sup>10</sup> *2022 Climate Change Scoping Plan*, at pages 220-222.

<sup>11</sup> See, eg, California Air Resources Board, *California Climate Investments 2022 Mid-Year Data Update*, September 2022.

c. CARB Should Adopt a Definition of Green Hydrogen that Includes Biogas and Waste Biomass.

BAC supports the definition of green hydrogen that the CPUC presented on September 5, which is:

“Hydrogen which is produced through a process that results in a lifecycle (i.e., well-to-gate) greenhouse gas emissions rate of not greater than 4 kilograms of CO<sub>2</sub>e per kilogram of hydrogen produced and does not use fossil fuel as either a feedstock or production energy source.”<sup>12</sup>

This definition is consistent with the U.S. Department of Energy’s draft guidance on the Clean Hydrogen Production Standard and would allow all RPS eligible feedstocks including organic waste and biogas. By including a lifecycle carbon intensity standard, it will also encourage the lowest carbon intensity forms of hydrogen and, in the case of hydrogen from organic waste or biogas, will encourage the development of BECCS, which can provide carbon negative emissions.

**2. The SB 1075 Analysis Should Not Assume the Elimination of Steam Methane Reformation (SMR).**

The Air Board’s presentation at the September 5 workshop assumed that Steam Methane Reformation (SMR) will be phased out by 2045,<sup>[1]</sup> but did not justify that conclusion. Phasing out SMR would make it harder or impossible to convert landfill gas, wastewater biogas, and digester gas to hydrogen. It will have a chilling effect on investments that could convert biogas to hydrogen now since those would be stranded investments in less than two decades (assuming several years’ lead time to develop biogas to hydrogen projects). California is encouraging the development of hundreds of digesters to convert livestock waste and diverted organic waste to biomethane, and there are opportunities for even greater recovery of digester gas and landfill gas that should be pursued to reduce methane emissions. The biomethane from those facilities should be beneficially used and, as SB 1075 notes, the Lawrence Livermore National Laboratory report on carbon neutrality found that converting that biogas to hydrogen is the most beneficial end use.

As noted below, rather than excluding or phasing out any specific technology, BAC urges the Air Board to adopt or recommend a definition and/or performance standards based on lifecycle carbon intensity for green and renewable hydrogen.

**3. Other Recommendations to Accelerate Development and Use of Renewable Hydrogen.**

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<sup>12</sup> CPUC presentation on September 5, slide 12.

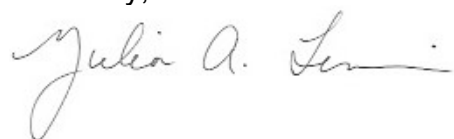
<sup>[1]</sup> CARB presentation on September 5, slide 9.

BAC also recommends several additional measures to accelerate the development and use of renewable hydrogen in California, including:

- a. Base incentive and procurement programs for hydrogen on its lifecycle carbon intensity to incentivize the lowest carbon forms of hydrogen including carbon negative hydrogen wherever possible.
- b. Streamline and consolidate permitting for renewable hydrogen projects, including programmatic EIRs and permit streamlining at all steps of production, distribution and use.
- c. Prioritize clean transportation and electricity funding for renewable – and especially carbon negative – forms of hydrogen, including EPIC and Clean Transportation Program funding.
- d. Incentivize the deployment of fuel flexible distributed generation technologies that can use renewable hydrogen as soon as it becomes available, with priority going to the lowest emission technologies that provide the greatest benefits for energy reliability.
- e. Codify a definition of “pyrolysis” in statute and clarify that non-combustion conversion of organic waste (pyrolysis or gasification) to hydrogen qualifies for waste diversion and RPS credit. State law in this area is confused and contradictory and a major hurdle for hydrogen production from diverted organic waste.
- f. Recommend that future CalRecycle funding include funding for waste biomass to hydrogen, including biomass gasification or pyrolysis to hydrogen, which CalRecycle has never funded (it has limited its GGRF funding to compost production and anaerobic digestion only, which does not address cellulosic biomass waste, the single largest category of organic landfill waste that must be diverted pursuant to SB 1383).
- g. Recommend that CalRecycle adopt a compliance pathway for diverted organic waste to hydrogen under its SB 1383 regulations (Article 12, Section 18993.1).

BAC would be happy to provide additional information on any of these recommendations. We appreciate the Air Board’s leadership on clean hydrogen and look forward to the development and issuance of the SB 1075 report.

Sincerely,



Julia A. Levin  
Executive Director