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BAC Comments on SB 423 Report

Additional submitted attachment is included below.

December 1, 2023

The Honorable Siva Gunda, Vice Chair
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Comments on the SB 423 Workshop Presentations – Docket 21-ESR-01

Dear Vice Chair Gunda:

The Bioenergy Association of California (BAC) submits these comments on the SB 423 presentations made at the Commission's November 17 workshop. BAC strongly supports the goals of SB 423 to promote the development of clean firm power, which is essential to meet California's climate goals while maintaining energy reliability. The presentations at the workshop provided helpful data, but omitted important technologies and fuels and failed to draw important distinctions between technologies. Almost all areas of the report require much more granularity to be accurate and helpful. In particular, BAC urges the Commission to correct the following:

- The analysis should distinguish between the different types of bioenergy and not lump them all together as "RNG," which is only one type of biofuel.
- Both bioenergy and hydrogen can be zero emission or carbon negative, but are listed as "low carbon" which is misleading since they are often lower carbon than the resources that are listed as zero carbon.
- The report should distinguish between resources that provide baseload versus dispatchable power, resources that provide generation (the focus of SB 423) versus energy storage, and resources that can provide power for multiple days, weeks and months, which will be needed for true energy reliability.
- The technologies analyzed should include linear generators that run on renewable or decarbonized fuels.
- The TRL's for bioenergy are incorrect – there are hundreds of commercial bioenergy projects in California and thousands deployed around the world.
- The costs for gasification and anaerobic digestion are likely too high and should be corrected.

The Bioenergy Association of California represents about 100 members working to promote sustainable bioenergy development in California. BAC's public sector

members include local governments, environmental and public health agencies, public research institutions, Tribes, publicly owned utilities, community and environmental groups. BAC's private sector members include energy technology firms, project developers, investors, an investor-owned utility, and more.

BAC submits these comments on the November 17 workshop presentations on SB 423.

1. **The SB 423 Report Should Distinguish Between Bioenergy Technologies, Which Are Not All "RNG."**

Slide 13 of the November 17 presentation incorrectly lumps all bioenergy technologies under the title of "RNG," which is not accurate for several reasons. "RNG" is non-technical, non-statutory term for biomethane, which is the gas produced from anaerobic digestion of organic matter. RNG/biomethane do not include biogas generated from gasification or pyrolysis and do not include biomass combustion, distillation, or other conversion technologies.

The Commission should not lump different bioenergy technologies together since they provide a wide range of end products and benefits, have different costs and efficiencies. BAC urges the Commission, instead, to more accurately divide bioenergy technologies into at least three different categories:

a. Biomethane from anaerobic digestion and landfills
b. Biogas produced from gasification or pyrolysis of biomass
c. Biomass combustion

Each of these three categories provides different operational, climate, and efficiency benefits. The first two categories, because they generate a renewable gas, can provide long duration storage and dispatchable power. For biomass, gasification and pyrolysis are also much more efficient and less polluting than biomass combustion.

Given the different technologies, efficiencies, energy attributes, costs, and emissions, these three categories should not be treated as a single technology and should definitely not all be listed under the inaccurate and non-technical name of RNG. BAC urges the Commission to list "biogas" and "biomass" as separate resources as follows:

Resource	**Technologies**
Biomethane from anaerobic digestion or landfills	Combustion engine, fuel cell, linear generator, energy storage
Biogas from gasification/pyrolysis	Combustion engine, fuel cell, linear generator, energy storage
Direct biomass combustion	Combustion engine

The Commission should distinguish between these different bioenergy technologies on slides 13, 14, 15 (TRL levels) and 16 (costs) and should not include gasification/pyrolysis or combustion under "RNG" as they are not sources of RNG.

2. **The SB 423 Report Should Analyze Emissions on a Lifecycle Basis and Correctly Identify Emissions from Bioenergy and Hydrogen as Potentially Zero Carbon or Carbon Negative.**

Slide 14 – perhaps because it also combines multiple technologies and fuels into overly broad categories – provides inaccurate information about the emissions from bioenergy and hydrogen. Both bioenergy and hydrogen can emit a wide range of emissions from very high to carbon negative. Their emissions profiles depend on the feedstock, the conversion technology, the generation technology, and whether the project includes Carbon Capture and Sequestration or Use (CCSU).

Both bioenergy and hydrogen that are generated from renewable resources can provide zero carbon or carbon negative power, especially when combined with CCSU. According to the California Air Resources Board's lifecycle analysis under the Low Carbon Fuel Standard program, biogas generated from dairy manure or diverted organic waste (diverted from a landfill) are carbon negative. When forest or agricultural waste are converted to energy with CCSU, they can also be carbon negative.

BAC urges the Commission to correct slide 14 by listing both bioenergy and hydrogen as having the potential to be either zero- or low-emission. Slide 14 should also be corrected to separate bioenergy-dispatchable generation (using biogas) and bioenergy-baseload generation (using direct combustion) as they have very different emissions profiles.

The Commission should also correct the designation of solar and wind power as zero emission. They are not zero carbon emission on a lifecycle basis, which is the only scientifically valid way to assess emissions. They are very low emission and have a critical role to play, but it is simply not accurate to designate them as zero emission on a lifecycle basis. A better way to describe them would be "de minimus or very low emission."

3. **The SB 423 Report should Distinguish Between Baseload and Dispatchable Power, Medium and Long Duration Storage, and Generation versus Storage Resources.**

The presentations on November 17 did not provide enough clarity between resources to meet the requirements of SB 423. SB 423 requires the Commission to analyze the availability and need for firm clean power that ensures reliability during:

> "multiday extreme or atypical weather events, including periods of low renewable energy generation, and facilitate integration of eligible renewable energy resources into the electrical grid and the transition to a zero-carbon electrical grid."

In order to ensure adequate firm resources for multi-day and atypical weather events – which can include weeks of rain or wildfire smoke – it is essential to distinguish between resources that can provide short-term reliability, as in several hours between dusk and when the wind picks up, and true firm power that is available whenever needed for as long as needed. The presentations on November 17 did not distinguish between these very different durations and it's not clear whether the economic and other analyses make any distinction between medium and long duration (or unlimited duration) resources, which makes cost and other comparisons invalid.

A stacked resource such as solar with batteries, while important for short term reliability, does not provide anywhere near the reliability benefits that baseload and dispatchable power can provide or the benefit of renewable gas used to truly long duration (weeks or months) of energy storage plus generation.

A meaningful analysis of the need and options for truly firm power that is available whenever needed for as long as needed must distinguish between a) medium and long (or unlimited) duration, b) generation and storage, and c) baseload versus dispatchable power.

4. **The SB 423 Report Should Explicitly Include Linear Generators.**

Slide 13 and other sections should explicitly include linear generators, which are a beneficial technology already in deployment in California that can convert multiple renewable fuels into dispatchable or baseload power. Linear generators can run on renewable hydrogen, biogas, biomethane, ammonia, and other renewable fuels. When using renewable fuels, they can be zero carbon or carbon negative, and have de minimus emissions of criteria air pollutants. Slide 13 and any analysis of firm power technologies should explicitly include linear generators.

5. **The SB 423 Report Should Correct the TRLs for Thermochemical Conversion.**

On slide 15, the Commission assigns a wide range of TRLs to thermochemical conversion technologies, yet these technologies have been demonstrated in commercial applications, including in California. There have been several biomass gasification projects in operation in California, far beyond TRL 5 as shown in slide 15. Currently West Biofuels is operating a biomass gasification project that is selling power under the BioMAT program and has more projects in construction. Phoenix Bioenergy has a biomass gasification project in the final stages of construction and several more in active development. Phoenix, West Biofuels, Syntech Bioenergy, and other gasification

companies have also had multiple demonstration and pilot projects using gasification, so the minimum TRL for the thermochemical category should be at least 7 or 8 and certainly not 5.

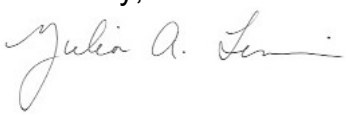
6. **The Costs Shown for Gasification and Anaerobic Digestion Are Likely Too High.**

Slide 16 in the staff presentation shows costs for bioenergy projects that are, in at least some cases, much higher than actual costs. While the CAPEX costs appear to be correct, the costs for O&M are higher than actual projects, even for distributed generation bioenergy. Slide 16 shows O&M costs for gasification and anaerobic digestion that are approximately $250 per kw per year. These O&M costs appear to be very high and are not broken down by feedstock type or location. For example, projects using diverted organic waste from a landfill may receive tipping fees that defray the feedstock collection and transport costs. Similarly, dairy digesters do not have transport costs. On the other hand, forest biomass projects may have bigger transport costs, but there are also considerable federal and state subsidies available to help defray those costs.

As in many other areas, providing greater detail and granularity would make the presentation and final SB 423 report much more accurate and helpful in guiding policies to promote clean firm renewables.

Thank you for your consideration of these comments.

Sincerely,



Julia A. Levin
Executive Director