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BAC Comments on Energy Reliability

Additional submitted attachment is included below.



November 10, 2022

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

Re: Comments on October 28 Workshop on Reliability (21-ESR-01)

Dear Vice Chair Gunda:

The Bioenergy Association of California (BAC) submits these comments on the CEC's October 28 workshop on reliability. BAC applauds the CEC's leadership on this important issue and urges the Commission to move forward quickly and aggressively with additional reliability measures that do not increase climate or air pollution. In particular, BAC urges the Commission to:

- Accelerate use of existing biogas sources, including landfill and wastewater biogas that is already captured and flared;
- Accelerate conversion of organic waste to biogas and renewable hydrogen to provide firm, carbon negative power and reduce SLCP emissions;
- Classify renewable gas as an eligible form of long duration storage;
- Adopt a program to convert backup and temporary generation to renewable gas rather than diesel;
- Adopt a plan to repower California's remaining biomass combustion facilities to advanced technology facilities to generate biogas or hydrogen from biomass;
- Include all non-combustion technologies, not just fuel cells, and clean combustion;
- Recommend measures to accelerate and expand implementation of the BioMAT program to provide firm, renewable power; and
- Recommend measures to increase firm renewable power, including dispatchable and baseload renewables, and recommend long-term and interim targets for firm renewables.

Each of these recommendations is described more fully below.

1. Accelerate Use of Existing Biogas Resources

According to the U.S. EPA, California landfills flare about 110 Billion Cubic Feet (BCF) of biogas annually.¹ That is biogas that is collected and centralized, which means that it could easily be used instead to generate electricity. In addition, recent methane monitoring by NASA's Jet Propulsion Lab found that the twelve leakiest landfills in California emit another 35 BCF of methane annually.² That methane is 84 times more damaging to the climate than the carbon dioxide emitted from fossil fuel burning. According to climate scientists, reducing methane emissions should be our highest climate priority as it is one of few climate measures that can benefit the climate right away.

Together, flared landfill gas and leaked landfill methane amount to the equivalent of about a billion gasoline gallons worth of fuel. Using a fuel cell or linear generator, that landfill gas can provide virtually emission free, firm, renewable power. New, ultra-clean combustion engines can also convert the biogas to power while reducing air and climate pollution compared from the flared gas and the displacement of fossil fuels. This is very low hanging fruit that should be a top priority for the state to use to generate firm, renewable power.

2. Accelerate Conversion of Organic Waste to Firm, Carbon Negative Power that Reduces SLCP Emissions

Conversion of organic waste to energy should be one of California's top priorities to protect the climate and provide firm, renewable power. Organic waste – landfill waste, dairy and agricultural waste, and forest biomass - is the source of the vast majority of California's methane and black carbon emissions, two of the most power climate "super pollutants" known as Short-lived Climate Pollutants (SLCPs).³ According to climate scientists, reducing SLCP emissions should be our highest climate priority because it is one of very few measures that benefits the climate right away or even in the next several decades.⁴ Reducing fossil fuels, which is what other renewables do, will not begin to benefit the climate for several decades,⁵ so SLCP reductions also buy us time until CO₂ reductions begin to benefit the climate. Reducing SLCP emissions also benefits public health because both methane and black carbon are serious air

¹ <https://www.epa.gov/lmop/project-and-landfill-data-state>.

² <https://www.jpl.nasa.gov/news/a-third-of-california-methane-traced-to-a-few-super-emitters>.

³ *Short-Lived Climate Pollutant Reduction Strategy*, adopted by the California Air Resources Board in March 2017, at page 40, Table 5. Available at:

https://www.arb.ca.gov/cc/shortlived/meetings/03142017/final_slcp_report.pdf.

⁴ See the Global Methane Assessment released by the United Nations Environment Program and the Climate and Clean Air Coalition in May 2021, saying that cutting methane is the strongest lever we have to slow climate change in the next 25 years. The Intergovernmental Panel on Climate Change (IPCC) has also said that methane and other SLCP reductions are our highest climate priority in this decade.

⁵ *Short-Lived Climate Pollutant Reduction Strategy*, footnote 2 above, and <https://bendingthecurve.ucsd.edu/>. See also, Kammen, Ramanathan, Matlock, et al, "Accelerating the Timeline for Climate Action in California," submitted to Environmental Research Letters, 2021. Available at: <https://arxiv.org/abs/2103.07801> [arxiv.org].

pollutants. Methane is a precursor to smog and black carbon is a toxic air contaminant and source of PM 2.5 emissions.⁶

Increasing use of bioenergy will also help California achieve its goal of carbon neutrality since bioenergy can provide carbon negative emissions needed to offset emissions that can't be eliminated. According to Lawrence Livermore National Lab, bioenergy plus carbon capture and storage (BECCS) can provide two-thirds of all the carbon negative emissions needed to reach carbon neutrality by mid-century.⁷ And, bioenergy can do so at the very cost-effective price of \$29 to \$64 per ton of carbon reduction.⁸

Bioenergy – including biogas or hydrogen from anaerobic digestion, gasification or pyrolysis of organic waste – also provides firm, renewable power, which is essential to maintain reliability. While biomass combustion can provide baseload power, biogas and hydrogen can provide dispatchable power, which is even more beneficial for reliability purposes to firm intermittent renewables. Renewable gas generated from organic waste can be used in backup generators to replace diesel or in distributed generation power plants to support microgrids and provide other grid support. Finally, biogas and hydrogen can be used as drop-in fuels in existing natural gas power plants to reduce carbon emissions from those plants.

3. Include Renewable Gas as a Long Duration Storage Resource

California's Long-Duration Energy Storage Program, authorized by AB 205 (Budget, 2022) includes storage systems that can provide at least eight hours of continuous discharge. Eligible technologies include, but are not limited to, thermal storage and hydrogen. Both hydrogen and biogas generated from organic waste should be included in the Long-duration Energy Storage Program since both resources can be stored indefinitely and can be used to generate power not just for eight hours, but whenever needed for as long as needed. And both forms of renewable gas can be used to generate dispatchable power, but far the most valuable form of power for grid reliability.

As noted above, biogas and hydrogen produced from organic waste can also generate carbon negative emissions and reduce SLCP emissions, which no other form of energy storage can do.

For all these reasons, BAC urges the CEC to include biogas and hydrogen generated from organic waste in the list of eligible long-duration storage technologies and to prioritize their use in the Long Duration Storage Program.

⁶ *Short-Lived Climate Pollutant Reduction Strategy*, footnote 2 above.

⁷ Lawrence Livermore National Lab, *Getting to Neutral – Options for Negative Carbon Emissions in California*, January 2020, at page 2.

⁸ *Id.* at page 8.

4. Adopt a Program to convert Backup and Temporary Generation from Diesel to Renewable Gas

California subsidizes the replacement of highly polluting vehicles, wood stoves, farm equipment and more to reduce air pollution and move away from diesel. The CEC and CPUC should also adopt incentives to replace diesel backup generators with cleaner alternatives including non-combustion conversion technologies like fuel cells and linear generators, as well as clean combustion generators that use renewable fuels. Doing so would provide enormous benefits for air quality and the climate by reducing particulate matter, NOx, black carbon, methane, and other pollutants. Replacing wood stoves and highly polluting engines is a very cost-effective way to cut pollution and should be extended to backup generators.

5. Recommend Measures to Accelerate and Expand the BioMAT Program

California already has a program to increase firm, renewable power generated from organic waste, and that is the BioMAT program adopted pursuant to SB 1122 (Rubio, 2012). One of the easiest ways to increase firm, distributed generation would be to increase and extend the BioMAT program, which is currently limited to 250 megawatts total. California generates enough technically available organic waste every year to generate 20 to 30 times that amount of power. Given the need for firm, decarbonized power, it makes sense to expand the BioMAT program to require 500 or 1,000 MW. This would also help local governments to meet their landfill diversion requirements under SB 1383 (Lara, 2016) and to beneficially use forest, agricultural and dairy waste for local electricity generation. Community Choice Aggregators sponsored AB 843 (Aguiar-Curry, 2021) so that they can participate in BioMAT, both for energy reliability reasons and to address local waste issues. Increasing the BioMAT program will provide more firm distributed generation and can do so throughout the state since all regions of California generate organic waste.

6. Include All Clean, Low Carbon Technologies and Fuels

The staff presentation on October 28 provided a preliminary list of eligible resources and technologies which left out several important resources.⁹ In particular:

- Both the DER category and the Renewables category should include bioenergy in all forms;
- All resource categories should distinguish between firm and intermittent resources and long or short duration;
- The DER category should include all non-combustion technologies, including linear generators, fuel cells and other technologies still in development;

⁹ CEC Workshop on Reliability, October 28, 2022, staff presentation slide 53, "Preliminary List of Resource Options."

- Non-combustion technologies should not be limited to natural gas and hydrogen when both fuel cells and linear generators can also run on biogas;
- Gas fired generation should require renewable gas wherever possible; and
- The energy storage category should include renewable gas.

7. Recommend Measures to Increase Firm Renewable Power and Recommend Interim and Long-Term Procurement Targets for Firm Renewable Power

SB 423 (Stern, 2021) requires the Commission to assess firm, zero-carbon resources to determine how many will be needed, how to remove barriers to their deployment, how to increase R&D for firm resources, and related issues. Modeling for the SB 100 report found that California will need up to 15,000 MW of firm resources for reliability purposes.¹⁰ More recent studies have estimated that California may need closer to 30,000 MW of firm clean power.¹¹ Increasing firm resources not only boosts reliability, but will save overall system costs by reducing the need for excess solar and batteries that are only used occasionally. One study estimates that increasing a diverse portfolio of firm resources – including bioenergy, hydrogen, and geothermal – could cut overall system costs by 65 percent compared to a portfolio that depends on intermittent resources and storage.¹²

BAC urges the CEC, therefore, not only to estimate the potential and the need for firm resources, but to recommend a long-term target and interim targets for firm resource procurement. The CPUC made a good start in this direction by adopting a requirement in the Integrated Resources Planning proceeding for 1,000 MW of new firm renewables to come online by 2026, but that is only a small start. By recommending interim and long-term targets, the CEC can help the CPUC or the Legislature to adopt a clear ramp-up schedule for firm renewables that aligns with California’s overall RPS goals, reliability needs, and climate targets.

8. Adopt a Plan to Repower Existing Utility Scale Biomass Facilities to Advanced Technologies that Generate Biogas or Hydrogen

California’s utility scale biomass combustion facilities provide important air quality and public health benefits compared to open burning of forest and agricultural waste. According to CalEPA, they cut black carbon, methane, and carbon monoxide emissions 98 percent compared to open burning and also cut smog-forming pollution substantially.¹³ Nonetheless, the utility scale biomass plants are using direct

¹⁰ California Energy Commission, *2021 Integrated Energy Policy Report*, Volume III, at page 24.

¹¹ Jane C.S. Long, et al, “Clean Firm Power is the Key to California’s Carbon-Free Energy Future,” published March 24, 2021 in *Issues in Science and Technology*.

¹² E. Baik, et al, “What is different about different net-zero carbon electricity systems?” published in *Energy and Climate Change 2* (2021) 100046, July 2021.

¹³ “California Forest Carbon Plan – Managing Our Forest Landscapes in a Changing Climate,” adopted by the California Environmental Protection Agency, California Natural Resources Agency, and CalFire in May 2018, at page

combustion, which is less efficient, more polluting, and less valuable for reliability than gasification or pyrolysis, which produce biogas or hydrogen.

The CEC, as part of its analysis of clean firm power options, should propose a plan to repower the existing biomass combustion facilities to use advanced technologies that produce biogas or hydrogen. Generating renewable gas has several advantages over direct combustion to electricity, including:

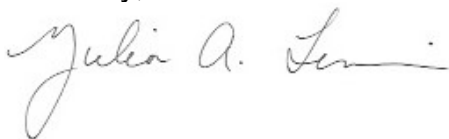
- Renewable gas can be stored for use later (providing a form of energy storage),
- Renewable gas can be used to generate power without combustion, virtually eliminating air pollution emissions,
- Renewable gas can provide dispatchable power,
- Non-combustion conversion technologies (gasification and pyrolysis) are about 40 percent more efficient than direct combustion; and
- Both gasification and pyrolysis generate biochar, which can provide Carbon Capture and Storage or Use (CCSU) and makes the power carbon negative.

9. Conclusion

The CEC's analysis and recommendations are critical not only to ensure energy reliability, but to continue California's progress in meeting its climate and air quality goals. To maximize reliability and progress toward those goals, the Commission should prioritize firm, decarbonized resources that avoid the need for more diesel backup generators, reduce SLCP emissions, provide carbon negative emissions, and ensure a diverse portfolio of firm, renewable resources. In addition to recommending interim and long-term targets for clean firm resources, the Commission should recommend specific policies and incentives to ensure an orderly ramp-up of those resources to maintain reliability and costs while reducing climate and air pollution. Expanding the use of renewable gas – biogas and hydrogen – will help to achieve all of these goals quickly and cost effectively.

Thank you for your consideration of these comments.

Sincerely,



Julia A. Levin
Executive Director

135. Available at: <http://resources.ca.gov/wp-content/uploads/2018/05/California-Forest-Carbon-Plan-Final-Draft-for-Public-Release-May-2018.pdf>.