

Comment Letter #51

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June 21, 2022

**Bloom Energy Comments
Stationary and Mobile Source Control Measures
Draft Air Quality Management Plan
June 21, 2022**

I. Introduction

Bloom Energy Corporation (Bloom Energy) develops on-site distributed generation using innovative fuel cell energy technology that is fuel flexible. Our unique on-site power generation utilizes an advanced fuel cell technology with roots in NASA's Mars mission program. Derived from a sand-like powder, and leveraging advances in materials science, Bloom's technology is able to produce clean, reliable, affordable energy practically anywhere from a wide range of traditional or renewable fuel sources.

Bloom Energy appreciates the opportunity to provide feedback on the South Coast Air Quality Management District's (SCAQMD) Air Quality Management Plan (AQMP). As the AQMP serves to guide adoption of cleaner energy solutions within the air basin, it offers a path forward that will ensure increased deployment of technologies that are capable of meeting reliability standards and clean energy goals. Bloom Energy respectfully submits comments related to the following control measures:

- **L-CMB-03:** NOx Reductions from Permitted Non-Emergency Internal Combustion Engines
- **L-CMB-04:** Emission Reductions from Emergency Standby Engines
- **L-CMB-05:** NOx Emission Reductions from Large Turbines
- **L-CMB-06:** NOx Emission Reductions from Electricity Generating Facilities
- **MOB-01:** Emission Reductions At Commercial Marine Ports

More broadly, Bloom Energy applauds the 2022 AQMP's ambitious goal of a 71 percent reduction in NOx emissions in the LA Basin by 2037. This sober assessment notes that, in order to achieve this goal, a broader deployment of zero and/or near-zero emission technologies for both stationary and mobile sources will be required. To that end, Bloom Energy's comments are primarily focused on stationary source emissions, where Bloom Energy has delivered a near zero emissions solution. Fuel cells, as a technology, are capable of producing the largest quantity of clean, near-zero criteria air pollutant, electricity in proportion to their equipment footprint compared to any technology currently on the market.



Bloom Energy Corporation
4353 North First Street, San Jose, CA 95134
408 543 1500
www.bloomenergy.com

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II. Comments

- **L-CMB-03**: NOx Reductions from Permitted Non-Emergency Internal Combustion Engines
- **L-CMB-05**: NOx Emission Reductions from Large Turbines
- **L-CMB-06**: NOx Emission Reductions from Electricity Generating Facilities

Fuel cell technologies rely on an electrochemical process to create electricity. This process avoids the combustion of any resource, and creates a zero or near zero emission profile that is capable of meeting the California Air Resources Board's rigorous Distributed Generation Certification process¹. As evidenced in the 2015 Self Generation Incentive Program (SGIP), fuel cells are capable of reducing emissions, and offer a much more favorable emissions profile to traditional internal combustion technologies². Fuel cells in general are designed to be fuel flexible; capable of generating electricity on natural gas, biogas, or hydrogen.

Due its highly-modular architecture, there are a number of applications where a fuel cell can be seen as a best fit. As a customer-sited solution, fuel cells are able to easily displace larger, dirtier solutions that would otherwise serve as baseload. As the 2022 AQMP appropriately notes "fuel cells and electrification are ways to shift away from combustion sources generating NOx emissions wherever feasible."³ Bloom Energy has found this to be true. A large number of customers are migrating from traditional generation resources to cleaner generation resources such as fuel cells. High capacity factor and availability make fuel cells a logical resource for baseload generation.

An added benefit stemming from transitioning to fuel cells is the increased reliability and resiliency of onsite generation. Bloom Energy has direct experience in deploying resources where resiliency is a key factor. This was the case in Hartford, Connecticut in the wake of Hurricane Sandy. At that time, Bloom Energy was able to work with the community to deploy a large-scale community wide resource that has since provided reliable electric service to a gas station, grocery store, library, senior center, health center and an elementary school⁴.

The versatility of deploying a fuel cell stems from the power dense nature of a SOFC. For example, a Bloom Energy fuel cell only requires 0.58 square feet per kW⁵ as compared to a PV installation which requires 193.75 feet per kW⁶. This provides for additional benefits to the customer and/or community in

¹ See: <https://ww2.arb.ca.gov/our-work/programs/dgcert/exec-orders>

² Itron. SGIP Impact Evaluation Submitted to PG&E and the SGIP Working Group, April 2015.

³ See: <draft2022aqmp.pdf> (aqmd.gov)

⁴ Discovery Education and Constellation, "Hartford Microgrid" YouTube 3:51, April 21, 2017
<https://www.youtube.com/watch?v=2gMv-Diaxow>

⁵ <http://www.bloomenergy.com/fuel-cell/es-5710-data-sheet/>

⁶ http://www.nrel.gov/analysis/tech_cap_factor.html



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408 543 1500
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the form of avoided real estate costs and minimizes impacts to biological resources. Understandably, these are issues outside of the scope of the 2022 AQMP, but it is worth noting that in addition to the reduction in NOx emissions there are additional community level benefits that can be derived from greater adoption of fuel cells as a source of baseload generation.

As a baseload resource, Bloom Energy's Solid Oxide Fuel Cell technology requires less than one gallon of water per kW upon start up and then consume virtually no water during normal operations. As a firm resource, Bloom Energy Servers are capable of displacing generation from thermoelectric plants which make up 49% of water withdrawals in the US as well as nuclear plants which consume vast quantities of water⁷. This dynamic lends itself to deploy Bloom Energy's fuel cells virtually anywhere; there is no need to co-locate with a large body of water for operational purposes. And, given the strong likelihood that the extreme drought conditions will persist, it would seem logical that the State would pursue generation resources that are not dependent on large amounts of water withdrawal and consumption for normal operation.

To this end, Bloom Energy concurs with the proposed adoption and implementation timelines included in the AQMP. In fact, as noted above, the technology to manage emissions in accordance with the control measures exists today.

- **L-CMB-04: Emission Reductions from Emergency Standby Engines**

As noted in the 2022 AQMP, there are Over 12,000 internal combustion engines that are permitted for emergency standby power in the South Coast AQMD⁸. This is a staggering figure. And, unfortunately it is a figure that is trending in the wrong direction. Recent analysis conducted on behalf of Bloom Energy by independent analyst found that the diesel generator population jumped by nearly 22 percent over the previous year⁹. This analysis found that nearly 50 percent of the generators permitted in the district are sited in communities that are between the 80th and 100th percentile of Cal EPA's CalEnviroScreen.

These factors suggest that a greater degree of coordination between the state's energy planners and the state's pollution and emissions regulatory bodies is necessary. BUG's, which are often situated in underserved and working-class neighborhoods, are a signal that reliability concerns exist. When energy can be reliably delivered the need for a backup solution, such as a diesel generator is not necessary. Bloom Energy's fuel cells are capable of displacing the need for dirtier, antiquated technologies such as diesel generators. However, absent energy policy decisions designed to foster growth for technologies

⁷ <http://pubs.usgs.gov/circ/1344/pdf/c1344.pdf>

⁸ See: draft2022aqmp.pdf (aqmd.gov)

⁹ <https://www.bloomenergy.com/wp-content/uploads/diesel-back-up-generator-population-grows-rapidly.pdf>



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that can provide reliability, the proliferation of diesel generators will likely continue. Bloom Energy was encouraged to see that the 2022 AQMP included detail on coordination with other agencies at the State, federal, and local level, and would encourage SCAQMD to work with their partner agencies to adopt policies that encourage low and/or zero NOx emissions for stationary sources.

- **MOB-01:** Emission Reductions At Commercial Marine Ports

Bloom Energy looks forward to working with SCAQMD and stakeholders through the continued development of an indirect source rule designed to address emissions in marine applications. Fuel cells have a proven track record of delivering environmental and energy benefits designed to meet the emissions targets of SCAQMD. Again, the power density and modularity lend themselves to applications in more geographically challenging environments, such as in a port.

The power dense nature of the Bloom Energy's fuel cells have led to several strategic partnerships with ocean going carriers^{10,11}. By generating electricity 20 to 30 percent more efficiently than traditional combustion based propulsion and auxiliary based engines, delivering a significant reduction in carbon emissions and emitting virtually no harmful air pollutants like sulfur oxides, nitrogen oxides, and particulate matter. Bloom Energy has developed a future proof platform that is IMO 2040-2050 ready today, and remains capable of fuel flexibility. Bloom Energy looks forward to working with SCAQMD and stakeholders in developing a pathway to cleaner energy solutions for ocean going vessels as well.

III. Conclusion

Bloom Energy commends the SCAQMD for its continued efforts in creating a roadmap for a cleaner future for the LA basin. The AQMP is a sobering document that reminds us that there is still much work to be done. Bloom Energy looks forward to working with SCAQMD in crafting a regulatory framework that accomplishes the goals set forth in the 2022 AQMP.

Respectfully submitted,

/s/
Brady Van Engelen
Senior Manager
Policy and Government Affairs

¹⁰ <https://www.travelagentcentral.com/cruises/msc-world-europa-be-powered-clean-energy>

¹¹ <https://www.bloomenergy.com/news/samsung-heavy-industries-and-bloom-energy-advance-plans-for-clean-power-ships-with-joint-development-agreement/>



Bloom Energy Corporation
4353 North First Street, San Jose, CA 95134
408 543 1500
www.bloomenergy.com

What Powers You

Bloom Energy Corporation
4353 North 1st Street
San Jose, CA 95134
Phone: (202) 431-9626
E-Mail: Brady.VanEngelen@BloomEnergy.com



Bloom Energy Corporation
4353 North First Street, San Jose, CA 95134
408 543 1500
www.bloomenergy.com