



Dec 9, 2019

Richard Corey  
Executive Officer  
California Air Resources Board  
1001 "I" Street  
Sacramento, CA 95814

Dear Mr. Corey,

Thank you for the opportunity to comment on the California Air Resource Board's (ARB) proposed Greenhouse Gas (GHG) Emission Standards Regulation for fuel cell net energy metering. Bloom Energy (Bloom) appreciates the ARB's ongoing efforts to advance this shared vision through the technically rigorous, data-driven methodology used to arrive at the proposed emission standards as required by AB 1637. In the new normal of Public Safety Power Shutoffs (PSPS), wildfires, and other climate change caused disruptions to electricity, this proposal creates the certainty for non-combustion, always-on fuel cells like Bloom's Energy Servers to continue playing an integral role in reducing GHGs and criteria air pollutants, displacing dirty diesel generators, increasing resiliency, and achieving the state's clean and renewable energy goals.

### **Legislative Goals of AB 1637**

Assembly Bill 1637 (Low, 2016), effective January 1, 2017, extended the California Public Utilities Commission's (CPUC) Fuel Cell Net Energy Metering (FC-NEM) program through 2021.<sup>1</sup> This legislation specified that:

*(1) Not later than March 31, 2017, the State Air Resources Board, in consultation with the Energy Commission, shall establish a schedule of annual greenhouse gas emissions reduction standards for a fuel cell electrical generation resource for purposes of clause (iii) of subparagraph (A) of paragraph (3) of subdivision (a) and shall update the schedule every three years with applicable standards for each intervening year.*

*(2) The greenhouse gas emissions reduction standards shall ensure that each fuel cell electrical generation resource, for purposes of clause (iii) of subparagraph (A) of paragraph (3) of subdivision (a), reduces greenhouse gas emissions compared to the electrical grid resources, including renewable resources, that the fuel cell electrical generation resource displaces, accounting for both procurement and operation of the electrical grid.*

As the enabling legislation and accompanying legislative analysis make clear, AB 1637 directs ARB to establish a standard for fuel cell generators running on natural gas to reduce GHG emissions as

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<sup>1</sup> California Assembly Bill No. 1637, Chapter 658, September 26, 2016.



compared to the procurement and operation of electrical grid, and specifically indicates renewables be included in the comparison between the grid and the fuel cell generation.<sup>2</sup> These standards are required to be set annually and this analysis is to be updated every three years.

### **ARB Proposed GHG Standard and Methodology Meets this Directive**

ARB's October 22, 2019 proposed FC-NEM Greenhouse Gas Emission Standards Regulation accurately and effectively complies with this statute.<sup>3</sup> Specifically, the standard utilizes a data-driven methodology that is consistent with the statutory directive.

- **Current grid emissions:** The 2017 estimated emissions from California Energy Commission (CEC) data for combined and simple cycle power plants are the most-up-to-date estimates of the marginal emissions for the generation resources that always-on fuel cells displace.
- **Renewables:** Using California Independent System Operator (CAISO) pricing data when the cost of generation is zero is an effective estimate for when renewables are on the margin and properly reflects the current operation of the grid.
- **Annual updates:** The proposed standard is set annually and updated every three years to incorporate new grid operations and market realities.
- **Increasing performance requirement:** The 2.5% annual reduction in the emission standard through 2022 will drive innovation and accurately reflects the trends expected in future grid operation, including plant retirement, additional curtailment, and technology innovation with new generators coming online.

ARB should be applauded for rigorously evaluating multiple other methodologies—using curtailment data, SGIP numbers, or third-party models—and ruling them out due to various data inconsistencies and/or inappropriate application to setting this standard. Please find Bloom's technical comments on why this data-driven standard represents the best in public policy design and emissions reduction strategies for more details.<sup>4</sup>

### **The Proposed Standard and Methodology Fosters Increased Benefits from Fuel Cells**

This GHG standard will provide the accurate, clear guidance necessary for California's hospitals, universities, data-centers, and other commercial and industrial customers to deploy fuel cells to achieve their clean energy goals while simultaneously supporting the state's GHG reduction, air quality, and resiliency goals, including:

- **Reducing GHGs:** Thanks to their non-combustion process, fuel cells generate clean electricity at the highest efficiencies of any technology commercially available. This feature, combined with the fact

<sup>2</sup> [https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill\\_id=201520160AB1637#](https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201520160AB1637#), Pg. 7

<sup>3</sup> [https://ww2.arb.ca.gov/index.php/sites/default/files/2019-07/fcnem\\_discussiondraft\\_20190710.pdf](https://ww2.arb.ca.gov/index.php/sites/default/files/2019-07/fcnem_discussiondraft_20190710.pdf)

<sup>4</sup> <https://www.arb.ca.gov/lists/com-attach/7-fuelcellnemmethod-ws-UzFdNwRqAz8BagJd.pdf>

that fuel cells are located onsite, lessens the state's reliance on large combustion power plants that inefficiently burn gas and result in further waste due to losses caused by transporting the electricity long distances to load centers. Indeed, the third party impact evaluation of the Self-Generation Incentive Program—a CPUC program established in the wake of the 2001 energy crisis to reduce reliance on centralized grid resources—found that all-electric fuel cells reduced GHGs more than any other technology: over 100,000 metric tons of CO<sub>2</sub>e reduced in 2016 and 2017 combined.

- ***Virtually eliminating criteria air pollutants:*** AB 617 provided additional impetus to a key state objective: addressing criteria air pollutants. Due to its non-combustion electricity generation process that results in negligible NO<sub>x</sub>, SO<sub>x</sub>, and VOCs, ARB has certified Bloom's Energy Servers under its Distributed Generation regulation. With over 140 installations that total more than 70 MW in SB 535 designated Disadvantaged Communities, Bloom is proud to efficiently generate clean electricity while protecting air quality for all Californians. Fuel cells are uniquely able to provide these benefits, which align with California's commitments to environmental justice and equity, including SB 350, AB 617, and SB 535.
- ***Providing unparalleled resiliency:*** Fuel cells are the only technology able to meet the 24-7-365 energy demands for critical facilities like hospitals and emergency centers, as well as for commercial and industrial customers—sectors that are particularly difficult from which to reduce emissions. With their modular, redundant architecture, all-electric fuel cells offer multiple resiliency benefits, including indefinite operation, undergrounded fuel supply lines, and in-situ maintenance. Additionally, fuel cells serve as the always-on backbone for microgrids that integrate numerous distributed energy resources such as solar, wind, and batteries. Bloom has installed microgrids to provide data centers, hospitals, and emergency centers with truly resilient power.

These benefits have directly translated into resilient performance in real-world disaster and grid interruption events. Bloom fuel cells have powered through over 500 grid outages, including carrying critical load for an industrial facility in California during the historic Public Safety Power Shutoff episode in early October of this year. Further, fuel cells supplied critical load power to a healthcare facility during triple-digit temperature heat waves that triggered outages for 57,000 customers in Southern California in 2018; Bloom systems also withstood the Sonoma fires in 2018, the 6.0 magnitude Napa earthquake in 2014, and even when a bulldozer was accidentally dropped on them at a customer site in 2016.

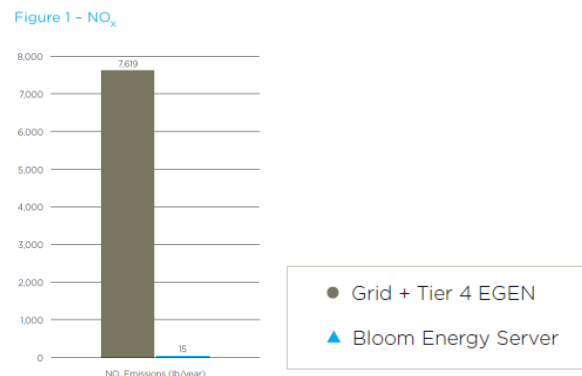
With the new normal of climate caused extreme weather events, combined with California's unprecedented reliance on Public Safety Power Shutoffs that proactively de-energize lines for multiple days for nearly 2 million customers this Fall, the resiliency benefits of fuel cells are more critical than ever.

- ***Advances California's long-term energy and climate goals.***

In addition to the GHG reduction, criteria air pollutant elimination, and resiliency benefits fuel cells have already provided, this innovative technology is foundational to assisting California in reaching its world-leading climate reduction, air quality, and clean energy goals in the future.

- *SB 1383*: This seminal legislation requires a 40 percent reduction in methane (CH<sub>4</sub>)—a potent GHG that has a global warming potential 56 times greater than CO<sub>2</sub> over a 20 year time frame—by 2030.<sup>5</sup> Methane currently accounts for approximately 9 percent of California’s overall GHG emissions, largely from agricultural, landfill, wastewater treatment, and food separation sources.<sup>6</sup> Methane is the main feedstock for fuel cells. Rather than flaring, venting, or burning this resource, fuel cells can convert this potent GHG into renewable electricity, virtually without criteria air pollutants.
- *AB 617*: Passed in 2017, this legislation requires statewide reductions in criteria air pollutants, especially in historically disadvantaged and heavily impacted communities across the state.<sup>7</sup> Given their modular architecture, microgrid capabilities, and clean air benefits, fuel cells are the perfect match to displace diesel generators—one of the dirtiest and most inefficient sources of electricity generation—in the overarching strategy to accomplish AB 617’s goals. On average, each 1 MW of diesel generators that Bloom Energy Servers displaces results in substantial air quality benefits—see Figure 1. To date, Bloom has displaced more than 6.5 MW worth of emergency diesel generators (EGEN) at customer sites across California, resulting in more than 1 million pounds in CO<sub>2</sub> reductions, in addition to the criteria air pollutants avoided. By displacing diesel generators plus electricity from the grid, Bloom reductions in criteria air pollutants are substantial.

Figure 1



In some areas of California, demand for backup generators has spiked as much as 1,400% in the wake of PSPS events.<sup>8</sup> ARB has warned against diesel usage in order to avoid against increased risk of cancer.<sup>9</sup>

- *SB 100*: Requiring retail electricity purchases to be 100 percent clean (60 percent renewable and 40 percent zero carbon) by 2045, SB 100 continues California’s leadership in

<sup>5</sup> <https://unfccc.int/process/transparency-and-reporting/greenhouse-gas-data/greenhouse-gas-data-unfccc/global-warming-potentials> [https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201520160SB1383](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1383)

<sup>6</sup> [https://ww3.arb.ca.gov/cc/inventory/data/graph/bar/bar\\_2016\\_by\\_ghg.png](https://ww3.arb.ca.gov/cc/inventory/data/graph/bar/bar_2016_by_ghg.png)

<sup>7</sup> [https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201720180AB617](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB617)

<sup>8</sup> <https://www.sfchronicle.com/business/article/Demand-for-generators-lights-up-as-PG-E-power-14054242.php#>

<sup>9</sup> <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.441.1007&rep=rep1&type=pdf>



decarbonizing the electricity sector. Fuel cells help California integrate additional intermittent renewables—such as wind and solar—onto the grid. The variable production nature of these resources is a reliability challenge; baseload resources are essential to smoothing the peaks and valleys. Fuel cells are the only non-combustion baseload generator, and as such, have a critical role to play in reaching SB 100's goals.

### **Conclusion**

Bloom commends ARB for the rigorous process to accurately determine the GHG emissions reduction standard appropriate for an always-on, behind-the-meter fuel cell. In the face of PSPS, wildfires, and other climate caused disruptions to California's electricity grid, this standard is key to ensure that fuel cells running on natural gas continue to help the state and customers reduce GHGs, achieving our climate change goals. Without this policy certainty, fuel cell projects that reduce GHGs will almost certainly be delayed or even stopped—meaning that California businesses and communities must turn to dirty, higher-emitting combustion resources to supply both always-on and back-up electricity to meet their needs. Additionally, without this certainty, fuel cell manufacturers will lose critical resources necessary to scale existing solutions and pursue emerging opportunities: higher efficiencies, biogas, renewable hydrogen, and microgrids. This standard exemplifies a best practice in policy design: a data-driven, continually updated performance standard that incentivizes innovation for a technology that is foundational to meeting California's ambitious methane reduction, air quality, clean and renewable energy, and environmental justice goals.

Sincerely,

A handwritten signature in black ink, appearing to read "Erin Grizard".

Erin Grizard  
Policy Director