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Mary D. Nichols
Chair, California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: National Fuel Cell Research Center Comments on October 19, 2019 Staff Report: Initial Statement of Reasons for the Proposed Fuel Cell NEM GHG Emission Standards Regulation

Dear Chair Nichols:

The National Fuel Cell Research Center (NFCRC) submits these comments to the California Air Resources Board (CARB) on the Staff Report: Initial Statement of Reasons issued on October 19, 2019, in advance of the Public Hearing to Consider the Proposed Fuel Cell Net Energy Metering (NEM) Greenhouse Gas (GHG) Emission Standards Regulation, scheduled for consideration on December 12, 2019. The NFCRC commends CARB for developing a robust, thorough record that spans three years of workshops, comments, and analysis. The NFCRC supports the data-driven methodology. Fuel cell systems are critical to displacing diesel generators and meeting California air quality, carbon reduction and resilient energy objectives.

I. Comments

A. Fuel Cells Displace Diesel Generators

With ever-increasing extreme weather events and grid outages, diesel generator use is rising steeply as millions of Californians lose power for multiple days.[1] This expanding utilization of polluting, combustion-based generators is threatening California's world-leading clean energy and clean air goals.

Non-combustion fuel cell systems are uniquely designed to address multiple resilience needs related to electricity production and power generation. As distributed, onsite resources, fuel cell systems produce virtually no criteria air pollutants, provide uninterruptible power for prolonged outages, can be paired with other technologies (for example: solar, battery storage, wind), and serve as the mainstay of microgrids in rural, vulnerable, and disadvantaged communities.

The adoption of the proposed fuel cell NEM GHG emissions standard will strengthen these benefits to the State by ensuring fuel cells can provide this resilient and clean power while continuing to reduce GHG emissions compared to the grid. With the declining

[1] https://sanfrancisco.cbslocal.com/2019/10/12/air-quality-concern-generators-power-shutoffs/

GHG emissions standard proposed, stationary fuel cell systems will continuously reduce GHG emissions as they operate into the future.

B. Fuel Cell NEM is Critical to Achieving the State's SB 100 and AB 617 Goals

As recognized at the July 8 workshop, finalizing this fuel cell NEM standard is important to enable the further deployment of fuel cell systems. Because of their non-combustion operation and high capacity factor, fuel cell systems decrease GHG emissions more than the grid and other renewable resources. In order to achieve the zero emission objectives in SB 100, California needs multiple resources that can balance intermittent renewables while also reducing GHG emissions.

As non-combustion distributed energy resources, fuel cell systems also greatly improve air quality in local communities and are critical to meet the goals of AB 617. The generation of continuous power, with zero criteria air pollutant emissions, is especially critical given that the majority of California currently suffers from poor air quality and faces major challenges in achieving clean air for the many citizens that live and work within these areas, including in economically disadvantaged communities that are often disproportionately burdened by air pollution.

C. The Proposed Fuel Cell NEM Emission Standards Presented by CARB are Data-Driven and Technically Validated via a Thorough Record

Over the past three years, CARB staff has developed a very complete record for the development of the methodology. As California's lead agency with air quality expertise, the agency has held multiple workshops to solicit stakeholder input on what metric(s) should be used to determine the fuel cell NEM GHG annual emission standards, considered several iterations of written comments, and comprehensively analyzed multiple datasets to arrive at this methodology.

The resulting proposed standard follows the legislative intent of AB 1637, which calls for a declining annual standard to be applied to a project each year. Because eligibility is not automatic for the lifetime of a project, an annual view of marginal emissions is appropriate for this standard. By decreasing the annual fuel cell NEM standard every year based upon actual marginal emissions rates, the standard as proposed accounts for the evolving dispatch profiles of load-following combined cycle and simple cycle power plants operating in concert with renewables for each year.

D. The Proposed Methodology Supports a Transition To Zero-Emission Generation

The Staff Proposal extensively demonstrates that CARB has properly accounted for the variables considered in the development of the regulation. On December 2, 2019, the joint environmental groups filed comments expressing specific concerns about the

proposed methodology.[2] These concerns have been thoroughly and previously addressed on the record of this proposed regulation. The CARB proposal demonstrates that the Staff has deeply considered the previous methodologies used to calculate emissions standards, such as the Avoided Cost Calculator (ACC) and improved upon the accuracy of these now outdated methods. Please see responses in Appendix A. Non-combustion fuel cell systems reduce GHG emissions and improve air quality, on any fuel.[3] Again, the proposed GHG emission standard that decreases every year supports increasingly renewable fuel cell systems – the orderly transition to completely zero emissions over time, which the environmental justice community seeks.

II. Conclusion

The proposed GHG standard for the net energy metering of fuel cell systems demonstrates thorough technical development and consideration by the CARB staff and will ensure that fuel cells displace diesel generators while simultaneously reducing emissions compared to the resources that would otherwise have produced that same electricity for the electric grid. The NFCRC appreciates CARB's recognition of unique fuel cell attributes that help address California's emissions reductions and resilient power priorities today, and into the future. We appreciate the opportunity to comment on the proposed methodology for a Fuel Cell Net Metering GHG Standard to force fuel cell systems to continually reduce GHG emissions compared to the electric grid over time while improving air quality and resilience. We look forward to implementing the program in the coming months; to ensure availability of a clean, non-combustion, reliable power sources before next fire season.

Sincerely,

/s/ *Jack Brouwer*

Dr. Jacob Brouwer, Director
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[2] https://www.arb.ca.gov/lists/com-attach/2-fcnem2019-WzVUNVU7WVULbgBv.pdf

[3] *SGIP 2016-2017 Self-Generation Incentive Program Impact Evaluation Report.* Submitted by Itron to Pacific Gas & Electric Company and the SGIP Working Group, September 28, 2018. Available at: https://www.cpuc.ca.gov/General.aspx?id=7890

Appendix A: Technical Response to December 2, 2019 Comments

In comments filed December 2, 2019, the joint environmental groups filed comments expressing several concerns with the proposed methodology.[4] Most of these points have been thoroughly and previously addressed in the record. Additionally, these concerns are addressed in the Initial Statement of Reasons produced by CARB. The NFCRC respectfully responds to the five concerns below, in an attempt to ensure that the record correctly reflects how CARB arrived at the current standard.

1. Statements re: Biomethane
   In their December 2, 2019 comments, the joint environmental groups—including Earthjustice and Sierra Club—state that: "Limited Biomethane Supplies Should Not Be Squandered on Stationary Fuel Cells."[5]

   Two years previously, in comments dated December 20, 2017, many of the same groups argued that: "To ensure the FC-NEM program achieves meaningful GHG reductions, Sierra Club and Earthjustice recommend CARB make the following changes to the proposed GHG standard: Require FC-NEM Resources to Increasingly Utilize Renewable Natural Gas."[6]

   CARB responded to their initial requests in the Initial Statement of Reasons (ISOR) and explains that "switching to eligible biofuels" is one pathway to comply with the standards.

2. Fuel Cell NEM and SGIP are Different Programs
   There are clear distinctions made on the record between the Self-Generation Incentive Program (SGIP) and FCNEM that account for the difference between methodologies.[7] To reiterate, those distinctions are:

   - SGIP is an incentive program; FCNEM is a tariff.
   - SGIP is available to all technologies, including intermittent resources that are not baseload generators and consequently do not displace dirtier marginal generators (e.g., the combined and simple cycle natural gas plants) in the same way.
   - The SGIP number is set once, formalized in the SGIP Handbook, and does not have a regular update schedule. In contrast, as this FCNEM methodology clearly states, CARB will update the standard every three years to reflect changing grid and market conditions, consistent with the 2017 request of the environmental organizations. The "living" standard

[4] https://www.arb.ca.gov/lists/com-attach/2-fcnem2019-WzVUNVU7WVULbgBv.pdf
[5] See pg 7 of https://www.arb.ca.gov/lists/com-attach/2-fcnem2019-WzVUNVU7WVULbgBv.pdf
[6] See pg 2-3 of https://www.arb.ca.gov/lists/com-attach/1-nemghgstandards-ws-USJXOFYyBSQEcAJj.pdf
[7] See pg 1 here: https://www.arb.ca.gov/lists/com-attach/7-fuelcellnemmethod-ws-UzFdNwRqAz8BagJd.pdf

that CARB has developed is innovative and reflective of operations, thus making it more accurate and superior to a "fixed time" SGIP model.

3. Consideration of Line Losses

The joint environmental groups suggest that methane leaks from the distribution system should be accounted for in the methodology, and that doing so would increase the standard by 18 kg CO2e/MWH per year.[8] The ISOR specifically states that the current reliance on combustion gas plants based hundreds of miles from where the electricity they generate is consumed results in line losses. To wit from the ISOR:

> *Transmitting electricity over transmission and distribution lines results in some of the electricity being lost, a concept known as line losses. Because of line losses the amount of electricity delivered to consumers is less than the electricity generated at the generator's site. The reality of line losses means that a greater amount of electricity must be generated to meet a certain level of demand, and if the electricity is generated by a generator that uses fossil fuel, more GHG emissions will occur. When the electricity is generated and consumed on-site, as in the case of fuel cell electrical generation resources in the Fuel Cell NEM Program, line losses are zero, and there is a GHG benefit to siting a fuel cell on-site. The CPUC uses a California line loss average of 8.4 percent, including in SGIP. Incorporating this factor in CARB's proposed methodology would result in a 2017 fuel cell NEM GHG emission standard of 443 kg CO2e/MWh, as opposed to the baseline of 409 kg CO2e/MWh that staff are proposing.*

If CARB were to accommodate the suggestion to increase the standard by 18 kg CO2e/MWH per year as the environmental groups suggest, when line losses are accounted for, the resulting number would be higher than the current proposal: 443 kg CO2e/MWh – 18 CO2e/MWh = 425 CO2e/MWh for 2017. This is substantially higher than the current proposal of 409 CO2e/MWh in 2017. This well-established data should be considered.

4. The Entire Record Justifies the Proposed Methodology. Other expressed concerns of the joint environmental groups have been previously addressed on the record including:
   - "This [fuel cells operating 24/7] decreases grid flexibility and increases hours of renewable curtailment." The ISOR provides an accurate and compelling explanation—based on CAISO data—on why curtailment data is not a suitable proxy to assess when renewables are on the margin.[9]
   - "The reason the 2018 ACC did not include an RPS adder was because the passage of SB 350 made the need to achieve GHG reductions, rather than the need to meet RPS goals, the binding constraint on the electric sector." The CPUC resolution that adopted this change to the ACC model makes no

[8] See pg 4: https://www.arb.ca.gov/lists/com-attach/2-fcnem2019-WzVUNVU7WVULbgBv.pdf
[9] See pg 29: https://ww3.arb.ca.gov/regact/2019/fcnem19/isor.pdf

mention of SB 350 or anything related to this claim.[10] The ISOR does clarify that, "CARB was advised by E3 staff [designers of the ACC model] that, because of fundamental changes to how the model calculated emissions, the 2018 ACC model was no longer appropriate for the purposes of the fuel cell NEM GHG emission standards."[11] Further, WattTime - the leading expert on marginal grid emissions - stated in 2017 comments that "The marginal emissions rate calculated in the ACC was reduced by a factor equal to the RPS standard during that year. WattTime believes this adjustment factor does not accurately reflect the actual operation of the grid and associated emissions at any point in time."[12]

CARB should consider the vast technical background work that has been conducted by CARB Staff over the past three years to develop an accurate and justifiable GHG emission reduction standard. This work has been sufficiently detailed on the record, and in the October 2019 ISOR, and should be strongly considered in the decision to approve this standard.

[10] See pg 6: http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M218/K010/218010890.PDF
[11] See pg 29: https://ww3.arb.ca.gov/regact/2019/fcnem19/isor.pdf
[12] https://www.arb.ca.gov/lists/com-attach/6-fuelcellnemwrkgrp-ws-AnVXMAF0V3ALeVM6.pdf