NATIONAL FUEL CELL RESEARCH CENTER

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VIA ELECTRONIC FILING AND EMAIL

Carmen D. Diaz
Acting Secretary of the Board
44 South Clinton Avenue, 1st Floor
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Trenton, New Jersey 08625-0350
Email: Board.Secretary@bpu.nj.gov

Re: In the Matter of New Jersey Grid Modernization/Interconnection Process
Docket No. QO21010085

Dear Acting Secretary Diaz:

Please accept these comments on behalf of the National Fuel Cell Research Center ("NFCRC") on the Draft Grid Modernization Study, issued by the Board of Public Utilities ("BPU") on June 13, 2022.

The NFCRC facilitates and accelerates the development and deployment of fuel cell technology and systems; promotes strategic alliances to address the market challenges associated with the installation and integration of fuel cell systems; and educates and develops resources for the decarbonization of power and energy storage sectors. The NFCRC was established in 1998 at the University of California, Irvine by the U.S. Department of Energy and the California Energy Commission in order to develop advanced sources of power generation, transportation and fuels and has overseen and reviewed thousands of commercial fuel cell applications.

Consideration of Emerging Fuel Cell Technologies and Hydrogen

On-site distributed energy resources ("DER") like natural gas-based fuel cell systems interact with the electric grid to displace less efficient and higher emitting peaker units and diesel backup generators. By supporting infrastructure for on-site smaller and cleaner DER and microgrids, and

prohibit fuel supplies from higher polluting peaker plants and diesel generators that back up those larger and dirtier central station plants, the BPU is avoiding the unintended consequence of extending the life and expanding the use of dirty peaking power plants and diesel generators which will, in turn, exacerbate air quality and health impacts in the local communities near those plants and diesel generators.

The Report appropriately considers emerging technologies, including fuel cell systems on any fuel. For reliability purposes, New Jersey also requires local generation to address peak load issues currently mitigated by diesel. Diesel generators have a disproportionate impact in non-attainment zones and disadvantaged communities. Fuel cell systems are replacing diesel generators for both primary and backup power around the U.S., including in New Jersey.

Fuel cells are clean and efficient firm DER that generate power (and heat) and are also required to utilize hydrogen and renewable fuels without combustion and without pollutant emissions. Fuel cell systems displace traditional emergency backup generators (almost exclusively fossil diesel combustion generators) that emit criteria air pollutants and greenhouse gas ("GHG") emissions. This feature is especially critical given that poor air quality can be a major issue in economically disadvantaged communities that are often over-burdened by air pollution and risks of COVID-19. By providing always-on dispatchable zero criteria pollutant emissions power, fuel cells can increase adoption of intermittent renewable wind and solar resources throughout New Jersey while significantly increasing the generation of decarbonized and pollutant-free electricity. By increasingly using renewable fuels (including renewable hydrogen) in fuel cells over time, these dispatchable systems will become a key technology for enabling completely zero emissions in all sectors of the economy.

Findings & Recommendations #9

The NFCRC agrees with the recommendations outlined in Table 5.1 Targeted Findings & Recommendations ("F&R") #9 to acknowledge that clean energy systems increasingly contain more than one technology, thereby maximizing air quality, decarbonization and energy efficiency benefits. A multi-pronged approach to distributed generation should include fuel cell systems and hydrogen in addition to the other clean technologies identified. Climate resilience hubs based upon solar and storage alone will not create a resilient system for multi-week periods of insufficient solar and wind power and other outages. For large-magnitude and long-duration

storage, lithium-ion batteries are limited due to self-discharge and connected power and energy density features, in addition to other challenges[1] that can make them prohibitively expensive for storage durations that extend over days. Strategies for maintaining and improving reliability and resilience, including cleaner and greener long-duration and large magnitude energy conversion and storage resources will be needed for the foreseeable future.

The recommendation actions and implementation plans in F&R #9 also support a modern grid and utility infrastructure that incorporates resilience and microgrids. When paired with storage, wind, solar, demand response, and other technologies, fuel cell systems can serve as the backbone for microgrids that integrate numerous distributed energy resources and controls. Microgrids that use fuel cell systems as baseload power can immediately disconnect from the grid and island (operate autonomously) from the larger grid when circumstances demand (e.g., grid outage). The fuel cell installation innately operates as an energy management system, with critical loads for backup power already identified and immediately followed in the event of an outage. A fuel cell system can smoothly transition from the grid to fully power the load during a grid outage, without interruption to the end user, and to seamlessly re-connect to the grid when its power is restored. Fuel cells can be, but do not need to be, connected to a storage device to provide these and other resilience benefits.

In facilitating the co-location of renewable energy systems and non-combustion fuel cell systems, and allowing net metering compensation for both, the BPU is supporting New Jersey's targeted decarbonization, local air quality, resilience, and reliability outcomes. The NFCRC looks forward to further participation as the BPU works through the implementation process.

Respectfully Submitted,

__/s/___Jack Brouwer____

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[1] Saeedmanesh, A., Mac Kinnon, M. and Brouwer, J. *Hydrogen is Essential for Sustainability, Current Opinion in Electrochemistry* 2018, 12:166–181.