Bloomenergy™

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Aida Camacho-Welch, Secretary of the Board
Board of Public Utilities
44 South Clinton Avenue, 9th Floor
Post Office Box 350
Trenton, New Jersey 08625-0350

Re: Integrated Energy Plan Feedback

Dear Secretary Camacho-Welch:

Please accept the following comments of Bloom Energy Corporation ("Bloom Energy") in response to the November 1, 2019 Integrated Energy Plan webinar and associated materials.

I. Introduction

Bloom Energy is a manufacturer of solid oxide fuel cell systems that produce on-site power for many of the world's most demanding customers. The Bloom "Energy Server" fuel cell generates electricity through an electrochemical process without combustion and therefore does not produce the local forms of "criteria" air pollutants associated with combustion technologies or consume or discharge water. Bloom Energy Servers are designed in a modular fault-tolerant format that provides mission critical reliability with no downtime for maintenance. Bloom Energy systems have been proven resilient through disruptive events including hurricanes, earthquakes, utility outages, physical damage, and fire damage. As a result, Bloom Energy servers are used by many of the world's leading companies to secure their critical business processes from the risk of utility outages.

Bloom Energy has installed over 350 MW of its solid oxide fuel cell systems for customers in eleven U.S. states as well as in Japan, South Korea, and India. A growing percentage of

Bloom Energy's business is focused on grid-islanding and micro-grid projects that are designed to operate indefinitely in the event of an outage of the electric grid. In 2018, our fuel cell-powered distributed generation and microgrid projects operated through over 500 electric grid outages worldwide.

II. Comments

It is critically important that the IEP take into account the inceasingly apparent impacts of climate-induced severe weather and the resulting challenges for the electric distribution system. This new reality requires that past assumptions and approaches be reconsidered in light of recent experiences. A specific area that warrants reconsideration involves the frequency and duration of electric distribution grid outages that should be assumed to continue going forward, as well as the degree to which the modern economy is dependent upon an un-interrupted supply of electricity.

The IEP Webinar Presentation uses the term "electricity sector" without indicating whether that term is meant to apply only to the electricity delivered by the electric grid or whether it is meant to also include behind the meter back-up generators. This is understandable and is a common practice, but recent experience in California indicates that close attention needs to be paid to the possibility that back-up generation will be utilized to a much greater extent in the future than it has in the past. The Public Safety Power Shut-offs (PSPS) that have occurred in California over the course of the last few weeks have resulted in unprecedented levels of generator use, increased generator sales, and harmful levels of generator associated local air pollution. As New Jersey knows too well from the experience of Superstorm Sandy, these types of extended outages are not limited to California and can be expected to increase in both frequency and duration. The IEP should be clarified to specify if the electricity sector analyzed in the Plan includes the costs of not having power as well as the cost and environmental impacts of excessive back-up power generation usage.

Similarly, the IEP Webinar Presentation appears to use the term "least cost" in a traditional sense without taking into account some significant and readily quantifiable costs.[1] The health and environmental impacts of combustion related pollutants such as NOx, SO2, and PM are both very significant and readily quantifiable. Recent calculations of the economic and health benefits associated with reducing NOx and PM emissions have been found to exceed the economic and health benefits of reducing GHG emissions on a per ton basis.[2] A steady stream of newly released studies continues to indicate that local combustion related air pollutants have far more serious and harmful consequences to human health and the environment than previously understood, including recent findings that:

- Combustion related air pollution may be as harmful to your lungs as smoking cigarettes;[3]
- Combustion related air pollution increases preterm birth risk;[4]

[1] For instance, the IEP Presentation says "Our analysis does not include costs outside of the energy system or benefits from avoiding climate change and air pollution." IEP Presentation, at 32.

[2] Institute for Policy Integrity, New York University School of Law, "*How States Can Value Pollution Reductions from Distributed Energy Resources*" July 2018. Available at: https://policyintegrity.org/files/publications/E_Value_Brief_-_v2.pdf

[3] Wang M, Aaron CP, Madrigano J, et al. Association Between Long-term Exposure to Ambient Air Pollution and Change in Quantitatively Assessed Emphysema and Lung Function. *JAMA.* 2019;322(6):546–556. doi:10.1001/jama.2019.10255 Aubrey, Allison. Air Pollution May Be As Harmful To Your Lungs As Smoking Cigarettes, Study Finds. NPR. 13 August 2019. Available at: https://www.npr.org/sections/health-shots/2019/08/13/750581235/air-pollution-may-be-as-harmful-to-your-lungs-as-smoking-cigarettes-study-finds

[4] Mendola, P. et al. Air pollution and preterm birth: Do air pollution changes over time influence risk in consecutive pregnancies among low-risk women? International Journal of Environmental Research and Public Health, 2019. Available at: https://www.nih.gov/news-events/news-releases/nih-study-suggests-higher-air-pollution-exposure-during-second-pregnancy-may-increase-preterm-birth-risk

- Particulate matter is the largest environmental health risk factor in the nation, and the resulting health impacts are borne disproportionately by disadvantaged communities;[5] and
- Combustion related air pollution causes dementia.[6]

In short, the "least cost" scenario may not be least cost at all. The IEP analysis would be improved by an additional focus on the potential impact of increasingly severe climate-induced weather upon its assumptions, as well as by the incorporation of new information relating to the health and environmental impacts of combustion related pollutants.

Bloom Energy appreciates the opportunity to provide these comments in response to the November 1, 2019 Webinar. We look forward to working with the Board and Staff as the Integrated Energy Plan is developed and stand ready to provide additional information wherever that information will be helpful to the process.

Very truly yours,

/S/

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[5] Tessum et al. Inequity in consumption of goods and services adds to racial–ethnic disparities in air pollution exposure. *PNAS March 26*, 2019 116 (13) 6001-6006; first published March 11, 2019. Available at: https://doi.org/10.1073/pnas.1818859116

[6] Jung CR, et. al. Ozone, particulate matter, and newly diagnosed Alzheimer's disease: a population-based cohort study in Taiwan 2015. Available at: https://www.ncbi.nlm.nih.gov/pubmed/25310992 https://www.wired.com/story/air-pollution-dementia/