



March 20, 2019

Aida Camacho-Welch
Secretary
New Jersey Board of Public Utilities
44 S. Clinton Avenue
Trenton, NJ 08625
Energy.Storage@bpu.nj.gov

Re: New Jersey Energy Storage Analysis - Sunrun Comments

Dear Ms. Camacho-Welch:

The following are Sunrun, Inc.'s ("Sunrun") responses to the questions presented by the New Jersey Board of Public Utilities regarding the energy storage analysis underway. Sunrun is the largest residential solar, storage, and energy services company in the country, with more than 233,000 customers in 22 states, the District of Columbia and Puerto Rico. We pioneered the "solar-as-a-service" model over 11 years ago to make solar energy more accessible. Sunrun has operated in New Jersey for many years. Sunrun believes there is a better, less expensive, and cleaner way for families to power their homes, and with Sunrun's residential rooftop solar, storage, and energy services, homeowners are saving money, dramatically reducing their greenhouse gas footprint, and becoming energy management partners capable of delivering grid benefits and lowering system costs for all New Jersey ratepayers. As a leader in residential solar plus storage deployment, Sunrun has great interest in regulatory initiatives that facilitate customer-sited energy storage for the benefit of individual consumers, all ratepayers and the electricity grid. With the right regulatory framework, Sunrun believes that New Jersey can become a national leader in battery storage deployment.

Questions

How might the implementation of renewable electric energy storage systems benefit ratepayers by providing emergency back-up power for essential services, offsetting peak loads, providing frequency regulation and stabilizing the electric distribution system?

There are tremendous benefits that residential or "customer-sited" solar-plus-storage can provide to customers, the distribution system and at the wholesale grid level. For individual residential customers, in the event of a power outage, a solar-plus-storage system can safely island from the grid and power the home. Solar + storage in island mode are capable of powering the home and charging the battery for backup, providing a smart form of site-level resiliency not previously available to homeowners with clean energy. The importance of back-up power for residential customers cannot be overstated. For vulnerable customers who may have serious illnesses or disabilities requiring treatment from electric-powered medical devices or refrigerated insulin, having a solar-plus-storage system at their residence can be the difference between life and death. For moderate-income working families living paycheck to paycheck, home resiliency during a severe weather event and power outage means, for example, that the food in their refrigerators does not spoil, saving them additional grocery expenses.



In Puerto Rico, in the aftermath of Hurricane Maria, Sunrun saw firsthand the suffering and destruction caused by power outages and a fragile, obsolete energy system. Sunrun was one of the first solar companies with boots on the ground, partnering with Empowered By Light and Puerto Rico construction firm Aireko, to donate and install solar and battery systems at fire stations in Puerto Rico. Without power, these first responders would not have been able to operate or provide emergency services to members of their communities in need of urgent assistance. Since the installation of Sunrun's solar and battery systems, the systems have run uninterrupted on these fire stations. Throughout the longest blackout in U.S. history, the firefighters were able to respond to emergencies and offer vital support to their surrounding communities. The resiliency benefit of local solar and batteries is proven in the field.

Sunrun has since commercially entered the Puerto Rico market, in partnership with local solar and storage companies. Sunrun is deploying residential solar plus storage systems, growing local jobs, and helping to rebuild Puerto Rico's grid one home at a time. Puerto Rico is similar to New Jersey in that it is ideally suited for distributed solar plus batteries as a jurisdiction with limited land available. Rooftop solar combined with storage uses existing building infrastructure, keeping costs low and maintenance at a minimum.

Further, the aggregation of residential solar-plus-storage systems into a virtual power plant provides a multitude of benefits to the grid including obviating the need for another peaker plant or transmission and distribution upgrade. This is something that Puerto Rico is considering as it rebuilds its grid. The benefits of aggregated solar-plus-storage systems also include distribution and transmission cost reductions, energy and wholesale market cost reductions, increased renewable energy integration, resource adequacy, peak reduction, and ancillary services. Indeed, there is a general recognition that maximizing the benefits energy storage can provide requires the "stacking" of value streams at the customer, distribution, and bulk system or wholesale level. This requires coordination of the operation and control of storage devices so that they can be used to provide multiple services (i.e., "multi-use applications" or "MUAs") without creating conflicts between the provision of one service and another. Customer-sited energy storage is considered to have the most potential value because it allows benefits to be created within all three domains.

How might the implementation of renewable electric energy storage systems promote the use of electric vehicles in New Jersey, and what might be the potential impact on renewable energy production in New Jersey?

Batteries can increase solar self-consumption and increase renewables while smoothing out load. Electric vehicles can do many similar functions and work in concert with stationary storage. Manufacturers like SolarEdge make integrated EV chargers and inverters to optimize the function of solar PV installation and reduce balance of system costs. Also, when residents are at home, they can set EV's to maximize charge when solar panels are producing. Sunrun believes that facilitating consumers' kitchen table conversations about solar with battery storage opens the door for interest in and adoption of EV's. Finally, the same supply chain applies for EV batteries as for stationary home batteries which creates a mutually beneficial cost-reduction curve.

What types of energy storage technologies are currently being implemented in New Jersey and elsewhere?



Battery Storage - Sunrun offers a solar-plus-storage service (“BrightBox”) in several jurisdictions such as Arizona, California, Hawaii, Massachusetts, New York, Florida and Puerto Rico. Our Brightbox battery paired with solar, a smart inverter, and load management capabilities typically utilizes a DC-coupled system for 100% solar charging of the battery, with connectivity through Wi-Fi or cellular for remote asset monitoring and dispatch.

The resiliency that residential solar plus battery storage provides does not only inure to the benefit of the individual consumer. Sunrun believes that customers – and how they manage their energy consumption where they live and work – are the grid’s greatest energy resource. For customers, there is truly power in numbers. Aggregated, customer-sited storage paired with solar can provide tremendous benefits to customers, the electric distribution system and the wholesale marketplace. In February of this year, ISO New England held its Forward Capacity Auction for the 2022-2023 period. ISO – NE is comprised of six New England states (Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, and Connecticut). Sunrun submitted a bid to provide 20 megawatts of residential solar and battery to the ISO NE capacity market, bidding in to fill the same need that fossil-fueled peaker plant would. Sunrun won the bid, marking the first time that customer-sited solar and battery systems will have been selected to participate in any wholesale forward capacity market in the United States. By having been selected, Sunrun will provide demand response services and the batteries will cycle as needed during windows in summer (June/July/August) and winter (December/January). Sunrun’s solar plus storage systems will be able to provide these grid services while maintaining back-up power for each individual customer’s home. Local solar and batteries can benefit all grid participants.

What might be the benefits and costs to ratepayers, local governments, and electric public utilities associated with the development and implementation of additional energy storage technologies?

There are significant benefits of storage to all classes of ratepayers which we anticipate will be reviewed as part of the NJBPU’s Energy Storage study. Please refer to the response to question #1.

What might be the optimal amount of energy storage to be added in New Jersey over the next five years in order to provide the maximum benefit to ratepayers?

We recommend that the inquiry be framed differently to address the specific issues and problems in NJ’s energy delivery system that need solutions in the next five years and beyond. Specifically, we would encourage the study of pain points throughout NJ’s grid and ratepayer experience that need improvement – whether it be the need for: 1) energy savings and cost reductions for consumers; 2) increased resiliency with greater impacts of climate change; 3) and/or cleaner peak. Energy storage is not the end goal, in and of itself, but an effective vehicle through which NJ can effectively improve conditions in the grid and empowers consumers to have greater control of their energy expenses. The energy storage targets – and related studies and stakeholder input – established by legislation in Massachusetts (1,000 MWh by 2035) and New York (3 GW by 2030; New York State Energy Storage Roadmap) can inform the process in NJ.

What might be the optimum points of entry into the electric distribution system for distributed energy resources (DER)?



As noted above, behind-the-meter battery storage systems can provide the greatest value to ratepayers, the utility and the larger grid. Residential, behind-the-meter batteries are being deployed faster than other market segments. In fact, the Smart Electric Power Alliance reported that from 2016 to 2017, residential capacity additions grew by 202% in terms of MW, while non-residential additions grew by a modest 9%.¹ Residential systems utilize the pre-existing built environment, avoiding land use and siting issues. Solar consumer demand for battery storage systems is also high and growing.

How might DER be incorporated into the electric distribution system in the most efficient and cost-effective manner?

As a restructured electricity market, New Jersey must support the participation of competitive suppliers and developers in the marketplace so that consumers are empowered to choose the energy services most affordable for them and their families. Upholding principles of competition not only drives down costs but is critical for the state's goals of greater diversity, economic development and community revitalization. Competition enables market players from under-served and underrepresented communities to contribute to our modernizing grid as entrepreneurs and owners of DER.

As mentioned above, Sunrun has successfully engaged in similar proceedings launching battery storage pilots and regulatory platforms across the country. Last month, Sunrun won a bid to deliver aggregated residential solar and batteries as a source of energy capacity to the ISO-NE, the grid operator for one of the largest electricity markets in the United States. Sunrun will provide 20 MW of energy capacity from Sunrun's Brightbox residential solar and battery systems to ISO New England beginning in 2022, which represents approximately 5,000 New England customers.

Additionally, in a recent proceeding before New Hampshire Public Utilities Commission, Sunrun was instrumental in working with stakeholders and the utility to come to a settlement on an innovative pilot program that will utilize customer-sited energy storage for peak load reduction and deliver savings and other benefits throughout the utility's service territory. Sunrun submitted expert testimony advocating for the inclusion of a "bring-your-own-device" ("BYOD") program in addition to the utility's proposed utility-owned battery program to allow customers to participate in the pilot through third party (non-utility) providers and aggregators. In approving the Settlement Agreement, the New Hampshire Commission specifically noted its statutory obligation to consider the pilot's "effect on competition within the region's electricity markets and the state's energy services market" and found that "utility ownership of DERs [distributed energy resources], such as customer-sited battery storage systems, may affect the competitive market for such products and services" and that the inclusion of the BYOD would serve to mitigate potential negative impacts on competitive markets.²

Further, Sunrun contributed to PSE&G Long Island's Utility 2.0 Long Range Plan 2018 Annual Update proceeding. Sunrun provided detailed recommendations for improving PSE&G's proposed Behind-the-Meter Energy Storage and Solar Program, including clarifications to market rules and providing up-front pricing for integrating cost-effective DER solutions to meet short-term and long-

¹ See Walton, Robert, U.S. Residential Storage Capacity Sees 317% Growth, Utility Dive, Sept. 5, 2018, available at: <https://www.utilitydive.com/news/us-residential-storage-capacity-sees-317-growth/531585/>

² See New Hampshire Public Utilities Commission, Docket DE-17-189, Liberty Utilities Petition to Approve Battery Storage Pilot Program, Order No 26,209 at 37 (Jan. 17, 2019).



term grid needs and recommending the program be expanded across PSE&G's Long Island territory. The New York Department of Public Service echoed Sunrun's recommendations and proposed PSE&G LI "initiate an open solicitation of third party aggregators to install energy storage solutions paired with solar, while also providing load relief through direct load control" and recommending that PSEG LI "pursue the BTM Energy Storage and Solar Program and expand it outside of load constrained areas on Long Island to be available system wide, to all classes of ratepayers, and include both paired solar PV and energy storage projects as well as standalone energy storage projects designed to reduce customer load during utility demand response events."³

In the context of the ESA, what might be the definition of Energy Storage?

Energy storage is defined as devices that absorb energy, store that energy for a period of time, and, thereafter, dispatch for consumption. In other words, storage enables an input of energy to be released for use at another time. Energy storage separates the time of generation from time of consumption which enables opportunities to optimize the efficiency and cost effectiveness of the energy delivery system.

How might Federal Energy Regulatory Commission's (FERC) Order 841 and the associated PJM compliance filing affect the foregoing?

It is our understanding that FERC Order 841 does not address removing barriers to the deployment of distributed energy resources. However, we are encouraged by FERC's momentum facilitating large scale storage participation in the wholesale markets and we are optimistic FERC will do the same for distributed storage.

Thank you for the opportunity to provide input on the New Jersey Board of Public Utilities' Energy Storage Analysis. Sunrun will continue to stay engaged in the process and will provide any additional information that may be helpful.

Respectfully submitted,

Nicole W. Sitaraman

Nicole W. Sitaraman
Senior Manager, Public Policy
Sunrun, Inc.
nicole.sitaraman@sunrun.com

³ See New York State Department of Public Service, Matter No. 14-01299, In the Matter of PSEG LI Utility 2.0 Long Range Plan, Department of Public Service Recommendations Regarding PSEG LI Annual 2018 Update at 15-16 (Nov. 1, 2018).