Sunowner, Inc.

VIA ELECTRONIC FILING March 20, 2019

Aida Camacho-Welch, Secretary

New Jersey Board of Public Utilities
44 South Clinton Avenue
3rd Floor, Suite 314, CN 350
Trenton, New Jersey 08625
Aida Camacho-Welch
Secretary to the Board

Energy.storage@bpu.nj.gov

Re: New Jersey Energy Storage Analysis – Comments

1. Solar Residential Electric Storage systems benefit ratepayers by providing electric power during grid interruptions, however short or long. I have lost work many times when the electric went out even for short periods. Longer outages can be supplied by solar and storage for multiple days, providing light, heat and refrigeration to avoid food spoiling. Adoption of storage by some of the 100,000 residential and commercial solar systems can be linked together to displace some of the old carbon emitting peaking generators we rely on today during peak demand hours, and reduce carbon emissions while stabilizing the grid. Storage can also provide capacity and ancillary services and respond more quickly than conventional generation and thus is more valuable than turbine based generators.

2. Electric storage can provide peaking power to assist the grid in supplying peak electric needs that may arise if electric charging at peak charging periods creates new higher electric demands during certain hours. Renewable electric generation can also be stored for use in vehicle electric charging to smooth out new electric charging demands on the grid. Vehicle to grid holds a large potential to profitably interact with the grid during peak cost hours because of the growing acceptance of electric transportation and the lager capacity held in this mobile electric storage than in home based battery storage.
3. Lithium technologies are the primary storage in use today for up to four or six hour discharge periods, and the cost of this technology is continuing to decline. Flow batteries are generally more cost effective for longer discharge periods but production has not reached significant scale.

4. Most of NJ's peaking generators are simple cycle, old and highly polluting when they operate. Solar and wind generation, whether co-located or located remotely, will operate to reduce carbon emissions, stabilize the grid, and reduce air pollution, especially in the area around existing fossil fuel peaking generators. These peakers are more often located near lower economic areas and adversely impact air quality for nearby residents. As storage costs continue to decline they will become cheaper than continuing to rely on the existing fossil peakers, and allow them to retire.
5. NY has goals of 1500MW of storage by 2025 and 3000 by 2030. I expect those goals to be increased as storage costs decline . The NJ grid has about half the demand of NY so 600-800MW would be a good initial target by 2025. The most cost effective storage could be to do a solicitation among the existing solar systems to secure near term storage capacity. With over 500MW of grid supply interconnected, the interconnection cost should be relatively low and average system large. FERC 845 would appear to allow approval of the storage plus the existing solar at the rating of the solar alone. Ie: 10MW of solar plus 10 MW of storage would be rated as a 10 MW interconnection. Residential and commercial storage should also be encouraged, as NY is doing with $350/KW for systems with at least 4 hour discharge capability.
6. Points of entry should be both in front of the meter and behind the meter. Sonnen recently won capacity from the New England ISO for 20MW of storage to come from 5000 residential storage units. Storage can also be combined with solar and targeted demand reduction to provide Non-wires Alternatives for nearly all utility proposed grid infrastructure expansions. To address our carbon reduction goals NJ should not permit any natural gas supply or generation because renewables, efficiency and storage can provide more cost effective solutions than fossil based proposals. Substation capacity has already been augmented with storage in other states instead of expanding electric high voltage transmission for the relatively few hours it was estimated to be needed.
7. Ratepayers will see a net lower long term cost of energy as more renewables are built along with storage and increasing industry scale lowers cost. The growth of DER will lessen the peak loads on the grid and reduce health costs imposed by fossil generated pollution. Electric customers can be induced to share the cost of expanding storage because sufficient incentives will encourage electric customers (some of the existing 100,000 NJ solar customers) to invest the balance to acquire enhanced resilience for their home or business. Smart meters and TOU rates will further encourage more storage to allow solar production to be stored during peak solar production hours for discharge during the hours after daylight hours. See discussion of "The Duck Curve" in California. The need for more solar storage to mitigate the steep ramp up of fossil generation as the sun sets only gets greater as solar capacity continues to grow. The combination of more renewable power combined with storage will produce the lowest

long term energy costs for the state as these system costs are amortized because there is no recurring fuel costs. More instate renewables and storage will also recuse the outflow of cash from the state as less fossil fuels are imported into NJ for generation of electricity and heating of buildings, and less refined fossil products are imported for transportation.

8. Integration of DER with real time communication for dispatch is essential for the operation of a smart grid. Storage can react much faster and more efficiently than our current grid that needs to be overbuilt to remain reliable.
9. DER needs to be incorporated fully with costs and revenues aligned to the realtime costs of producing energy and transparent price signals made available to encourage the most cost effective investment as the future intelligent grid evolves.
10. Energy storage is not only electric storage but should include thermal storage, usually in the form of ice storage for supplying peak demands during the summer air conditioning season. Thermal storage is less expensive per MWH than electric storage and does not reduce in capacity as quickly as electric storage. Energy storage is any electric or thermal storage that displaces energy that would otherwise need to be produced and consumed in the same moment.
11. A four hour minimum discharge requirement is proposed for incentivizing in New York under their new storage regulations, with lower incentive amounts per hour for additional commitment for hours in excess of four discharge capacity. Discharge requirements for additional MWH systems should be developed as lessons are learned from the initial 600-800 MWs deployed.
12. There is essentially no storage current beyond a few systems and about 200 residential systems (less than 2 MW), so they do not need to be counted toward that goal unless they participate in future NJ capacity participation programs.
13. Order 841 is expected to enhance the economics of storage connected to the grid by compensating the storage that can be dispatched and meet other performance requirements to enable it to earn capacity payments and sometimes ancillary services.

Respectfully Submitted

Dennis Wilson

Board member of the MidAtlantic Solar and Storage Industries Association
Chair, Sustainability Committee, Morris County Chamber of Commerce