BPU Energy Master Plan; Docket No. QO24020126
Re: RFI question C: 2019 EMP Strategy 5
Swiftly advance electric distribution upgrades & incorporating clean hydrogen electric storage

June 12, 2024

Dear NJ Board of Public Utilities Commissioners, BPU Leadership and supporting contractors;

In New Jersey's electric grid, there are three challenges that are preventing a transition from fossil fuels to 100% renewable all-electric infrastructure that matches demand and provides a resilient electric service to industry, businesses and New Jersey residents.

1. Enough renewable electric generation that will meet a fully 100% electric demand and can continue to grow as demand increases over time in a manner that minimizes environmental impact.
2. On demand electric storage that has the capacity sustain each utility supplied grid when there is no renewable electric source available.
3. Upgrades to the utility supplied grids that actively manages electric consumption with renewable generation and electric storage.

The revised 2019 EMP seven strategies attempts to attack these three challenges from seven approaches: 1. Reducing consumption; 2. Accelerate renewable energy and distributed energy resources; 3. Maximize energy efficiency and conservation and reduce peak demand; 4. Reduce energy use and emissions from the building sector; 5. Decarbonize and Modernize New Jersey's Energy System; 6. Support energy planning for environmental just communities; and 7. Expand the clean energy innovation economy.

All of these strategies are interrelated and a good set of strategy approaches to ensure that all aspects of the New Jersey energy grid are being considered in order to reduce the anticipated fully 100% electric demand, while creating an infrastructure that includes 100% renewable fed electricity with a smart grid infrastructure that regulates on demand distributed storage that automatically feeds into the grid when renewable sources are not available. While also ensuring that the disadvantaged have the same electric resources as the rest of the customers within New Jersey.

RFI Question C two questions:

C. Strategy 5 of the 2019 EMP: The 2019 EMP outlined how the benefits of electrification, including incorporation of renewable energy, energy storage, demand flexibility, energy efficiency, load shifting, resiliency, microgrids, decentralization, and decarbonization, all necessitate a 21st-century distribution grid. With the release of the 2022 Grid Modernization Report,[11] followed by robust stakeholdering and the recent approval of new grid modernization rules, New Jersey is working hard to build, through a coordinated and collaborative approach with expert and relevant stakeholders, a more advanced and capable grid to support the clean energy transition.

   1. How can New Jersey more swiftly advance required electric distribution system upgrades with which DER project developers may be faced in order to bring their project online? Should project developers be required to pay for the full upgrade, or can financial mechanisms be put in place to reduce the upfront burden of grid upgrades, reduce or mitigate any impacts on ratepayers, and achieve cost effective expanded hosting capacity for DER?
   2. How should the state incorporate emerging and existing technologies such as long-duration energy storage, clean hydrogen, and demand response in net-zero emission modelling scenarios that align state emission

reductions with the Global Warming Response Act of 2009?

The RFI Question C questions target two areas that are currently gaps in New Jersey's energy transition plan from fossil fuels to 100% renewable energies. In the recent BPU New Jersey Storage Incentive Program Docket QO22080540, it targeted the following storage targets over the next 6 years:

Energy Award Year	Grid Supply Procurement (MWhs)	Distributed Procurement (MWhs)	Distributed Multiple for Grid
2023/2024	120	40	3
2024/2025	200	40	5
2025/2026	300	60	5
2026/2027	420	60	7
2027/2028	560	80	7
2028/2029	720	80	9
2029/2030	1200	120	10

Docket Q022080540 SIP Stakeholder Process Day 1 Presentation, page 23: V. NJ SIP Straw Proposal: Targets and Timelines.

Proposed targets and timelines simplified just to denote grid total supply targets, distributed (Behind the Meter) total supply targets and an added multiplier column to demonstrate the ratio between distributed and grid storage proposed growth.

Distributed electric storage (behind the meter) as grid-edge utility-controlled energy supply is the most effective method for minimizing increased demand, offsetting increased peak loads as well as during times when renewable sources are underperforming (no wind, no sun, etc..). This requires an aggressive plan to deploy as many as possible distributed electric storage solutions (behind the meter) at as many residential locations willing to install a 2 to 5 MWhrs storage solution. The more multi MWhrs installations as grid-edge controlled, the reduction in grid load, the reduction in peak times and the increased resiliency for each segment of the grid.

There is only one electric storage solution that is currently available, that fits within 20' by 8' footprint and has a Lifecyle exceeding 25 years - that is the metal hydride hydrogen electric storage solution. It doesn't require pressurized hydrogen; it does not require hydrogen transmission (the solution is a standalone self-contained storage solution); the solutions are self-contained and does not emit hydrogen; and it only has electric inputs and outputs. Some solutions require a water input, others build that into the solution. This solution is scalable at each site and there are multiple US based companies offering this solution today. Two specific companies with solutions available now: Harnyss (www.harnyss.com) and GKN Hydrogen (www.gknhydrogen.com).

Standalone Hydrogen metal hydride Electric Storage solution

- Solution includes Production, Storage, and Fuel Cell Systems
- Safety: Low-pressure storage, advanced containment solutions.
- Scalability: Flexible storage capacities up to 100kq (3.3 MWhrs), suitable for residential and commercial applications.
- Renewable Integration: Utilizes renewable (solar, wind) or grid power, enhancing renewable energy utilization.
- Self-Sufficiency: No supply chain for water or fuel, as the water is sourced from atmospheric water harvesting.

In a scenario where a transformer provides electricity to a neighborhood of 200 residents:
If 50 of those residents are willing to install at least a 2 MWhrs hydrogen electric storage solution, that means that there is 100 MWhrs of electricity controlled by the utility to offset daily usage during peak hours and also when renewable sources are not generating electric are underperforming.

Recommendation for New Jersey to adopt a pilot program, allocating $20,000,000 to subsidize 60 installations (20 installations per utility). Financing should be a 20 year program using funds from the IRA bill, proceeds from wholesale electric supply within the grid and investments that each utility has to make in upgrading their utility grids.