



## **State Commission Staff Surge Call: Energy Storage**

**April 29, 2019**

Energy storage is a critical tool for integrating renewable energy, managing peak load, and improving grid reliability. As the cost of storage continues to decline, commissions are taking advantage of this growing resource in a variety of ways. On this call, commission staff heard how three states have responded. Staff from Maryland discussed a value of storage report and the impact of recent legislative action on the commission and the state's storage market. Staff from New York presented on the state's working group on storage integration with the New York Independent System Operator and other stakeholders, storage deployment goals, and the commission's recent storage order. Lastly, Vermont staff discussed a unique distributed storage aggregation program.

Jeremy Twitchell, a former Washington Utilities & Transportation Commission analyst now with Pacific Northwest National Lab (PNNL), served as an expert guest moderator for this call. Jeremy gave an overview of the U.S. Department of Energy (DOE) energy storage program, which works across four areas: improving technology, advancing codes and standards, conducting economic analysis and demonstration projects, and creating an equitable regulatory environment. Jeremy's role at PNNL is to help DOE identify regulatory and planning barriers to energy storage. He also provides direct technical assistance to state commissions and assists in maintaining a policy database on energy storage.

### **Maryland**

The Maryland Public Service Commission is working through two key actions on storage. In late 2018, the state Department of Natural Resources released a report on energy storage. The general assembly passed legislation in April 2019 to advance energy storage pilot programs. Following the Pepco-Exelon merger, Pepco Holdings, Inc. (PHI) was required to make a filing with the PSC for a "grid of the future" proceeding, looking at possibilities for the distribution grid to incorporate new technologies and resources like storage. After a stakeholder process, the PSC created PC44 workgroups to address specific topics, including energy storage. Simultaneously, Maryland passed legislation calling for a Power Plant Research Program (PPRP) to explore reforms and market incentives that could increase the deployment of storage, under the assumption that demand for storage and its services outpaced supply.

In January 2018, the PC44 storage workgroup released a memo addressing key legal and policy issues to storage adoption. Maryland's status as a restructured state with retail choice and limits on utility ownership of generation assets creates confusion over how storage is classified and who owns it. In December 2018, the PPRP released a report on energy storage addressing available technologies and their applications, barriers to widespread storage, other state actions, and what Maryland can do. PC44's workgroup submitted a proof-of-concept proposal allowing utilities to submit project applications for innovative regulatory and business model pilots. The April 2019 legislation is based on that proposal.

Even though costs are declining, storage is still a high upfront investment that needs value stacking in order to make it a good investment for developers. Cost and value of storage depends on technology, system size, location (in front of or behind the meter), and applications – not all of which are monetizable. Maryland has one large-scale (10 MW) storage project providing ancillary services to PJM. Smaller storage projects incorporate different technologies and applications. Maryland was the first state to offer an investment tax credit for storage. State agencies like the Maryland Department of Transportation are



soliciting storage proposals to establish renewable facilities. The Maryland Energy Administration offers grants for customer-sited storage paired with renewable generation.

Storage in Maryland also faces a number of barriers. Rate design and regulatory changes can ease barriers to entry and unlock additional opportunities. The PSC needs to clarify the classification of storage as a generation or distribution asset. Costs and financing issues, ownership questions, interconnection procedures, and system planning are also in need of attention. The PPRP report highlights options for Maryland to increase storage, mainly incorporating time-of-use rates and modifying interconnection protocols. The PSC is considering these options as part of PC44.

Currently, the general assembly passed SB573 based on non-consensus recommendations from the PC44 workgroup, and the bill is awaiting Governor Hogan's signature.<sup>1</sup> The bill proposes four commercial and regulatory models for storage: strictly utility-owned, utility-owned with third-party contracts for operation in wholesale markets and other applications, third party-owned, and virtual power plants consisting of BTM storage aggregated by the utility or a third party. The PSC would be required to solicit proposals for each of the four models and select two of the four to move forward as pilot programs. Utilities would be required to solicit offers across all four models, with at least one being non-utility-owned. Cumulatively, the programs would account for 5 – 10 MW / 15 MWh and would last for three years once the PSC accepts applications.

### **New York**

The New York State Public Service Commission has been focusing on a multifaceted approach to storage consisting of a state-issued report, legislative mandate, and detailed deployment policy. The New York State Energy Research and Development Agency (NYSERDA) issued an energy storage roadmap for the PSC in June 2018. The state legislature ordered the PSC to set a storage deployment goal, but allowed the PSC to decide what that goal should be. The PSC settled on 3000 MW of storage by 2030 – representing about 10% of peak load – to complement the state's broader carbon reduction goals.

To get to 3000 MW, the PSC is exploring soft cost reductions, \$350 million worth of upfront bridge incentives to push down initial capital costs, and utility procurements to use storage to satisfy bulk power system needs. Interconnection costs and lack of data can prevent storage from being deployed in optimal sites. The PSC may also use a value stacking approach in rate design to compensate storage where gaps exist in wholesale or retail markets and prevent cross-subsidization from non-storage customers to storage owners. Demand response programs could be tweaked to pay storage assets according to the full value they provide to the grid.

New York is not allowing utility ownership of storage, instead attempting to create third-party interest by stimulating markets and creating transparent, fair rules that fully unlock the value of storage. The PSC is studying requiring all peaker plants to study the potential to use onsite storage to decrease use or potentially retire gas-fired units, with results expected in July 2019.<sup>2</sup>

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<sup>1</sup> The bill was signed on May 13 and went into effect on June 1, 2019.

<sup>2</sup> The study is available at: [https://www.ethree.com/wp-content/uploads/2019/08/E3\\_The\\_Potential\\_for\\_Energy\\_Storage\\_to\\_Repower\\_or\\_Replace\\_Peaking\\_Units\\_in\\_New\\_York\\_State\\_July\\_2019.pdf](https://www.ethree.com/wp-content/uploads/2019/08/E3_The_Potential_for_Energy_Storage_to_Repower_or_Replace_Peaking_Units_in_New_York_State_July_2019.pdf).



## Vermont

A Vermont Department of Public Service staffer discussed Green Mountain Power's behind-the-meter energy storage aggregation pilot program. The program fits in well to Vermont's focus on the distribution system and what staff described as a shared culture of innovation at the commission and GMP. For a 1000-MW peak load system, Vermont has 300 MW of BTM solar installed, and wants a comparable amount of distributed grid storage. As the vertically integrated state's only investor-owned utility, GMP put forward a pilot program to install up to 2,000 5-kW/13.5-kWh Tesla Powerwalls for residential customers. Participating customers pay \$15 per month over ten years or \$1,500 upfront for the Powerwall, which retails for around \$7,000. Customers can use their Powerwalls for backup during outages, but GMP can access the batteries to reduce peak load.

In early April 2019, GMP filed preliminary results of the program. The utility installed 1,300 Powerwalls but expressed its intent to install the remaining 700 by the end of summer 2019. Difficulty finding installers and supply constraints with the Powerwall contributed to the lower-than-expected deployment. Most of the participating customers were located in rural towns that experienced more frequent outages. 480 customers opted to install two Powerwalls in their homes to provide longer backup power during an outage. GMP decided not to bid the aggregated Powerwalls into ISO-NE as a capacity resource, but did successfully utilize the Powerwalls to reduce their total capacity needs and lower associated costs. ISO-NE allocates bulk transmission costs by non-coincident peak hour for each member utility every month. During a 13-month period, GMP was able to reduce its regional network peak nine times and reduced its capacity peak once. In a few cases over winter months, GMP opted not to call upon the Powerwalls so that they would be available for backup to customers in case of a severe storm. GMP valued the Powerwalls at several hundred thousand dollars over the 13-month period. Ultimately, GMP plans to file a tariff based on data from the pilot program.

GMP also created an algorithm with Tesla called Grid Logic to predict peak load and battery charging/discharging. The algorithm was nearly as accurate as manual dispatch and GMP slightly preferred using Grid Logic's capability to aggregate and calculate real-time information, stopping discharge earlier than a manual process would have and thus reducing the need to recharge the batteries. After an event was called, the Powerwalls would discharge over several hours and then recharge slowly to mitigate energy costs for customers while making the batteries available again.

## Discussion

With many states following New York and California's model of passing strong storage targets but deferring to commissions on how and when to bring storage online, staff from Maryland, New York, and Vermont recommended taking the time to produce studies that look at the current energy market and set a realistic goal. Commissions can also rely on consultants and more mature states to build knowledge of storage's particular capabilities.

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