

November 13, 2019

Jeffrey R. Gaudiosi, Executive Secretary
Public Utilities Regulatory Authority (PURA)
10 Franklin Square
New Britain, CT 06051

Re: Docket No. 17-12-03RE03, *PURA Investigation into Distribution System Planning of the Electric Distribution Companies – Electric Storage*

Dear Mr. Gaudiosi:

Pursuant to the Public Utilities Regulatory Authority's ("Authority") October 24, 2019 Notice of Request for Presentations and Information in the above referenced docket, the U.S. Energy Storage Association ("ESA") respectfully submits these comments for the Authority's consideration. ESA applauds the Authority for its October 2, 2019 Interim Decision, which opened Docket Number 17-12-03RE03 to explore programs and technology applications that leverage the value of electric storage for the net benefit of the electric distribution system.

ESA is the national trade association dedicated to energy storage, working toward a more resilient, efficient, sustainable and affordable electricity grid – as is uniquely enabled by energy storage. With more than 190 members, ESA represents a diverse group of companies, including independent power producers, electric utilities, energy service companies, financiers, insurers, law firms, installers, manufacturers, component suppliers, and integrators involved in deploying energy storage systems around the globe. Further, our members work with all types of energy storage technologies and chemistries, including lithium-ion, advanced lead-acid, flow batteries, zinc-air, compressed air, and pumped hydro among others.

In our comments below, ESA outlines provides initial recommendations of utility programs to support energy storage, based on programs that have been successful in other jurisdictions. ESA also provides a framework to evaluate the cost-effectiveness of these programs.

Respectfully,



Nitzan Goldberger
Policy Director
Energy Storage Association

**STATE OF CONNECTICUT
PUBLIC UTILITIES REGULATORY AUTHORITY**

PURA INVESTIGATION INTO : DOCKET NO. 17-12-03RE03
DISTRIBUTION SYSTEM PLANNING :
OF THE ELECTRIC DISTRIBUTION :
COMPANIES – ENERGY STORAGE : NOVEMBER 13, 2019

I. INTRODUCTION

Pursuant to the Public Utilities Regulatory Authority’s (“Authority”) October 24, 2019 Notice of Request for Presentations and Information in 17-12-03RE03, the U.S. Energy Storage Association (“ESA”) respectfully submits these comments for the Authority’s consideration. ESA is the national trade association dedicated to energy storage, working toward a more resilient, efficient, sustainable and affordable electricity grid – as is uniquely enabled by energy storage. With more than 190 members, ESA represents a diverse group of companies, including independent power producers, electric utilities, energy service companies, financiers, insurers, law firms, installers, manufacturers, component suppliers, and integrators involved in deploying energy storage systems around the globe. Further, our members work with all types of energy storage technologies and chemistries, including lithium-ion, advanced lead-acid, flow batteries, zinc-air, compressed air, and pumped hydro among others. Several of our members conduct business in Connecticut in related fields, and many more are interested in doing so. In our comments below, ESA provides initial proposals for the Authority’s consideration of programs to incent the deployment of energy storage that can provide net benefits to Connecticut’s ratepayers.

II. ENERGY STORAGE BENEFITS TO CONNECTICUT

i. Energy storage serves as a cost-effective alternative for traditional distribution investment

Energy storage plays a unique role in distribution system planning. Energy storage can be deployed as a cost-effective solution for extending the life of distribution system infrastructure and investments, increasing power quality on distribution circuits, and increasing circuit and substation

hosting capacity to meet the system demands posed by increasing proliferation of distributed energy resources (DERs), particularly non-dispatchable generation. Utilities outside of Connecticut have begun to demonstrate the use of energy storage as a distribution asset, for example:

- Eversource Energy has proposed a 1.7 megawatt (MW) / 7.1 MWh energy storage project in New Hampshire that is estimated to save ratepayers \$6 million by avoiding the construction of a 10-mile distribution circuit.¹ The project will also reduce peak demand, resulting in additional energy supply and transmission cost savings.
 - Arizona Public Service purchased a 2 MW / 8 MWh battery-based energy storage system for less than half the cost of the traditional investment of a wires alternative in August 2017.
 - New York's Con Edison is deferring a \$1.2 billion substation upgrade through its non-wires alternative program, the Brooklyn-Queens Demand Management Program, by contracting for 52 MW of demand reductions and 17 MW of distributed resource investments, including energy storage.
- ii. *Energy storage will be key to meeting Connecticut's ambitious policy goals affordably and reliably*

The ability of energy storage to enhance hosting capacity is particularly applicable to the State of Connecticut's ambitious energy and environmental goals. Energy storage can integrate more variable wind and solar power and distributed energy resources onto the grid, by obviating the need for traditional infrastructure to accommodate the new resources. Energy storage will also reduce curtailment of renewable energy and other clean energy resources by storing energy from those resources at times when there is potential overgeneration, for use at a later time. And energy storage provides the critical fast responding flexibility to ramp up and down as for example, solar generation comes online in the morning and goes offline in the evening. Deployment of energy storage on the distribution system, including behind the customer's meter, can actually serve to facilitate greater penetrations of intermittent distributed generation without the need for investment in infrastructure to enable customers to deploy DERs.

¹ Eversource Energy application in New Hampshire Public Utilities Commission docket DE 19-133, available at: http://www.puc.state.nh.us/Regulatory/Docketbk/2019/19-133/INITIAL%20FILING%20-%20PETITION/19-133_2019-07-31_EVERSOURCE_TESTIMONY_ANCEL.PDF

iii. Energy storage can enhance resilience of the distribution system at times of increasing extreme weather events

Energy storage can also play a key role in grid resilience and emergency management planning. Energy storage is already providing resilience benefits, from backup power in schools and hospitals to the rapid storage deployment to mitigate the Aliso Canyon gas shortage in California. While the benefits of resilience are more difficult to quantify for the purposes of a cost and benefit analysis, it can provide benefits to many ratepayers. Energy storage sited at critical facilities such as community centers, fire stations, and government buildings can ensure that services are provided to an area during emergency events. Energy storage sited at non-critical facilities can mitigate the steep economic consequences that are caused by power outages, and ensure that people whose paychecks depend on their businesses being open can continue to earn a living.

iv. Energy storage can provide bulk system benefits while serving the distribution system

Finally, energy storage on the distribution level can provide bulk system and other benefits while serving as a distribution asset in regulatory constructs that enable multiple use application from the same energy storage asset.

III. BARRIERS TO DISTRIBUTION-CONNECTED ENERGY STORAGE IN CONNECTICUT

i. Energy storage resources are unable to provide grid services and receive compensation for them

The ability of energy storage assets to provide multiple services from the same asset is critical to the economics (and therefore the successful deployment) of energy storage as well as for maximizing customer benefits. Yet in Connecticut, as in most states, regulatory frameworks and wholesale market rules can stand in the way of an asset providing multiple services. Moreover, the role of behind-the-meter resource is particularly important, given the immense opportunity to leverage private capital to drive down costs of meeting the grid's needs for all ratepayers. Behind-the-meter (BTM) energy storage

systems aggregated into a Virtual Power Plant could provide valuable grid services, including ramping, local and system capacity, voltage support and frequency response.

Energy storage assets behind a customer's meter can reduce a utility's cost of meeting peak demand as well as provide distribution and wholesale grid support. These services have the potential to provide savings to the system by foregoing the need for additional investment in infrastructure. However, in Connecticut, for the most part retail programs do not exist to provide customer-sited energy storage resources an opportunity to compete for grid services or to help with shifting energy from periods of low demand to periods of high demand. ESA is aware of Eversource's "Daily Dispatch" programs for behind-the-meter customers and recognizes this is an important starting point for a broader program design. We understand that the program is only funded for 1-2 MW of participation. ESA recommends that Connecticut significantly expand these types of programs and will provide more details later in the document.

ii. Wholesale market participation hurdles require state action to realize real savings to ratepayers

Storage assets, whether located behind-the-meter, distribution-connected, or transmission-connected, also face significant challenges to participating in the ISO-NE wholesale market. ISO-NE's minimum offer price floor rule creates a floor for where storage can offer in a Forward Capacity Auction, and that floor for most storage assets is very likely to be above the Forward Capacity Auction clearing price. If storage cannot clear in the Forward Capacity Auction, depending on where it is located and when it is discharged, it can still significantly reduce wholesale capacity and/or energy costs and distribution costs for Connecticut ratepayers. Indeed, the most recent Avoided Energy Supply Cost study for New England conducted by Synapse Economics found that programs that reduce ISO-NE's Installed Capacity Requirements (by reducing peak demand, as in an EDC-focused peak demand reduction program) could drive levelized, Connecticut-specific savings of \$73.13/kW-year over a 10-year period, and savings of

\$237.88/kW-year throughout the rest of the market over the same 10-year period.² These savings primarily arise due to the reduction in clearing price that results from shifting the demand curve on the near-vertical portion of ISO-NE's supply curve in the capacity market. But with storage projects facing uncertainty over wholesale revenue, state programs will be necessary to provide the necessary funding for storage projects to reflect these real savings provided to the State's distribution ratepayers.

Even for storage resources that do participate directly in ISO-NE, there are wholesale market rules that jeopardize the ability to participate in retail and wholesale programs. For example, in ISO-NE, behind-the-meter storage participates in ISO-NE as an Active Demand Response Capacity resource. Demand response resources are subject to baselines that evaluate a customer's consumption over the last 10 days. Compensation, or penalties, are determined by the difference between a customer's baseline and the customer's consumption after being dispatched. If storage is dispatched 30-60 times per summer for "Daily Dispatch" type programs, it will erode the customer's baseline. Therefore, even if storage is dispatched in response to an ISO-NE dispatch, and responds perfectly, it would be deemed to be not performing because the baseline is so low that there is no gap between the baseline and the customer's consumption after discharging the battery. This customer could then be subject to penalties of \$5,400/MWh, creating significant risk for wholesale participation. There are straightforward fixes to this issue, but the current market rules threaten the ability to revenue stack. ESA respectfully recommends that the Authority, DEEP, and utilities in Connecticut to collaborate with storage developers and ISO-NE to resolve this issue.

Dual participation in retail and wholesale markets will optimize storage to the benefit of ratepayers and grid reliability and provide the necessary revenue streams to finance projects. Robust state retail programs and reform in wholesale market rules are necessary to achieve this dual participation. Without dual participation, the result is not only reduced efficiency since these assets are not optimized

² Synapse Energy Economics report prepared for AESC 2018 Study Group, *Avoided Energy Supply Components in New England: 2018 Report*, Table 71, October 24, 2018 (available at: <https://www.synapse-energy.com/sites/default/files/AESC-2018-17-080-Oct-ReRelease.pdf>)

for all the applications they can serve, but also reduced revenue streams that will limit the total number of energy storage assets that will be deployed.

IV. POLICY OPTIONS TO ADDRESS BARRIERS TO DEPLOYMENT OF STORAGE

- i. Develop utility programs to allow behind-the-meter storage to provide services and receive compensation for them*

ESA respectfully suggests that the Authority consider working with stakeholders to significantly expand utility programs for behind-the-meter energy storage systems to ensure those assets have an opportunity to compete for services and receive compensation for those services based on the value they provide. In addition to the nascent programs in Connecticut, there are several programs currently operating or under consideration in New Hampshire, Massachusetts, Rhode Island, Vermont, New York and Maryland. In terms of cost effectiveness, these programs leverage a customer's private capital investment in deploying resources on their premises, and provides compensation to those customers that are aligned with the savings they are providing to the entire system, and therefore all ratepayers. These programs are not incentive programs, where grants or rebates are provided to customers deploying assets. Rather, these programs are compensating customers for services provided to the system.

One such program is the "Bring Your Own Device" program currently available for Green Mountain Power in Vermont, Liberty's customers New Hampshire, and has been proposed by Eversource Energy for its New Hampshire customers. Under such a program, customers are able to provide traditional grid services and peak demand reduction benefits to the utility and are compensated for the value they provide through an on-bill credit. The savings provided by customer-sited storage comes through the deferment of traditional distribution investment that would have otherwise been needed. The savings are realized to customers in several ways. Although not a formal definition, these BYOD programs are typically associated with mass market customers.

The Authority could also consider significantly expanding the Daily Dispatch program currently offered by Eversource in Connecticut. While we applaud Eversource for developing this program and the

Authority for approving it, at 1-2 MW of program size, it will not stimulate a meaningful storage market or generate meaningful ratepayer benefits. A “Targeted Dispatch” program³ and Daily Dispatch are offered at a larger scale by National Grid and Eversource Energy in Massachusetts. These programs recognize that shifting energy from periods of low demand on the system to periods of high stress to the system provides net benefits to customers, even if there is a slight increase in energy usage. “Daily Dispatch” programs compensate storage resources based on performance during peak period dispatches upwards of \$200/kw-yr. Importantly, the program is available to customers for a five-year term, which provides certainty of incoming revenue streams that is critical for the financing of projects. ESA recognizes that scaling the program in order to drive meaningful deployment and savings for ratepayers could require considering a separate program from a separate funding source. ESA welcomes the opportunity to work with other stakeholders in further developing what this program redesign might look like and provide recommendations for funding streams.

ii. *Encouraging non-wires alternatives solutions should include new rules to memorialize best practices for competitive procurement*

Given the immense potential for employing non-wires solutions and leveraging customer purchased resources to defer or replace the need for traditional investment in the distribution system, ESA respectfully recommends that the Authority require that utility distribution investment plans give strong consideration to non-wires solutions and consider the feasibility and cost-effectiveness of non-wires solutions before the utility proposes a major distribution system investment. When doing cost-effectiveness, ESA asserts that the benefits should not be limited to deferred or avoided distribution costs,

³ Targeted Dispatch programs are dispatched for 3-8 events per summer for three hours each with compensation of \$100/kW-yr, subject to performance. Daily Dispatch programs are dispatched for 30-60 events per summer for three hours each with compensation of \$200/kw-yr, subject to performance. More info can be found in the Mass Save Report, *Active Demand Reduction: Demonstration & Initiative Update*, March 20, 2019. Page 25, available at: http://ma-eeac.org/wordpress/wp-content/uploads/March-Demand-Presentations_EEAC_3-8-19_Final_corrected.pdf.

but also avoided wholesale costs and any other benefits that are included in the Authority's preferred BCA framework. A non-wires solution can also be dispatched to avoid wholesale costs.

This year the Connecticut General Assembly enacted legislation that authorizes electric distribution utilities to own and rate-base wholesale storage generation assets.⁴ This change is one step towards providing the necessary regulatory clarity regarding ownership to ensure that Connecticut's ratepayers begin to benefit from the savings energy storage can provide. However, enabling utility ownership of energy storage should be married with a competitive framework to ensure that there is a robust market of project developers providing a variety of offerings to customers. This can be done through several important steps. First, ESA respectfully recommends that procurement rules be revised to ensure that utilities abide by best practices, including Requests for Proposals for both the Engineering, Procurement and Construction ("EPC") but also comparable third-party owned projects. By setting these requirements, the Authority can ensure that when it is authorizing a utility-owned energy storage system to serve as a distribution grid asset, that the costs borne by ratepayers is the lowest. Lastly, in order to encourage utilities to partner with third parties, ESA would support utilities receiving incentives for meeting certain pre-defined milestones, such as a certain MW level of participation in a behind-the-meter program as is the case in Massachusetts.

As ESA noted in our comments above, ESA recommends that a cost-benefit analysis for nonwires solutions should include more than the deferred or replacement value of the storage solution. Below, ESA proposes the following the cost-benefit assessment framework as a starting point for further stakeholder engagement in developing a cost effectiveness framework. We note that not every single commercial model would include these benefits. In those instances, the benefit value would be zero.

⁴ An Act Concerning A Green Economy and Environmental Protection 2019 (HB 5002), available at: https://www.cga.ct.gov/asp/cgabillstatus/cgabillstatus.asp?selBillType=Bill&bill_num=HB-5002.

Cost-Benefit Analysis Framework

1. Energy storage system costs (including O&M)
2. Deferral or avoidance of traditional investment
3. Optionality of delaying investments (seeing if load materializes)
4. Distributed generation hosting capacity enhancement
5. Grid services provided
6. Peak shaving (Reduction of capacity obligation)
7. Energy conservation during times of peak demand
8. Resilience (Back-up capabilities, critical customer locations)
9. Transmission cost reductions
10. Wholesale market revenues/benefits
11. Air Emissions & Public Health Benefits
12. Reliability enhancement

iii. Bulk storage can also provide savings and benefits to the distribution system

Energy storage is well positioned to address peaking capacity needs and should at a minimum be considered. ESA respectfully recommends that the Authority explore ways to facilitate bulk system storage assets in recognition of the benefit those assets will provide to Connecticut's electricity grid and would be interested in supporting that effort. Energy storage on the bulk system can provide several benefits to all Connecticut ratepayers. First, as noted in our comments above, energy storage is a critical tool for integrating greater penetration of renewable energy resources, which are expected to come online given the State's ambitious policy objectives. Second, energy storage can reduce the State's peak demand by shifting resources from times of low demand and low costs to times of high demand and high costs.

Given the growing interest in state capitals in the Clean Peak Standard recently implemented in the Commonwealth of Massachusetts, the Authority could benefit from soliciting consultants to support a quantitative assessment of the potential values bulk energy storage assets could provide to Connecticut ratepayers, particularly reduction of capacity obligation at the wholesale market due to a reduction in peak demand.

V. CONCLUSION

ESA appreciates the opportunity to provide these initial comments and recommendations to support the Authority's investigation into the barriers to, and improve the integration of, distributed energy resources such energy storage. ESA commends the Authority for laying out a clear and thoughtful framework by which it will develop and adopt potential programs and rate design reforms in its October 2, 2019 Interim Decision.⁵ ESA looks forward to working with the Authority and other stakeholders to further develop these initial recommendations and cost-benefit framework.

Respectfully submitted on this 13th day of November, 2019.



Nitzan Goldberger
State Policy Director
Energy Storage Association

⁵ Public Utilities Regulatory Authority, Interim Decision Adopting a Framework for an Equitable Modern Grid (Framework), October 2, 2019, available at: [http://www.dpuc.state.ct.us/dockcurr.nsf/8e6fc37a54110e3e852576190052b64d/98b91b64d734d3368525848700598fe1/\\$FILE/171203-100219%20InterimDecision.pdf](http://www.dpuc.state.ct.us/dockcurr.nsf/8e6fc37a54110e3e852576190052b64d/98b91b64d734d3368525848700598fe1/$FILE/171203-100219%20InterimDecision.pdf).