



February 7, 2024

Via e-mail: thomas.ferguson@mass.gov

Tom Ferguson, Energy Storage Programs Manager
Massachusetts Department of Energy Resources
100 Cambridge Street, 9th Floor
Boston, MA 02114

RE: Comments of NECEC on the Charging Forward Report on Energy Storage

Dear Mr. Ferguson,

On behalf of the Northeast Clean Energy Council (“NECEC” or “The Council”) and the Solar Energy Industries Association (“SEIA”), thank you for the opportunity to provide feedback on the on *Charging Forward: Energy Storage in a Net Zero Commonwealth*, the report jointly prepared by the Massachusetts Clean Energy Center (“MassCEC”) and the Massachusetts Department of Energy Resources (“DOER”) and published in December 2023.

NECEC leads the just, equitable, and rapid transition to a clean energy future and a diverse climate economy. NECEC is the only organization in the Northeast that covers all of the clean energy market segments, representing the business perspectives of investors and clean energy companies across every stage of development. NECEC members span the broad spectrum of the clean energy industry, including clean transportation, energy efficiency, wind, solar, energy storage, microgrids, fuel cells, and advanced and “smart” technologies.

The Council is dedicated to growing the clean energy economy in Massachusetts and across the region, in pursuit of our mission to create a world-class and equitable clean energy hub in the Northeast. The Council’s 250+ members include companies based in Massachusetts and those from elsewhere who do business here or hope to make future investments in the state.

The Solar Energy Industries Association (SEIA) is the national trade association for the United States solar and storage industries. SEIA works with its more than 1,000 member companies and other strategic partners to fight for policies that create jobs in every community and shape fair market rules that promote competition and the growth of reliable, low-cost solar power. There are 502 solar companies located in Massachusetts along with national firms also conducting business in the Commonwealth.

The Report's findings are significant, yet more work is needed

We begin by commending the Commonwealth for its thorough investigation in this long-anticipated report. Our members were pleased to read many positive findings and statements in the Report. A few positive examples:

- The deployment and use of energy storage systems is a critical and cost-effective strategy for the Commonwealth to support in reliably meeting its climate mandates under the 2050 CECP.
- In addition to providing grid services, energy storage can promote the integration of off-shore wind “OSW” and other renewable resources.
- Energy storage supports regional reliability, especially as deployment of renewable resources increases. Long-duration energy storage is expected to provide nearly a 1:1 replacement of fossil peaker plants by 2030, offering both grid support and emission reductions in communities where these facilities are located.
- For the standalone cases, wholesale market revenues are not enough to incent deployment, making new programs as well as revenues from Clean Peak Energy Credits (“CPECs”) from the Clean Peak Energy Standard (“CPS”) critical. However, these programs need to be revised, with stakeholders citing long-term revenue uncertainty in the CPS and price fluctuations in the CPEC, driving up the cost of project financing and challenging deployment.
- Queues in both ISO-NE and in EDC territories can be many years long.

While the above statements/findings are accurate, the Report does not seem to entirely align with or accurately reflect the study findings, and the Report's final recommendations don't fully capture all the value energy storage can provide. In order to satisfy our climate mandates, NECEC and SEIA urge the Department to be bolder in scale, scope, and timing. The industry needs storage mandates and procurement schedules to have confidence in the market and continue development. *We note that:*

- Connecting storage targets to renewable deployment could risk undervaluing the benefits that energy storage provides to the grid even in the absence of renewables, such as distribution/transmission investment deferral, peak shaving and peak shifting.
- We are not aware of any other state that ties storage targets to renewable deployment.
- The target outlined in the report would equate to 3 GW of storage by 2030. It's worth noting that there are 10 GW of storage in queue in Massachusetts alone, today.
- For reference, New York's goal is 6 GW by 2030; Connecticut's goal is 1 GW by 2030; Maryland's goal is 3 GW by 2032 and New Jersey's goal is 2 GW by 2030.
- \$50 million in funding spread across four programs will go quickly. We encourage DOER to seek to replenish the funding with future ACP receipts.
- If the Commonwealth wants more storage online by 2030 we need to start now, because development timelines can depend on lengthy permitting and interconnection processes.

Medium and Long-Duration Storage

DOER recognizes the value in procuring Medium-Duration Energy Storage (“MDES”) and Long-Duration Energy Storage (“LDES”) technologies; however, they state that the need is not immediate. Therefore, DOER recommends reserving its procurement authority. This fails to recognize that it takes ~7 years to develop projects and that there is significant value in starting now to develop those markets.

The study found significant value in MDES & LDES, but again, that did not all translate into the report. The near-term value of multi-hour or multi-day storage is not adequately depicted in the Report. For example, the study found that “LDES technologies can provide a zero-carbon alternative to significant quantities of dispatchable generation, which are otherwise needed to support system resource adequacy in futures with high levels of renewable energy.”

But it also found that these resources can provide nearly a 1:1 replacement value for up to 10 GW of fossil peaker capacity by 2030. (See *Charging Forward Study* at page 121). This suggests a near-term need to deploy these resources in order to reliably reduce emissions, especially in overburdened communities where peaker plants currently operate and are likely to be sited in the future.

Furthermore, the study did not capture the benefits of MDES & LDES resources on winter reliability needs—a use case that shows tremendous value in the near term for New England.¹ Finally, the way the study modeled LDES (by forcing it into pre-existing portfolios rather than through capacity expansion modeling) fails to capture the optimization value these resources can provide through reduction in overall portfolio buildout. Other studies have shown tremendous cost and land use savings² from deployment of a diverse mix of storage resources that are not fully captured in the *Charging Forward Study*.

We expect there to be attrition in MDES (4+ hours) storage development and continued barriers to commercialization of LDES unless a firm mandate and procurement schedule is finalized. DOER should include a recommendation that a firm mandate and procurement schedule for MDES and LDES be created.

Storage incentives are ripe for review

The complexity of the Commonwealth’s energy storage programs and the variable revenue streams make it extremely difficult and inefficient for developers to finance battery systems. Lenders either discount or do not consider the value of variable revenue streams when offering financing. Therefore developers need a higher return to attract investment and offset the risk that investors perceive. In order to optimize the available capacity of ESS, developers need ESS compensation to be more stable to allow lenders to underwrite these investments.

¹ See Form Energy, September 2023: [Clean, Reliable, Affordable: The Value of Multi-Day Storage in New England](#) at 14-18.

² See *id.* at 7-13.

As referenced in the table below, only one of the four existing revenue streams for ESS, the SMART storage adder, is established enough and is considered financeable by commercial lenders. Furthermore, the compensation structure should be more comprehensive and consider how to incentivize market actors to develop ESS projects most efficiently. The incentive structure should reinforce a recommendation to improve coordinated planning between developers and utilities, as made in the *Charging Forward* report to:

A coordinated planning process that, based on state deployment goals, asks EDCs to identify the most valuable sites for energy storage could reduce interconnection timelines, reduce project uncertainty, and ensure value to the state and ratepayers from the storage capacity being installed.

We encourage DOER to review compensation levels every-other year. The last time this was completed was in 2016. While more frequent refreshes are necessary, care should be taken to not jeopardize the viability of already financed projects. DOER should ensure that program changes do not harm projects that are already financed but not yet under development. DOER should also establish a clear and transparent methodology for revising compensation values and give stakeholders an opportunity to review and comment on the proposed methodology.

Program-Specific Feedback

Charging Forward correctly identifies the challenges of operating a battery in multiple programs with overlapping charge/discharge windows. The complexity and overlapping nature of energy storage programs also makes estimating the economics of commercial and industrial (“C&I”) battery systems a major challenge. Market-leading modeling tools such as Xendee and HOMER have no way of representing the total performance of the system. Battery demand response (“DR”) providers such as CPower, EnelX and STEM have acknowledged the challenge of estimating the value stack, and these market leaders all heavily rely on customized spreadsheet analysis that can add hours of work and revenue uncertainty to propose a storage project.

The use of commercial and industrial (“C&I”)-scale batteries for providing backup power has been very limited. Although *Charging Forward* does not provide any data, we find that less than 10% of battery capacity registered in the Clean Peak Standard program receives the Resilience Multiplier (source: Clean Peak Standard Qualified Units List, published 1/2024). A higher Resilience multiplier (e.g., 3X versus 1.5X) could be a simpler way to incentivize batteries of this size rather than tinkering with the SMART Storage Adder or adding a complex new grant program.

The Clean Peak Standard Qualified Units List also points to a hole in the market for batteries under 1 MW, with only 6 battery systems on CPS List with nameplate power output less than 1 MW. There is a very large amount of 4 hour FTM storage with ISA's and late term studies specifically designed for the Clean Peak Incentive (a portion of the pipeline cited in the report). The incentive needs to be improved or bolstered with an additional incentive to maintain financing that would allow those to come online and operate as intended.

Storage Program Review by SEIA & NECEC:

Program	Financeable?*	Challenges	Recommendations
SMART Storage Adder	Yes	<ul style="list-style-type: none"> • One-size-fits all approach • Does not compensate for added cost of Resiliency 	<ul style="list-style-type: none"> • Storage adder multiplier for smaller batteries that don't enjoy the same economies of scale that larger batteries do • Create a Resilience adder
Connected Solutions	Challenging to finance	<ul style="list-style-type: none"> • 5-year term is shaky • EDCs change program without open proceeding 	<ul style="list-style-type: none"> • Encourage a fixed incentive value and set a 10-year term • Raise the Incentive Cap for C&I batteries to a level that supports at least 18 hours of resilience for the host customer.
Clean Peak	Challenging to finance	<ul style="list-style-type: none"> • Variable CPEC price presents financing challenges, especially with no floor price • Not based on power, just energy injection • Rigid windows are not tied to market prices 	<ul style="list-style-type: none"> • Set a floor price for a 10 year term • Implement CPEC procurement
ISO-NE Demand Response	No	<ul style="list-style-type: none"> • FCA price is only known for 3 years • Capacity buyout creates barrier • Customers with AOBCs not eligible 	Increase SMART incentive to compensate for capacity value

ConnectedSolutions is falling far short of potential

The State of Charge report issued by the Commonwealth in 2016 recommended 106 MW of Behind the Meter C&I energy storage by 2020, representing 6% of the overall goal of 1,766 MW. As of the summer 2022 Demand Response season, *Charging Forward* reports 35 C&I storage systems totaling 11.1 MW were enrolled statewide in the ConnectedSolutions program. In December 2023, Mass Save reported C&I enrollments of 42 C&I storage systems totaling 18.3 MW. We find ConnectedSolutions to be a strong representation of the overall size of the BTM C&I energy storage in Massachusetts.

We estimate that C&I Energy Storage has reached only 17% of the 2020 goal set in the State of Charge Report. Raising the Incentive Cap for C&I batteries and fixing the incentive rate for 10 years would help the Commonwealth to meet the goals set by the 2016 State of Charge report. We urge DOER to recommend concrete programmatic support for the C&I sector to provide additional, certain revenue streams to C&I installers.

The Report does not value the potential of V2X

The *Charging Forward* report does not reference vehicle-to-everything (V2X) technology as a source of grid storage for Massachusetts. However, the E3 *Charging Forward* study evaluates the V2X opportunity and concludes:

“Investment in DERMS and Vehicle-to-Everything (V2X) technologies will also enable flexible load and electric vehicle batteries to provide many of the services of standalone energy storage. Leveraging these sunk-cost resources will be a valuable strategy in right-sizing the Commonwealth’s energy storage buildout and reducing ratepayer costs.”³

V2X is complementary to stationary storage and offers several advantages. V2X will be highly distributed and can be deployed quickly and at scale while offering cost advantages relative to stationary storage. Furthermore, V2X can serve as a hedge against the possibility that the pace and scale of stationary storage due to supply chain and other deployment delays does not keep pace with the Commonwealth’s grid storage needs. In fact, the DOER *Charging Forward* report recognizes this risks stating:

“Lithium-ion is the dominant technology in recent energy storage deployments across the country and in the Commonwealth. Because of this dominance, supply chain issues and constituent raw material costs will impact project deployment timelines and capital costs. Diversifying energy storage technologies may mitigate these challenges.”⁴

Policy support for V2X should be considered as a key strategy to diversify energy storage technologies to mitigate potential delays in stationary storage deployments.

³ See E3, December 2023, *Charging Forward: Energy Storage in a Net Zero Commonwealth* Study Prepared for MassCEC and DOER page 25 available at

<https://www.masscec.com/sites/default/files/documents/Charging%20Forward%20%282023%29.pdf>.

⁴ See DOER, December 31, 2023, *Charging Forward: Energy Storage in a Net Zero Commonwealth Report* page 10 available at

<https://www.mass.gov/doc/charging-forward-energy-storage-in-a-net-zero-commonwealth-report/download>.

Massachusetts has already demonstrated the value of bidirectional charging and V2X with several projects participating in the electric distribution companies' ("EDCs") ConnectedSolutions programs, which are part of their 3-year energy efficiency plans. Highland Electric Fleet's Beverly Public School fleet electrification project demonstrates the viability of electric school buses as bidirectional V2G resources, receiving revenue via National Grid's ConnectedSolutions program⁵ and providing a template to scale the service at additional deployment sites.

BlueHub Capital and Fermata Energy recently launched the first V2G pilot program in the nation for a multi-family affordable housing building in Dorchester, MA. The pilot is designed to increase affordable access to EVs for low-income drivers through an innovative V2G car share program that is partially financed by earning Eversource ConnectedSolutions revenue.⁶ Fermata Energy also worked with FirstLight Power and Skyview Ventures to deploy the first ever V2G bidirectional charging stations in Western Massachusetts.⁷

EV owners can get paid by selling electricity back to the grid, significantly cutting the cost of vehicle ownership. Offsetting the cost of owning and maintaining an EV through the revenue earned from bidirectional charging can accelerate EV adoption. The BlueHub Capital and Fermata Energy pilot referenced above uses the revenue from Eversource's ConnectedSolutions program to reduce the monthly EV lease payment for a low-income household. Bidirectional charging and V2G can provide equitable EV access to low-income households using this innovative approach, a segment that has not seen significant EV adoption given the cost barrier.

NECEC and SEIA recommend that the DOER include a section in the final *Charging Forward* report that references the potential of V2X as a valuable source of grid-scale storage. Furthermore, the DOER should consider creating an additional program for V2X as part of the \$50 million dollar funding proposal. A \$/kW incentive for bidirectional charging infrastructure should be provided along with specific performance requirements.

Front-of-the-Meter Storage

Front-of-the-meter ("FTM") energy storage is a critical segment of the industry necessary to meet the stated energy storage targets and contribute to meeting the state's climate mandates. NECEC and SEIA appreciate the Department's intent to use \$50 million in ACP funding to support the deployment of transmission- and distribution-connected FTM energy storage

⁵ See CISION PR Newswire, Highland Electric Fleets Coordinates Electric School Buses' Summer Job - Supporting Local Grid with Vehicle-to-Grid Technology available at <https://www.prnewswire.com/news-releases/highland-electric-fleets-coordinates-electric-school-buses-summer-job-supporting-local-grid-with-vehicle-to-grid-technology-301611928.html>.

⁶ See Enterprise Mobility, First-in-Nation Pilot to Provide Low-Income Driver with Affordable Access to EV Launched in Boston by BlueHub Energy, Fermata Energy, Enterprise Holdings & Codman Square Neighborhood Development Corp. available at <https://www.enterprisemobility.com/news-stories/news-stories-archive/2023/09/pilot-for-affordable-access-to-evs-launched-in-boston.html>.

⁷ See businesswire, FirstLight Power, Fermata Energy, and Skyview Ventures Partner to Launch First Ever Vehicle-to-Grid Charging Platform in Western Massachusetts available at <https://www.businesswire.com/news/home/20220908005343/en/>.

projects in the late-stages of planning. This funding will help close the gap needed to secure financing and help to kickstart the market in Massachusetts.

Distribution-connected FTM storage

The Report recognizes the unique potential of distribution-connected FTM storage to contribute to several state policy goals: distribution system cost improvements, renewable energy integration, reliability, etc. The Distribution Circuit Multiplier (“DCM”) is intended to compensate these resources for some piece of the value they provide to the grid, however the DCM will result in limited deployment of storage for that purpose.

In fact, the Clean Peak Standard may not be the appropriate vehicle for distributed FTM storage compensation and we encourage the Department to consider whether additional statutory authority is necessary. For instance, a SMART-style program could provide a more financeable revenue stream, and could incentivize deployment to not only provide clean peak value, but to provide other ratepayer and public policy benefits.

One of the most significant barriers to this segment is rate design that reflects the value of storage and its actual charging behavior. Currently, large demand charges for even non-coincident peak charging and other components of retail rates that impose costs not attributable to storage significantly impact project economics. DOER should recommend that DPU take a firm, proactive approach to fair rate design for FTM distribution connected storage.

Transmission-connected FTM storage

Transmission-connected FTM storage can provide large steps towards the state’s goals in fewer projects, but these projects take a long time to develop and progress through the approval process. The CPS may provide substantial value to these projects to support development, but the CPS revenue cannot be relied upon and financing is challenging.

To overcome this hurdle and give developers confidence that they have reliable revenue streams when their projects are completed, NECEC and SEIA recommend that the Department implement procurements for attributes from transmission storage resources. In the near term, this can take the form of a procurement of CPECs, as envisioned early in the program development. In the longer term, this could be for Clean Peak services or other services that the Department deems necessary, though this would require additional statutory authority.

Interconnection Concerns

The storage industry is deeply concerned about the current policies and approach of the EDCs towards energy storage interconnection. Without significant changes, energy storage interconnection will remain in limbo for many years to come. There are several critical roadblocks that hinder the integration of energy storage projects in Massachusetts. Interconnection is perhaps the most significant. In recent years, the cost of interconnection upgrades borne by developers have risen rapidly and the industry is reaching a point where developing an energy storage project is financially feasible, but the cost of interconnecting the project to the utility’s distribution system is not financially feasible.

Over the past 4 years, interconnection costs have risen by as much as 800% and the timeline to complete the utility's studies has increased from 3 months to at least 18 months. We urge DOER to take a strong role in helping to address these interconnection challenges, by actively participating in the Interconnection Implementation Review Group ("IRRG"), Energy Storage Interconnection Review Group ("ESIRG") and generally continuing to engage with the EDCs, industry and other stakeholders through the Electric Sector Modernization Plans and other proceedings.

In summary:

- DOER plays a central role in the development of policies and programs to deliver on the Commonwealth's ambitious goals. The storage industry urges the Department to take a stronger leadership position, and work to deliver timely and predictable guidelines to ensure the industry can succeed.
- There is a disconnect between the value of storage found in the *Charging Forward Study* and the lack of near-term recommendations and programs in the Report. The state and region can't wait for these resources to materialize on their own—state policy support is needed to ensure they are deployed and available when needed.
- The Report acknowledges issues with the Clean Peak Standard not providing long-term revenue streams, but more action is needed.
- As the *Charging Forward Study* noted: "investment in long-duration energy storage at reasonable cost is a no-regrets action for the Commonwealth."
- A standalone bulk storage program with proposals by April 1 was seen as ambitious, but we see this as a laudable ambition.
- More clarity and definition is needed around terms like "bulk storage" and timelines
- Distribution-connected storage and its benefits were not adequately covered in the Report
- Interconnection remains a challenge; we urge DOER to stay engaged with ESIRG/IIIRG
- Industry has concerns about the delayed procurement timelines not meeting state goals

The development of energy storage of various sizes and configurations is a vital link in the Commonwealth's vision for a net zero future. We thank you and your team for the hard work and efforts to gather stakeholder input throughout this process, and we hope that our concerns will be meaningfully addressed as DOER moves forward. Please do not hesitate to contact us if you have any questions or would like to meet once more with storage industry stakeholders.

Sincerely,

/s/ Natalie Hildt Treat
Director of Public Policy
Northeast Clean Energy Council
ntreat@necec.org

/s/ Valessa Souter-Kline
Northeast Regional Director
Solar Energy Industries Association
vsouterkline@seia.org

CC: Senator Michael Barrett & Representative Jeffrey Roy, Co-chairs of the Joint Committee on Telecommunications, Utilities and Energy