



By email to Thomas.Ferguson@mass.gov

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100 Cambridge Street, 9th Floor
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Subject: Comments on the Advancing Massachusetts Power (AMP) Energy Storage Grant Program Straw Proposal

Dear Dr. Ferguson

Form Energy appreciates the opportunity to submit comments on the Advancing Massachusetts Power (AMP) Energy Storage Grant Program Straw Proposal. Form supports this effort to facilitate the development and deployment of innovative energy storage technologies to realize the benefits of energy storage for the Commonwealth. We offer these recommendations, which focus on the Long Duration Energy Storage Commercialization Subprogram.

Form Energy is a Massachusetts-based technology innovation company that is commercializing a rechargeable, iron-air battery capable of continuously discharging electricity for 100 hours at rated capacity. Form's multi-day battery will enable a clean electric grid that is reliable and cost-effective year-round, even in the face of multi-day weather events and energy shortages. With more than 900 employees nationwide, Form Energy's first commercial battery manufacturing facility in Weirton, WV, which came online last year, is producing grid-scale multi-day battery systems for delivery to utility customers later this year.

Form Energy refers to its battery system as a "multi-day storage" (MDS) system because of its ability to discharge energy for days at a time before needing to be recharged. Multi-day storage includes chemical battery technologies, and other technologies like green hydrogen, mechanical storage systems, and thermal storage.

Multi-day energy storage can help ensure reliability during the transition to a carbon-free electric grid, can support the grid for critical reliability events, such as winter storms or lulls in renewable energy output, can absorb surplus renewable energy—shifting it over several days, weeks, or months, and can help increase the utilization of renewable energy resources like solar and wind. Multi-day storage also helps reduce system portfolio costs by reducing the need to build new resources, which also reduces the amount of land needed for the build out of new clean resources.

Introduction: The Importance of Long-Duration Energy Storage for Massachusetts

The Massachusetts Department of Energy Resources (DOER) Advancing Massachusetts Power (AMP) grant program is a critical initiative for accelerating the equitable deployment of energy storage systems (ESS) to meet the Commonwealth's clean energy goals. Long-duration energy storage (LDES), defined as an ESS with a duration of 10 or more hours, plays a distinct and vital role in a clean, affordable, and reliable energy future for Massachusetts. While shorter-duration batteries are important for managing daily energy fluctuations, LDES technologies provide a different, but equally crucial, grid service: maintaining reliability during prolonged periods of grid stress. This includes periods of extreme weather, which can cause extended power outages. Therefore, a program that supports the commercialization of LDES technologies is essential for the Commonwealth.

Feedback on the LDES Commercialization Subprogram

1. Flexibility of Grant Levels

The straw proposal for the LDES Commercialization subprogram suggests a maximum grant level of \$5 million per project, with an estimated number of 3-5 projects. While this is a good starting point, we recommend that the DOER consider providing flexibility for larger grant amounts on a case-by-case basis.

- The capital and soft costs associated with the deployment of novel LDES technologies can be significant. A fixed grant cap of \$5 million may be insufficient to support a project of the scale necessary to meaningfully advance commercialization and de-risk the technology.
- Larger, more impactful projects that have the potential to deliver greater benefits to the grid and local communities, such as integrating large-scale renewables like offshore wind or displacing fossil fuel peaker plants or supporting increased community resilience, may require funding exceeding this cap. Allowing for larger grant sizes would ensure that the most promising and transformative LDES projects can be realized under this program.

2. Removal of the Minimum Round-Trip Efficiency (RTE) Requirement

The straw proposal for the LDES Commercialization subprogram proposes including a minimum RTE requirement of 50% for project eligibility. We strongly recommend that this requirement be removed. Judging a technology or project solely on RTE is not appropriate for a program designed to support the commercialization of innovative new technologies, which provide a different service than short-duration storage. The most important metrics for LDES, which are first and foremost reliability assets, are duration and availability.

- **RTE vs. Duration and Availability:** For a reliability asset designed to deliver power during extended periods of grid stress, RTE is not a primary indicator of its value or cost-effectiveness. Instead, the key performance metrics are duration and availability.
 - *Availability* is crucial for a reliability asset. It is a function of the system being charged and ready to go when a prolonged grid stress event occurs. It is not directly impacted by RTE.

- *Duration* means how long the resource is available without needing to be recharged or refueled. Longer durations mean greater availability. Duration is not impacted by RTE.
- **Fully capturing surplus clean energy and reducing curtailment:** A high-RTE, short-duration battery may be unable to charge continuously during an oversupply event, leading to potentially more clean energy lost to curtailment than if lower-RTE, longer-duration batteries were also available to charge from this oversupply. In fact, inclusion of multi-day storage in the resource mix could reduce curtailment of clean energy resources by nearly 60% by 2050.¹
- **Peaker Replacement:** Most fossil peaking resources in New England run for many hours or even days at a time during grid stress events, so resources with longer durations are needed to meet the same needs. LDES and MDS technologies are designed to deliver reliable power throughout extended periods of grid stress without needing to be recharged. This capability is what makes them a distinct and valuable asset, similar to a natural gas combustion turbine (CT). CTs are extremely valuable to the system even though they have very low efficiency ratings.
- **Additional benefits:** Even with lower RTEs, LDES and MDS resources provide additional benefits beyond reliability, including renewable energy integration and firming, no risk of becoming stranded assets, broad stakeholder support, decorrelation with volatile commodity markets, and more reliability in extreme weather.

For these reasons, the minimum RTE requirement should not be the measure of a project's value and may in fact be a barrier to entry for innovative LDES and MDS technologies that provide a critical reliability service to the grid and help Massachusetts meet its clean energy and community benefits goals. Therefore, it should be removed from the LDES Commercialization subprogram as a criterion for eligibility..

Thank you for the opportunity to provide these comments. We look forward to working with DOER on supporting innovation in and deployment of home-grown energy storage systems in Massachusetts. Please feel free to reach out to me with any questions or follow up requests.

Sincerely,

Sarah Jackson
Senior Policy Manager
Form Energy

¹ Wilson et al., 2023.

<https://formenergy.com/insights/the-value-of-multi-day-energy-storage-in-new-england/>