

Feedback Form

Long-Term 2 (LT2) RFP – February 15, 2024

Feedback Provided by:

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To promote transparency, feedback submitted will be posted on the Long-Term RFP engagement page unless otherwise requested by the sender. If you wish to provide confidential feedback, please mark "Confidential".

Following the LT2 RFP February 1, 2024, engagement webinar, the Independent Electricity System Operator (IESO) is seeking feedback from stakeholders on specific items discussed during the webinar. The webinar presentation and recording can be accessed from the [engagement web page](#).

Please submit feedback to engagement@ieso.ca by February 15, 2024.

Revenue Model

Topic	Feedback
<p>Do you have any additional comments regarding the revenue model, particularly with regards to the following: Deeming energy market revenues based on real-time locational marginal prices (LMP), as opposed to the IESO's recommendation of basing this on the day-ahead LMP. (Slides 19-21)</p> <ul style="list-style-type: none">• The optionality of using either a simple average day-ahead price or weighted average LMP, with the latter including hours where the resource was scheduled day-ahead in a given month. (Slides 22-23)• Including monthly production factors that on average equate to the annual production factor, in order to further account for seasonality. (Slides 24-26)	

DERs

Topic	Feedback
<p>Do you have any comments regarding eligibility requirements for DERs or other general comments?</p>	

Capacity Resources

Topic	Feedback
Do you have any comments regarding considerations for acquiring additional capacity resources, and utilizing a multi-stream approach (energy and capacity streams)?	As noted in more detail below, Form Energy is commercializing and manufacturing a new class of multi-day battery energy storage: an iron-air battery capable of discharging at rated capacity for 100-hours. Long-duration energy storage and multi-day energy storage are resources that provide firm capacity: guaranteed high availability energy at times when grid stress is highest. It is therefore important for both the capacity and energy value of long-duration energy storage resources to be considered together. Additionally, one of the principal benefits of long-duration energy storage is that it lowers overall needs for new generating capacity and lowers overall portfolio costs associated with meeting grid reliability and decarbonization requirements. This benefit is achieved by improving the overall utilization of renewable energy resources and transmission lines. This benefit should also be considered when evaluating the procurement of long-duration energy storage resources.

LT2 Deliverability

Topic	Feedback
Do you have any comments on early deliverability data and evaluation stage deliverability?	

Repowering

Topic	Feedback
Do you have any comments around repowering participation?	

Long Lead-Time Resources

Topic	Feedback
Do you have any comments on enabling long-lead time resources?	Form Energy supports the creation of a multi-streamed approach to enabling long lead-time resource and long-duration energy storage.

To ensure that diverse long-duration energy storage resources, inclusive of multi-day storage, can compete effectively and also deliver firm capacity in the years it is needed, we propose the following recommendations:

Include Long-Duration Storage as a Distinct Category, and Evaluate Long-Duration Storage by Distinct Duration Categories

- Energy storage is a diverse resource, and it is composed of three separate resource classes: short duration storage, long-duration storage, and multi-day storage. We recommend that short duration storage be defined as storage having <10 hr duration, and that long-duration be defined as 10-hr duration and longer, inclusive of multi-day storage, defined as 24-hr duration and longer. These definitions align with a recent law adopted in the U.S. state of Michigan, [Senate Bill 71](#) (2024) and generally align with a report from the U.S. Department of Energy, *Pathways to Commercial Liftoff: Long Duration Energy Storage*, which distinguishes between "inter-day" long-duration storage and "multi-day" long-duration storage.
- Each of these separate energy storage classes has different cost, efficiency, and duration attributes and they each specialize in different grid services that together will enable a reliable, affordable, clean energy grid.
- Notably, long-duration and multi-day energy storage resources provide stored energy on a far lower \$/MWh capex basis than short-duration storage and their primary value is to provide both capacity and energy to support grid reliability and lower overall portfolio costs over diverse weather conditions.
- Studies of long-duration storage and other firm zero carbon resources show that they enable multiple system benefits, including: lower system costs by lowering overall resource needs, more rapid GHG reductions; improved grid reliability and resilience, including during extreme weather; higher overall utilization of renewable energy and transmission system assets; and non-energy

benefits like avoided land-use, improved safety, and more diverse supply chains.

- Given the differences among energy storage resource classes and relative to other long-lead time resources, we recommend that the IESO either create separate resource categories for long-duration and multi-day storage apart from other long lead-time resources, or separately evaluate these resources as distinct resource classes.
- These separate and complementary procurement and evaluation processes will allow for competition within each energy storage resource class, while ensuring that each class develops at sufficient scale to serve future IESO resource needs for long-duration energy storage beyond 2034 that are likely to be significant.
- In designing an RFP and contracts for long-duration storage, we recommend that contracts provide for a flexible commercial online date (COD) that could allow resources to come online sooner than 2030. At present, IESO specifies that LT2 resources should have a target 2030 COD with long-lead time resources having flexibility until 2034. We support this flexibility; however, we also recommend that IESO extend this flexibility to clarify that LT2 resources, including long-duration storage, are allowed to come online much earlier (as soon as 2027 or 2028) or in phases, to meet forecast risk of unserved energy that begins in 2028.

General Comments/Feedback

About Form Energy

Form Energy is a U.S. based energy storage technology and manufacturing company that is commercializing a new class of multi-day energy storage systems that will enable a clean electric grid that is reliable and cost-effective year-round. Our first commercial product is a rechargeable iron-air battery capable of continuously discharging electricity at rated capacity for 100 hours at a total installed cost per unit of energy that is less than 1/10th of today's lithium-ion battery technology. Form's battery can achieve these low costs by using iron, one of the most abundant and cheapest minerals. Our iron-air battery is modular, safe, and can be sited anywhere on the grid.

Form Energy has more than 5 GWh of announced projects across the U.S. coming online as soon as 2026 and we are in discussions with project developers in Ontario. Form's first project will be a 1.5 MW, 150 MWh pilot project with utility Great River Energy in Minnesota. This pilot project will demonstrate the repeatable, scalable building block of our system, and how it can provide firm energy delivery to address grid reliability needs. We expect this project to go online in 2025, immediately followed by larger systems with partners across the U.S. Other announced projects include:

- Two projects with Xcel Energy, including a 10 MW/1,000 MWh system at the Sherburne County Generating Station in Becker, Minnesota, and a 10 MW/1,000 MWh system at the Comanche Generating Station in Pueblo, Colorado – both expected to come online as early as 2025;
- A 5 MW / 500 MWh project at Pacific Gas & Electric's Mendocino Substation in California, expected to come online as early as 2025;
- A 15 MW/1,500 MWh project with Georgia Power to come online as early as 2026;
- A 5 MW/500 MWh project with Dominion Energy in Virginia, to come online as early as 2026;
- A 10 MW/1,000 MWh project in New York, supported by a \$12M grant from NYSERDA, which will come online as early as 2025.

We plan to broaden deployments to 100 MW scale projects in 2026 and beyond, with multiple gigawatts (GW) deployed before 2030. With over 700 employees, Form Energy is constructing its first commercial manufacturing facility in Weirton, WV, in the U.S., which will begin operations mid-to-late 2024, ultimately employing over 750 additional employees and producing 500 MW (50 GWh) of capacity per year.

The Multi-Day Energy Storage Resource Class

Multi-day energy storage is a diverse resource class of storage technologies that can discharge at rated capacity for at least 24-hours. This class includes iron-air batteries like Form Energy's, as well as hydrogen energy storage, thermal storage, compressed air energy storage, and other novel technologies. In addition to being able to provide guaranteed firm zero-emission energy capacity over consecutive days during periods of grid stress, multi-day storage can also provide other benefits and services to the grid, including: flexible, dispatchable capacity to provide hourly and sub-hourly load balancing; rapidly-deployable solutions to uneconomic grid congestion and renewable energy curtailment; resilience for critical loads; black start and other existing ancillary services; and a physical hedge to protect markets from price shocks.