# Feedback Form

## Long Lead-Time Resource Procurement – April 23, 2025

### Feedback Provided by:

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Organization: Bedrock Energy Corp

Date: May 9, 2025

To promote transparency, feedback submitted will be posted on the Long Lead-Time engagement page unless otherwise requested by the sender.

- ☐ **Yes – there is confidential information, do not post**
- ☐ **No – comfortable to publish to the IESO web page**

Following the LT2 RFP April 23, 2024, engagement webinar, the Independent Electricity System Operator (IESO) is seeking feedback from stakeholders on the items discussed. The presentation and recording can be accessed from the LLT engagement web page.

**Note:** The IESO will accept additional materials where it may be required to support your rationale provided below. When sending additional materials please indicate if they are confidential.

**Please submit feedback to** engagement@ieso.ca **by May 9, 2025.**

## Resource Eligibility: Hydroelectric Resources

Do you have any feedback regarding Hydroelectric resource eligibility?

The IESO is interested in any specific project information regarding potential hydro redevelopments, expansions and upgrades looking to participate in the procurement to help inform eligibility.

## Resource Eligibility: LDES Resources

Do you have any feedback regarding LDES resource eligibility?

The IESO is looking for feedback to consider when developing the list of LDES technologies that will be eligible to participate in the procurement.

## Term Length & Commercial Operation

Do you have any feedback regarding the proposed term length and MCOD?

## Mandatory Requirements

Do you have any feedback regarding the requirements noted?

## Rated Criteria

Do you have any feedback regarding the rated criteria noted in the presentation?

Do you have suggestions on additional criteria that should be considered as part of the LLT Resource Procurement? Please provide rationale to support any recommendations.

## Proposal and Contract Security

Do you have any feedback the IESO should consider when developing a proposal for this design item?

## Contract Design Considerations

Do you have any feedback on the contract design considerations discussed?

The IESO is looking for feedback on the LT2 draft contracts to help inform design for the LLT contract. Please highlight any areas you think should be reconsidered for LLT resources; provide as much detail and rationale as possible to help inform decision making.

## General Comments/Feedback

Please see attached a letter titled "Commentary on IESO LDES Contracting". This forms the feedback from Bedrock Energy Corp, at this time.

# Bedrock Energy Storage

# Commentary on IESO LDES Contracting

**May 9, 2025**

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*Background*

Over the past 20 years, Ontario has secured new resources for the electricity system principally using three mechanisms: competitive Requests for Proposal (RFPs) that result in long-term contracts; standard "Feed-in Tariff" long-term contracts that are made available to all new projects that meet narrowly defined and specific conditions;  and directly negotiated long-term contracts that result from Ministerial directives, which avoid public competition or standardized terms and conditions. An exceptional mechanism, applicable to the new Small Modular Reactor initiative, is to approve additions to Ontario's stock of regulated electricity generation assets, which requires promulgation of regulatory amendments by the Government of Ontario.  Each of these mechanisms has pros and cons, and each is inherently more or less favourable to different types of resources.

The IESO is now proposing to use an RFP mechanism to secure Long Duration Energy Storage resources, with a contract style similar to what has been used in the recent eLT1 and LT1 procurements (and presumably also similar to the LT2 procurement underway). For a number of reasons, described further below, we believe that neither the mechanism (a one-time RFP) nor the contract style (i.e., similar to the LT1 contract used for lithium battery facilities) is appropriate for the main technologies and opportunities that are available for long duration resources. Instead, we would recommend a combination of features that are drawn from Ontario's past experience with both tariff mechanisms and regulated electricity resources.

*Bedrock Energy Project – Development of a Natural Resource*

Bedrock Energy Corp. ('Bedrock') is a ~500 MW community-supported CAES project located near Bayfield ON. It will connect to the immediately adjacent Hydro One Networks Inc. ('HONI') 500kV grid, which is located in close proximity to geologic depleted natural gas storage rock reservoirs, 500 meters below local farms. Its 6 Billion cubic feet of 1200 psia compressed air storage cavern space will

allow it to contract and be operated very flexibly to the benefit of the IESO control center.

What is unique about this CAES project and distinct from other renewable energy projects is that these massive air containers were formed naturally underground, and geologically sealed with a tested and secure A1 anhydrite salt layer. They are 100% known and were approved by the OEB for natural gas storage, but are now ready for CAES development. They held gas at ~500 psia for 400+ million years, and are now empty of gas, ready for a nitrogen sweep and delta air pressurization.

What such air containers can do in a CAES project is remarkable. Multiple engineered vertical and horizontal wells will allow for monitored daily injections and withdrawals at whatever rates are dispatched. The project output can be maximized or idled at whatever capacity rate is desired or required. The plant can operate at a low level with 75 MW injecting into the grid for 3 days, acting as emergency local grid support, or, the generation can kick into full gear at its maximum output for 8 hours – or any other configuration of mid-output that the IESO desires.

Unlike wind, solar, and other intermittent renewable energy resources, this LDES project can provide valuable ancillary services, including Blackstart, VAR support, reactive power, or emergency back-up if required. These additional services are available to be contracted in whatever customized form of arrangement the IESO wishes to pursue, depending how the IESO would choose to have the plant deliver its services.

*Long Duration Energy Storage*

Besides Ontario's significant hydroelectric fleet, owned largely by OPG and only some of which has impoundment capability, historically, there has been little flexible power storage capacity available on the grid. Instead, Ontario relied on the flexibility of its fossil fuel-fired facilities (both coal and natural gas) to manage the daily and seasonal fluctuations of electricity demand. With the ongoing anticipated increases in intermittent renewable fleets of solar and wind power, the elimination of the coal fleet, and questions about the long-term acceptability and economics of natural gas-fired resources, there is now a growing forecasted need for enhanced, longer duration energy storage ("LDES"). While Ontario has already procured (through eLT1 and LT1) a significant quantity of shorter-duration

lithium battery storage resources, it has yet to take advantage of Ontario's long duration energy storage potential. Globally, LDES resources are primarily based on utilization of large quantities of two ubiquitous mediums, water or air pumped or pressurized in various forms, typically taking advantage of a limited supply of natural formations suitable for the purpose.

The IESO is very familiar with the only two pumped hydro projects submitted and progressing through the gateway process through the USP channel, being the TCE and Northland Power Marmora projects. Bedrock recalls that Minister Todd Smith wrote a Letter of Direction to the IESO on January 29th, 2024 in which the Minister specifically requested Ministry Staff to work with the IESO:

> With respect to the appropriate revenue framework for these projects longer term, I am currently not prepared to make a final determination on this matter. In the meantime, I have asked Ministry officials to work with the Ontario Energy Board (OEB) and proponents on project cost recovery mechanisms for my consideration, with a report back by July 31, 2024.

Bedrock believes that this additional information in respect of cost recovery mechanisms would serve to improve and enhance ratepayer benefits of these projects. Bedrock agrees that these long-term assets would be best suited for a cost-of-service ("CoS") type of regulation, similar to that routinely undertaken by the Ontario Energy Board ("OEB"). Bedrock reviewed the Letter and believes that the CoS model is *the* correct, base approach to contracting with these unique types of LDES facilities.

Our primary reason for this approach lies in the size and nature of the asset base, which each of the LDES projects shares regardless of whether they are using air or water for the medium. By definition, these are large-scale facilities, with significant capital investment to deploy and capable of flexibly delivering hundreds of MWs in each operating cycle over several hours (8+), depending on the IESO's system needs. Their construction takes ~4 years or more, depending on the location. These project types may also be sizable in terms of their footprint, more so for pumped storage surface reservoirs, than compressed air energy storage ("CAES"). In all cases, these systems take advantage of particular natural features which are limited in availability, and cannot be artificially replicated at reasonable cost. In Ontario, there are only so many locations that are appropriate for pumped storage, and only so many natural caverns that are ideal for air storage, which is similar to the limited availability of hydroelectric generating

opportunities at natural waterfalls. Historically, Ontario Hydro mapped all such hydroelectric opportunities, and systematically exploited them over the course of decades. RFP mechanisms, which are focused on specific points in time and typically require near-term delivery in order to manage cost risks during the development period, are not appropriate mechanisms to exploit the limited natural resources underlying potential LDES assets.

The cost and lifetime of these larger, long-term 'system' assets is also worth mention. The TCE project is estimated to be ~$4 Billion; Bedrock's project is in the ~$2 Billion range, both projects not dissimilar to the scale of needed investment recorded in the relatively newer OPG Beck tunnel project. One way to look at these long-term LDES assets is to recognize that once constructed, they are effectively permanent, embedded additions to the Ontario grid network. Even if they are financed on a 40-year time horizon (as would be necessitated by a proposed 40-year contract), these LDES facilities are realistically century-length facilities, akin to the Niagara Falls hydraulic facility. In the case of Ontario's Silurian pinnacle air reservoirs, which are 450 million years old, and which frankly have an infinite lifespan, spreading financing for a suitable term (i.e. decades) is a smart way to lower annual costs and thus reduce rates to the benefit of the ratepayers. At a minimum, spreading the project cost over the full life of the major equipment (i.e., 60 years, at least) would be appropriate. This also assures that the net benefit to ratepayers is crystal clear over the project life. [In Bedrock's case, the net positive contribution arising in the project model lies in the reality that over time, the *CAES project pays for itself* (using a slice of project revenues from the early years) and delivers between *$4 Billion to $7 Billion in ratepayer benefits* (in the later years), depending on the amount of run-time the project is utilized. These benefits are substantial as the financial model of LDES projects will demonstrate. The IESO is welcome to review this model during the CoS contract discussions.]

*Why Cost-of-Service Contracting/Supervision Makes Sense*

LDES assets are in a different category of facility than a basic wind or solar fleet. While LDES facilities are similar in nature to large scale hydraulic plants which OPG has developed and operated for decades – and which are subject to OEB regulatory supervision. This oversight ensures their ongoing operations are

understood and reviewed by an independent authority to the benefit of the ratepayers. The IESO is familiar with the *Navigant Study* of the TCE project, which evaluates ratepayer benefits against a CoS remuneration structure, using standard OEB regulatory parameters. Bedrock believes there is value in referring to this approach.

Given the long life of LDES assets over other contracted renewable energy assets, Bedrock is advocating for this different form of economic arrangement. This would feature a prolonged amortization period, which is to the obvious benefit of the province, the ratepayers and project investors. Ratepayers benefit from extended asset financing/payback timeframes as the costs are spread over decades. This is aligned with how franchised gas and electric utilities are supervised by the OEB. Long-term assets, such as pipelines and transmission lines are inserted into ratebase recognizing their initial capital deployment, and over time, their ongoing operations and maintenance costs are monitored and managed, usually in some periodic, light-handed way, and are also incentivized to encourage efficiency – all in order to lower costs for ratepayers.

Bedrock recommends that an LDES CoS contract should contain the following features:

1. A minimum 40-year term (with option to renegotiate past 40 years) to minimize initial annual depreciation/return-of-capital charges, but with rebasing every five years.
2. An annual revenue requirement paid in equal instalments sufficient to fully recover projected annual operating and capital costs, including working capital carry costs, over a five-year projection, with rebasing every five years to an updated five-year projection. No retroactive adjustment for any costs savings achieved versus the projection. Five-year rebasing eliminates the time-consuming and costly process of annual rates review.
3. A capital structure regime for capital cost recovery based on that utilized in the Navigant Study with updates to the cost of equity and debt to reflect the latest OEB standards.
4. A credit against the monthly revenue requirement payment to reflect revenues received from the sale of capacity, energy, operating reserves and regulation services into the market and equal to eg. 80% of those revenues.

This approach will incent the project operator to act like any other market participant in offering its capabilities into the market, a feature which seems to align with the IESO's overall market philosophy.

5. Some form of right on the part of the IESO to override the project's market-based capacity, energy and operating reserve offers and direct those decisions, as if they own the LDES facility, to achieve particular objectives the IESO may have now or in the future, but with some form of compensation to the project for any market revenues foregone.
6. The capital cost to be recovered should be initially set equal to the actual final capital cost of the project plus all development and pre-development costs incurred, tested using a standard of "prudence", similar to what is used by the OEB. This augers clarity for ratepayers and project investors. This approach could include a capital cost incentive overlay which introduces both risk and upside to the project.

Importantly, a comprehensively negotiated CoS contract structure will allow for the stability of the project and firm-up its obligations to operate in a beneficial manner to the ratepayers without any opportunity for untamed windfall profits during operations over the decades. Where risk is reduced, ratepayers benefit from lower costs and known, adjustable returns to the project proponent. LDES projects should fit this paradigm, the details of which can be established in a collaborative pre-contracting process between project proponents and the IESO.

Bedrock looks forward to working with the IESO to design a mutually beneficial, financeable LDES contract, which serves the public interest and those of the many stakeholders associated with the contract.

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