



OCT 21, 2025

Long Lead-Time Request for Proposals

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Territory Acknowledgement

The IESO acknowledges the land we are delivering today's webinar from is the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples. We also acknowledge that Toronto is covered by Treaty 13 with the Mississaugas of the Credit First Nation.

As we have attendees from across Ontario, the IESO would also like to acknowledge all of the traditional territories across the province, which includes those of the Algonquin, Anishnawbe, Cree, Oji-Cree, Huron-Wendat, Haudenosaunee and Métis peoples.

Purpose

The purpose of this session is to continue discussing design considerations related to the development of a Long Lead-Time Request for Proposals (LLT RFP).

Agenda

Today's engagement will cover the following topics:

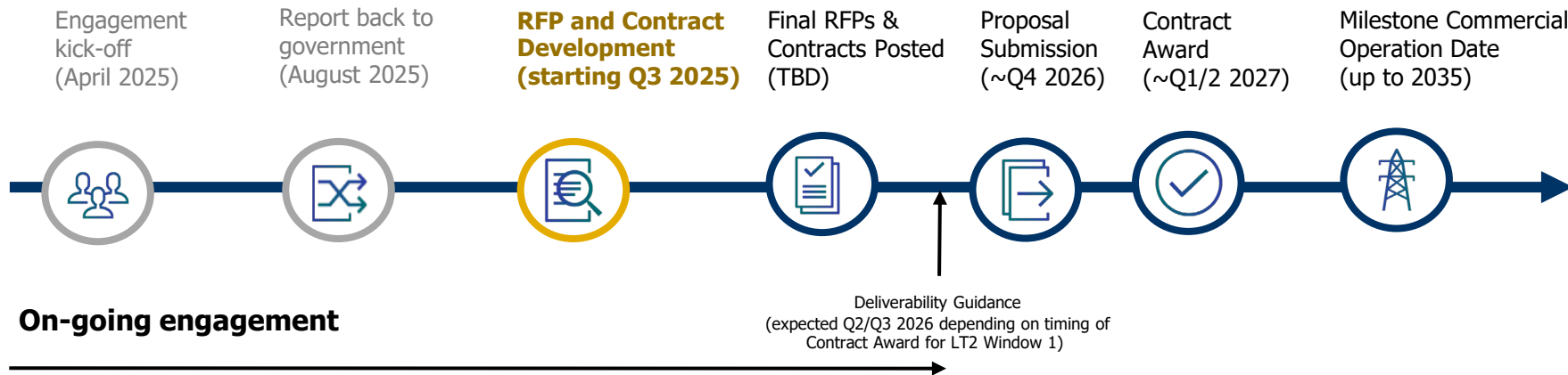
1. Recap – Foundational Design & Timelines
2. LLT Capacity RFP & Contract Overview
3. Additional Design Considerations
4. Response to Stakeholder Feedback
5. Next Steps

Recap - Foundational Design Elements

- At this time, the IESO expects the LLT RFP to be administered as a **single procurement window**, subject to Ministerial direction.
- The LLT RFP is **intended for new build resources**, however the IESO is considering whether hydro redevelopments will be eligible to participate.
- To be eligible, **projects must require a lead time of five or more years**; certain projects may be required to demonstrate this to the IESO
 - For greater clarity, lead time means the period between contract execution and commercial operation
- A **40-year contract term** is being proposed for all successful projects across both the energy and capacity stream; as such resources are expected to be able to operate reliably over this period with minimal interruptions.

Recap - Procurement Timelines

- As a reminder, procurement timelines are under development and will need to be coordinated with activities related to window 1 of the LT2 RFP.



The timelines presented above are approximate and are subject to change depending when final policy direction is received from the Ministry, and when final RFPs and Contracts are posted.

Overview of LLT RFP Design Considerations

Design Items Discussed Today

Capacity Only

- Eligible LDES Technologies
- Minimum Project Size
- Minimum Duration
- Team Member Experience
- Must Offer Obligations
- Round Trip Efficiency

Both Capacity and Energy

- Mid-Term Extended Outages
- Regulation Service Readiness
- Optional Termination
- Reserve Price
- Environmental Attributes

Items under Ongoing Consideration

- Resource Eligibility (Class II technologies for capacity and hydro redevelopments)
- Deliverability
- Contract Escalation
- Early In Service Provisions
- Technical Rated Criteria & Points Allocation

Policy Related Items are subject to direction from the Ministry of Energy and Mines:

- *Applicability of Tariff Provisions*
- *Canadian Status*
- *Proponent Incentives*
- *Policy related mandatory requirements and rated criteria*



LLT Capacity - High Level Overview of RFP and Contract

LLT(c) RFP - Resource Eligibility

- The capacity stream of the LLT RFP will be open to **LLT Capacity Projects** that:
 - are a New Build Electricity Storage Facility;
 - have a Nameplate Capacity that is equal to or greater than 50 MW;
 - are capable of continuously delivering the Contract Capacity for at least 8 hours; and
 - use an Eligible LDES Technology.
- An **Eligible LDES Technology** includes one of the following:
 - Class I: Compressed Air Energy Storage and Pumped Hydro Storage.
 - Class II: Liquid Air Energy Storage and Pumped Thermal Energy Storage.

LLT(c) RFP – Eligible LDES Technologies

In the RFP, the IESO has included the following language to define Eligible LDES Technologies. Definitions have been adapted from the National Renewable Energy Laboratory (NREL)'s [Storage Futures Study](#) and [Industrial Energy Storage Review](#):

- **Compressed Air Energy Storage** - a large-scale storage system using pressurized air to store potential energy.
- **Pumped Hydro Storage** - a storage system that uses the pumping and release of water between two reservoirs at different elevations to store and retrieve potential energy.
- **Liquid Air Energy Storage** - a storage system that uses electricity to compress air until it becomes a liquid, and saves the released thermal energy in a high-grade thermal store.
- **Pumped Thermal Energy Storage** - a storage system that converts electricity into heat, which is stored as thermal energy and is later converted back into electricity by means of reversible thermodynamic cycles.

LLT(c) RFP – Class II Eligible LDES Technologies (1)

- Eligible LDES Technologies have been selected based on level of technology readiness and alignment with the foundational design elements (i.e., long lead time and expected project lifetime of 40 years or longer).
- However, some selected technologies do not have proven lead times and lifetimes. As such, the IESO is considering additional requirements for projects that will use Class II technologies, which may include an IE report that provides information such as project scope, permitting path, supply chain constraints/lead times, etc.
- Developers that are considering a project that uses a technology that is not currently listed as an Eligible LDES technology, that they believe should be eligible to participate in the LLT RFP, should provide the IESO with information regarding technology readiness, expected project development timelines and project lifetime for further consideration.

LLT(c) RFP – Class II Eligible LDES Technologies (2)

- While an overall target of up to 600-800 MW is expected for the LLT RFP capacity stream, the IESO is proposing to procure **a maximum of 100 MW** from Class II technologies. This is being proposed to:
 - acknowledge the emerging nature of these technologies and limit the risks related to procuring less proven technologies; and
 - encourage participation from a diverse set of Eligible LDES technologies.
- For further clarity, the proposed 100 MW maximum is:
 - **included** (not in addition to) the total capacity stream target of 600-800 MW; and
 - **not intended to be a set aside**; projects will only be awarded a contract if they are among the most cost-effective proposals.

LLT(c) RFP – Minimum Project Size

- For the capacity stream, the IESO is proposing that projects must be **equal to or greater than 50 MW** and able to become registered in the IESO-administered markets.
 - this is a change from the LT2(c-1) RFP, which includes a minimum size requirement of 1 MW.
 - the requirement is intended to encourage the participation of commercial scale projects. As a reminder, the LLT RFP is a reliability based procurement and is not intended for pilot scale projects.
- The IESO is open to stakeholder feedback regarding the minimum project size requirement, considering the proposal to secure a maximum of 100 MW from Class II technologies (per previous slide).

LLT(c) RFP – Minimum Duration

- The IESO is proposing a **minimum duration of 8 hours**, consistent with the requirements under the LT2(c-1) RFP, and is **exploring the use of rated criteria to incentivize longer durations of up to 12 hours**
 - at this time, the IESO is not considering incentivizing durations longer than 12 hours under the LLT RFP as further study is required to understand and value the benefits of longer duration storage resources.
- The IESO is seeking further information to understand cost impacts related with increasing duration from 8 to 12 hours; this will help the IESO consider rated criteria weighting used to evaluate submitted Proposals.

LLT(c) RFP - Registration & Proposal Review

The following processes will be similar to the LT2(c-1) RFP, with some minor adjustments made to processes based on lessons learned:

- Proponents who wish to submit a Proposal must register their project and pay the associated non-refundable registration fee (\$500) during the timelines specified in the RFP.
- Submitted proposals will be evaluated over 5 stages, including:
 - Stage 1 - Completeness Requirements (similar to LT2)
 - Stage 2 – Mandatory Requirements
 - Stage 3 – Rated Criteria (subject to government direction)
 - Stage 4 – Review of Economic Bid Statement
 - Stage 5 – Deliverability Assessment

LLT(c) RFP - Team Member Experience

- The Proponent must have at least two designated Team Members who, collectively, have experience in the:
 - (A) Planning and Developing at least one Same Technology Qualifying Project; and
 - (B) Financing, Constructing and Operating of at least one Qualifying Project (which for greater clarity can be in relation to any technology).
- All Qualifying Projects must have a nameplate capacity of 1 MW or greater and have reached commercial operation in Canada, USA, UK, Italy, France, Australia or Japan no more than 15 years prior to the Proposal Submission Deadline.
- A Same Technology Qualifying Project must use the same storage technology as that proposed for the LLT Capacity Project and must have reached commercial operation in the last 10 years.

LLT(c) Contract – High Level Overview (1)

The LLT(c) Contract will be a capacity-style contract, substantially similar to the LT2(c-1) contract (subject to adjustments), including the following key contractual parameters:

Requirements for Commercial Operation (Article 2)

- The Facility must come into service by the Milestone Date for Commercial Operation (8 years after the Contract Date) and no earlier than 5 years after the Contract Date.
- The Supplier must provide documentation to demonstrate that the facility has achieved commercial operation (e.g., IE Certificate, Metering Plan, etc.).

Completion and Performance Security (Article 6)

- The Supplier must post and maintain the required amounts of Completion and Performance Security from the Contract Date until the end of the Term; initial amount is reduced from LT2(c-1) as discussed in prior engagements.

LLT(c) Contract – High Level Overview (2)

Must-Offer/Performance Obligations (Article 3)

- Requirement to offer electricity output from the Facility into the Day Ahead Market during Qualifying Hours such that the Monthly Average Offered Quantity for the Settlement Month is equal to or greater than the Adjusted Monthly Contract Capacity.

Monthly Payment (Exhibit J)

- Settlement will occur monthly and will generally be based on the Indexed Fixed Capacity Payment (in \$/MW for each Business Day) and the Monthly Contract Capacity, accounting for any events of Force Majeure, minus any applicable non-performance charges.

LLT(c) Contract - Must Offer Obligations

What is the same:

- Consistent with the LT2(c-1) contract, Suppliers will be required to offer Electricity output from the facility into the Day Ahead Market during Qualifying Hours.

Proposed changes:

- The IESO is proposing to update the definition of Qualifying Hours for long lead time resources (currently 7am-11pm on Business Days) to **include additional hours on weekends and Holidays.**
- The IESO is also considering **introducing Real Time (RT) Must Offer Requirements** for LLT Capacity Projects to better align with operational needs.
- The IESO is seeking stakeholder feedback to understand how the expanded Qualifying Hours and RT Must Offer Obligations will impact proposed projects (e.g., cost, operation).

LLT(c) Contract – Contract Capacity

Proposed Change:

- The IESO is proposing to remove the Option to Reduce Contract Capacity included in the LT2(c-1) Contract (see Article 4.3), as this provision was based on lithium-ion BESS and understood to only be required for such projects.

Feedback Request:

- The IESO is seeking feedback from stakeholders to confirm whether the option to reduce Contract Capacity is required for LLT Capacity Projects.
- The IESO would also like to understand whether Contract Capacity is expected to differ monthly or if seasonal Contract Capacities would suffice.

LLT(c) Contract - Round Trip Efficiency

What is the same:

- Consistent with the LT2(c-1) Contract, the IESO has not included mandatory requirements or rated criteria related to round trip efficiency (RTE) due to the challenges associated with evaluating this at the Proposal Submission stage.

Proposed changes:

- The IESO has **reduced the Reimbursement Reference Efficiency (RRE)** included in the calculation of the Regulatory Charge Credit (see Exhibit S) **from 75% to 60%** to reflect the lower expected RTEs associated with Eligible LDES Technologies.
- Exhibit S is under review by the IESO, however the current language reflects that should a resource's Apparent Monthly Round Trip Efficiency (AMRTE) be lower than the RRE, the Regulatory Charge Credit will be adjusted accordingly.



Additional Design Considerations

Mid-Term Extended Outages (1)

- To address stakeholder requests for longer term outages, the IESO has introduced the concept of a **Mid-Term Extended Outage** which provides Proponents with the opportunity to take up to one outage, after the 20th anniversary of the contract, for a maximum period of 12 months.
 - This is an increase from the long-term outage duration of 6 months proposed during the last engagement.
- For clarity, Mid-Term Extended Outages will be provided in addition to the allowance of shorter term Planned Outages that can be taken on an annual basis.

Mid-Term Extended Outages (2)

- The IESO has received stakeholder feedback suggesting:
 - extended outage periods of 24-36 months are required;
 - a maximum outage duration of 12 months should be provided over up to two outages, with no limitation around when this can be taken; and
 - additional outage provisions may be required for events such as water management equipment replacement.
- The purpose of the Mid-Term Extended Outage is to allow the Supplier to complete small-scale work that may be required to allow the facility to continue to operate and is not intended to be a period over which major refurbishment work is completed.
- If stakeholders believe that Mid-Term Outages are required beyond the proposed 12-month duration, the IESO is seeking further information to better understand the nature, timeline, and frequency of required outages.

Regulation Service Readiness (1)

What is Regulation?

- Regulation service is one of four Ancillary Services that the IESO utilizes to ensure the reliable operation of the power system.
- It allows the IESO to meet NERC Reliability Standards by continuously responding to small mismatches between supply and demand within less than 5 minutes.
- Regulation provides minute-to-minute balancing to ensure electricity supply matches demand and is currently provided by generation facilities with Automatic Generation Control (AGC) capability, which permits them to vary their output in response to signals sent by the IESO.

Regulation Services Readiness (2)

- With an increasing penetration of variable generation resources and industrial loads with highly fluctuating load profiles connecting to the grid, the IESO is forecasting an increased need for regulation services in the future; both hydroelectric and LDES are ideal candidate technologies to provide regulation services.
- To encourage resources to be ready to respond to this need in the future, the IESO is considering adding **a mandatory requirement or rated criteria to require/incentivize facilities to install the required equipment to be ready to provide regulation services in the future.**
- For greater clarity, the IESO is proposing that the requirement under the LLT RFP would only be to have the facility be "regulation ready", regulation services would be secured/paid for separately through the mechanism that exists at the time regulation needs are identified.

Regulation Services Readiness (3)

- The IESO is proposing that any mandatory requirements/rated criteria would apply/be available to all resources under the capacity stream and hydro resources that are able to provide a 20 MW range (± 10 MW regulation) above their minimum loading point (MLP)
- In order to be considered "regulation ready" a facility would need to:
 - have a minimum ramp rate of 5 MW/min; and
 - be capable of receiving and following regulation signals every 4 seconds or less (further details related to responding to signals are outlined on the next slide)

Regulation Services Readiness (4)

Further details on Telemetry and IT Requirements:

- The resource or facility's programmable logic controller (PLC) system (or alternative control system, as applicable) must be able to receive the setpoints sent by the AGC system, and the associated control system must be able to adjust the hydraulic gate (for hydroelectric resources) accordingly to change the output of the resource/facility according to the setpoint. For LDES, the response mechanism will depend on the technology type.

The IESO is seeking feedback from stakeholders to understand potential cost and/or development timeline impacts to have the facility be "regulation ready" and any other information the IESO should consider when exploring this mandatory requirement/rated criteria. Relevant market rules and manuals are referenced in Appendix A.

Optional Termination (1)

- To recognize the uncertainty related with developing long lead time resources, the IESO is considering including a **two-way optional termination provision** in the LLT contracts
- At a high level, IESO is proposing that:
 - the termination provision would be time bound; could be exercised by either party up to a pre-established date (e.g., 2-3 years post the Contract Date).
 - if the IESO exercises termination, Completion and Performance Security would be returned and the IESO would provide a fixed payment to the Supplier to cover portion of development costs.
 - if the Supplier exercises termination, the IESO would retain a portion of the Completion and Security; no payment will be issued to cover development costs.
 - if neither party terminates by the pre-established date, the Completion and Performance Security would step up to the full amount of \$35,000/MW.

Optional Termination (2)

- The IESO is considering tying the expiry of the optional termination rights to a Notice to Proceed (NTP) Milestone Date, which would reflect the reasonable average date by when commencement of construction (e.g., all permits, financial close, full NTP under an EPC contract) would be expected.
- The IESO is seeking feedback regarding the proposed optional termination provision, the definition of NTP Milestone Date, as well as any further insights regarding how other jurisdictions manage the uncertainty related to developing long lead time resources.

Reserve Price

- To manage uncertainty related to the cost of developing long lead time resources and ensure the IESO is securing the most cost-effective resources through its suite of long-term procurements, the IESO is proposing to introduce Reserve Prices under both the energy and capacity stream.
 - The Reserve Price will be a confidential price threshold determined by the IESO and documented with the Fairness Advisor prior to the Proposal Submission Deadline.
- The mechanism by which the Reserve Price will be calculated is still being established, but may consider inputs including, but not limited to:
 - LT2 Capacity and Energy price outcomes under window 1;
 - the 40-year contract term being offered under the LLT RFP; and
 - any increased/modified obligations between LT2 and LLT resources.

Environmental Attributes

- The IESO has included its proposal related to sharing of benefits from Environmental Attributes during the second half of the contract term (see Article 2.10).
- The IESO acknowledges feedback from some stakeholders indicating that Suppliers should retain the rights to all benefits from Environmental Attributes.
- At this time, the IESO is under the assumption that Suppliers are not attributing value to Environmental Attributes in proposal prices.
- Given the 40-year contract terms being offered under the LLT RFP (with terms extending up to 2075), there is potential that the value of Environmental Attributes could change in the future. Should there be a future value, the IESO believes that both ratepayers and Suppliers should share in the benefits, which will be based on actual revenues.
- The IESO is open to stakeholder feedback on alternate approaches to managing the uncertainty associated with the value of Environmental Attributes.



Response to Stakeholder Feedback

Resource Eligibility – LDES Technologies

What we've heard from stakeholders

- The IESO should provide opportunities beyond the Grid Innovation Fund (GIF) for pilot and emerging LDES technologies.

IESO Response to Feedback

- The IESO is a contributor to a recently launched research initiative led by the Centre for Energy Advancement through Technological Innovation (CEATI) that will explore the overall viability of different LDES technologies on a regional basis across Canada.
- While there are no specific opportunities currently contemplated for emerging LDES, results of this research may inform future opportunities.
- The LT2 RFP is technology agnostic, resources that can be developed in 4 years or less should also consider participation in future windows of the LT2 RFP.

Resource Eligibility – Hydro Redevelopments

What we've heard from stakeholders:

- Replacement equipment is no longer available for hydro facilities originally constructed in the early 1900s; long term contracts will be required to make these projects economic.
- One stakeholder provided an example of a re-developed hydro facility that took approx. 6 years to complete.
- One stakeholder indicated that if the IESO requires redeveloped facilities to increase capacity beyond what is currently registered with the IESO, this may be unattainable due to connection constraints.

IESO Response to Feedback:

- The IESO will continue to evaluate eligibility and will provide more details on a proposed approach in the next engagement session.

Contract Design – Non-Performance Charges (Energy)

What we've heard from stakeholders

- Under the E-PPA structure, Suppliers could face negative payments in instances where production is low and energy market prices are high; this could be related to issues which are out of the Supplier's control (e.g., reduced water availability).

IESO Response to Feedback

- The IESO has received similar feedback under Northern Hydro Program (NHP) and is considering what changes may be necessary. Given that under the LLT RFP, Proponents can control price and production factors, different provisions may apply.

Contract Design – Contract Length & Price Adjustments

What we've heard from stakeholders

- The IESO should reconsider contract term lengths to better align with the expected life of major capital assets (e.g., compressed air and pumped storage major mechanical components have an expected life of 60+ years).
- The IESO should adopt an open book process with respect to long-term debt for LDES allowing price adjustments at the mid-point of a 60-year contract term.

IESO Response to Feedback

- At this time, the IESO is not contemplating a contract term length greater than 40 years. Proponents should consider expected costs (including those related to long term debt) over the contract term when establishing proposal prices.



Next Steps

Next Steps

- The IESO invites stakeholder feedback on the materials presented today, including the proposed procurement considerations by **November 4, 2025**. All written feedback should be submitted to engagement@ieso.ca utilizing the IESO Feedback Form posted on the engagement webpage.
- First drafts of the LLT Capacity RFP and Contract are now available for review on the [LLT RFP Procurement Website](#). Please use the feedback form to provide feedback on the documents along with feedback on design items presented in this session.
- On October 20, the IESO held a webinar to discuss repowering resources; further details can be found on the [LLT RFP Stakeholder Engagement Webpage](#).
- If you have any questions regarding the LLT RFP, please send them to LLT.RFP@ieso.ca.



Q&A

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Appendix A – Regulation Readiness - Relevant Market Rules and Manuals Sections

Telemetry and IT Requirements for Regulation Service Providers

- Market Rules Chapter 0.5, Appendix 5.1, Sections 1.1.1 and 1.1.2
- Market Rules Chapter 0.4, Section 7.3
- Market Rules, Chapter 0.4 Appendices 4.15 and 4.19
- Market Manual 0.6.0: Participant Technical Reference Manual, Sections 3 and 4

Control System Performance Requirements for Regulation Service Providers

- Market Rules Chapter 0.5, Appendix 5.1, Sections 1.1.6 and 1.1.7
- Market Manual 0.6.0: Participant Technical Reference Manual, Sections 3 and 4
- Market Rules Chapter 0.4, Appendix 4.2, Categories 1, 2 and 3, and associated requirements:
 - NERC standards MOD-027 and PRC-024
 - Ontario Resource and Transmission Assessment Criteria (ORTAC)
- Market Manual 0.1.6: Performance Validation
- IESO Form 58, Form 69 and Form 70

Ramping Requirements for Regulation Service Providers

- Market Rules Chapter 0.5, Appendix 5.1, Sections 1.1.3, 1.1.4, and
- Market Rules Chapter 0.5, Section 4.4.2

Testing Requirements for Regulation Service Providers

- Market Rules Chapter 0.5, Section 4.9.2.6

Regulation Capacity Requirements

- Market Rules, Chapter 0.5, Appendix 5.1, Section 1.1.5.