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Long-Term 2 RFP Stakeholder Engagement

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Purpose

As a follow up to the LT2 RFP stakeholder engagement in February 2024, this session will explain the IESO's:

1. Modifications to the Enhanced Power Purchase Agreement (E-PPA) revenue model based on stakeholder feedback
2. Initial considerations on performance obligations under the LT2 contract
3. Updates to the LT2 RFP deliverability guidance and evaluation

Agenda

1. Overview of LT2 RFP Design Considerations
2. E-PPA Revenue Model:
    i. Proposed Modifications
    ii. Energy Market Settlement
3. LT2 RFP & Contract: Key Provisions
4. LT2 RFP Report Back to the Minister: Highlights
5. LT2 RFP Deliverability
6. Next Steps

Overview of LT2 RFP Design Considerations

Design Items Discussed Today

- E-PPA Revenue Model
- LT2 Contractual Obligations
- MT2 RFP: design and coordination with LT2 RFP
- Long lead time resources
- LT2 Deliverability Assessment

Ongoing Considerations

- Resource eligibility: DERs, hybridized facilities, repowered facilities
- Indigenous Community participation requirements
- Community engagement
- Rated criteria
- LT2 RFP: capacity stream
- LT2 RFP Proposal Evaluation

Design Decisions Pending Ministerial Decision

- Agricultural Land-Use Considerations

Enhanced Power Purchase Agreement (E-PPA) Revenue Model: Proposed Modifications

Overview

The IESO is proceeding with the E-PPA revenue model for energy producing resources under the LT2 RFP, as this model prioritizes more efficient system operation, that is aligned with the IESO's renewed market.

After considering stakeholder feedback, the IESO has proposed some changes to the E-PPA design and will be discussing those changes today and seeking input from stakeholders.

All contents in this presentation reflect the energy stream of the LT2 RFP. Details on a potential LT2 capacity stream will be shared with stakeholders following the conclusion of the LT1 RFP.

- **Submitted values as part of proposal**
- **Values calculated as part of contract settlement**

Re-cap: Total Monthly Revenue under E-PPA

Monthly Revenue Requirement	**= Proposal Price * Annual Imputed Production Factor * Contract Capacity * # of hours in the settlement month**
Deemed Energy Market Revenue	= Deemed Energy Market Price * Monthly Imputed Production Factor * Contract Capacity * # of hours in the settlement month
Grid Reliability Payment (Contractual Payment)	= Revenue Requirement – Deemed Energy Market Revenue
Actual Energy Market Revenue	=[DA LMP * DA Quantity] + [RT Price * (RT Quantity – DA Quantity)]
Total Monthly Revenue	**Grid Reliability Payment + Actual Energy Market Revenue**

Proposed Modifications to the E-PPA Design

Based on stakeholder feedback, the IESO is proposing to make changes to the E-PPA design in the two areas below.

Production Factor
Establishing the granularity of submitted production factors

Deemed Energy Market Price
Establishing the price used to deem energy market revenues

Note: the IESO is still assessing options for suppliers to manage day-ahead to real-time balancing.

Continued Evolution of E-PPA Design

- The IESO is making the aforementioned modifications to the E-PPA in response to stakeholder concerns regarding risks associated with the lack of a track record for both a deeming style contract for VGs and the DAM in general in Ontario.
- As more data become available after the implementation of MRP, the IESO will continue to evolve this revenue model for future procurements based on the general framework laid out in the LT2 contract.

E-PPA Design: Production Factors

Production Factor
Establishing the granularity of imputed production factors

Deemed Energy Market Price
Establishing the price used to deem energy market revenues

Proposed Design: Production Factors

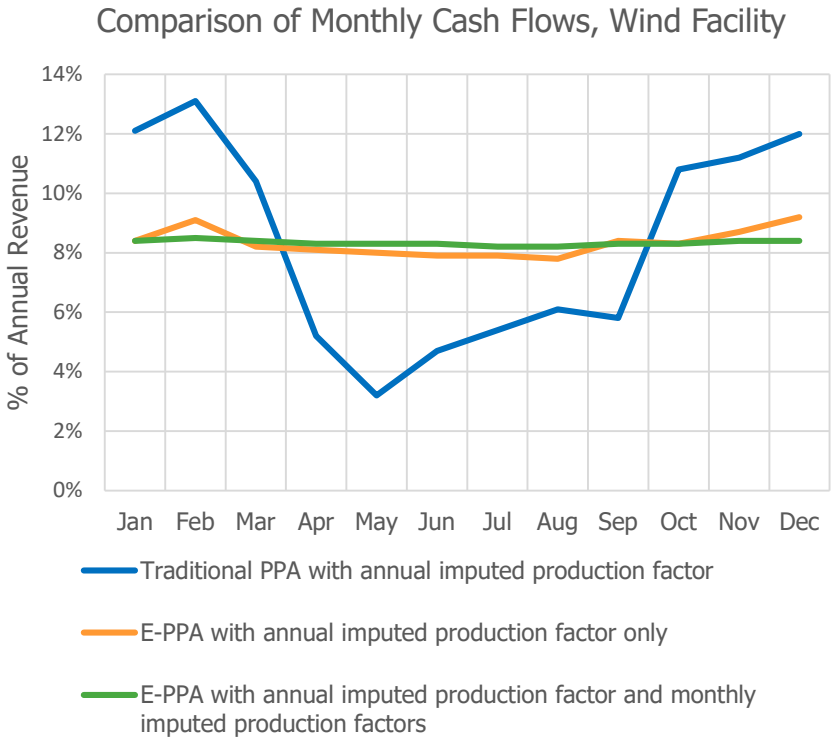
The IESO is proposing to use:

- **Monthly imputed production factors** (that collectively average out to the annual imputed production factor) for the purpose of deeming energy market revenues; and,
- An **annual imputed production factor** for the purposes of proposal evaluation and calculation of the Monthly Revenue Requirement.

Imputed production factors provided by suppliers at proposal submission should serve as estimate of average (monthly/annual) production capability relative to the facility's maximum capacity. The values should account for planned or potential forced outages but do not need to consider assumptions for curtailment of available production.

Rationale: Imputed Production Factors

- The IESO has decided to use an annual imputed production factor to determine the Monthly Revenue Requirement to provide suppliers with more consistent monthly cash flows.
- In response to stakeholder feedback, monthly imputed production factors will be used to deem energy market revenues so that suppliers can better reflect seasonal variations in production which can lead to improved alignment between deemed and actual energy market revenues.



E-PPA Design: Deemed Energy Market Price

Production Factor
Establishing the granularity of imputed production factors

Deemed Energy Market Price
Establishing the price used to deem energy market revenues

Feedback Considerations

Since the introduction of the E-PPA design, feedback on how the IESO should calculate the average LMP (at the location of the facility) used to deem energy market revenues has focused primarily on the two following aspects:

Approach to averaging LMPs	Solar and wind resources expressed concern regarding deeming based on a simple average of DA LMPs. Since the production from such facilities may be skewed towards lower priced hours the concern is that deemed revenues would be higher than those actually earned in-market. To help address this risk, stakeholders suggested that the use of a weighted average price based on forecasted production would help VG resources manage this risk.
Quantities used to weight LMPs	Recommended weighting prices based on the IESO forecast capability for a specific resource in each respective hour.

Proposed Design: Forecast Weighted Average Pricing for VGs

Resource Type	Approach to Averaging LMPs	Rationale
Wind, Solar (including those hybridized with an energy storage resource)	**Forecast weighted average price (FWAP)**, based on quantities associated with the IESO DA Centralized Forecast and DA LMPs, with negative prices set to zero	Addresses daily and seasonal shape risk for solar and wind resources by weighting prices based on a resource's expected production when those prices occur. Enables suppliers to better meet or exceed deemed revenues.
All other non-emitting (i.e. hydroelectric, bio energy)	**Simple average price**, with negative prices set to zero	Addresses stakeholder feedback requesting equal exposure to prices in each hour as a reflection of the operational characteristics of these resources.

FWAP Considerations

Use of IESO DA Centralized Forecast to Weight Quantities

- The IESO has elected to use quantities associated with the IESO Centralized Forecast to reflect resource capability as using quantities associated with supplier forecasts can result in an inflated GRP when a forecast of 0 MW is submitted by the supplier.

Treatment of Negative DA LMPs

- As resources are assumed to offer into the DAM at their marginal cost, negative DA LMPs will be set to zero to reflect market signals indicating that generation is not needed. This results in a higher GRP for suppliers and enables them to better meet their revenue requirement.

Simplified Example: Forecast Weighted Average Pricing for VGs

This simplified example illustrates the mechanics for calculating the Forecasted Weighted Average Price (FWAP) by applying it to a subset of hours. In comparison with the simple average, the FWAP in this example results in a lower energy market deeming price reflective of the resource's forecasted production capabilities.

$$\text{FWAP} = \frac{sum\ of\ hourly\ forecasted\ revenue}{sum\ of\ forecasted\ production}$$

$$= \$1000 / 145\ \text{MW}$$

$$= \$6.90 / \text{MWh}$$

Hour	Forecasted Production (IESO DA Centralized Forecast)	Price (DA LMP)	Hourly Forecasted Revenue (Forecasted Production * Price)
HE 1	30 MW	-$1 / MWh	$0 (prices below zero will be set to zero)
HE 2	60 MW	$5 / MWh	$300
HE 3	5 MW	$40 / MWh	$200
HE 4	50 MW	$10 / MWh	$500

For comparison, the simple average price = (0+5 + 40 + 10) ÷ 4
= $13.75 / MWh

Note: for illustrative purposes only

Enhanced Power Purchase Agreement (E-PPA) Revenue Model: Energy Market Settlement

Recap from February 1st Webinar

IESO Market Renewal – DAM Participation Requirements

In order to be eligible to produce in the RTM, VG suppliers will be required to submit the following into the DAM for each hour:

- Offers in the form of price/quantity pairs up to their available capacity;
- A forecast quantity (either their own forecast quantity or the IESO's Centralized Forecast).

Deeming Using DAM Prices – Impact of DA to RT Settlement Risk

VG resources expressed concern about risks associated with:

- Price differentials between DAM and RTM
- Inability to supply energy scheduled in DAM

Renewed Market Settlement

- **Suppliers will be required to manage any production shortfall** (RT balancing) between their DAM schedule and RTM availability.
- However, **suppliers will also be provided with up-side opportunity** to:
  - Earn additional market revenues in RTM when actual production is greater than forecasted;
  - Earn additional market revenues by shifting production to higher priced hours when RTM prices indicate the need for additional injections (e.g. via hybridization or investment in technological advancements) over the life of their contracts.

Considerations: Variable Generator DAM Participation

- The IESO continues to receive mixed feedback on how VGs are best positioned to participate in the DAM, and how they may elect to manage DA to RT balancing.
- The IESO has explored a number of alternatives to manage DA to RT balancing and perceived risks, including those previously proposed by stakeholders, but has not yet found one that sufficiently aligns with the IESO's objectives.
- The IESO will continue to evaluate options and remains open to suggestions and further discussion on ways to suitably de-risk DAM participation for VG suppliers; any proposed solution must balance protection for suppliers with the IESO's objectives with respect to the renewed markets' dynamics.

LT2 RFP and Contract: Key Provisions

Overview

In support of the proposed LT2 RFP Revenue Model design, the IESO has started work on a number of related LT2 RFP and Contract provisions and is proposing considerations for three areas currently under development.

Performance Obligations

Force Majeure and Treatment of Outages

Payback of Deemed Market Revenues

LT2 RFP and Contract: Performance Obligations

Performance Obligations

Force Majeure and Treatment of Outages

Payback of Deemed Market Revenues

Performance Obligations

Given that LT2 RFP is a reliability-driven procurement, the IESO is proposing the following measures to ensure that the resources procured can provide the volume of energy the system requires over the life of the contract, while limiting gaming opportunities:

1. **Minimum Production Factors**: during RFP evaluation, proposals with production factors below the IESO identified minimums will not be accepted.
2. **Non-Performance Charges**: over the life of the contract, the IESO will impose financial penalties on suppliers that are not able to achieve a proportion of their submitted Production Factors (within an acceptable margin of error).

The IESO is open to feedback on both the broad concepts and the details of these measures.

Minimum Production Factors

The IESO is proposing to set minimum production factors that will be accepted during proposal evaluation. This is both to limit gaming potential and to ensure that the IESO is procuring resources that are contributing to system needs in an efficient manner.

- Each resource type will be assigned a different minimum production factor, which will be broadly related to the expected output of different resource types.
- Suppliers will be required to **submit production factors greater than the minimum production factor** specified for their technology type as a requirement of the LT2 RFP.

Example: Minimum Production Factors

The example below shows illustrative minimum production factors and how they would be applied during the LT2 proposal evaluation stage.

The IESO is seeking feedback from stakeholders on the minimum production factors that should be set for hydroelectric, wind and solar resources.

Proposal Number	Technology Type	Submitted Production Factor	Minimum Production Factor (EXAMPLE ONLY)	Proposal meets LT2 RFP requirements?
1	Wind	0.30	0.15	Yes
2	**Wind**	**0.10**	**0.15**	**No**
3	Solar	0.12	0.10	Yes
4	Hydro	0.45	0.25	Yes

Non-Performance Charge

As the LT2 RFP is a reliability-driven procurement, it is essential that there are guard rails in place to ensure that contracted resources are in fact providing the services that the contracts are paying for.

Similar to E-LT1 and LT1 RFPs, the IESO is proposing a non-performance charge for suppliers that are not able to produce **[85% or more]** of their annual production factor over a rolling **[three-year basis].**

If a supplier is not able to generate **[85% or more]** of its annual production factor, the IESO will impose financial penalties on the supplier, using a tiered approach as shown in the example on the next slide.

Example: Non-Performance Charge

The following example shows how a non-performance charge could be applied when a supplier is not able to generate 85% or more of its annual imputed production factor.

The IESO is seeking feedback from stakeholders on the tiers that should be used to apply a non-performance charge and the value that should be applied for each respective tier.

Production achieved after 3-year period (vs. annual production factor)	Illustrative example of Non-Performance Charge Applied
Greater than 85%	 Increasing Financial Penalty
80% to 85%	
75% to 80%	
70% to 75%	
Less than 70%	Potential for supplier event of default

LT2 Contract: Treatment of Outages

Performance Obligations

Treatment of Outages

Payback of Deemed Market Revenues

Deeming Energy Market Revenues during Outages

The IESO is seeking feedback from stakeholders on in its approach to deeming energy market revenues while facilities are on outage:

- Energy market revenues will continue to be deemed while a facility is on outage, and proponents should account for both planned outages and expected forced outage rates when determining production factors
- The IESO is still evaluating its approach to declaration of force majeure and will provide further details in a future engagement.

LT2 Contract: Payback of Deemed Market Revenues

Performance Obligations

Treatment of Outages

Payback of Deemed Market Revenues

Excess Deemed Market Revenues

- Under the renewed market and proposed E-PPA design, there may be instances when the deemed market revenues of a supplier are greater than contracted Monthly Revenue Requirement.
- These instances will result in a negative Grid Reliability Payment (where a supplier will owe payment to the IESO) and can occur when FWAP is greater than the supplier's Proposal Price due to conditions such as high LMPs.
- In these instances, the IESO is proposing that **suppliers will be required to pay back their monthly deemed energy revenues in excess of their monthly revenue requirement,** however this topic and the amount are open to further feedback from stakeholders.

LT2 RFP Report Back to the Minister: Highlights

LT 2 RFP Report Back Overview

- The IESO submitted its **LT2 RFP Report Back** to the Minister of Energy on March 15, 2024, which provided a summary of stakeholder feedback received to date on all design issues related to the LT2 RFP, including the E-PPA revenue model, project eligibility, timelines and considerations surrounding community support and engagement**.**
- The report highlighted the importance of receiving **policy clarity on items impacting project siting** to support early project development (e.g., agricultural land-use limitations, development on Crown Land).
- Beyond the LT2 RFP, the Report Back outlined early considerations for the second **Medium-Term RFP (MT2 RFP)** as well as the procurement of **long lead time resources.**

Project Siting Considerations

- While awaiting policy clarity, the IESO has continued to work with relevant ministries (MNRF, OMAFRA, MMAH, MECP, ENERGY) to articulate current regulatory and permitting requirements for project siting, these have been shared via dedicated webinars in the past couple of months.
- The IESO's Report Back also included early information, that will be confirmed by the IESO's Preliminary Connection Guidance document, stating that project **siting in Northern Ontario will be enabled** through the LT2 RFP.
- To support this, the IESO is continuing to work with MNRF to align Crown Land access processes with the LT2 RFP timelines and requirements.

MT2 RFP and Repowering

- Over the past year, the IESO has heard from a number of developers exploring options to extend the life of existing facilities, which have included the potential to **repower** those facilities for participation in the LT2 RFP.
- More recently, stakeholders have communicated a number of permitting and regulatory barriers that introduce risks to repowering resources in Ontario, and are thus exploring other opportunities for these resources to continue to operate.
- In its Report Back, the IESO proposed **advancing the MT2 RFP** to 2024/2025, to be run in a coordinated fashion with the LT2 RFP, providing existing asset owners with the opportunity to continue operations via the MT2 RFP, or if they so desire, seek repowering opportunities for the LT2 RFP.

MT2 RFP and Repowering (2)

- The IESO is working to determine the exact timelines for running the MT2 RFP, seeking to best align it with the LT2 RFP Proposal submission milestone.
- To provide existing suppliers with optionality, the IESO is examining an option that would allow for existing facilities to submit **contingent bids into the two procurements.**
- For example, the MT2 RFP would precede the LT2 RFP and if an existing facility is selected under the MT2 RFP and is then successful under the LT2 RFP for a **repowering** proposal, it would be allowed to exit its MT2 Contract (i.e., choose to repower under the LT2 RFP if feasible, or continue operating under the MT2 RFP).

MT2 RFP Eligibility

- The focus of the MT2 RFP is meeting Ontario's energy needs from variable generators coming off contract, and will use the E-PPA revenue model (a capacity stream is still under consideration for the MT2 RFP and will be determined by the status of resources are coming off-contract)
- Pending market interest, the IESO remains open to enabling new-build resources under the MT2 RFP, understanding that separate considerations around project development, municipal support and deliverability testing will need to be addressed
- Leveraging the IESO's January 2022 presentation on Medium-Term RFP Bridging and Cadence Considerations, the MT2 RFP will offer a flexible **5 year term** that targets the core years of 2029-2032, with an option for contracts to start on **May 1 2027, 2028 or 2029.**

MT2 RFP Eligibility (2)

- Existing resources with contracts expiring in 2027, 2028 and 2029 are well positioned to participate in the MT2 RFP.
- Depending on exact contract expiry dates, the IESO understands that further discussion about contract bridging and participation in the Capacity Auction may be necessary (similar to those under the MT I RFP) to provide clear signals to existing resource owners.
- The IESO is aiming to design the MT 2 RFP in a manner that is streamlined (for existing resources) and relies primarily on a pricing evaluation.
- Additional discussions surrounding the MT 2 RFP as well as target setting will be forthcoming.

Long Lead Time Resources

- In its Report Back, the IESO responded to the Minister's request to consider how long lead time resources, such as hydroelectric generation or long duration storage could be considered in its procurement efforts.
- While the IESO believes that its cadenced procurement framework inherently helps enable the development of long lead time resources in the long run, stakeholder feedback has suggested interest in the development of both new-build hydroelectric and long-duration energy storage resources in the interim.
- To enable their participation, the **IESO recommended a separate procurement stream for long lead time resources**, to be run in parallel to the LT2 RFP to enable resources with longer development timelines to come into operation at a later date (e.g., COD up to 2034).

Long Lead Time Resources: Eligibility and Term

- To account for the capital-intensive nature of long lead time resources and noting their ability to operate over longer life spans, the IESO intends to limit participation in this stream to **long lead-long duration storage** and **new build hydroelectric generation**, while offering these resources a **40-year** contract term.
- Resources that are able to achieve commercial operation by 2030 (**wind, solar, bio-energy and hydro expansions**) will **not** be eligible for this stream and should participate in the LT2 RFP and will be limited to a 20-year contract term.
- Stakeholders with projects that are less advanced in their development should consider targeting subsequent long-term procurements (LT3 RFP, LT4 RFP); the IESO is open to discussing how these future procurements can accommodate different resources.

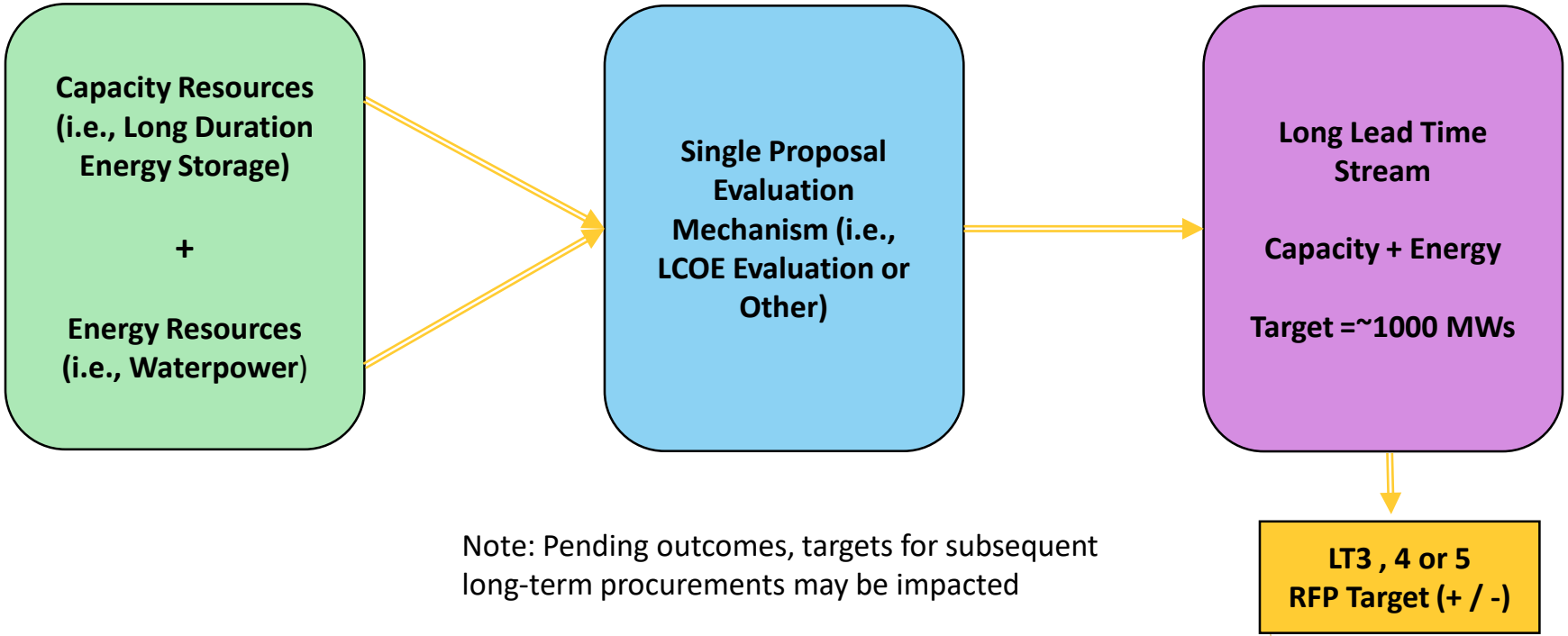
Long Lead Time Resources: Contract and Evaluation

- The IESO's recommended approach would entail a single stream for all eligible long lead time resources however, noting different operating characteristics for certain projects, they will be able to select the contract design that most closely aligns with their proposed project (**LT1 Contract for Capacity** or the **E-PPA for Energy**).
- The IESO proposes that proposals be evaluated on a like-for-like basis, regardless of contract chosen (i.e., capacity or energy) using a singular and more flexible evaluation methodology.
- The IESO is considering a target for the stream of approximately **500-1000 MWs,** while accounting for ability to potentially accept the marginal proposals
- Pending the outcomes of the stream, subsequent long-term RFP targets would be adjusted accordingly.

Long Lead Time Resources – Additional Considerations

- A well understood and stakeholdered evaluation model will be key to driving participation and competition within the long lead time stream. The evaluation model may include certain system benefit criteria (duration, ramp rate etc.) that would augment pricing/cost inputs.
- It should be noted that beyond an evaluation of price/ratepayer cost impacts, the long lead time stream will seek to procure resources with certain system benefits or strategic characteristics beyond those procured under other long-term procurements. This could include limiting long-duration resources to those with durations of 8 or more hours.

Long Lead Time Resources Illustrative Example



Note: Pending outcomes, targets for subsequent long-term procurements may be impacted

LT2 RFP Deliverability

LT2 Deliverability Process

As mentioned at the previous webinars, the IESO is developing a Deliverability Process comprised of two steps:

- **Preliminary Connection Guidance** - to help proponents select sites that would contribute to meeting the IESO's energy needs and avoid or minimize negative reliability effects on the grid.
- **Evaluation Stage Deliverability Test** – to be performed for each project submitted to the RFP as part of the Proposal Evaluation stage, based on their evaluated price, until the procurement targets are met.

Preliminary Connection Guidance

- The **Preliminary Connection Guidance** document is close to completion and includes information related to:
  - Zonal, sub-zonal and circuit energy congestion limitations
  - Inverter-based resource limitations
  - Short-circuit and protection limitations - Hydro One's transmission system only
  - Distribution limitations - Hydro One stations only
- The **Preliminary Connection Guidance** document will be published next week and will be discussed through a focused webinar later this month.

Evaluation Stage Deliverability Test

- The IESO is currently developing details of the **Evaluation Stage Deliverability Test**
- The test will be based on principles and criteria similar to those used in the Preliminary Connection Guidance document
- The test methodology will be shared with Proponents in upcoming engagements

Next Steps

Next Steps

The IESO invites written feedback on the below items by **April 23, 2024.** All written feedback should be submitted to engagement@ieso.ca utilizing the provided IESO Feedback Form:

- E-PPA design and use of the Forecasted Weighted Average Price (FWAP)
- Minimum production factors
- Application of the non-performance charge
- Treatment of outages under the LT2 Contract
- Payback of deemed market revenues greater than the Monthly Revenue Requirement

Looking Ahead – Ongoing Engagements

Milestones	Timing
LT2 RFP Report Back to the Ministry of Energy	Complete (delivered on March 15, 2024)
Technical Deliverability Engagement Session/ Additional Details on the LT2 RFP, MT2 RFP and Long-Lead Time Resources (as needed)	Week of April 15 (TBC)
Ongoing Engagement Sessions • LT2 / MT2 RFP and Contract design • Indigenous and Municipal communities • Technical sessions (as needed) *[Sessions expected on a 4-6 week cadence]*	Spring – Summer
Final LT2 RFP Posted	Fall 2024

Thank You

ieso.ca

1.888.448.7777

customer.relations@ieso.ca

engagement@ieso.ca

@IESO_Tweets

linkedin.com/company/IESO

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