# York Region Non–Wires Alternatives Demonstration

## Project Evaluation

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07 23 2024

# Agenda

1. Project Background
2. Competitive Market-Based Approaches
3. Analysis of Demonstration Project
4. DER Performance
5. Illustrative Cost-Benefit Analysis
6. Participant Feedback
7. Future Program Considerations
8. Conclusion

# Feedback Questions

1. What key learnings from the evaluation of the Demonstration do you think are the most important to consider in future Distributed Energy Resources (DER) integration work?

2. Do you have any additional feedback on how to utilize DERs as alternatives to traditional infrastructure beyond what is outlined in the evaluation report?

Please use the feedback form found under the July 23, 2024 entry on the engagement webpage to provide feedback and send to engagement@ieso.ca by Aug 13, 2024.

# Executive Summary

- This presentation summarizes the York Region Non-Wires Alternatives Demonstration evaluation report.
- The project is aimed to utilize wholesale market concepts to showcase DERs as viable alternatives and/or deferral strategies to traditional generation, transmission, and distribution infrastructure .
- In 2021 and 2022, ten participants provided local services in York Region with individual or aggregated DERs.
- 10 – 15 MW was secured as part of Local Capacity Auction and activated using Local Energy Auctions.
- Average DER portfolio performance was high (81-91%), but there were over/under deliveries by different DERs.
- The economic value of using DERs as alternatives was net-positive in most simulated scenarios evaluated, though the assessment is illustrative and dependent on key assumptions.
- The evaluation finds that the Demonstration was successful and met the objectives it set out to achieve.
- Findings support potential for ‘stacked services’ opportunities for DERs, assuming sufficient penetration of DERs in a given service area to support energy needs.

# Scope and Limitations

The evaluation of the demonstration summarizes the design, experiences, and lessons learned from the project.

A report accompanies this presentation and provides detailed analysis and information.

## Evaluation Scope

- The analysis is specific to the context and timeframe of the Demonstration operations (2021-2022).
- DERs could provide significant value in the southern York Region given future infrastructure needs. Local value in other regions may differ.
- A coordination model* informed the project design, aimed at minimizing the required interfaces and environments for DER participants.
  - This report does not assess the viability or benefits of one model over another and the described principles, results and mechanisms are adaptable to other models.

## Evaluation Limitations

- The findings may not directly apply to other time periods, geographic regions, or mix of DER types.
- Participating DERs were mostly existing resources. Observed prices do not reflect future installations.
- Capacity of participating DERs was small (10-15 MW total). Availability of DERs for large scale NWA projects needs further investigation.

*The 'Total Distribution System Operator (T-DSO)' model involves the DSO coordinating all services for DER or DER aggregators (DER/As) in both wholesale and distribution markets, thereby eliminating the need for DER/As to participate directly in the wholesale market.

# Project Background

# Project Overview

The York Region NWA Demonstration was funded by the IESO and NRCan* and delivered by Alectra.

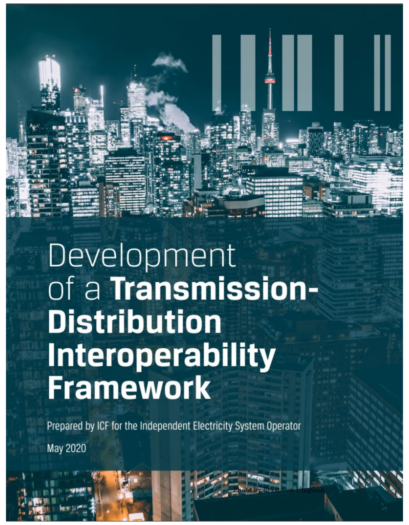
Key aspects of the project included:

- **DERs as NWAs**: Utilizing DERs† as NWAs† to traditional infrastructure such as transmission and distribution (poles, wires, transformers) as well as conventional generation
- **Customer-driven**: Enabling customers to actively participate in providing grid services using DERs, promoting customer choice and providing tools to manage electricity costs
- **Competition**: Exploring market-based approaches (i.e., auctions) for the competitive procurement and operation of DERs for capacity and energy services
- **Planning need**: Demonstrating the use of DERs in southern York Region, where demand is projected to surpass the existing system capability over the next decade
- **Coordination**: Exploring coordination across DER participants, IESO, and an LDC† acting as a Distribution System Operator (DSO) in procuring services from DERs

* Provided through NRCan's Smart Grid Program and IESO's Grid Innovation Fund
† Distributed Energy Resources (DERs); Non-Wires Alternatives (NWAs); Local Distribution Company (LDC)
‡ Based on Integrated Regional Resource Plan (IRRP) 2020

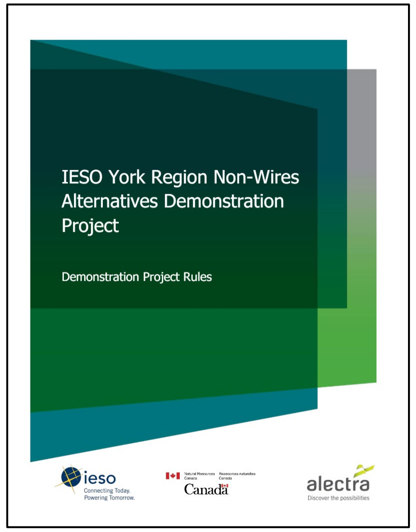
# Demonstration Design Framework

Whitepapers and other materials were developed, informing and documenting the demonstration design.

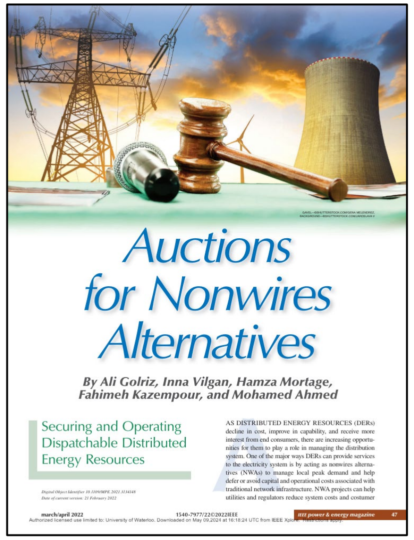



[Development of a T-D Interoperability Framework](#)
(ICF 2020)

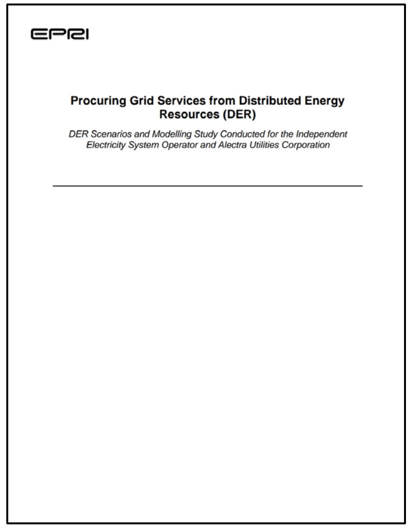

[NWA Using Energy & Capacity Markets](#)
(IESO 2020)




[Demonstration Rules and Contracts](#)
(BLG 2020, 2021)




[Auctions for Nonwires Alternatives](#)
(IEEE P&E Magazine 2022)

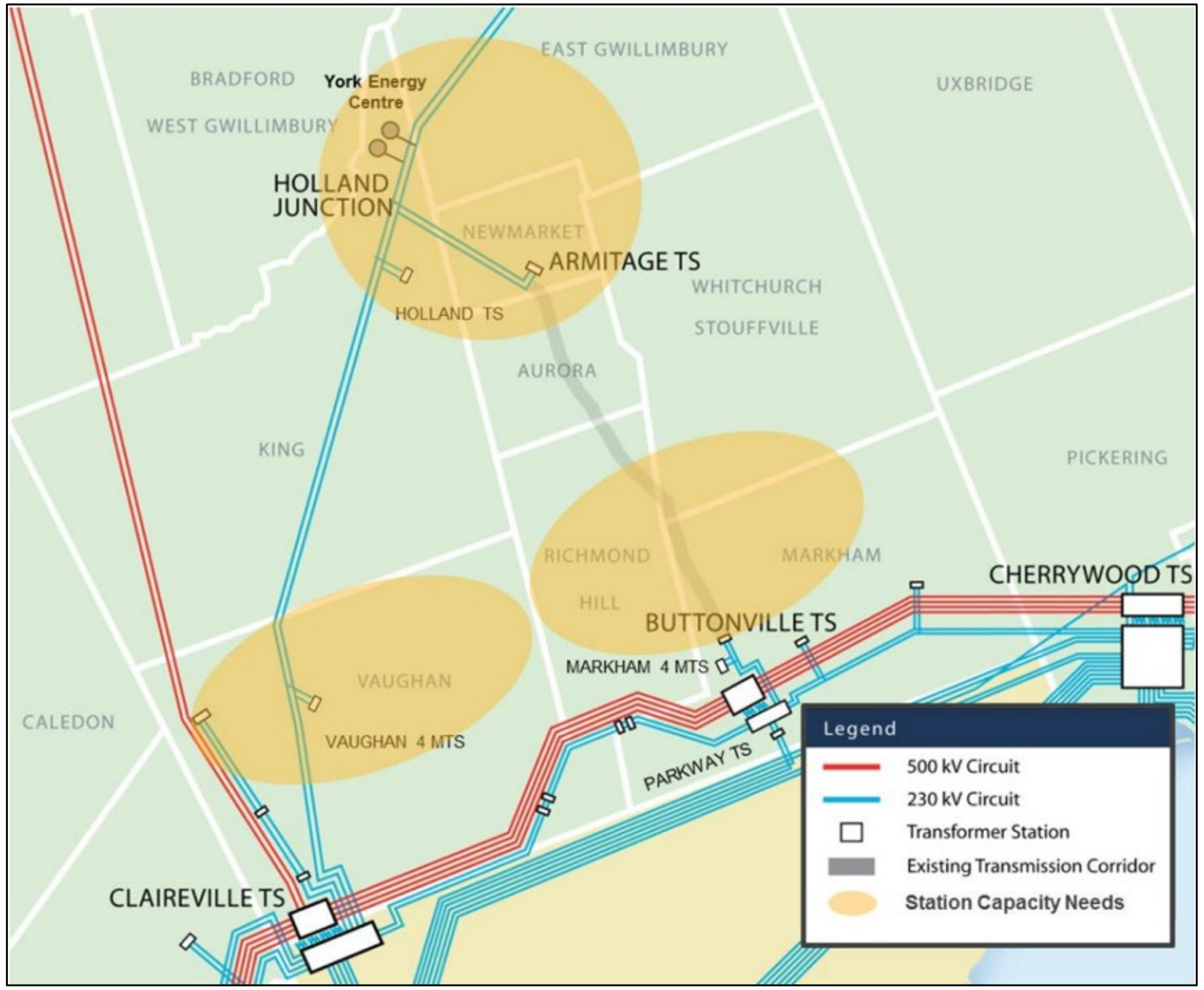



[Procuring Grid Services from DER – Scenarios & Modelling Study](#)
(EPRI 2024)

The demonstration evaluation report (ICF 2024) provides an overview of the design as well.

# Planning Context

- York region is one of the fastest growing regions in Ontario.
- York Region's 2020 Integrated Regional Resource Plan (IRRP) identified opportunity to study NWAs
  - Potential for transmission and distribution infrastructure deferral, given forecasted need
- Demonstration area included Richmond Hill, Markham, and Vaughan in southern York Region.
- Capital cost deferral opportunities evaluated for the purposes of this Demonstration may include
  - $50M+ Municipal Transformer Station (MTS), and
  - $100M+ transmission solution in the early 2030s
- The next IRRP for York Region is expected in 2025*.




**Source:** IESO, 2020, York Region IRRP

* The Demonstration evaluation provides only illustrative cost-benefit analysis and should not be mistaken for an assessment of current planning options in York Region.

# Demonstration Timeline

**2018**

- Market design framework
- Whitepaper and concept design development
- NRCan Proposal development

**2019**

- NRCan Submission and award
- NRCan-IESO agreement
- IESO-Alectra Agreement

**2020**

- Platform Development
- Stakeholder Engagement
- Participant Enrollment
- 2020 Capacity Auction

**2021**

- 2021 Local Energy Auctions
- Enhancements and updates, including Local Reserves
- 2021 Local Capacity Auction

**2022**

- 2022 Local Energy Auctions with Local Reserves Auctions

**2023 - 2024**

- DER Scenarios and Modelling Study
- Project evaluation and lessons learned
- Final reporting

# Demonstration Rules & Contract

- IESO, Alectra, and Borden Ladner Gervais (BLG) teams developed demonstration rules and contract documents.
- Documents were shared in a public stakeholder engagement process before finalization.
- Details to facilitate Local Capacity Auctions and Local Energy Auctions were captured in the documents.
- Approach taken was influenced by concepts from wholesale market and past programs.
- Rules were updated in Year 2 of Demonstration to incorporate Local Reserve Auctions*.

Demonstration **Rules** included:

- Eligibility criteria
- Registration requirements
- Resource review process
- Local Capacity Auction process

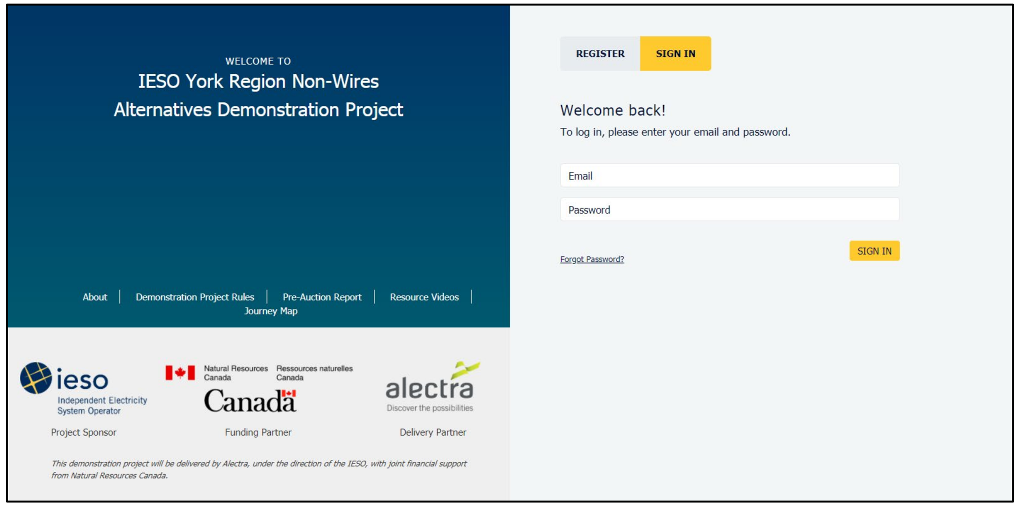
Demonstration **Contracts** included:

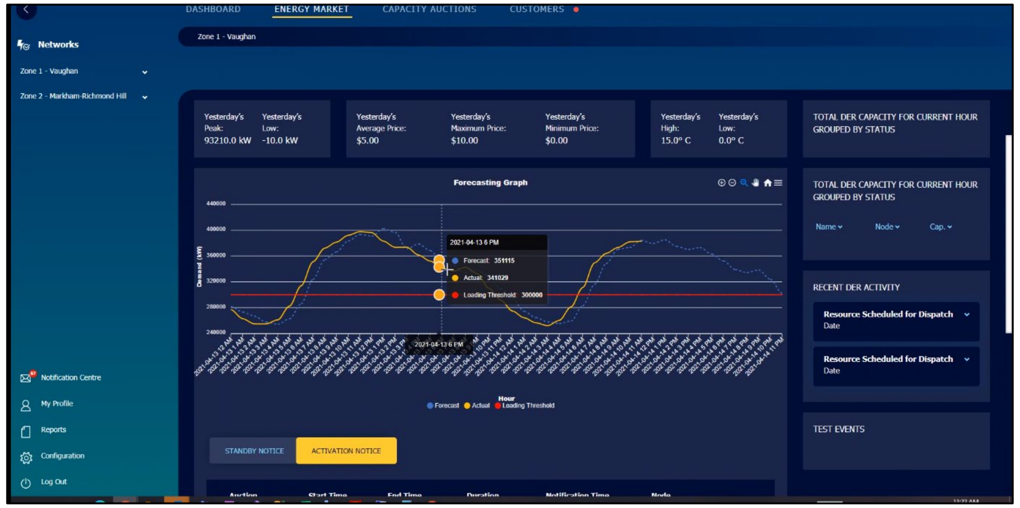
- Local Energy Auctions process
- Outage management
- Test activations
- Metering and baselining
- Settlement calculations

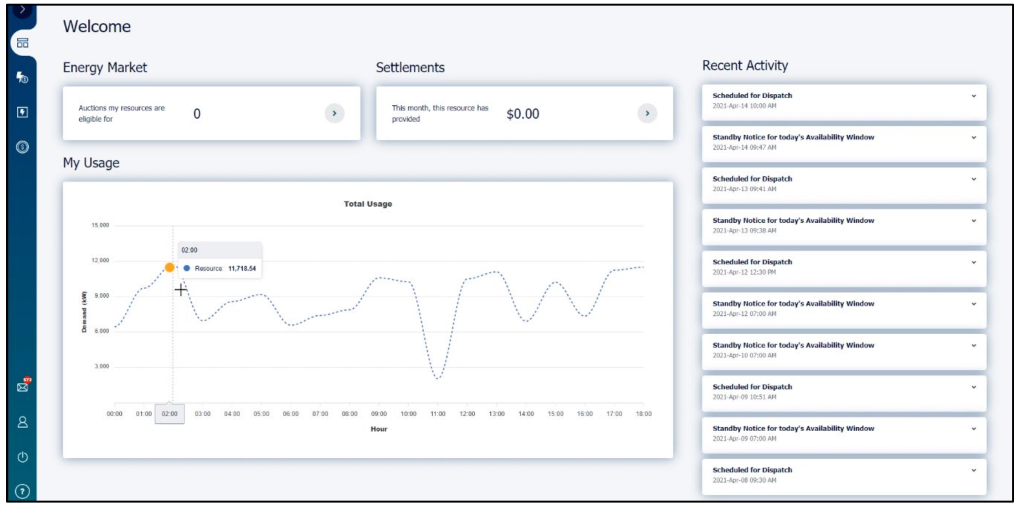
* DER participants in the Local Reserve Auction were given a 30-minute notification of activation, allowing for faster response to unforeseen events in the distribution system identified by Alectra

# Software Platform

- Alectra, in collaboration with Util-Assist, developed an in-house cloud-based software platform solution.
- Platform facilitated various activities, including:  registration, capacity auction, contracting, energy auction, measurement and verification, and settlements.



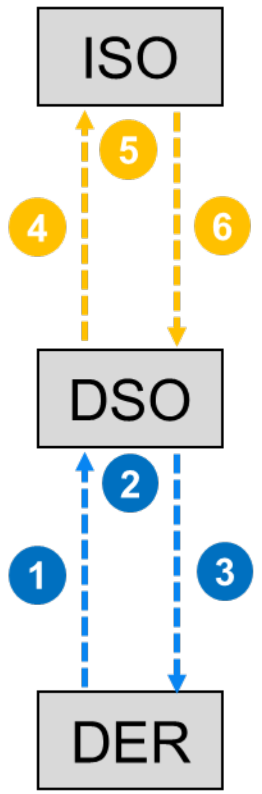




# Local Capacity Auction (LCA) Mechanism

- Eligible DER technologies: thermal generation*, battery storage, and demand response (C&I † or residential)
- In the LCA, participants submitted bids with one or more price-quantity (P-Q) pairs for each DER resource.
- The last P-Q pair accepted in the LCA sets the clearing price for the auction.
- Participants that cleared the LCA were offered a Demonstration contract.
- The contract assigned a capacity obligation, requiring participation in Local Energy Auctions.

**Illustrative/simulated coordination process during capacity market operations****

1. DERs submit capacity auction bids to DSO
2. DSO clears auction for all distribution-level capacity zones
3. DERs subject to distribution-level capacity auction rules
4. DSO submits available capacity auction bids to ISO‡
5. ISO clears auction for all transmission-level capacity zones
6. DSO subject to transmission-level capacity auction rules



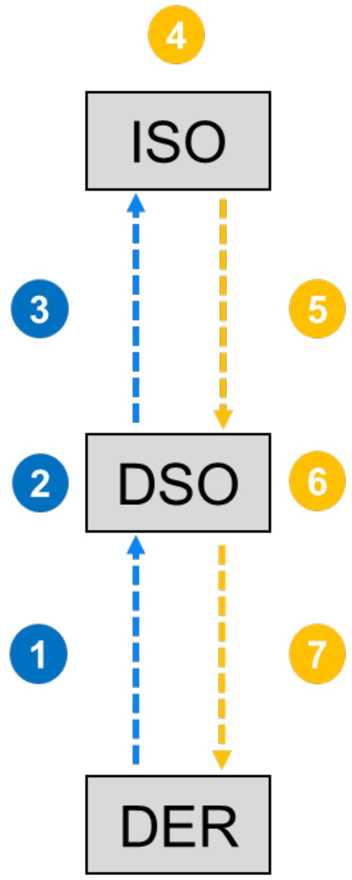

* A DER that generates electricity from natural gas, biomass, or biofuel, including combined heat and power (CHP)
† Commercial and industrial (C&I)
‡ Independent System Operator
**Source: Innovation and Sector Evolution White Paper Series – Non-Wires Alternatives Using Energy And Capacity Markets (IESO 2020)

# Local Energy Auction (LEA) Mechanisms

- Throughout May – October 2021 and 2022, DER participants submitted P-Q pairs to the LEA.
- P-Q pairs indicated the hourly willingness to provide local energy services.
- Participating DERs were required to be available from noon to 9 PM on business days.
- LEAs had a price ceiling of $2.00/kWh.
- The last P-Q pair accepted in the LEA sets the clearing price for the auction.
- Clearing price represented a simply derived DLMP*.
- Participants received email and software platform standby notifications by 7AM and activation notifications 2.5 hours in advance of operation.

**Illustrative/simulated coordination process during energy market operations****

1. DERs submit energy market bids and offers to DSO
2. DSO consolidates bids/offers and identifies DERs needed as NWAs
3. DSO submits consolidated energy market bids/offers to ISO
4. ISO clears transmission-level market
5. ISO dispatches DSO
6. DSO distributes ISO dispatch and clears distribution-level market
7. DSO dispatches DERs, including DERs needed as NWAs

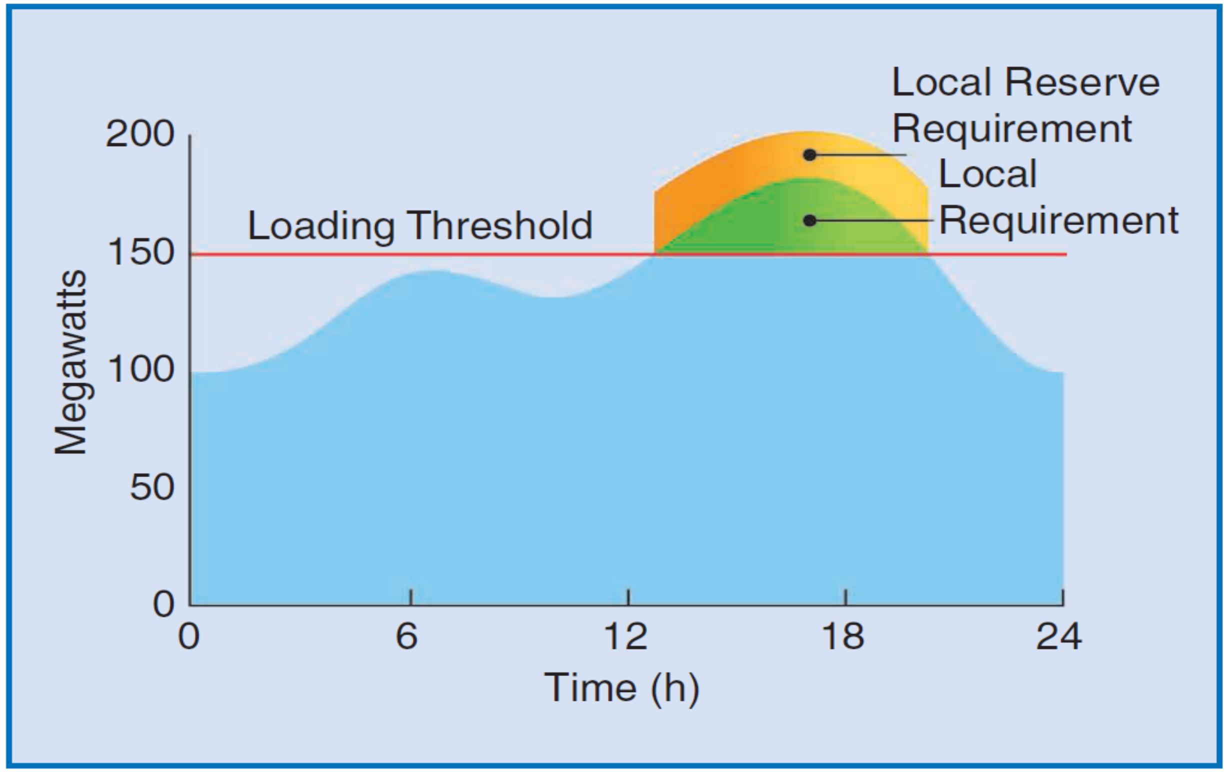



* Distribution locational marginal price (DLMP)

**Source: Innovation and Sector Evolution White Paper Series – Non-Wires Alternatives Using Energy And Capacity Markets (IESO 2020)

# Simulated Local & Wholesale Activations

- Local activations occurred when forecasted demand exceeded a pre-set loading threshold.
  - The threshold was determined based on historical demand in the demonstration area in order to simulate the limits on network infrastructure.
  - DER were activated as NWAs when threshold was exceeded.
- Once the local energy needs were met, DERs could be activated based on the nearest wholesale market shadow price.
  - If bids/offers were economic vs the shadow price, activated based on wholesale market signals
  - Aimed to simulate DERs being bid/offered into the wholesale market




Source: IEEE Power and Energy Magazine article, Auctions for Non-wires Alternatives: Securing and Operating Dispatchable Distributed Energy Resources

# Analysis of Demonstration Project

# Detailed Demonstration Objectives

The evaluation report details 9 objectives identified at the beginning of the project.

1. Explore **auctions** to secure services from DERs as alternatives to traditional infrastructure.

2. Explore **coordination** models among DER participants, the IESO and Alectra, acting as DSO.

3. Demonstrate the interest of DER participants in and the potential for the creation of **local prices**.

4. Assess **interest** in and **ability** of different DERs to compete to provide local services.

5. Assess impact of DERs on safe, reliable, and efficient distribution **system operations**.

6. Identify **barriers** to the use of DERs as alternatives and explore potential solutions.

7. Explore how benefits and design elements of wholesale **market design** could be extended.

8. Drive **community engagement** by enabling local solutions to meet local needs.

9. Assess the unique **operational** and **reliability** characteristics of DERs.

# Objectives Results Summary

The evaluation finds that the Demonstration was successful and met the objectives it set out to achieve.

- ☑ Demonstrated the use of local auctions to employ third-party DERs as NWAs.
- ☑ A coordination model demonstrated, and other models explored in whitepapers.
- ☑ Demonstration generated local capacity, energy, and reserve prices.
- ☑ The demonstration's two Local Capacity Auctions were oversubscribed by 250% and 170%.
- ☑ No safety or reliability impacts to the distribution system were identified.
- ☑ DER participant and project team feedback captured in evaluation.
- ☑ Local Energy Auction prices represented a simply derived DLMP*.
- ☑ Observed several new DER participant entrants in the demonstration.
- ☑ DER performance† was good on average (> 80%) but varied widely across participants.

* Distribution locational marginal price (DLMP)
† DER Performance: quantity activated vs quantity delivered

# Local Capacity Auction (LCA) Results

- Auction oversubscribed* by 250% in 2021 and 170% in 2022
  - Decrease was due to a higher capacity target of 15 MW in Year 2, up from 10 MW.
  - 11 of the 13 bidders from Year 1 returned for Year 2, indicating high continued interest.
- Clearing price decreased by 38% from 2021 to 2022
  - Weighted average bid price dropped by 51% in Year 2.
  - Indicates that participants likely updated their strategies based on Year 1 experiences and possible perceived competition

| Auction Characteristics | Year 1 (2021) | Year 2 (2022) |
|---|---|---|
| Quantity of Bidders | 13 | 11 |
| Quantity Resource IDs | 24 | 17 |
| Quantity of Bids | 41 | 34 |
| Total Capacity Bid (kW) | 25,200 | 25,775 |
| Cleared Capacity (kW) | 10,000 | 15,000 |
| Max Bid Price ($/kW-day) | $1.60 | $1.60 |
| Min Bid Price ($/kW-day) | $0.00 | $0.00 |
| Avg Bid Price ($/kW-day) | $0.78 | $0.56 |
| Weighted Avg Bid Price ($/kW-day) | $0.81 | $0.40 |
| Clearing Price ($/kW-day) | $0.64 | $0.40 |

*i.e. volume of capacity bids in the Local Capacity Auction exceeded the target capacity.

# Demonstration Participants

| Participant Name | 2021 Cleared Capacity (kW) | 2022 Cleared Capacity (kW) |
|---|---|---|
| Demand Power Group Inc. | 0 | 2,875 |
| Edgecom Energy Inc. | 3,000 | 0 |
| Enel X Canada Ltd. | 0 | 1,500 |
| Rodan Energy Solutions Inc. | 400 | 1,000 |
| Energy Hub Inc. | 1,200 | 2,525 |
| GC Project LP | 1,000 | 1,000 |
| Tycho Poly Inc. | 500 | 300 |
| Longo Brothers Fruit Markets Inc. | 1,000 | 1,000 |
| Markham District Energy | 2,900 | 1,800 |
| Sobeys Capital Inc. | 0 | 3,000 |
| **Total Cleared Capacity (kW)** | **10,000** | **15,000** |

- The demonstration saw great diversity in participant types
  - Included manufacturers, supermarket operators, residential customers, district heating facility, etc.
  - Most participated as aggregations, either self-represented or through a third-party aggregator
  - DER technology included smart thermostats, load curtailment, BTM* storage or gas generation.
  - Included new entrants and experienced participants

*Behind-the-meter (BTM)

# Local Energy Auction (LEA) Results

- The LEA clearing price was capped at $2.00/kWh.
  - While the average LEA consistently cleared at the ceiling price, the average bid price was $1.5/kWh over the two  years.
  - Future energy prices will be dependent on various factors such as DER location, DER penetration and growth and overall market maturity.
  - In follow-up interviews, many participants said they bid at the LEA price ceiling to maximize economic value and minimize dispatch frequency.
- The LEA resulted distribution-level activations only and did not directly demonstrate transmission-level activations.
  - Several local activations coincided with periods of high wholesale market prices and ICI* events.
  - Since all DERs were activated for local needs first, explicit transmission-level activations did not occur.

| Energy Bid Characteristics | Year 1 (2021) | Year 2 (2022) |
|---|---|---|
| Activations | 9 | 6 |
| Total Energy (MWh) | 184 | 342 |
| % of bids at Ceiling Price ($2/kWh) | 88% | 53% |
| Avg. Bid Price ($/kWh) | $ 1.81 | $ 1.19 |
| Weighted Avg. Bid Price ($/kWh) | $1.75 | $1.41 |

* Industrial Conservation Initiative (ICI) allows participating customers to manage their Global Adjustment (GA) costs by reducing demand during peak periods

# Settlements – Payments & Charges

The demonstration settlements involved five types of payments and three types of charges

| Payment Type | Payment Description | % of total payments |
|---|---|---|
| Availability Payment | Compensate participants for making capacity available for distribution or transmission level needs | 71% |
| Energy Payment (DLMP) | Compensate participants that deliver or reduce energy for distribution or transmission level needs | 23% |
| Local Reserve Payment | Compensate participants that are scheduled for local reserve services (distribution needs only) | 5% |
| Deployment Payment | Compensate participants when reserves are deployed (distribution needs only) | <1% |
| Test Payment | Compensate participants for the quantity delivered/reduced during a test activation | <1% |
| **Charge Type** | **Charge Description** | **% of total charges** |
| Availability Charge | Applies when participants fail to submit bids/offers to meet capacity obligation | 72% |
| Capacity Charge | Applies when participants fail a test activation | 25% |
| Dispatch Charge | Applies when participants fail to deliver or reduce energy within a 15% dead band of the quantity activated | 3% |

# DER Performance

# Performance – Overall Observations

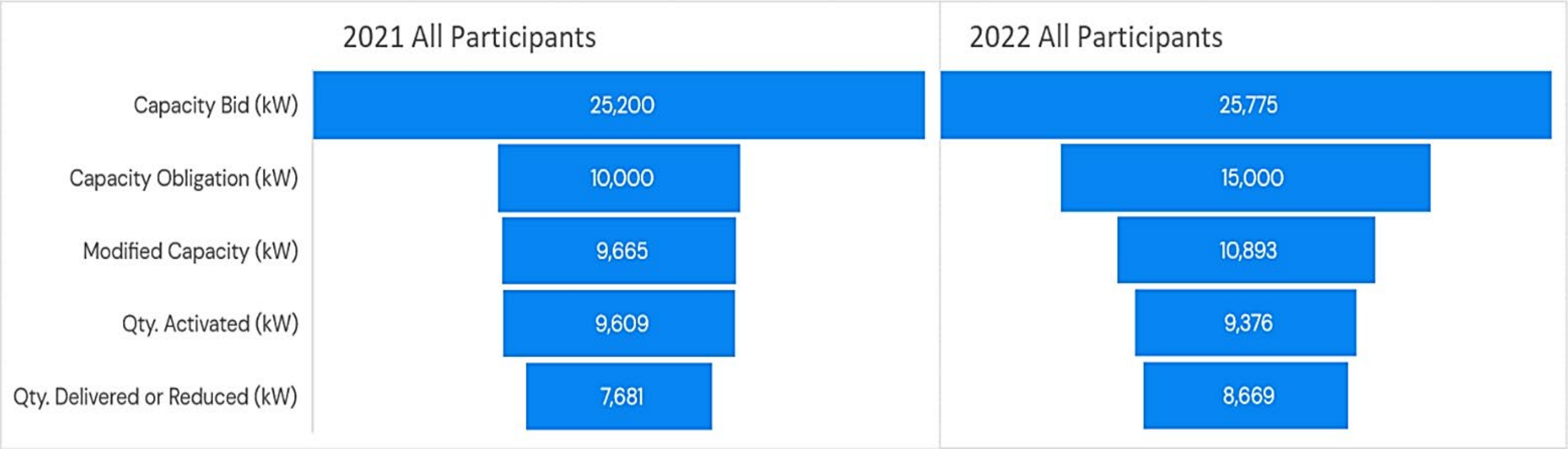
- Average performance for the portfolio across the demonstration was high (81-91%).
- However, there were significant over and under delivery by different DERs.
- DER unavailability and capacity derates reduced the capacity available for activation.
- Operational challenges during Year 2 resulted in resource unavailability (such as technical equipment failures, delayed equipment repairs due to supply chain issues driven by Covid-19).
- DERs with consistent under performance or outages were subjected to test activations.
- The test activations allowed the demonstration project to assess DER performance, charge for non-performance and adjust capacity obligation as needed.

| Operational Characteristics | Year 1 (2021) | Year 2 (2022) | Total | Equation |
|---|---|---|---|---|
| Sum of Hourly Capacity Obligation (MWh equiv.) | 254.5 | 262.9 | 517.4 | A |
| Sum of Hourly Quantity Activated (MWh equiv.) | 246.6 | 182.5 | 429.1 | B |
| Sum of Hourly Modified Capacity Obligation (MWh equiv.) | 246.5 | 194.9 | 441.4 | C |
| Total Quantity Delivered or Reduced (kWh) | 200.5 | 165.9 | 366.4 | D |
| Over/(Under) Delivered or Reduced (kWh) | 40.7 / (86.8) | 48.6 / (65.3) | 89.3 / (152.0) | D - B |
| Availability Metric* | 97% | 69% | 83% | B / A |
| Performance Metric* | 81% | 91% | 85% | D / B |

* The availability metric indicates the proportion of a DER that is available for activation compared to the original capacity obligation and considers unavailability. The performance metric is an indicator of the DERs' over- or under-deliveries compared to the activation instructions to provide energy services.

# Performance – Quantifying for Reliability

- Understanding DER reliability enables planners to assess the required capacity to meet needs.
- The Demonstration project identified four variables which were assessed to quantify DER reliability.
  - Capacity obligation: based on amount of kW cleared in the local capacity auction for a given DER
  - Modified capacity: capacity obligation minus resource unavailability and derates
  - Quantity activated: based on kW in each activation hour that the DER was activated for
  - Quantity delivered/reduced: the actual amount of kW in each hour the DER generated or reduced



# Illustrative Cost-Benefit Analysis

ICF

# Analysis Methodology

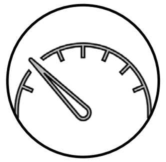
- An illustrative cost-benefit analysis explores the stacked value of DERs based on results from this Demonstration.
- The following slides provide an overview of the detailed analysis presented in the evaluation report.

A holistic assessment methodology was used.

- Scenario based: Financial, technical, investment parameters were chosen across three scenarios.
- Net cost/benefit: Calculated by comparing the benefit streams to the cost of services from DERs
- Present value: Multi-year horizons were modelled, and net present value was calculated.
- Deferral strategy: Adopted a 'look-ahead' and 'rolling deferral' strategy to manage infrastructure lead times, value fluctuations, long-term DER commitments, and electricity system planning cycles
  - Applied 5-year look-ahead and rolling deferral for MTSs, and 7-year for the transmission solution

# Scenario-Based Parameters

- Scenario-based approach adopted to help offer insights within uncertain and complex future conditions
- Differentiates among 3 scenarios, each reflecting varying levels of DER deployment and market impacts

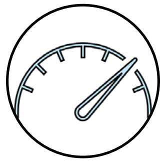


### Slow Growth

- Assumes limited DER deployment and growth. Due to a smaller pool of available DERs, there would be greater DER performance risk and higher DER procurement costs
- Assumes that traditional infrastructure costs are lower*, resulting in lower avoided costs for DERs used as alternatives

### Base Case

- Considers a moderate presence of DERs
- This scenario tracks most closely to Year 2 of the Demonstration project.



### High Growth

- Anticipates significant deployment and growth of DERs
- Due to a larger pool of DERs in the region, there would be more resource availability, reducing DER performance risks and decreasing DER procurement costs.
- Assumes that traditional infrastructure costs are higher*

* This assumption is independent of DER growth.

# Cost/Benefit Streams

- DERs, located close to load, can serve as alternatives to upstream infrastructure.
- In scenarios with high DER penetration, DERs may defer or eliminate the need for new infrastructure, avoiding costs in the short term.
- NSPM* for Benefit-Cost Analysis of DER was used to identify potential DER benefit/cost streams.
- Evaluation focuses on specific benefit streams, excluding other benefits that have value.

**NSPM benefit/cost stream items included in the illustrative cost-benefit analysis**

| Type | Utility System Impact |
|---|---|
| **Generation** | Energy Generation |
| | Generation Capacity |
| **Transmission** | Transmission Capacity |
| | Transmission O&M |
| **Distribution** | Distribution Capacity |
| | Distribution O&M |
| **General** | Financial Incentives |

* U.S. National Standard Practice Manual (NSPM)

# Key Cost/Benefit Parameters

- Avoided T&D* costs were based on expected future investments described in the 2020 IRPP.
  - New MTSs to meet load growth in Vaughan and Markham
  - Potential transmission solution upstream of the demonstration area in early/mid-2030s†
- Avoided generation capacity across the 3 scenarios is informed by:
  - 2022 IESO capacity auction clearing price
  - IESOs forecasted Net CONE* reference price
  - Storage price in the recent E-LT1 RFP*
- Refer to the report for a detailed breakdown.

| Parameter | Source | Slow Growth | Base Case | High Growth |
|---|---|---|---|---|
| Discount Rate (Nominal) | N/A | 8% | 10% | 10% |
| DER Reliability Margin‡ (Incl. Performance Adjustment) | ICF + demo data | 24% | 22% | 18% |
| MTS Unit Cost** ($2020 Millions) | Alectra | $50 | $50 | $62.5 |
| Transmission Unit Cost ($2020 Millions) | IESO | $100 | $100 | $175 |
| Avoided generation energy ($2022/MWh) | IESO | $30 | $30 | $36 |
| Avoided generation capacity ($2022/MW-Day) | IESO | $265 | $570 | $882 |
| DER energy procurement ($2022 $/MWh) | ICF + demo data | $2,000 | $1,500 | $1,000 |
| DER capacity procurement ($2022/MW-Day) | ICF + demo data | $640 | $400 | $400 |

* Transmission and distribution (T&D); Cost of new entry (CONE); Expedited Long-Term (E-LT1) RFP
† Due to the limits of the 230 kV circuits from Claireville TS to Brown Hill TS being reached.
‡ Total reduction in DER available capacity to increase reliability of DERs
** MTS unit cost for Slow and Base Case: $50M (based on 2020 IRRP); High Growth: Increased by 25% to account for additional upgrades

# Illustrative Analysis Results

- Net Cost/Savings varies significantly by illustrated scenario and over time.
- Stacking services, avoiding costs of upstream infrastructure, has potential to create significant value, assuming sufficient availability of DERs in the targeted areas.
- The economic value of DERs used as alternatives was found to be net-positive in most illustrated scenarios evaluated, although highly dependent on key assumptions.

**Summary of Net Benefits of using DERs as NWA in 2032***

| Category | Cost/Benefit | Slow Growth | Base Case | High Growth |
|---|---|---|---|---|
| A. Avoided Generation Energy Cost | Total Avoided Generation Energy Cost ($/MW-year equivalent) | $880 | $880 | $1,060 |
| B. Avoided Generation Capacity Cost | Total Avoided Generation Capacity Cost ($/MW-year) | $99,000 | $257,000 | $398,000 |
| C. Transmission Deferral Value | Rolling 7-Year Transmission Deferral Value ($/MW-year) | $104,000 | $112,000 | $174,000 |
| D. Distribution Deferral Value | Rolling 5-Year MTS Deferral Value ($/MW-year) | $57,000 | $70,000 | $144,000 |
| E. DER Procurement Cost | Total DER Procurement Cost ($/MW-year equivalent) | $(282,000) | $(213,000) | $(202,000) |
| **F. Net (Cost) or Savings for DER as alternative** | ($/MW-year equivalent) | $(21,000) | $227,000 | $515,000 |

* All figures are in 2032 dollars.

# Key Planning Take-Aways

- Prime locations for DERs are areas with constrained distribution or transmission networks, driven by rising demand, evolving load patterns, or the retirement of existing generators.
- DERs have shorter development timelines and can be deployed modularly, allowing for closer alignment of capacity need and DER installation (vs T&D which is oversized compared to initial capacity need).
- DERs potentially also provide option value, e.g., in case expected load growth does not materialize and construction of T&D asset which would be underutilized is avoided.
- Demonstration provided real-world data on DER performance and showcased that DERs can be a solution for meeting local energy needs.

# Participant Feedback

# Participant Feedback – Recommendations

All interviewed organizations indicated they would participate again and enjoyed working with Alectra. Registration and enrollment processes were effective, and the web platform was user friendly.

Energy bidding strategy was to bid at the ceiling to maximize payment per dispatch and minimize dispatches frequency. Aggregators noted that 10 activations per year is acceptable but was on the upper end.

Some demand response participants had combined heat and power (CHP) or natural gas-fired thermal generators, displacing site load to participate in the Demonstration.

Some participants withdrew DERs from other programs to enroll into the Demonstration. One of the participants noted confusion about participating in both the Demonstration and ICI.

# Participant Feedback – Recommendations

### Customer M&V and Settlement

- Provide settlement data in CSV format (per DER)
- Expand current payment details within the platform

### Event Notification

- Longer advance notification would be better for participants that use load curtailment.

### Metering & M&V

- Better access to meter data via distributor would simplify participation.
- Participants requested alternative or dynamic baseline methodology.

### Long-term Commitments

- Benefits of longer-term commitment (4-5 years) and greater certainty for participants was mentioned several times.

# Future Program Considerations

# Program Administration Considerations

### Participant Engagement Strategies

Enhance engagement by clearly communicating DER opportunities, defining program rules and contracts and facilitating participation using a web-based platform

### Automating and Scaling Processes

Standardize and automate participant activities on a web-based platform. Metering data available near real time can improve participant decisions.

### Historical Data for Future Evaluation

Collect and analyze relevant data to drive continuous program evaluation and improvement. Use historical data to gain confidence in DER capabilities.

# Program Design Considerations [1/2]

### Economic Valuation of DERs as Alternatives

Conduct local DER potential studies to inform planning decisions, ensuring sufficient DERs available. Value of DERs can be based on ‘stacked value’ across multi-year periods, as appropriate.

### Recognizing all DER Cost and Benefit Streams

Using established analytical methods to evaluate DERs highlights their economic potential. It is also important to acknowledge the value of less tangible benefits.

### DER Planning and Operation with Portfolio Approach

Incorporate DER performance metrics into acquisition processes to ensure reliable outcomes. Use a portfolio approach with multiple DER types to improve performance.

# Program Design Considerations [2/2]

**Reliability of Individual DER Performance**

Establish a framework that includes incentives for performance and disincentives for non-performance. Future DER reliability may differ due to evolving technologies.

**Multi-year Commitments on Program and DERs**

Provide multi-year commitments to improve certainty and support participants in investing in DERs. These commitments also boost confidence that planners have in using DERs.

**DSOs, DER Participants, and IESO Coordination**

Simplify provision of grid services by streamlining rules and processes across DSO and IESO opportunities. Effective coordination is essential for 'stacking' services across the grid.

# Conclusion

- The project demonstrated innovative ways to use DERs as alternatives or deferment to traditional infrastructure.
- Economic value of DERs used as alternatives was found to be net-positive in the simulated scenarios evaluated.
- Local market auctions showed promise as mechanism for securing services from DERs.
- Local pricing of services enabled participation that is aligned with electricity system needs.
- The Demonstration’s rules and contracts documentation have informed other Ontario pilots with different approaches.
- Findings support potential for ‘stacked services’ opportunities for DERs, assuming sufficient penetration of DERs in a given service area to support energy needs.

**Source:** Wikipedia, Distribution Transformer

# Feedback Questions

1. What key learnings from the evaluation of the Demonstration do you think are the most important to consider in future Distributed Energy Resources (DER) integration work?

2. Do you have any additional feedback on how to utilize DERs as alternatives to traditional infrastructure beyond what is outlined in the evaluation report?

Please use the feedback form found under the July 23, 2024 entry on the engagement webpage to provide feedback and send to engagement@ieso.ca by Aug 13, 2024.

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