

# IESO York Region Non-Wires Alternatives Demonstration Project

Webinar

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July 23, 2020



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# Today's Presenters



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# Disclaimer

This document provides an overview of the currently proposed rules for the IESO York Region Non-Wires Alternatives Demonstration Project and is subject to on-going revision. The posting of this document is made exclusively for the convenience of stakeholders, prospective participants, and other interested parties.

The information contained in this document and related documents shall not be relied upon by any stakeholder, prospective participant, or other interested party as a basis for any commitment, expectation, interpretation and/or design decision.

# Agenda

1. Project Overview
  - Structure & Background
  - Integrated Regional Resource Plan
  - Demonstration Objectives
  - Dec Webinar – Feedback Summary
2. Demonstration Details
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  - Demonstration Timelines
  - Eligibility Requirements
  - Registration
  - Local Capacity Auction
  - Local Energy Auction
  - Settlement
  - Baselineing
  - Distribution LMP (DLMP)
3. Stakeholder Feedback
4. Next steps

# Project Overview

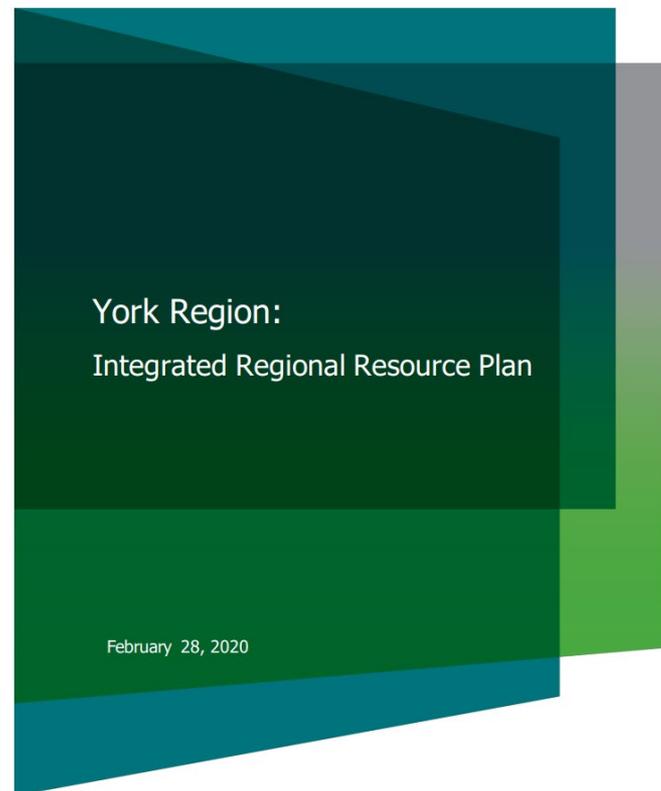
- Aimed at developing a better understanding of how to competitively secure and operate distributed energy resources (DERs) to meet local, regional and province-wide electricity needs
- When communities grow and need more electricity, some combination of new transmission and distribution infrastructure and central generation has traditionally been the primary solution - DERs are providing communities more options to address their local electricity needs
- DERs can provide value by managing local peak demand and providing other services to defer, reduce or avoid capital and operating costs associated with traditional electricity infrastructure
- The IESO and Alectra are committed to fostering innovation that supports reliability and affordability for ratepayers because investing in innovation today will position Ontario's electricity sector to effectively face the challenges of tomorrow

# Structure & Background

- Project has \$5M of funding from Natural Resources Canada, matched with \$5M from the IESO's Grid Innovation Fund
  - IESO: lead & sponsor; Alectra: delivery partner; NRCan: funding partner
  - Demonstration concept design is supported by two white papers
- Adopting a Total Independent Distribution System Operator (IDSO) model, with Alectra acting as the IDSO
  - Total DSO: DERs interact with DSO only, which sends local + wholesale signals
  - Independent DSO: Alectra and specified Affiliates are not eligible participants
- Project is a proof-of-concept, will operate in a simulated test environment that is isolated from the real IESO market and system operations
  - Local need and wholesale market participation are simulated
  - Services secured, obligations, activations, settlement, etc. are real
- Demonstration involves two Local Capacity Auctions (one in Q4 2020 and one in 2021), but the Demonstration Project Rules only contemplate the first
  - DERs not contributing to resource adequacy, given simulated needs
- Platform being developed to register, secure, schedule, and activate DERs

# York Region Integrated Resource Plan

- Integrated Regional Resource Plan (IRRP) final report posted in February 2020
- Includes a 20-year forecast of peak electricity demand based on:
  - Demand forecast
  - Energy efficiency targets
  - Contracted distributed generation
  - Impact of extreme weather conditions
- York Region is one of the fastest-growing regions in Ontario
  - Extensive urbanization expected to continue
- Existing station infrastructure in southern York Region expected to reach limit in mid- to late-2020s



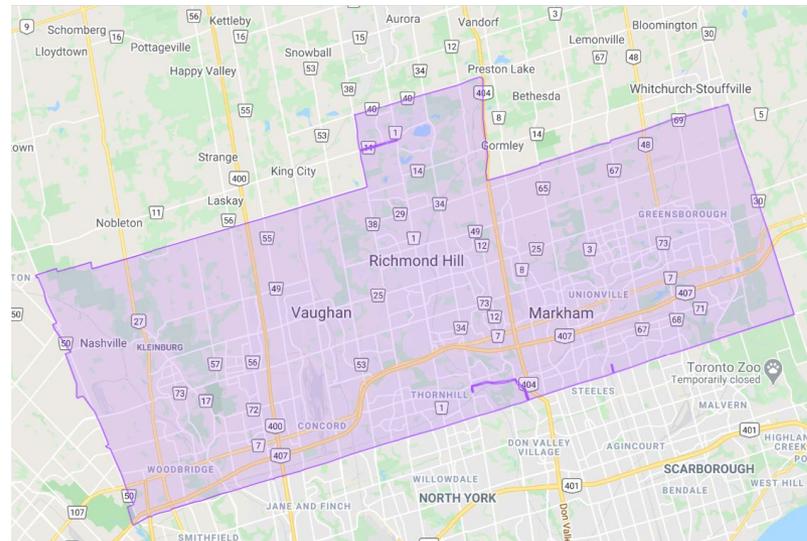
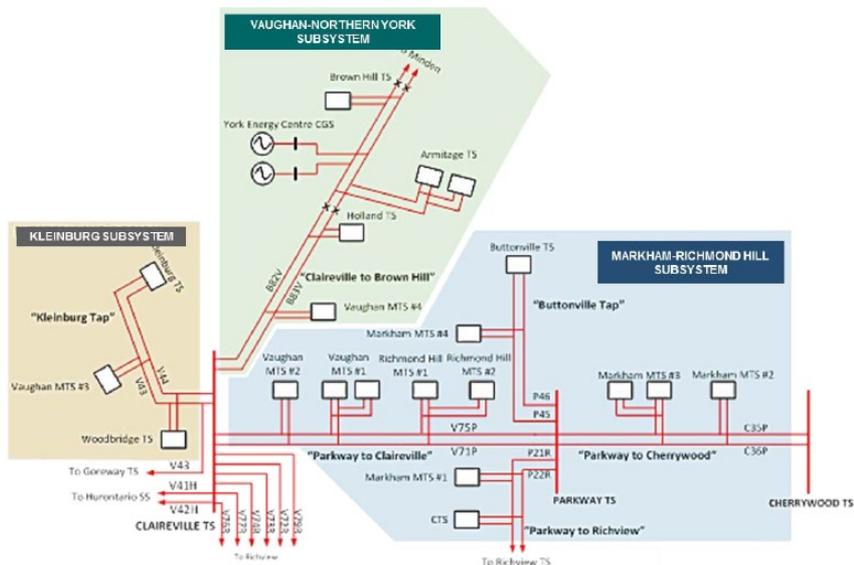
# Demonstration Objectives

- Explore the use of auctions to secure services from DERs to demonstrate their use as NWAs and wholesale-level resources
- Explore models of coordination between the IESO, as the transmission system operator, and Alectra, acting as DSO for the Demonstration
- Assess the interest and ability of different DERs to compete to provide local capacity and energy services
- Identify market and systems operations barriers to NWAs and exploring potential solutions to such barriers
- Assess the operational and reliability characteristics of particular DERs as compared to traditional solutions
- Assess the feasibility and impacts of distribution-level electricity pricing, while supporting reliability, resource adequacy and market efficiency
- Drive community engagement and development by enabling local solutions to meet local needs

# Dec 2019 Webinar – Feedback Summary

- Participation in IAMs: intent is to facilitate where commitment periods do not overlap (i.e. during winter periods)
- Participation of LDC-owned DERs: DERs owned and/or operated by LDC or affiliates that are unrelated to the host LDC will be eligible to participate
- Competition: focus on maximizing participation by removing barriers
- Revenue stacking: allow revenue stacking while avoiding duplication of compensation
- Hourly Demand Response (HDR): alignment with IESO's existing HDR participation model
- Success metrics include: compliance with dispatch instructions, meeting local and system level needs, transmission-distribution interoperability, and identification of potential future rule/process changes
- Requested details: regarding demonstration rules and participant obligations, including DLMP, which is the purpose of this webinar

# Demonstration Area



- The Demonstration is focused on the southern York Region, and includes the municipalities of Richmond Hill, Vaughan, and Markham
- A map of the demonstration area can be found [here](#)
- Includes area serviced by: Markham #1 - #4 MTS, Buttonville TS, Richmond Hill #1-#2 MTS, Vaughan #1 - #4 MTS, and Woodbridge TS
- Southern York Region peak demand is about 1350 MW

# Demonstration Timelines



# Process Overview - Part 1

## Initial Registration Period (Approximately 1 month)

- Auction parameters and timelines are published

### Registrant Registration

- People wishing to participate in the Local Capacity Auction must register as a Registrant on the Platform
- Must register as either a Direct Participant or an Aggregator
- DSO reviews and approves Eligible Registrants

### DER Registration

- Registrant registers their DERs on the Platform
- DSO reviews and approves Eligible DERs
- Subject to the supplemental registration evaluation to be completed during the Forward Period
- Eligible Registrants receive an Eligibility Notice; identifying their Eligible DERs and Eligible Capacity
- Registrant may proceed to Supplemental Registration to finalize registration of its DERs

# Process Overview - Part 2

## Local Capacity Auction (Two days)

- Only Eligible Registrants and Eligible DERs may participate in the Local Capacity Auction
- Eligible Registrants must deliver their Auction Deposit prior to the Local Capacity Auction
- Eligible Registrants submit Capacity Offers
- DSO clears the Local Capacity Auction
- The DSO will offer a Contract to Eligible Registrants for each Eligible DER that clears the Local Capacity Auction
- Establishes the Local Capacity Obligation for each Contracted DER

# Process Overview – Part 3

## Forward Period (Approximately 5 months)

- Eligible Registrants execute a Contract and pay the required Completion Security for each DER
- Once the Contract is executed and Completion Security posted Eligible Registrants become Participants and Eligible DERs become Contracted DERs
- DSO will publish the Post Auction Report

### Supplemental Registration

- Supplemental Registration must be completed by Participants for all Contracted DERs
- All Direct DERs must be in-service, and all Contributors must be contracted, before the deadline specified in the Rules
- DSO assesses all Contracted DERs against eligibility criteria. Failure to meet eligibility criteria will result in termination of the Contract

# Process Overview – Part 4

## Commitment Period (Local Energy Auctions) (6 months May 1 - Oct 31)

- Participants must meet its Local Capacity Obligation by submitting bids/offers for each of its Contracted DERs into the Local Energy Auction process
- Local Energy Auctions occur each Business Day during the Commitment Period
- Aggregators may update their Contributor DERs periodically during the Commitment Period

# Eligibility Requirements - Participants

- To register as a Direct Participant, the Registrant must be an existing DSO customer with a valid account number or Temporary Account Number
  - In the event the Registrant does not have an account number but wishes to register a Future DER, the Registrant must obtain a Temporary Account Number
- The Registrant must be a corporation (with or without share capital), co-operative, partnership, or limited partnership
- DER Capacity of the DERs submitted by a Registrant and its Affiliates cannot exceed 3,000 kW
- Direct Participants can participate with Direct DERs and Aggregators can participate with Contributor DERs registered as Aggregator DERs
- Direct Participants, Aggregators and Contributors may be registered market participants in the Wholesale Markets and also participate in the Demonstration

# DER Eligibility - Direct Participants

- Must be owned by the Direct Participant
- Must be only one of the following types of “Permitted Resource”:
  - a Demand Response Resource
  - a Gas-fired Resource
  - a Storage Resource
- Must have a DER Capacity of at least 100 kW and no more than 3,000 kW
- Must, no later than the last day of the Supplemental Registration Period:
  - be constructed, in commercial operation with a fully energized Connection Point capable of accommodating the DER Capacity
  - have a valid Meter Number
  - connect directly to the DSO’s Distribution System at a single Connection Point in the Demonstration Area
  - be capable of providing the DER Capacity for four (4) consecutive hours at any time once during each Availability Window
  - have revenue-quality interval metering

# DER Eligibility - Aggregators

- Each Contributor DER no later than the last day of the Supplemental Registration Period must:
  - be owned by the Contributor
  - have a valid Meter Number
  - have revenue-quality interval metering
  - connect directly to the Distribution System at a single Connection Point
  - have a Connection Point within the Demonstration Area
  - be one of the Permitted Resource types
- Each Aggregator DER must:
  - be two or more Contributor DERs
  - be a single Aggregator Resource Category
    - Four categories for Aggregator DERs: (i) Demand Response Resources - Residential Customers, (ii) Demand Response Resources - Commercial and Industrial Customers, (iii) Gas-fired Resources, and (iv) Storage Resources
  - be capable of providing the Eligible Capacity over at least four (4) consecutive hours during each Availability Window
  - have an Eligible Capacity of at least 100 kW and no more than 3,000 kW

Registrant (+ Affiliates)  
Sum of the Aggregator DERs  
 $100 \text{ kW} \leq \text{Capacity} \leq 3,000 \text{ kW}$

AGGREGATOR

$100 \text{ kW} \leq \text{Eligible DER} \leq 3,000 \text{ kW}$

Aggregator DER

Aggregator DER

Aggregator DER

Aggregator DER

STORAGE

GAS-FIRED  
GENERATION

DEMAND  
RESPONSE -  
C&I

DEMAND RESPONSE -  
RESIDENTIAL

Contributor  
DER

# DER Ineligibility

- A DER that is participating in the IESO Capacity Auction for the Demonstration's Commitment Period
- A Direct DER that is a registered facility or a Contributor DER that is a registered contributor in the Wholesale Markets during the Demonstration's Commitment Period
- A DER that is the subject of a physical or financial power or capacity purchase contract relating to the generation or storage of Electricity, a net-metering contract or other form of contract relating to Electricity or Related Products (an "Existing Contract"), unless otherwise consented to by Alectra
- A DER that is the subject of rate regulation by the OEB pursuant to the Ontario Energy Board Act, 1998
- A DER that is not in respect of a Permitted Resource, including a DER that involves a Generation Resource that uses coal or diesel as a fuel source
- A DER that is the subject of a contract with a licensed electricity retailer, unless an Electricity Retailer Waiver is provided

# Registration

- Registration is to be completed via the Platform and includes two stages
  1. Initial Registration pertains to registering the Registrant
    - Information needed to demonstrate eligibility, type for each DER, DER Capacity
    - Initial Registration Period closes 23:59 EST Oct 21, 2020
  - Registrants that complete the Initial Registration will be issued an Eligibility Notice to offer Eligible Capacity into the Local Capacity Auction
    - Eligible Registrants with DER that clear the Local Capacity Auction will be offered a Contract for the duration of the Commitment Period
    - Once a Contract is executed, the Eligible Registrant is considered a Participant
  2. Supplemental Registration pertains to registering the DERs
    - Eligible Registrants will be required to complete the Supplemental Registration
    - Must be completed prior to 23:59 EST Mar 31, 2021
    - All information required for each Direct DER and Contributor DER
    - All Direct DERs must be in-service, and all Contributors must be contracted

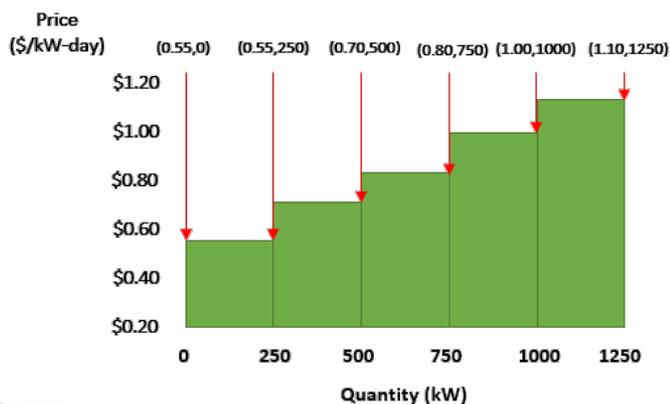
# Local Capacity Auction

- Eligible Registrants with one or more Eligible DERs can participate in the Local Capacity Auction up to their respective Eligible Capacity
- By Sep 23, 2020, the Pre-Auction Report will be published on the Website\*
  - Target Capacity = 10 MW
  - Capacity Auction Offer Window = Nov 18-19, 2020
  - Minimum Capacity Auction Price = \$0/kW-day
  - Maximum Capacity Auction Price = \$1.6/kW-day
  - Minimum Energy Price = \$0/kWh
  - Maximum Energy Price = \$2/kWh
- An Auction Deposit will be required from the Eligible Registrant via certified cheque for each Registered DER\*
  - Auction Deposit = \$2/kW multiplied by the Eligible Capacity
  - Will be refunded to the unsuccessful Eligible Registrants
  - For successful Eligible Registrants with
    - existing DERs, refunded
    - Future DERs, exchanged for Completion Security

\* Dates and values presented here for the purpose of seeking stakeholder feedback – the Pre-Auction Report will set out what is ultimately used for the Demonstration

# Local Capacity Auction – Offer Submission

- Capacity Offers can be submitted for Eligible DERs (individually) using the Platform during the Capacity Auction Offer Window
  - Applicable to the Availability Window, defined as from noon to 9PM EST on Business Days throughout the Commitment Period
  - Must not be less than 100 kW and must not exceed the Eligible Capacity
- Offer format of five (5) monotonically increasing price-quantity pairs
  - Quantities must be submitted in minimum increments of 10 kW
  - Price in \$/kW-day submitted in dollars and whole cents
  - For each price-quantity pair, indicate whether it must be fully or may be partially cleared



# Local Capacity Auction – Post Auction

- An electronically sealed-offer, single round, pay-as-clear price format
  - Offers will be accepted up to the Capacity Target
  - Ties will be broken based on timestamp of the Offer submission
- Post-auction report to be issued on Nov 25, 2020 and include:
  - the Local Capacity Auction Clearing Price
  - the capacity cleared for the Demonstration Area
  - the Local Capacity Obligation for each successful Eligible Registrant
- A Contract will be issued for each Eligible DER that clears the Local Capacity Auction and will specify the Local Capacity Obligation
  - Eligible Registrant will have until Jan 6, 2021 to accept and enter into the Contract electronically via the Platform
  - Completion Security of \$2/kW multiplied by the Eligible Capacity will be required for Future DERs
    - Returned upon successful completion of the Supplemental Registration
- Upon Contract execution, the Contracted DER becomes qualified for the Local Energy Auctions

# Local Energy Auction

- The 2020 Local Capacity Auction will secure capacity for the Commitment Period defined as May 1, 2021 until October 31, 2021
- To satisfy their Local Capacity Obligation(s), Participants are required to participate in Local Energy Auctions during the Commitment Period by
  - submitting Bids/Offers in the Local Energy Auctions
  - submitting Outage or non-performance event information
  - responding to activation instructions
- Local Energy Auction will run every Business Day for each hour of an Availability Window using a single-round, pay-as-clear format
  - Maximum of ten (10) activations per Contracted DER in the Commitment Period
  - A Contracted DER will only be activated once during an Availability Window
  - Activation will be for a minimum of one hour and up to four consecutive hours
- Local Energy Auction for each Activation Hour will clear using the Bids/Offers that were existing as of 09:00 EST on that day
  - Bids/Offers will be standing, but may be updated prior to 09:00 EST

# Local Energy Auction - Activation & DLMP

- Standby Notice is issued by 07:00 EST on Business Days if
  - the most recent Loading Forecast shows a Local Requirement
  - the Standby Shadow Price is greater than or equal to \$0.1/kWh (i.e. \$100/MWh)
- An Activation Notice for the Contracted DER will be issued to the Participant no later than 2 hours in advance of the first Activation Hour
- Price-quantity pairs for the Contracted DER will be accepted
  - a) if there is a Local Requirement, the price-quantity pairs that are among the least-cost set needed to meet a Local Requirement will be accepted
  - b) if there is not a Local Requirement or if there are price-quantity pairs remaining following a), then price-quantity pairs that are  $\leq$  the Activation Shadow Price will be accepted

Quantity Activated is the sum of the quantities of the price-quantities accepted

- DLMP is the higher of the highest priced price-quantity pair accepted in a) and the Activation Shadow Price in b)

# Local Energy Auction - Bid/Offer Format

- Local Capacity Obligation must be made available and Bid/Offered into the Local Energy Auction for each hour of an Availability Window
- Demand Response Resources will submit energy Bids identifying the price at which they are willing to Reduce Energy
- Storage Resources and Gas-fired Resources will submit energy Offers identifying the price that they are willing to Deliver Energy
- Bids or Offers will be in the form of five (5) monotonically decreasing or increasing (respectively) price-quantity pairs
  - Quantities must be submitted in minimum increments/decrements of 10 kWh
  - Price in \$/kWh will be submitted in dollars and whole cents
  - For each price-quantity pair, indicate whether it must be fully or may be partially cleared
- Energy Bid/Offer price must be  $\geq$  the Minimum Energy Price and  $\leq$  the Maximum Energy Price specified in the Pre-Auction Report
  - Minimum Energy Price = \$0/kWh and Maximum Energy Price = \$2/kWh

# Demonstration Settlement

$$\text{Monthly Payment} = \text{Availability Payment} + \text{DLMP Payment} + \text{Test Activation Payment} - \text{Non-Performance Charges}$$

- Availability Payment (\$) =  $\sum$  Local Capacity Obligation (kW)  $\times$  Local Capacity Price (\$/kW-day)
  - If Local Capacity Price ends up being less than the Revenue Guarantee (IESO Q4 Capacity Auction price), then the Revenue Guarantee will be used instead
- DLMP Payment (\$) =  $\sum$  Energy Quantity (kWh)  $\times$  [DLMP (\$/kWh) – HOEP (\$/kWh)]
  - To simulate the economics if Participants were exposed to Distribution Locational Marginal Price
- Test Activation Payment (\$) =  $\sum$  Energy Quantity (kWh)  $\times$  \$0.25/kWh

$$\text{Non-Performance Charges} = \text{Availability Charge} + \text{Capacity Charge} + \text{Dispatch Charge}$$

- Availability Charge: claws back the availability payment for hours in the Availability Window in which bids/offers are not submitted for the Contracted DER
- Capacity Charge: claws back the full month's Availability Payment, if a Test Activation is failed (20% dead band)
- Dispatch Charge: claws back the availability payment for hours which the Contracted DER does not deliver its Activation Quantity (15% dead band)

# Outages, Test Events, & Contributor Mgmt.

- During an Outage, energy Bids/Offers must be updated to reflect the actual capability of the Contracted DER and the Availability Charge will apply
  - For Planned Outages, an Outage Notice must be submitted (using the Platform) prior to the Commitment Period
  - For Forced Outages, Participants should make commercially reasonable efforts to provide an Outage Notice as soon as possible
  - Outage caused by a force majeure event does not constitute a Forced Outage
- Up to two (2) Test Activations may be conducted to verify the Local Capacity Obligation
  - An Advisory Notice will be provided one day in advance of a Test Activations
  - Failing a Test Activation will result in Capacity Charge and a subsequent Test Activation, and consecutive failures may result in an event of default under the Contract
- Aggregator may change Contributor DER during the Commitment Period
  - Contributor DERs can be added/removed during the last two Business Days of each month

# Demand Response Baseline – C&I

- For Aggregator DERs under the C&I customer category, the baseline for each Activation Hour will be calculated as

$$\text{Baseline}_h = \text{Standard Baseline}_h \times \text{In-Day Adjustment Factor}_h$$

- Standard Baseline: average of the highest 15 historical consumption values in a given hour “h” of the last 20 Suitable Business Days in the 35 days preceding the activation notice
  - Suitable Business Days are Business Days that are not Activation Days
- In-Day Adjustment Factor is the average consumption values in the Adjustment Window divided by the average consumption in the Adjustment Window hours in the past highest 15 of 20 Suitable Business Days
  - Adjustment Window is the 3 hours occurring 1 hour before an activation event

# Demand Response Baseline – Residential

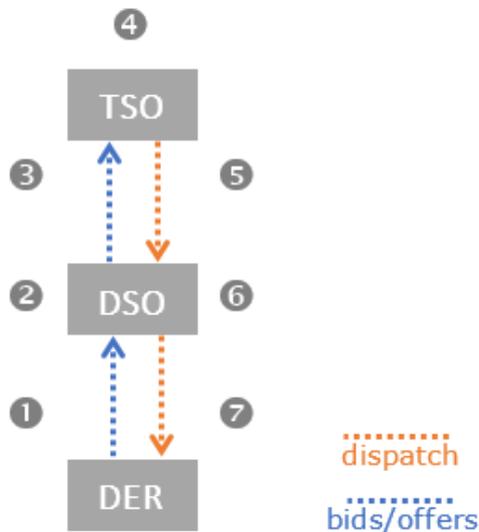
- For Aggregator DERs under the Residential Customer category, a randomized control trials (RCT) baseline methodology is used
  - Evaluates the difference between a “treatment” and “control” group
  - “Treatment” group are Contributors activated as per Activation Notice
  - “Control” group is 350 randomly selected Contributors used as proxy for baseline consumption
- The baseline for each Activation Hour will be calculated as

$$\text{Adjusted Control Group Load}_h = \frac{\text{Total Consumption}_h}{\# \text{ of Contributors in Control Group}_m} \times \text{Same-Day Adjustment}$$

- Total Consumption is the measurement data for the control group for the hour
- Same Day Adjustment =  $C \div D$ , where
  - “C” is the average consumption during the Adjustment Window on the Activation Day for the treatment group divided by the number of Contributor DERs in the group
  - “D” is the average consumption during the Adjustment Window on the Activation Day for the control group divided by the number of Contributor DERs in the group
  - Adjustment Window is the three hours occurring one hour before an activation

# Interoperability - Total DSO Energy Auctions

- An objective of the demonstration is to explore models of coordination between the IESO and Alectra, acting as DSO for the Demonstration
- Non-Wires Alternatives Using Energy and Capacity Markets white paper lays out illustrative TSO-DSO coordination processes and considerations for select models, e.g. for Total DSO model:

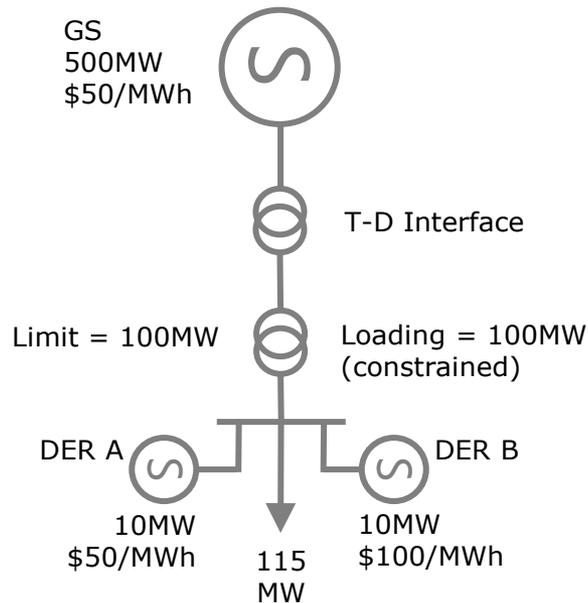


Coordination process steps:

- ① DERs submit energy market bids and offers to DSO
- ② DSO aggregates bids/offers and identifies DERs needed as NWAs
- ③ DSO submits aggregated energy market offer to TSO
- ④ TSO clears transmission-level market
- ⑤ TSO dispatches DSOs
- ⑥ DSO disaggregates TSO dispatch of DERs
- ⑦ DSO dispatches DERs, including DERs needed as NWAs

Simulated in the Demo by checking against the Activation Shadow Price

# Case: DER needed locally, constraint binding, and DLMP > LMP



ID	Offer (\$/MWh)	Quantity (MW)	Partial Clearing
A	\$50	10	0
B	\$100	10	1

Minimum Dispatch = 15MW

ID	Tag
A	10MW Dispatched
B	5MW Dispatched

DLMP = \$100/MWh

Market-based coordination process:

- DERs submit energy market offers to DSO
  - DER A = 10 MW @ \$50/MWh
  - DER B = 10 MW @ \$100/MWh with partial clearing
- DSO aggregates DERs, identifies DERs needed for Dx
  - Minimum DER dispatch = 15 MW to respect limit
  - All of DER A and 5 MW of DER B needed
  - DLMP' = \$100/MWh
- SOD submits aggregated offer to TSO
  - DERs organized into P-Q pairs as per TSO rules
  - DSO either excludes DERs needed locally or identifies them as "must run"
  - 5 MW of DER B available for TSO dispatch
- TSO clears transmission market
  - 100 MW of GS clears
  - LMP = \$50/MWh
- TSO dispatches DSO
  - In this case, DSO dispatch is 0 MW
- DSO disaggregates TSO dispatch
- DSO dispatches DERs, including DERs needed for Dx
  - DER A dispatch = 10 MW
  - DER B dispatch = 5 MW
  - DLMP' > LMP, therefore DLMP = DLMP' = \$100/MWh

# Stakeholder Feedback Requested

- The IESO is requesting feedback on the Draft Demonstration Project Rules posted on the project [webpage](#)
- Feedback on the following questions would be particularly helpful:
  - Do the proposed dates present any challenges?
  - Any other general feedback with regards to the draft Demonstration Project Rules? If so, please include the specific section of the Rules being referenced.
  - Information about you (will not be shared publicly):
    - Subject of a contract with a licensed electricity retailer? Specify, if possible.
    - A new DER that is not yet in operation? Will be seeking a connection impact assessment and/or connection cost agreement?
    - A DER that is registered in the IESO-Administered Markets?
    - A DER with an existing contract relating to its electricity? Specify, if possible.
    - Funding from a Governmental Authority or Alectra for the DER? Specify, if possible.
- Please use the feedback form that can be found under the July 23, 2020 entry on the IESO York Region NWA Demonstration Project [webpage](#) and send to [engagement@ieso.ca](mailto:engagement@ieso.ca) by August 13, 2020

# Next Steps

Timing	Engagement Activity
July 23, 2020	Webinar
August 13, 2020	Stakeholder feedback due
September 10, 2020	Responses to stakeholder feedback posted Final Demonstration Project Rules posted
September 23, 2020	Pre-Auction Report issued
October 2020	Registration/local capacity auction platform walk-through
October 21, 2020	Initial Registration closes
November 18-19, 2020	Local Capacity Auction Offer Window
November 25, 2020	Post-Auction Report issued

# Questions & Comments