Demand Response Working Group

November 15, 2018

ieso
Connecting Today.
Powering Tomorrow.

Agenda

Time	Agenda Item
9:00am	Welcome
9:05am	DR Operational Updates - DR activation timeline - DR registration Updates (Virtual – C&I)
9:45am	2019 Work Plan - Proposed topics and structure
10:15am	Break
10:30	Incremental Capacity Auction - DR participation in the ICA - DR resources participating in the ICI
12:20pm	Next Steps - Proposed meeting frequency and 2019 dates
12:30pm	Adjourn

DR Activation Timeline Proposals

Demand Response Working Group

November 15, 2018

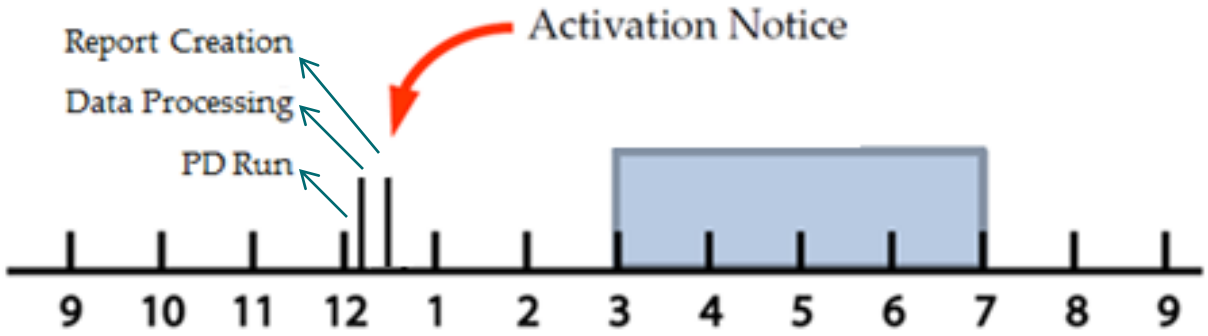
ieso
Connecting Today.
Powering Tomorrow.

Purpose

- Present options to make DR activation timeline more firm
- Provide an update on DR test activations

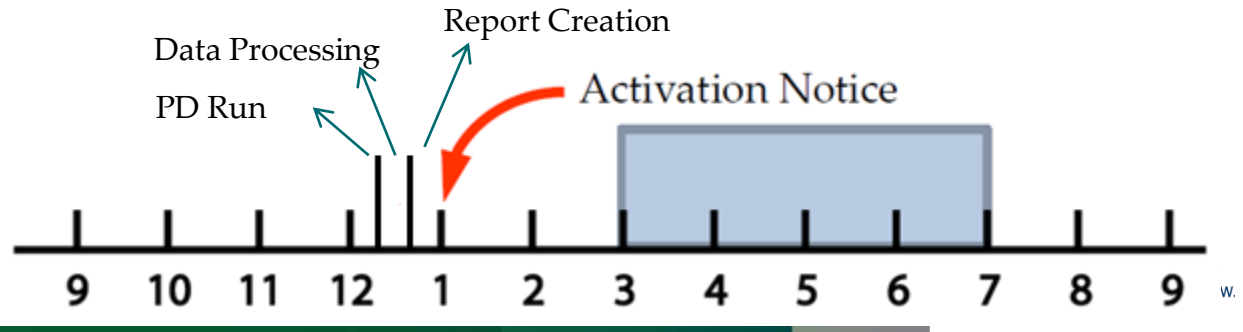
Update to DR Activation Timeline – Issue

- As per *Market Manual (MM) 4.3: Real-Time Scheduling of the Physical Markets*, IESO is required to publish activation report **approximately** 2.5 hours before the start of the dispatch hour
- Use of "approximately" creates uncertainty for DRMPs
- IESO has examined the pros and cons of two approaches to address this uncertainty



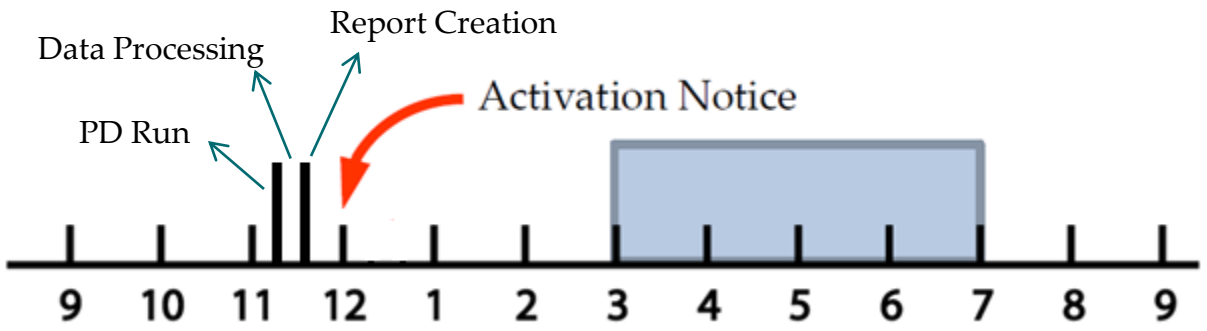
Update to DR Activation Timeline – Approach 1

- Add the following to the applicable MMs - "*The activation notice is issued approximately 2 hours and 30 minutes* ***but at least 2 hours*** *before the start of the first dispatch hour …"*
  - If HDR resources do not receive an activation notice 2 hours prior to the dispatch hour, then no activation notice will be issued for that hour
  - Change should provide more certainty to HDR resources on DR activation
  - The IESO would endeavour to provide activation notices as early as possible (e.g. as close to the 2.5 hour before the start of the first dispatch hour as possible) but no later than 2 hours before the start of the first dispatch hour
  - Accounts for concerns raised by some stakeholders: current aggregator contracts with contributors based on approximately 2.5 hours
- The advantages of this approach are:
  - Implementation would be more aligned with the direction the ICA is seeking to take with the DR
  - Activation based on market conditions closer to the real time
  - No material cost of implementation to the IESO since only the Report Creation component requires change



Update to DR Activation Timeline – Approach 2

- Revise the language in applicable MMs to " *The activation notice is issued at least 3 hours before the start of the first dispatch hour…*"
  - If HDR resources do not receive an activation notice 3 hours prior to the dispatch hour, then no activation notice would be issued for that hour
  - Would provide more certainty to HDR resources on DR activation
- The disadvantages of this approach are:
  - Implementation would be not be consistent with the direction the ICA is seeking to take the DR product
  - Activation based on market conditions that may not appropriately reflect real-time conditions
  - Additional cost to the IESO to implement this change since it impacts multiple components, and is not expected to be aligned with desired enduring DR design



Update to DR Activation Timeline – Recommendation (Approach # 1)

Market Manual (MM) 4.3: Real-Time Scheduling of the Physical Markets, Section 7.2 will be updated

from:

> *"The activation notice is issued approximately 2 hours and 30 minutes before the start of the first dispatch hour…"*

to:

> *"The activation notice is issued approximately 2 hours and 30 minutes* ***but at least 2 hours*** *before the start of the first dispatch hour…"*

- HDR resources will not be required to follow any activation notice issued within 2 hours before the start of the first dispatch hour

DR Test Activations - Update

- IESO currently limits 3 resources per aggregator for testing
- During real-time including emergency conditions, IESO can potentially activate all the HDR resources
- Test activations provides certainty that DR resources will be available during times of system need
- **Starting from this Winter commitment period (November, 2018 – April, 2019), IESO will remove the limit of 3 resources per aggregate**
    - *Improves IESO's DR testing process efficiency*
    - *Allows to reflect real-time scenario more effectively in testing and improve its value*
- No Market Rule/Market Manual change required

DR Registration Updates (Virtual – C&I)

November 15, 2018

ieso
Connecting Today.
Powering Tomorrow.

Agenda

- Proposed Changes to Contributor Management (CM) Process
- Topic for Discussion / Consideration
- Next Steps

Proposed Changes to CM Process

Record of Installation (ROI)

Current Requirement:

- As per requirements for Virtual C&I HDR Contributors under Section 6.2.1 of Market Manual 12, DRMPs must submit ROI at the time of contributor registration

Proposed Requirement:

- Remove the requirement to submit the ROI
- Include a copy of contributor's LDC statement at the time of registration
  - The LDC Statement shall be within last three months of the commitment month
- LDC Statement will be used by the IESO to verify the virtual contributor registry

Proposed Changes to CM Process

Single Line Diagram

- Section 6.2.1 of Market Manual 12.0 states that DRMPs can provide Demand Response in two ways:
  - Load Interruption (Single Meter or Multiple Meters); or
  - Behind the Meter Generation (BMG)

Current Requirement

- As per requirements for Virtual C&I HDR Contributors under Section 6.2.1 of Market Manual 12.0, DRMPs must submit the SLD when the Demand Response is provided via
  - Load Interruption with more than **one meter**; and
  - Behind Meter Generation (BMG)

Proposed Requirement

- DRMPs will now **only** be required to submit SLD if Demand Response is provided via Behind Meter Generation (BMG)

Proposed Changes to CM Process

Record Retention

- Under Section 6.3.2 of Market Manual 12.0,

"Demand response market participants must retain individual contributor measurement data and supporting registration documentation, including agreements with their respective contributor(s), for audit purposes. The IESO may request such information in order to verify the accuracy of information disclosed by the *demand response market participant"*

- In addition to the aforementioned requirements, DRMPs must also retain Monthly LDC Statements (**New**)
- Supporting registration documents include SLD, ROI (if applicable)
- IESO is also proposing a record retention period of seven (7) years
  - This is consistent with the Market Rule requirements

Proposed Changes to CM Process

Interdependencies in Contributor Registration

- During the contributor registration cycle, DRMPs run into the issue of contributor interdependency.
- This usually occurs when $DRMP_A$ wants to register a contributor while $DRMP_B$ is deregistering the same contributor
- This requires some coordination between $DRMP_{A'}$ $DRMP_{B'}$ and the IESO
- IESO has handled these infrequent occurrences through internal processes
- DRMPs must contact the IESO when this type of an interdependency is identified

Topic of Discussion

Current Means of Collecting Meter Data

- At the time of contributor registration, DRMPs are required to specify means of collecting meter data.
- Section 6.2.1 of Market Manual 12 specifies two means of collecting data
  - Directly from the meter i.e. remotely interrogating the meter and collecting data
  - LDC provided meter data

Consideration for New Means of Collecting Meter Data

- DRMPs have inquired about collecting meter data via KYZ pulses
- There are currently no provisions in the Market Manual to allow for collecting meter data via KYZ pulses
- Collected meter data will be subject to the same scrutiny as the data collected using the other two means

Next Steps

Phase I

- Market Manual 12 will be updated to reflect the following proposed changes (pending DRWG feedback)
  - Removal of ROI submission at the time of contributor registration
  - Submission of the LDC statement at the time of contributor registration
  - Removal of SLD requirement for a facility with more than one meter
  - Identification of Records
  - Record Retention Period Requirement

Phase II

- The lessons learned from the DR Audits conducted, will be shared with the participants at the DRWG in the upcoming meetings
- Measurement Data Submission process will be reviewed with the DRWG to better understand data integrity and submission barriers

QUESTIONS & COMMENTS

2019 DR Work Plan

Demand Response Working Group

November 15, 2018

ieso
Connecting Today.
Powering Tomorrow.

Purpose of DR Work Plans

- The DR work plan will consists of a list of priority initiatives identified by the IESO and DRWG
- The 2018 work plan focused on establishing a stable market for DR, opportunities to increase participation and addressing issues in the auction design
- A key focus going forward will be ensuring DR is delivering its full potential and in a position to compete to meet Ontario's future capacity needs

Recap of the 2018 Work Plan

Proposed 2018 DR Work Plan	
Confirmed Priority	Improved Utilization of DR ★
	Facilitating DR Input into ICA ★
	Review Webpage ★
Additional Review/ Discussion to Determine Priority	Utilization Payments ★
	Review Testing ★
	Review Metering Requirements ★

★ To Be Discussed
★ In Progress
★ Complete

(from the May 3, 2018 DRWG Presentation)

The Future of Demand Response

Short Term

- Webpage updates
- Continue to implement approved enhancements to the existing DR Auction process and operational improvements

Transition

- *What is required, and what would be most efficient, to transition from the DR Auction to the ICA?*
- *What does the DR community need?*

ICA

- ICA design elements are discussed via the Stakeholder Engagement, with some DR specific details coming to the DRWG for understanding and clarification
- Need to define the DR product within the ICA

In collaboration with the DRWG

Short Term Enhancements

- Proposed approach:
  - Continue to implement recently passed market rules changes for the DR Auction
  - Continue to seek opportunities to enhance DR operational processes (including DR testing)
  - Continue to seek stakeholder feedback on any proposed enhancements throughout 2019

- **Webpage Updates?** A stakeholder requested the IESO look at developing web content to better demonstrate the value of DR and to support communication about this resource to the broader sector.

Facilitating DR Input into ICA

- Proposed Approach:
  - ICA design issues and discussions will continue to evolve in the MRP ICA stakeholder engagement initiative. Stakeholders should continue to participate and send feedback on ICA design to the ICA engagement directly
  - DRWG can be utilized as forum for more focused discussions on the impact of particular ICA design decisions to provide clarity and understanding for both the IESO and DR participants
  - Develop work plan for 2019, to be discussed at next meeting (tentatively Feb 2019)

Transition

- The DR Auction was developed as a transitionary procurement mechanism used to select demand response capacity until an incremental capacity auction is in place

- *Discussion:*
  - *What is required, and what would be most efficient, to transition from the DR Auction to the Incremental Capacity Auction?*
  - *What does the DR community need?*

- Proposed Approach:
  - Seek suggestions from stakeholders
  - Develop work plan for 2019, to be discussed at next meeting (tentatively Feb 2019)

QUESTIONS & COMMENTS

DR in the Incremental Capacity Auction (ICA)

Introduction to Areas of Potential Future Discussion with the DRWG

November 15, 2018

ieso
Connecting Today.
Powering Tomorrow.

Purpose and Overview

Highlight some of the key aspects of the ICA design where discussions with the DRWG may be appropriate during the "Detailed Design" phase of the ICA project

Key areas that have been identified to date where DR specific considerations will need to influence the design include:

- Resource Eligibility
- Qualified Capacity
- Forward Period Obligation
- Performance Assessment
- Capacity Payments

QUALIFIED CAPACITY - Background

- Participants in the current DR Auction are required to provide information prior to the auction
  - Provision of a Load Reduction Plan (which indicates how the capacity obligation will be satisfied) is optional and is only used for information purposes
- DR eligibility requirements under the ICA are expected to be similar to those under the DR Auction
- Requirements during the Forward Period may need to change due to the longer forward period in the ICA

RESOURCE ELIGIBILTY - Aggregation

- Aggregated resources will be eligible to participate in the auction, subject to current aggregation rules and technical limitations
  - For DR resources, contributors must be located within a single electrical zone (i.e., one of the existing 10 electrical zones), consistent with requirements under the current DR auction

RESOURCE ELIGIBILTY - Aggregation

Going Forward: Detailed Design Considerations

- IESO currently publishes the virtual aggregation limits in the pre-auction report ~6 months prior to the DR Auction. What would be the appropriate timelines to publish those limits in the ICA recognizing the much longer forward period (i.e. 3.5 years)?

- Aggregation limitations in the current DR Auction have been an area of discussion to date. Given other potential areas of focus, how important does the DRWG feel it will be to evolve the virtual aggregation limits in the ICA?

RESOURCE ELIGIBILTY - Minimum Consecutive Hours of Delivery (MCHD)*

- Existing market design requires all resources to be able to deliver energy for at least 1 hour
- The ICA will have a MCHD requirement
  - Resource adequacy assessments during detailed design will inform the decision concerning the MCHD duration
  - The MCHD for ICA is likely to be greater than one hour given initial assessment of forecasted load profiles and supply mix
  - DR must conform with the MCHD (could be greater or less than the current four hour obligation in the DR auction)
- The MCHD will also be used as an input when determining Eligibility and Qualified Capacity

** This Design Feature was previously referred to as "Minimum Dispatch Duration"*

RESOURCE ELIGIBILTY - Imports

- All generation types (except coal) will be eligible to participate; DR and energy efficiency will not be eligible
  - Imports of DR and Energy Efficiency are not eligible in any other jurisdictions

QUALIFIED CAPACITY – Resource Assessment

- Participant submits quantity for which they wish to qualify
- Participant submitted quantity is verified by IESO
  - Must conform with the MCHD
- Resource Assessment Quantity may then be further reduced based on performance data from historical activations and/or the results of Capacity Check Tests
- All resources being compensated for capacity will need to be responsive based on limitations of their physical capability

QUALIFIED CAPACITY – Resource Assessment

Going Forward: Detailed Design Considerations

- IESO envisions using capacity check test/historical activations for an existing DR Auction participant as part of the Capacity Qualification process in the ICA. How should the current DR Auction obligations evolve such that capacity check test results can be used for the purposes of qualifying DR resources for the ICA?
- Given the above consideration, when is the right time for historical performance to begin counting towards future Capacity Qualifications in the ICA?

QUALIFIED CAPACITY – New Resources

- IESO is considering using DR Capacity Check test results as well as activation data to create a DR class average, which may then used as a performance factor when establishing Qualified Capacity for new DR resources
  - Class averages may be created separately for aggregated portfolio vs. Single Contributor resources

QUALIFIED CAPACITY – Deliverability Assessment

- Deliverability Assessment is part of the Capacity Qualification Process for all resources
  - For each qualification submission, the Deliverability Assessment will determine the largest portion of the submitted capacity that is deliverable from the submitted connection point
  - The Deliverability Assessment will also identify any system points where the submission is competing with another submission(s) based on a deliverability constraint that cannot accommodate all of the submissions
  - Whether this process can be applied to DR resources is yet to be determined
- Deliverability will be assessed through all transmission levels
- The IESO has carried out preliminary engagement with LDCs to discuss distribution level deliverability considerations

FORWARD PERIOD OBLIGATION - Background

- Resources that obtain obligations from either the base or rebalancing auctions will be required to meet certain Forward Period obligations

- These obligations ensure that a resource is ready to deliver capacity during the Commitment Period
  - Failure to meet certain obligations will have implications (e.g., fees/charges, reduction or loss of obligations, requirement to replace capacity through Rebalancing Auctions, etc.)

- These obligations may vary by resource type (i.e., new or existing, generation or DR). These obligations will include the following:
  - Meeting Project Milestones
  - Provision of Project Progress Status Reports
  - Post Performance Security

FORWARD PERIOD OBLIGATION – Capacity Check Test

- Resources that are not otherwise obligated to perform commissioning tests (e.g., DR), may be required to demonstrate capability through other mechanisms during the Commitment Period

- Failing a commissioning test or not providing required information may result in a reduction in, or loss of, obligations during the Commitment Period

FORWARD PERIOD OBLIGATION – Project Milestones

- For DR projects, there may be different milestones which are tied to acquiring a certain percentage of contributors at various stages during the Forward Period (similar to ISO-NE)

FORWARD PERIOD OBLIGATION – Project Milestones

Going Forward: Detailed Design Considerations

- What would be appropriate milestones for DR resources?

- What are reasonable percentages of contributors for the IESO to require an aggregator to have secured at various stages during the Forward Period?

Performance Assessment – Time Frame

- **Obligation:** All resources with capacity obligations are required to make their capacity available in both the Day-Ahead and Real-Time energy markets

- **Assessment:** Generally, all resources will be assessed based on the capacity made available during the Real-Time timeframe
  - The extent to which the ICA will also need to assess the capacity made available in the Day-Ahead timeframe will be explored further during detailed design

Performance Assessment - Hours

- **Assessment:** Generally, all resources will be assessed based on an 'average' availability across the pre-defined set of hours
  - The horizon (daily, weekly, monthly, or seasonal) over which this 'average' is calculated and compared against the Capacity Obligation amount will be determined during detailed design
  - *Resource-specific exceptions:*
    - Demand Response: Assessment may be similar to the existing methodology used in today's DR Auction, where the capacity made available in each 'hour' of the pre-defined set of hours will be compared against the Capacity Obligation amount

CAPACITY PAYMENTS – Non-Performance Charge

- DR resources, when activated, must reduce load within pre-defined thresholds to ensure system reliability
- Failing to reduce load within these threshold will result in dispatch non-performance charges being applied
  - It is expected to be similar in nature to existing DR Auction Dispatch Charge (CT 1317)
- Factors impacting the amount of charge include: actual consumption, bid quantity, dispatch schedule, auction clearing price and non-performance factor
- Performance may impact future QC assessments
- As we move to a future without a capacity surplus, resources may be dispatched more often

QUESTIONS & COMMENTS

Accounting for Loads Participating in the ICI and as DR Resources in the ICA

Discussion of Issues and Considerations

DRWG Nov 15, 2018

ieso
Connecting Today.
Powering Tomorrow.

Disclaimer

This presentation and the information contained herein is provided for information and discussion purposes only. This presentation does not constitute, nor should it be construed to constitute, legal advice or a guarantee, representation or warranty on behalf of the IESO. In the event of any conflict or inconsistency between the information contained in this presentation and the Market Rules, the Market Manuals, any IESO contract or any applicable legislation or regulation, the provisions of the Market Rules, Market Manuals, contract, legislation or regulation, as applicable, govern.

Purpose & Overview

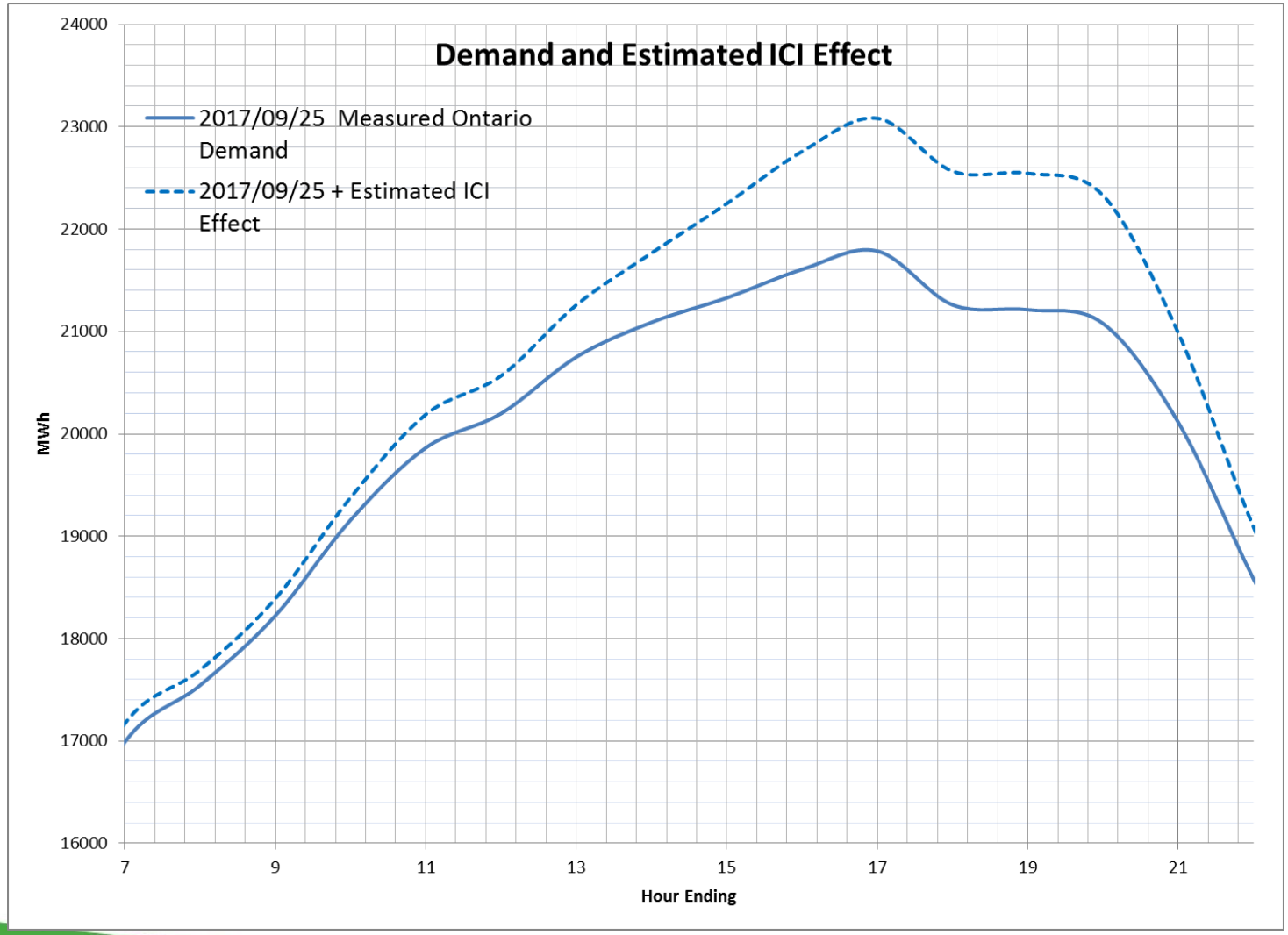
The purpose of this discussion is to:

- Explain how the response of loads resulting from the Industrial Conservation Initiative (ICI) is included into the IESO's demand forecast
- Provide an overview of the potential capacity shortfall should DR resources participating in the ICI not be properly accounted for in the Incremental Capacity Auction (ICA)
- Start the discussion and solicit input on possible options to address this potential issue

Effect of ICI on Demand Forecasts

- When attempting to minimize consumption during a top five peak hour, participating loads generally adjust their demand over the course of a portion of the day they expect the peak hour to occur
- Loads generally have to anticipate the day the peak hours will occur, and therefore will generally respond to more than 5 days (e.g. ~ 10+ days)
- The estimated ICI-related hourly response in 2017 ranged from a minimum of about 150 MW to a maximum of 1330 MW in each of the top five peak days
- When developing future demand forecasts, and to determine future resource requirements, the estimated ICI response is factored into the forecasts
  - i.e. the forecast is reduced to factor in the expected ICI response
- As a result, a MW of consumption that has been reduced for ICI is not also available to further offset demand as a DR response during those same hours

Effect of ICI on Demand Forecasts - Example



Demand Response & Resource Requirements

- DR that clears the ICA will be counted on as a resource that contributes to meet Ontario's resource adequacy needs (i.e. as supply towards meeting the required Target Capacity)
  - Cleared DR must be available to reduce consumption when required
- However, if these loads are also reducing their consumption to take advantage of the ICI, then their anticipated value will have already been factored into the demand forecast
- Therefore, the same MW of load reduction could end up being counted on twice towards meeting total resource adequacy needs during ICI peak days (once on the supply side and once on the demand side)

Reliability Issue

- Loads that are procured as DR in the ICA, but who also plan to adjust their consumption to take advantage of the ICI, will not be fully available during the top peak hours of the year

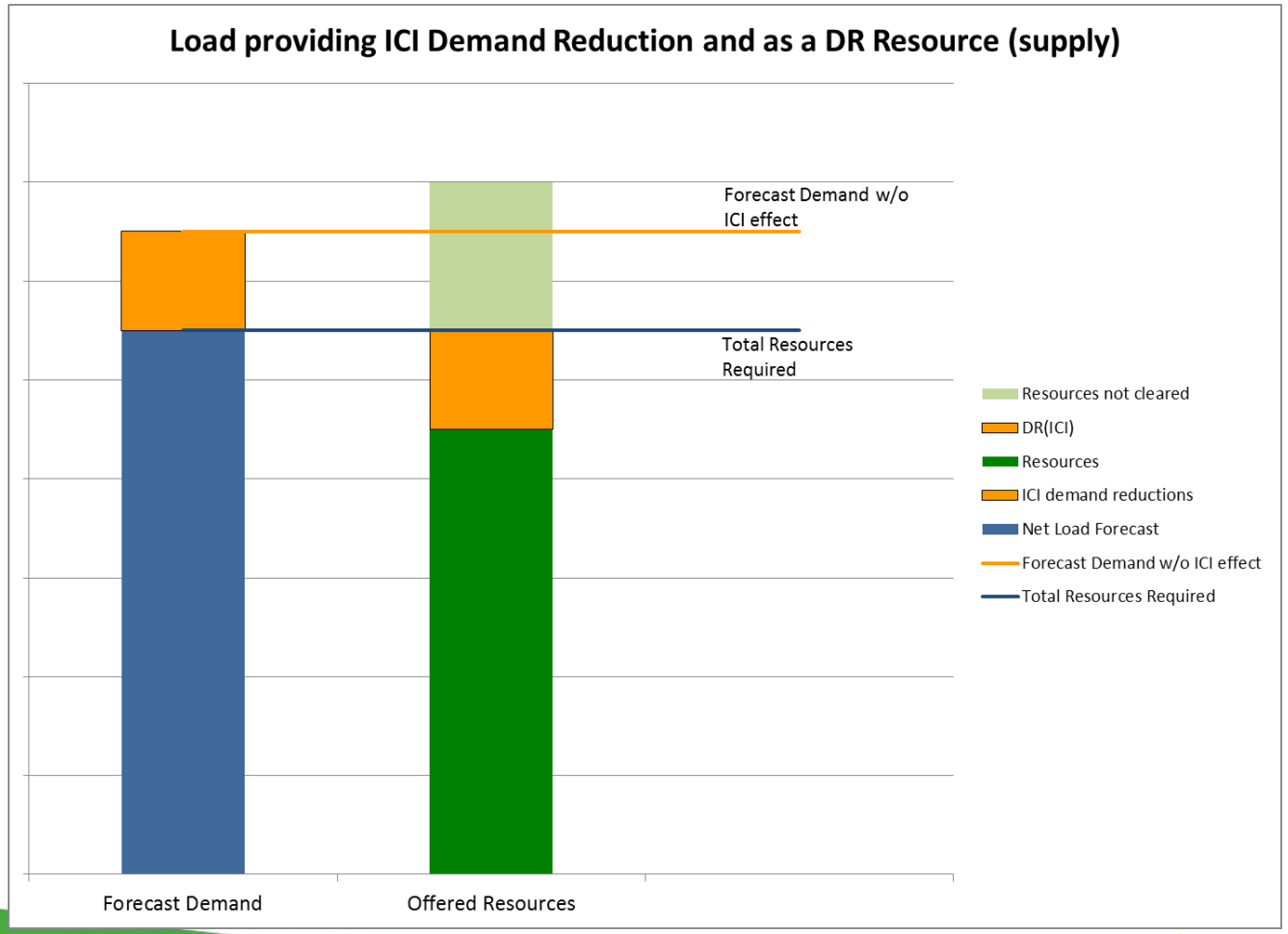
- Accounting of DR in the ICA will need to ensure that the capacity contribution of the response is properly reflected in both the demand forecast and available resources to meet resource adequacy needs; this is illustrated in the formula below:

  Total Resources (G1+G2…+ ***DR***) ≥ Total Demand – ***ICI effect***
  + Reserve Margin

- Ignoring this has the potential for the IESO to under-procure capacity to satisfy resource requirements.

- To ensure the IESO meets its reliability obligations related to resource adequacy, this issue will need to be addressed prior to the first ICA

Counting ICI demand reduction and DR supply Illustrative Example



"Levers" available to the IESO to manage the reliability risk - for discussion

For discussion purposes, a preliminary list of potential approaches that could be considered to address this issue are presented below. The IESO is interested in hearing other proposed solutions that the DRWG may have.

1. Assess a DR load's qualified capacity to reflect its contribution to resource adequacy (participating in ICI would likely lower the qualified capacity)
2. Introduce a financial non-performance penalty to encourage availability during times of peak need
3. Adjust the demand forecast up to compensate for the DR that is unavailable due to participation in the ICI
4. Apply one of the above in the future based on actual ICA performance data
5. Make eligibility for the ICA contingent on not also participating in the ICI
6. Other?

Stakeholder Questions to Date

Problem definition:

The existing process for assessing adequacy assumes that loads offering DR can be counted as fully available resources, and are **not** participating in the ICI.

Q: What adequacy forecasting timeframes are impacted by this problem (i.e., real time, day ahead or longer)?

A: All timeframes are affected by this problem. The problem originates as a capacity planning problem and, if not resolved, will lead to increased probability of resource shortages in the energy market.

Q: How is the contribution of ICI presently estimated for in adequacy studies? What is MW accuracy, zonal breakdown, etc.?

A: For grid connected loads, the ICI effect is determined by establishing a baseline profile by analyzing the metered consumption for the previous three months excluding weekends, holidays and any day with a top ten peak. That load's consumption on the top ten peak days is compared to the baseline established for that day. For smaller distribution connected loads it is estimated indirectly from the assessment of the distributor's metered consumption on the top five peak days. The same approach will be applied on a zonal level for the ICA.

This analysis is performed on annual basis and applied to future forecasts.

The accuracy for the grid connected loads would be very high whereas the distribution connected load estimates are less certain as they cannot be verified at this time.

Stakeholder Questions to Date *(cont'd)*

Q: Is the inability to reconcile ICI and ICA participation a systems issue, a market design issue or both?

A: This is a market design issue, that is, an issue with the coordination of two "market programs"; the consequence of not managing it becomes a system reliability issue.

Q: What other ICA linkages to ICI participation does the IESO foresee?

A: The IESO does not foresee any other linkages at this time, given the current ICI design.

Q: Do these ICI considerations create barriers for loads that do not exist for other suppliers?

A: The IESO does not view ICI considerations as representing a barrier to loads participating in the ICA. Participation in the ICI as a Class A load is voluntary and a decision driven by financial efficiency. To the extent that a load wants to participate in both ICI and ICA, the trade-off that may need to be weighed is that the resource adequacy value of a DR resource participating in the ICI is expected to be lower compared to one that is not participating in the ICI and as such the load would be qualified with fewer MWs.

QUESTIONS & COMMENTS

ICI Background

- The Industrial Conservation Initiative (ICI) is a form of demand response that allows participating customers to manage their global adjustment (GA) costs by reducing demand during peak periods.
- Customers who participate in the ICI, pay GA based on their percentage contribution (i.e., peak demand factor) to the top five peak Ontario demand hours, occurring on different days, over a 12-month base period (May 1 to April 30).
- Selected consumers of 500 kW up to 1 MW, and all consumers 1 MW to 5 MW can opt in; consumers above 5 MW are automatically included but can opt out.
- All requirements related to the ICI can be found in Ontario Regulation 429/04

Closing & Next Steps

Demand Response Working Group

November 15, 2018

ieso
Connecting Today.
Powering Tomorrow.

2019 Meeting Schedule

- DRWG to meet more regularly again in 2019
- Proposed schedule:
  - First meeting on February 12 , 2019
  - Stakeholder feedback due within two weeks of each meeting
  - 2019 DRWG meeting schedule:
    - February 12, 2019
    - April 25, 2019
    - June 25, 2019
    - September 12, 2019
    - November 12, 2019

Next Steps

- Feedback due by December 7th to engagement@ieso.ca
- Proposed Next Meeting: Feb 12, 2019

QUESTIONS & COMMENTS