

Demand Response Enhancements

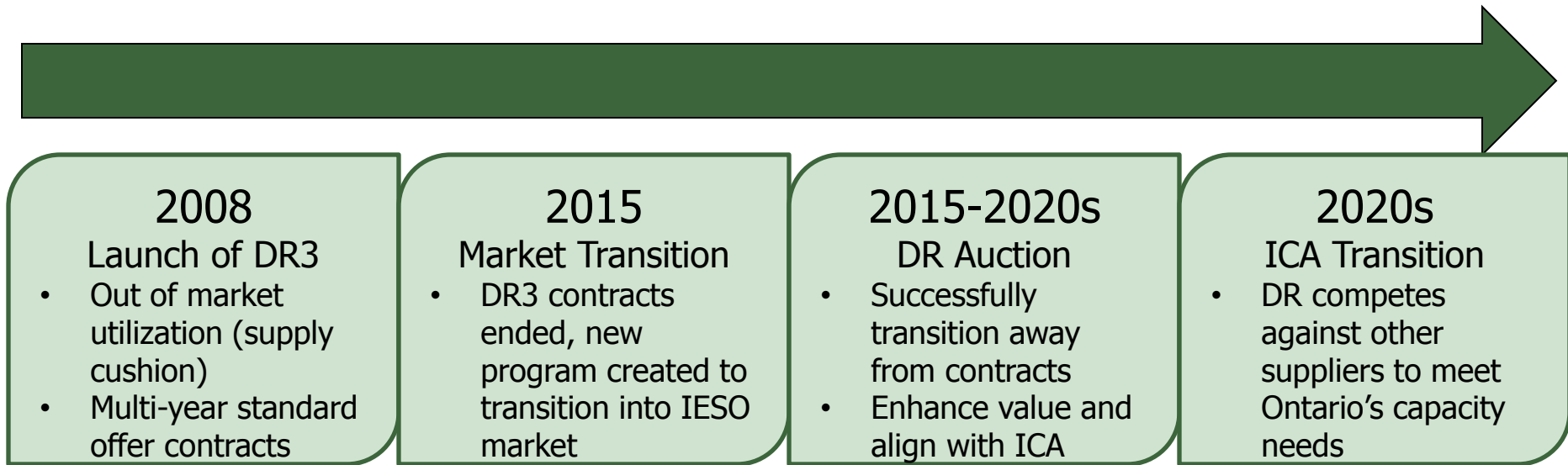
Technical Panel
April 16, 2018

Jason Kwok, IESO

Purpose

- To provide an overview of proposed DR enhancements to increase the value of Hourly Demand Response (HDR) resources

Evolution of DR in Ontario



- IESO's latest 2017 DR Auction saw a 23% price reduction over historical contract costs
- DR capacity has grown from 527 MW in 2015 to 712 MW in Winter 2018/19
- Registered participants rose from 5 to 35

- As of the 2017 DR Auction, all contracted DR capacity has been transitioned to an auction-based procurement mechanism
- DR Auction has proven that an auction-based mechanism is a viable and cost-effective approach to capacity procurement in Ontario

Goals for Demand Response

1. Develop DR to ensure it can compete with traditional supply

2. Alignment with Market Renewal

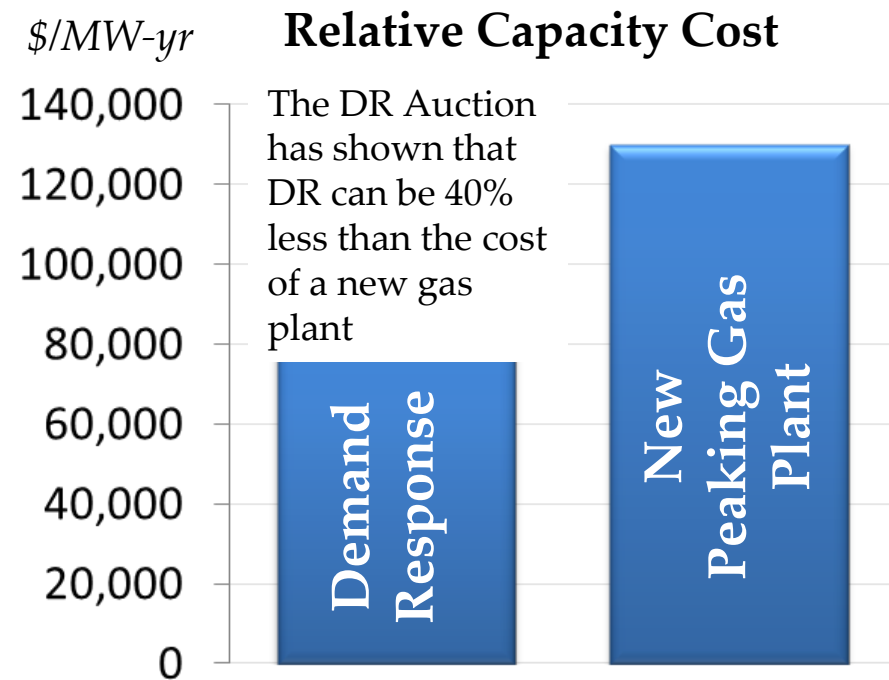
- While the IESO has had success in transitioning and growing a resource using an auction-based mechanism, the IESO is still committed to enhancing the value of DR
- The IESO will be striving towards these goals by maximizing the value of HDR resources in the near-term and working towards meeting the requirements to compete in the future incremental capacity auction (ICA)

The Economics of DR

- Most consumers place great value on the electricity they consume and will only not consume when electricity prices are extremely high
 - Most HDR resources are bid near the maximum market clearing price, indicating they are only willing to reduce consumption when prices approach the price ceiling of \$2000/MWh
- By contrast, most generators are willing to provide power at much lower energy prices
- **It does not make sense to use DR when there are more cost-effective alternatives, however, it does make sense to ensure DR can be utilized during times of system stress**

System Value of DR

- While DR may only be used when economic in a few hours when the system is under most stress, it still has significant value as a “capacity” resource
- DR can be significantly cheaper than building an equivalent peaking gas generator that would only operate for a relatively few hours a year



Future Improvements

- The IESO has been working with stakeholders to discuss ways to increase the value of Hourly Demand Response (HDR) resources

Ready

Market Manual changes have completed pending change process and will be effective May 1, 2018

2018 Improvements:

Add HDR resources to the Emergency Operating State Control Actions (EOSCA) list for Summer 2018 commitment period

In Development

2019 Improvements:

Continue to evolve the HDR resource to better meet system needs and to prepare to compete in the future ICA

2018 Improvements

EOSCA List

- For the upcoming Summer 2018 Commitment Period, the IESO is planning on adding HDR resources to the Emergency Operating State Control Actions (EOSCA) list
- The EOSCA list is a table of control actions that are available to the IESO leading up to and during an “emergency operating state”
 - Allows the IESO to take “out-of-market” actions to maintain reliability
 - The list of control actions include: recalling outages, run short of operating reserve, curtail exports, shed load, activating CBDR, etc.
 - More information on the EOSCA list can be found in [Market Manual 7.1, Appendix B](#)
- Consistent with the IESO’s treatment of Capacity Based DR (CBDR) and dispatchable load resources, as well as other generation resources

2019 Improvements

- For the 2018 DR Auction, the IESO has identified two areas for utilization improvement that will improve scheduling flexibility:

1. Minimum Dispatch Duration

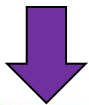
2. Real-Time Availability

- Market Rules on how HDR resources are utilized in the energy market are covered in MR Chapter 7, Sec 19

Current HDR Activation Protocol

1. Standby Notice:

4-hour schedule required for a standby



2. Activation:

4-hour schedule required for an activation after a Standby notice is issued



3. Duration:

DR activated for 4 hour blocks



1. Minimum Dispatch Duration

- Currently, HDR resources can only be activated when scheduled for a four-hour block
 - This requirement has contributed to HDR not receiving an in-market standby notice since the start of the DR Auction
- Reducing the minimum dispatch duration increases the number of scenarios that HDR resources can be utilized to meet system needs

1. Minimum Dispatch Duration

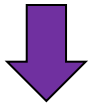
March 1 Proposal to DR Stakeholders

The IESO proposed to change the HDR resource's dispatch duration from a four-hour block to a one-up-to-four hour block

Current HDR Activation Protocol

1. Standby Notice:

4-hour schedule required for a standby



2. Activation:

4-hour schedule required for an activation



3. Duration:

DR activated for 4 hour blocks



Proposed Change

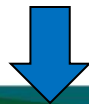
1. Standby Notice:

1-hour trigger required for a standby



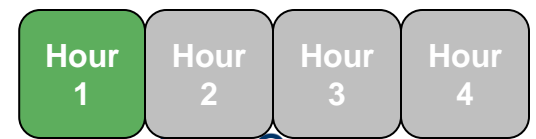
2. Activation:

1-hour schedule required for an activation



3. Duration:

DR activated for 1 up-to 4 hour block



1. Minimum Dispatch Duration

- Under the proposal, HDR resources are still required to be able to provide a four-hour DR activation. However, the IESO would be able to utilize DR resources for one up-to four hours
 - Activation compliance would continue to be measured based on a resource's schedule using the existing methodology
 - ICA stakeholder engagement will be reviewing minimum dispatch requirements through the *Visibility and Control Obligations* design element
- Based on stakeholder feedback received in 2017/18 through the Demand Response Working Group (DRWG), this proposed change received strong stakeholder support

2. Real-Time Availability

- Throughout 2017 and 2018, the IESO has been discussing improving real-time availability of HDR resources through the *elimination* of the standby notice
- Under current design, a standby notification is issued when a resource is **scheduled** for a DR activation by 7am of the dispatch day, otherwise the resource is no longer required to be available to be utilized that day
- DR stakeholders have advised that the immediate elimination of the standby notice would significantly impact their ability to participate in DR
 - The IESO has told stakeholders it will not eliminate the standby notice for the 2018 DR Auction but will modify triggers to increase real-time availability of the resource
 - IESO has also signaled to stakeholders that the standby notice should not be tied to activation of DR

2. Real-Time Availability

- Based on discussions with the DRWG, the IESO has analyzed three options that can be used to improve the trigger for a standby notice for an HDR resource

1. Schedule-based trigger

2. Price-based trigger \$100

3. Price-based trigger \$200

- Parameters of analysis:
 - One up-to four hour dispatch duration is adopted
 - Lookback period of May 2014 to Oct 2017
 - Southwest, Toronto and East zones were selected for analysis, which represent ~70% of the virtual DR participation
 - For this analysis, HDR resources are assumed to be bid at \$1999/MWh

2. Real-Time Availability

Schedule-based trigger

1. Standby Notice:

At least 1-hour schedule is required for a standby by 7am



2. Activation:

Activate when at least 1 hour scheduled for DR ~2.5hrs prior



3. Duration:

DR activated for up to 4 hours based on schedule when 1st hour activated



- The current standby notice criteria uses a schedule-based trigger
- For this analysis, when a resource's energy bid is "uneconomic" for *at least one hour* during the availability window prior to 7am of the dispatch day, a standby notice will be issued

2. Real-Time Availability

Schedule-based trigger

Historical Observations:

Commitment Period	# of Standby Notices Issued
Summer 2014	0
Winter 2014/15	1
Summer 2015	0
Winter 2015/16	0
Summer 2016	1
Winter 2016/17	0
Summer 2017	0

Based on assumption that DR energy bids are priced at \$1999/MWh

ICI Year	Scheduled Based Trigger
2014/15	0 of 5 peak days
2015/16	0 of 5 peak days
2016/17	1 of 5 peak days
2017/18*	0 of 5 peak days

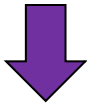
2017/18 ICI year not finalized until year ending April 30, 2018

2. Real-Time Availability

Price-based trigger \$100

1. Standby Notice:

At least 1-hour is \geq \$100 trigger price required for a standby by 7am



2. Activation:

Activate when at least 1 hour scheduled for DR ~2.5hrs prior



3. Duration:

DR activated for up to 4 hours based on schedule when 1st hour activated



- A standby notice is issued for a resource when its respective pre-dispatch shadow price is equal to or greater than \$100 for an hour during the availability window prior to 7am of the dispatch day

2. Real-Time Availability

Price-based trigger \$100

Historical Observations:

Commitment Period	# of Standby Notices Issued
Summer 2014	3
Winter 2014/15	17
Summer 2015	15-16
Winter 2015/16	0
Summer 2016	24
Winter 2016/17	1-4
Summer 2017	8

ICI Year	Scheduled Based Trigger
2014/15	3 of 5 peak days
2015/16	5 of 5 peak days
2016/17	5 of 5 peak days
2017/18*	2 of 5 peak days

2017/18 ICI year not finalized until year ending April 30, 2018

2. Real-Time Availability

Price-based trigger \$200

1. Standby Notice:

At least 1-hour is \geq \$200 trigger price required for a standby by 7am



2. Activation:

Activate when at least 1 hour scheduled for DR ~2.5hrs prior



3. Duration:

DR activated for up to 4 hours based on schedule when 1st hour activated



- A standby notice is issued for a resource when its respective pre-dispatch shadow price is equal to or greater than \$200 for an hour during the availability window prior to 7am of the dispatch day

2. Real-Time Availability

Price-based trigger \$200

Historical Observations:

Commitment Period	# of Standby Notices Issued
Summer 2014	0
Winter 2014/15	10
Summer 2015	4-6
Winter 2015/16	0
Summer 2016	6-7
Winter 2016/17	0-2
Summer 2017	5

ICI Year	Scheduled Based Trigger
2014/15	2 of 5 peak days
2015/16	2 of 5 peak days
2016/17	3 of 5 peak days
2017/18*	2 of 5 peak days

2017/18 ICI year not finalized until year ending April 30, 2018

2. Real-Time Availability

Observations

Schedule-based	Price-based \$100	Price-based \$200
<ul style="list-style-type: none">• Very little increase in quantity of standby notices triggered	<ul style="list-style-type: none">• Increased availability of HDR resources to help meet system needs in real-time• Intuitive trigger that aligns real-time availability during peak times such as ICI peak days	<ul style="list-style-type: none">• Increased availability of HDR resources but less effective than \$100 trigger

2. Real-Time Availability

March 1 Proposal to Stakeholders

The IESO proposed to change the standby notice trigger to a \$100 price-based trigger.

- Increases value of HDR resources
 - Increased number of standby notices issued means an increase in real-time availability of HDR resources during times of system need
 - Changes to utilization criteria to facilitate activation when needed was encouraged by the Market Surveillance Panel's May 2017 report
- Balances capability of stakeholders
 - DR stakeholders have advised that removing the standby notice for the 2018 DR Auction would significantly impact participation. A \$100 trigger helps transition DR resources to increase availability in real-time without significantly impacting participation
 - Helps transition HDR resources towards future ICA requirements

Stakeholder Feedback

- Generally supportive of need to increase scheduling flexibility and availability
- Concerned about how increase in frequency of standby notices will impact business processes/costs because the standby notice is currently treated as advance notice of an activation rather than a notice to be available in real-time
- At the same time, DR stakeholders continue to provide feedback into ICA design process

IESO believes shortening the minimum dispatch duration and moving to a price-based trigger for standby will significantly improve the value of DR in the short term and help in the future transition to the ICA over the long term

Timeline for May 2019 Changes

- The IESO plans on bringing draft market rules to Technical Panel at the May 22 TP meeting
- Changes are targeted to be in place for the next Auction in December 2018

TP process

