

**JULY 22, 2021**

# Resource Adequacy Engagement

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# Agenda

- Recap of recent stakeholder feedback on Qualified Capacity (QC) proposals
- Updates to QC proposals since May 28 Resource Adequacy webinar
- Expanding Participation to Resource-Backed Imports for 2022 Capacity Auction
- Recap and Next Steps



# Recap of recent stakeholder feedback on QC proposals

## Recap: Recent Written Stakeholder Feedback

- 10 stakeholder feedback submissions received following the May 28 Resource Adequacy engagement webinar
  - Several submissions included comments on the initial QC proposals
- Additionally, 5 resource-specific sessions were hosted over June 25 & June 28 in order to discuss QC methodology details.
  - Meeting summaries are posted on the Resource Adequacy [engagement webpage](#)
- The following slides summarize feedback and provide a corresponding IESO response

# Feedback Theme: Use of ELCC

## Stakeholder Feedback

- Recommendation to consider using Effective Load Carrying Capacity (ELCC) for the qualification of wind, solar, hydro and storage resources

## IESO Response

- ELCC is not currently used in the IESO's system planning processes and it is important for planning and procurement of resource adequacy needs to be closely aligned. If in the future, the organization moves towards incorporating ELCC into the planning models, the use in the Capacity Auction/Acquisition mechanisms may be re-evaluated.

# Feedback Theme: Energy Limited Hydro

## Stakeholder Feedback

- Recommendation that IESO consider production data for energy limited hydro, as offer data does not encapsulate the resource's operability.
- Recommendation that IESO consider a 4 hour availability requirement within the window, rather than a requirement for 4 *consecutive* hours.

## IESO Response

- IESO has updated the proposal for hydro and other resource types to better reflect availability at peak which will be outlined in the next section

# Feedback Theme: UCAP Calculation for HDR

## Stakeholder Feedback

- Request for IESO to provide example calculation for performance adjustment factor (PAF) requested.
- Inquiry as to when the PAF will be assigned.
- Inquiry as to if a “gross up” will be considered to account for avoided line losses.

# Feedback Theme: UCAP Calculation for HDR (continued)

## **IESO Response**

- Example calculations provided in this presentation. (refer to slide 33)
- The PAF will be assigned during the Capacity Qualification process
- IESO is currently not considering credits/gross ups to account for avoided line losses for 2022 as deliverability is not currently part of the qualification process for internal resources. This would also require significant changes to modelling and other measurement considerations (including deadbands currently only applicable to HDR resources.)

# Feedback Theme: Storage 4-Hour Qualification Requirement

## Stakeholder Feedback

- Inquiry as to what the basis is for the 4 hour requirement and if it is related to the peak shape.
- Inquiry as to if the 4 hour requirement will apply to mid and long term procurements.

# Feedback Theme: Storage 4-Hour UCAP Requirement (2)

## **IESO Response**

- The Capacity Auction 4-hour product is meant to find a balance between system needs, operational flexibility and cost. The 4-hour duration has been a part of requirements for resources procured within both the Capacity Auction and the previous Demand Response Auction.
- Minimum Durations for upcoming Resource Adequacy procurements are still under evaluation by the IESO and will be stakeholdered as part of the procurement.

# Feedback Theme: Use of Historical Data

## Stakeholder Feedback

- Suggestions to consider validity of historical data if a resource was previously operating under different incentives/contracts
- Inquiry as to how a resource upgrade will be considered within the UCAP assessment.
- Recommendation to include facility testing or audits in qualification

# Feedback Theme: Use of Historical Data (continued)

## **IESO Response**

- Historical data for hydro and thermal resources will be used, however, there is an opportunity to incorporate the impact of more recent output given that the qualification process will continue to be done annually in the auction.

# Feedback Theme: Seasonal or Annual UCAP?

## Stakeholder Feedback

- Inquiry as to whether UCAP will be an annual or seasonal value.

## IESO Response

- UCAP will be calculated on a seasonal basis for the Capacity Auction.



# Updates to QC proposals since May 28 Resource Adequacy webinar

## Recap – Transition to Qualified Capacity (QC)

The IESO has committed to transitioning to a UCAP (refers to Unforced Capacity) approach to qualify resources to meet resource adequacy needs

- Ensures resources are capable of delivering their capacity obligation in real-time, and that resources are compensated consistent with the reliability value they provide
- A key measure to improve resource performance and alignment with adequacy needs
- High-level proposals introduced to stakeholders May 28 and subsequently refined through further internal and external consultations

## Recap - Qualified Capacity Design Principles

- **Simplicity** – the process should aim to balance time and effort for participants and IESO with achieving accuracy
- **Fairness** – the process should establish a fair capacity value for all resources based on unique characteristics. Different methodologies may be established for each resource type
- **Transparency** – ensures all stakeholders (i.e. suppliers, IESO, ratepayers, etc.) understand how capacity will be qualified and valued
- **Alignment** – with performance and assessment requirements

# Summary Updates to QC Proposals

- No changes to QC proposals for dispatchable thermal generation, dispatchable storage generation and system-backed import resources
- For methodologies that used a peak window approach, the IESO has opted to replace this input with the 'top 200' hours of Ontario Demand per season (~5% of peak hours/year) as a better reflection of availability at peak
- More refinements to Hourly Demand Response proposal
- Removal of losses from resource-backed imports
- Specific changes outlined in subsequent slides

# QC Proposal: Dispatchable Thermal Generation (no change)

$$\text{UCAP (MW)} = \text{ICAP (MW)} * (1 - \text{EFORd})$$

- ICAP value reflects the variation in maximum capability of thermal generators with external factors like ambient temperature and humidity
- ICAP value will be established using the existing planning process published in the Annual Planning Outlook, and based on the peak demand month of the season

## QC Proposal: Dispatchable Thermal Generation (2)

- Equivalent Forced Outage Rate on Demand (EFORd) reflects the uncertainty in the availability of thermal generators due to unforeseen outages
  - EFORd calculations will generally align with the current methodology the IESO utilizes in the planning resource adequacy assessment to determine capacity needs
  - IESO proposes to apply EFORd on an annual basis using the existing IESO processes (5 years of historical data)

# QC Proposal: Dispatchable Hydro

$UCAP \text{ (MW)} = ICAP \text{ (MW)} \times \text{Production Data in Top 200 hours of Ontario Demand per season (average up to 5 years historical data)}$

- 'Top 200 hours' replaces previous peak window methodology as better reflection of availability at peak
- Approximates ~5% of peak hours per year
- Historical production data of Hydro resources is proposed as an accurate reflection of their capability
  - Hourly data of actual quantity of energy injected to the grid, incorporating impacts of energy and weather limitations, as well as forced outage

# QC Proposal for Dispatchable Storage Generation –no change

$$\text{UCAP (MW)} = [\min(\text{Full Power Operating Mode, Energy Rating}/4\text{hrs})] * (1-\text{EFORd})$$

- Full Power Operating Mode (in MW): temperature-sensitive maximum power rating that can be sustained for 1 hour
- Energy Rating: temperature-adjusted maximum amount of energy (in MWh) that the resource is capable of delivering, when it is fully charged
- Energy delivery that can be sustained for 4 hours

## QC Proposal for Dispatchable Storage Generation (2)

- EFORd adjustment to account for forced outages in determining final UCAP value
  - An EFORd of 5% is proposed as a reasonable metric

# QC Proposal: Dispatchable Load

$UCAP \text{ MW} = ICAP \text{ (MW)} \times \text{Bid Data in Top 200 hours of Ontario Demand per season (1 year historical data)}$

- 'Top 200 hours' replaces previous peak window methodology as better reflection of availability at peak
- Approximates ~5% of peak hours per year
- Real-time historical bids provides reasonable estimation for future availability of the resource during peak hours; longer lookback may create distortions due to changing business operations and associated consumption; utilize a class average for new resources

# QC Proposal: System-Backed Resources (no change)

$$\text{UCAP MW} = \text{ICAP (MW)} \times (1 - \text{tie line outage rate})$$

- Guaranteed by the host system operator, not tied to a specific resource
- IESO has established global import limits that, over the next few years, are going to be well below the tie line capabilities and internal transmission constraints
- Expected to be fully reliable and assured by the neighbouring jurisdiction where they originate to be available to meet Ontario's resource adequacy needs; however outages of the tie line itself need to be considered

# QC Proposal: Resource Backed Imports

Resource-Backed  
Imports in an ISO with a  
fungible UCAP product

$$\text{UCAP (MW)} = \text{Host System UCAP (MW)} * [1 - \text{tie line outage rate}]$$

Resource-Backed  
Imports in an ISO without  
a fungible UCAP product

$$\text{UCAP (MW)} = \text{UCAP as Measured Under IESO QC Process (MW)} * [1 - \text{tie line outage rate}]$$

## QC Proposal: Resource-Backed Imports (2)

- Derates associated with transmission losses will not be included in the initial proposal for imports
- Will utilize other requirements to ensure deliverability of the resource's capacity obligation including requirement for firm transmission to border, import must-offer and support from backing jurisdiction



# Updates to HDR QC Methodology

# HDR Participation in the Auction Today

- In the current auction design all performance assessment is done 'after-the-fact' (during the commitment period, after the auction has run)
- The introduction of qualified capacity (QC) processes will look at past performance data to determine the maximum amount of capacity that a resource will be eligible to submit in the auction

# Proposed Changes to the Qualification Framework

- A performance adjustment factor (PAF) will be determined for the resource based on its past year's performance
  - Real-time energy market bid data too limited to be used as an availability input
- The PAF will determine the resource's Unforced Capacity (UCAP)

# New Terms with HDR QC Methodology

- For the proposed QC Methodology, the IESO has introduced some new terms defined below:
- **Submitted Capacity** (ICAP) value, is the MW amount submitted for each resource in the pre-auction period
- **Performance Adjustment Factor** will be used by the IESO to determine a resource's UCAP based on its submitted capacity
- **Cleared Capacity** – This has two components:
  - **Cleared UCAP** – This is the UCAP MW amount assigned to the resource after the auction and the resource will be settled against this value
  - **Cleared ICAP** – This value is derived using the Cleared UCAP value and the PAF and a resource's capacity check is done against this value

# HDR QC Methodology

- Capacity Qualification will be based on two critical metrics
- Availability assessment based on the Unforced Capacity (UCAP)

$$UCAP = ICAP (MW) * (1 - PAF)$$

- Capability assessment based on the Cleared Capacity

$$Cleared ICAP = Cleared UCAP / (1 - PAF)$$

- A class average PAF will be established for new resources

# Proposed Changes to the Qualification Framework

- A participant is responsible to register contributors equal to its ICAP value corresponding to its cleared UCAP value
- A resource's capability will be assessed based on the ICAP value
- However, a resource's availability payment will be made based on its cleared UCAP value

# HDR Auction Participation Today

- Participant enrolls a MW amount for each resource to prepare for the auction
- During the auction window, participants can offer a MW amount up to their enrolled amount
- After the auction runs, participant receives a cleared MW amount up to their offered MW amount for each obligation period. The cleared MW amount becomes the participants obligation MW amount
- Participants with virtual HDRs are required to register contributors up to their obligation MW amount prior to obligation period

## Proposed New QC Process

- The MW amount submitted by a resource will now be considered as the ICAP for that resource. This number should be a reflection of resource's capability
- A PAF will be determined based on the resource's performance during tests or activations from the previous obligation periods
- This will produce the resource's UCAP value eligible for auction participation
- After the auction runs, whatever MW amount the resource clears will become its **cleared UCAP** and a **cleared ICAP** will be calculated based on this UCAP value and the PAF

# Important Considerations

- A virtual HDR participant is responsible to register contributors equal to its cleared ICAP value
- A resource's capability will be assessed based on that cleared ICAP value
  - Capacity testing will test a resource's capability to deliver MWs according to the cleared ICAP value
- However, a resource's availability payment will be made based on its cleared UCAP value

## Illustration Scenario

- At the time of enrollment, the 100 MW amount submitted by a participant becomes the resource's ICAP MW amount
- For the purpose of illustration, let's assume that the resource's UCAP value is equal to its ICAP value (PAF of 0)\*
- If the participant offers 100 MW to the auction and clears the entire 100 MW, its cleared UCAP value as well as its cleared ICAP value is 100MW

\* This essentially means that the resource had passed previous year's capacity check test

## Illustration Scenario (continued)

- During a capacity check test, if the resource delivers its cleared ICAP amount within a 20% threshold, it passes the test and the PAF will remain zero for year 2
- This allows the resource to continue to offer with no de-rate in a subsequent auction

## Illustration Scenario (continued)

- If the resource fails to deliver on its cleared ICAP value, a new PAF value will be calculated
- For an ICAP value of 100MW, resource needs to deliver upwards of 80MW to pass the test.\* If the resource delivers 75MW, its revised PAF value is:  $PAF = 1 - (75/100) = 1 - 0.75 = 0.25 = 25\%$

\*A 20% dead band is used in the assessment of the capacity charge for HDR resources

## Illustration Scenario (continued)

- For Year 2, if the participant submits 100MW for a resource for qualification, based on the revised PAF value, its UCAP value will be:

$$\text{UCAP} = 100 * (1 - 0.25) = 75\text{MW}$$

- If the participant offers and clears the entire 75MW during the auction, then its cleared ICAP value will be

$$\text{cleared ICAP} = 75 / (1 - 0.25) = 100\text{MW}$$

- This means that the resource needs to register contributors equaling 100MW, will be tested for 100MW *but will only receive availability payment* for 75MW

## Illustration Scenario (continued)

- The previous formulae will apply if the participant decides to offer less than or clears less than its full UCAP amount
- For example, if the participant offers 75 MW during the auction but only clears 60MW, then 60 MW will be its cleared UCAP value and based on a PAF of 0.25, its cleared ICAP value will be 80 MW. This means it will have to register contributors equal to or more than 80MW to deliver 60 MW of UCAP

# What is the impact of PAF?

- For a resource that performs to its obligation, there is no penalty to future participation
- In year 1, if a resource fails to perform to its obligation, the financial implication is equivalent to the auction clearing price for the next full year/season x MWs failed
- Financial exposure is proportional to last year's performance
- Strong incentive to perform to expectation today to avoid financial exposure in subsequent auctions



# Expanding Participation to Resource-Backed Imports for 2022 Capacity Auction

# Overview

- 2021 Capacity Auction work plan includes expanding participation to resource-backed imports for the 2022 Capacity Auction
- Resource-backed imports are imports from neighbouring jurisdictions that are tied to or “backed-up” by a specific generating resource
- The following slides describe the proposed participation model to enable these imports to participate in the auction
  - Framework may be subject to refinement pending further discussions with external ISOs/RTOS

# Eligibility

- Dispatchable generation resources only
  - Only generation technologies/fuel types that are currently eligible to participate in the auction, i.e. no coal
- The resource must demonstrate that it is non-recallable and not under obligation to deliver capacity (in whole or in part) to the host system or any other region. This can be demonstrated by company certification, a generalized agreement between IESO and the external system operator on how to confirm non-recallability, and an annual coordination process between the two system operators

## Eligibility (continued)

- Have a written approval from the host system where the backing resource is located to specify:
  - The capacity resource(s) approved to offer/participate,
  - The commitment period for which the approval applies, including start and end dates,
  - The maximum MW quantities approved, and
  - Any other information or limitations on the approval that may be required by the IESO

## Qualification – Demonstration of Deliverability

- Demonstrate that the resource has firm transmission service to the Ontario border (typically firm point-to-point transmission service) or equivalent
- The MW of transmission service reservation must equal the resource ICAP MW rating

# Deliverability Considerations in Other Jurisdictions

ISO/RTO	Deliverability Evidence	Notes/Other Considerations
MISO	<p>The import participant to provide evidence that they have secured Network Resource Interconnection Service for the commitment period (Section 6 of BPM-015-Generation Interconnection document)</p> <p>The import participant to provide evidence that they have secured Transmission Service with the IESO identified as the sink. (Section 5 of BPM-020-Transmission Planning document)</p>	
NYISO	Market Participant to provide evidence that their resource is deliverable to the IESO's border by establishing Capacity Resource Interconnection Service (CRIS) status, particularly the deliverability of resource to the IESO's border (Section 25.7 - Deliverability Studies and Cost Allocation Methodology for CRIS of NYISO Open Access Transmission Tariff (OATT))	NYISO does not offer transmission services. IESO may impose other requirements from an import resource
Hydro Quebec	Market participant could deliver on Ontario-Quebec interface at Outaouais (PQAT) by purchasing/redirecting point-to-point transmission services in accordance to OATT	

# Imports Obligation

- Obligation is to offer supply into the IESO day-ahead commitment process (DACP) through to real-time
- The obligated must-offer hours are the same as what applies to Ontario Capacity Market Participants
- Availability performance would be assessed relative to energy import offer data (not resource availability data). Penalties would be applied when offers are not submitted, even if the reason for not offering is related to intertie outages

## Imports Obligation (Continued)

- Capacity-backing facilities are required to request approval for and report all outages to the purchasing jurisdiction. As such, IESO would not call on energy from a resource that is on outage. Failure to report an outage could result in compliance penalties against the generator

# Call

- A unique feature applicable to resource-backed capacity imports is the ability of the buying jurisdiction to issue a 'call' on the energy associated with the capacity resource
- The call will be comprised of scheduling instructions which may be issued starting from day-ahead in advance of real-time to the resource
- When a capacity call is made, the participant must ensure the generator backed import is scheduled and the backing generator is injecting an amount equal to or greater than the called capacity.

# Proposed Call Procedure

Call will include MWs and hours. Notification will account for mandatory window requirements and start up times

Special e-tag procedures to identify transaction

Backing resource will need to get scheduled in the selling jurisdiction and will need to successfully schedule an intertie transaction to the buying jurisdiction with the specified quantities and for the specified hours

Failure to deliver on a call will invoke a capacity charge

# Operating Agreement Parameters

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The buyer/seller must verify to their appropriate Operating Jurisdictions that the ICAP resource is not committed to or sold to more than one Operating Jurisdiction.

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Firm transmission service or equivalent is required to guarantee delivery to the sink Operating Jurisdiction's border across restricted or congested external transmission. This means that curtailment for transmission security is done in accordance with the applicable tariffs on a comparable basis with other firm customers, including firm load.

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When scheduled, the energy associated with the ICAP purchase must be backed by operating capacity. 'Backed by operating capacity' will mean that the source Operating Jurisdiction is committing generating capacity to provide for the transaction.

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When experiencing a capacity shortage, the sink Operating Jurisdiction has first call rights in accordance with their market requirements, to the energy that is being produced or could be produced by the ICAP resource, whether or not the energy had been previously scheduled by the buyer.



# Technical Panel Update

# Technical Panel Update

- At the June 29 meeting, the Technical Panel voted to post the proposed rule amendments for broader stakeholder comment. The amendment proposal is posted [here](#) for comment until July 15.
- The amendments reflect the administrative updates that have been previously stakeholdered.



# Recap and Next Steps

# Stakeholder Feedback Requests

- Stakeholders are invited to submit questions and provide general feedback on the updated QC proposals and the proposed resource-backed import framework
- IESO may conduct further resource-specific meetings/outreach as needed
- Please provide all written feedback to [engagement@ieso.ca](mailto:engagement@ieso.ca) by August 13 using the feedback form on the [engagement webpage](#)

## Next Steps – Capacity Auction (continued)

- Updates to Performance Obligations and Assessment
  - Further Discussion with stakeholders during the August 24-26 engagement days

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# Thank You

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