

MAY 28, 2021

Resource Adequacy Engagement

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Agenda

- Resource Adequacy Engagement Update
- Resource Adequacy Information Guide
- Annual Acquisition Report (AAR) Preview
- Capacity Auction
 - Forward Guidance and Minimum Target Threshold
 - Transitioning to Qualified Capacity/UCAP
- Recap and Next Steps



Resource Adequacy Engagement Update

Resource Adequacy Engagement General Update

- 10 stakeholder feedback submissions received following the March 22 Resource Adequacy engagement webinar
 - A document that summarizes this feedback with an IESO response has been posted to the [engagement webpage](#)
- Stakeholder feedback on the April 22 Resource Adequacy engagement webinar due by May 13
 - IESO will aim to review and respond in advance of the June engagement days



Resource Adequacy Information Guide

Resource Adequacy Information Guide

- Previous stakeholder feedback indicates an opportunity to delineate between details in the Resource Adequacy framework and its implementation through the AAR and mechanism-specific documents
- The following slides are intended to clarify information provided in the framework, AAR, and mechanism-specific documents
 - Information to serve as a guide to inform participation in upcoming Resource Adequacy engagement sessions and competitions
- This guide will be posted on the IESO website after considering stakeholder feedback

Resource Adequacy Information Guide (continued)

- Not intended to answer all Resource Adequacy-related questions but provide an indication of where answers to questions may be found
- Much of this information was developed through feedback and discussions with stakeholders.
- Stakeholder feedback is requested on:
 - Is there any important Resource Adequacy-related information not already considered in this guide?
- Details on how to submit feedback provided in Recap and Next Steps

Information Guide - Timelines

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
Acquisition based on needs in three different timeframes: short, mid and long term	Translates needs identified in Annual Planning Outlook (APO) and other inputs into targets for each timeframe	Annual Capacity Auctions are for two 6-month obligation periods. Commitment periods for mid-term and long-term competitive procurements will be established for each procurement, based on the specific needs.

Information Guide – Procurement Mechanisms

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
<ul style="list-style-type: none">• Short-term mechanism – Annual capacity auction• Mid-term mechanism - RFP or enhanced capacity auction• Long-term mechanism – RFP• Bilateral contracting in some circumstances	<p>Specifies which mechanisms will be used to meet needs for each timeframe and a range of procurement targets for each mechanism.</p>	<p>Procurement mechanism runs according to each AAR.</p> <p>Stakeholders will have an opportunity to comment on draft mechanism documents such as market rules and market manuals (for Capacity Auction enhancements), and draft RFP and contract documents, etc. (for other competitive procurements), before they are finalized.</p>

Information Guide – Commitment Details

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
<ul style="list-style-type: none">• Short-term – annual auction establishing seasonal commitments and relatively short forward period• Mid-term – multi-year commitment with longer forward period (up to 3-4 years)• Long-term – longer term commitments and forward period aligned with financing needs and life of facilities• Bilateral contracting – expected to be similar to mid-term commitment lengths with the aim of alignment with future competitions	<p>AAR will provide a range of commitment length for mid- and long-term mechanisms</p>	<p>Detailed commitment and forward period details outlined in market rules and manuals for Capacity Auction, and in procurement documents for competitive procurements</p>

Information Guide – Products and Services

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
<ul style="list-style-type: none">• Short term – unbundled capacity• Mid-term – unbundled capacity, and other attributes as necessary to meet system reliability needs• Long-term – potential to acquire attributes other than capacity as necessary to meet system reliability needs• Bilateral contracting – products and services procured in alignment with mid and long term products and services <p>IESO will engage with stakeholders through the Resource Adequacy engagement to develop a capacity qualification methodology for various resource types. The intent is this methodology will inform the individual processes that will apply to each of the framework mechanisms with the exception of bilateral contracting.</p>	<p>Translates reliability needs identified in APO and other inputs into a range of targets for capacity, energy and other products for each timeframe and mechanism</p> <p>The AAR will outline facilities that have been secured through bilateral contracting, to the extent permitted by confidentiality limitations, and how target ranges reflect those MWS.</p>	<p>Detailed requirements for each mechanism outlined in market rules and manuals for Capacity Auction, and in procurement and contracting documents for competitive documents</p>

Information Guide – Eligibility

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
<p>Competitions open to as many resource types as possible that can satisfy the identified needs with eligibility aligned with the specific context of each mechanism.</p> <p>Bilateral contracting – when an existing and available resource can meet a specified need that cannot be effectively met through a competition.</p>	<p>Needs outlined in APO and other inputs will be translated into requirements, needs and target ranges for mechanisms in AAR, which will inform resource capabilities required.</p> <p>Types of requirements that will be specified either through the AAR or mechanism-specific documents may include energy production requirements, telemetry requirements, capability to be dispatched by the IESO, ramping characteristics, etc.</p>	<p>Detailed eligibility requirements for each mechanism outlined in market rules and manuals for Capacity Auction, and in procurement documents for competitive procurements</p>

Information Guide – Transition/Bridging Mechanisms

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
<p>Resources with expiring or expired contracts are expected to compete in annual Capacity Auctions and upcoming mid-term RFPs.</p> <p>IESO will work with individual suppliers to address any short-term misalignments between contract end dates and when commitment periods for the mechanisms are scheduled to begin.</p>	n/a	n/a

Information Guide – Governance & Decision-Making

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
<p>IESO is participating in discussions to inform the government’s Long-Term Energy Planning (LTEP) consultation which may result in changes that create or inform the governance and decision-making on IESO’s overall planning and acquisition activities. In addition, the IESO is considering any short-term considerations for each of the mechanisms that may necessitate discussions with stakeholders.</p>	<p>n/a</p>	<p>The authority under which the IESO is undertaking an acquisition will be clearly outlined in the mechanism-specific documents (e.g., existing market rules, proposed market rule amendments or government directive).</p>

Information Guide – Target-Setting Methodology

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
n/a	<p>The AAR will apply and explain the principles used for decision-making on target allocation for the mechanisms.</p> <p>Where the AAR sets a target allocation for a future acquisition, the method used and its alignment to the principles will be discussed.</p>	n/a

Information Guide – Planning Considerations

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
The APO will continue to evolve to meet the needs of the system and to inform the Annual Acquisition Report.	The AAR will continue to evolve to identify mechanisms and targets to address system needs.	n/a

Information Guide – Programs

Resource Adequacy Framework	Annual Acquisition Report	Mechanism-Specific Documents
<p>The IESO will continue to consider the role of programs in meeting Ontario’s Resource Adequacy needs in the APO and other system planning documents.</p> <p>Historically, programs (e.g. energy efficiency, peaksaver) implemented by the IESO and its predecessor organizations have resulted from government policies issued to the IESO and this is not expected to change in the immediate future.</p>	n/a	n/a

Stakeholder Feedback Requested

- Stakeholder feedback is requested on:
 - Is there any important Resource Adequacy-related information not already considered in this guide?
- Please provide feedback to engagement@ieso.ca by **June 18** using the feedback form on the [engagement webpage](#)



Annual Acquisition Report Preview

2021 Annual Acquisition Report

- The primary objective of the first AAR will be to inform procurement activities that will be initiated this year
 - It is expected to be published by end of June
- IESO welcomes stakeholders' review of the full report, and will be actively seeking feedback and suggestions for the evolution of the AAR in subsequent years

2021 Annual Acquisition Report Preview

Background

- Role of the AAR in the Resource Adequacy framework
- Relationship to IESO planning and operability documents

Understanding Ontario's Needs

- The various products and services required to meet needs
- Uncertainties in planning forecasts and their impact on acquisition targets and tools
- Transmission system bulk and regional planning considerations

2021 Annual Acquisition Report Preview (continued)

Principles for Decision-Making

- Principles used for decisions on use of mechanisms, target-setting, etc.

Use of the Resource Adequacy Framework Mechanisms

- How the Resource Adequacy framework mechanisms will be used to meet the identified needs
- Target ranges for the products and services to be acquired
- High-level timelines outlined for mechanisms to be used

2021 Annual Acquisition Report Preview (continued)

Defining Capacity

- Explanation of unforced capacity (UCAP) and how it will be applied to the framework

2021 AAR Preview – Short-term Mechanism

Capacity Auction

- Mechanism to balance the system year-to-year, while continuing to play a more significant role in meeting overall capacity needs
- Ability to adjust quickly if our forecast changes significantly
- Ongoing and repeatable process to maintain and attract resources that can provide capacity with a relatively short forward period
- The AAR will set targets for the next capacity auction and forward guidance for future capacity auctions



Capacity Auction: Balancing Certainty and Cost

Purpose

- Discuss enhancements to increase business and investment certainty in the role of the Capacity Auction and provide guidance on future needs, while supporting competitive and cost-effective outcomes for ratepayers

Importance of A Balanced Approach

The annual capacity auction is undergoing design enhancements to:

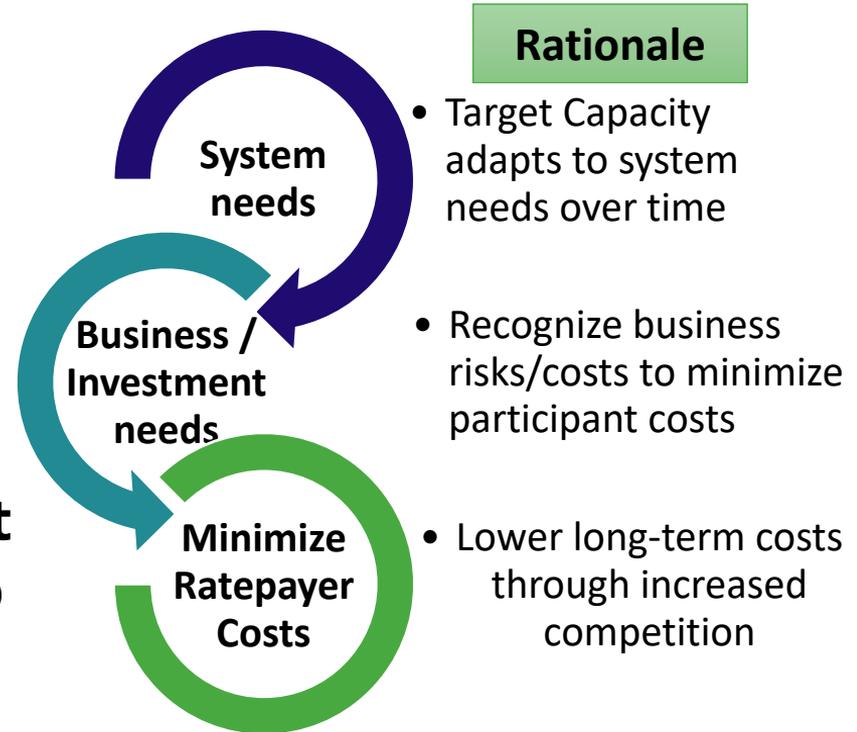
1. Meet system needs as they arise and be the balancing mechanism as conditions change
2. Create a stable business environment that minimizes investment risk associated with future uncertainty while adapting to system needs over time
3. Maximize participation to increase competition and result in cost effective outcomes

Striking a balance between these three design goals will ensure a stable, competitive, successful auction mechanism to meet needs at lowest cost

Proposed Approach

The IESO is proposing two enhancements to increase certainty in the auction mechanism:

1. Provide appropriate **Forward Guidance** by introducing an outlook of needs
2. Establish seasonal **Minimum Target Capacity** thresholds that commits to procuring MWs on a seasonal basis



What is Forward Guidance?

- An expected projection of the IESO's Capacity Auction needs over the next 5 years
 - 2021: Firm target for 2022 summer and 2022/2023 winter obligation periods
 - 2022: Anticipated target within a range
 - 2023-2026: Illustrative forward guidance
- Updated and issued annually through the AAR

Why Forward Guidance?

1. Creates a stable business environment that minimizes investment risk associated with future uncertainty while adapting to system needs over time
2. Maximizes competition to create competitive tension and drive down costs over the long term
3. Avoids boom/bust scenarios

In the absence of providing an appropriate degree of certainty/predictability, a market is at risk of undesirable outcomes such as, extreme price volatility, reduced participation and ultimately higher long run costs

Capacity Auction - Minimum Target Threshold

- Stakeholders have expressed strong views for a minimum target capacity threshold in order to manage business risk and uncertainty
- Acts as a “safety net” in the event that conditions change materially year-over-year putting their investments at risk
- In practice, two minimum thresholds could be established for summer and winter commitment periods, respectively, in ongoing auctions

Why Minimum Target Threshold?

- As the system balancing mechanism, the IESO expects the auction to play an important role in future winter and summer commitment periods
- Provides additional confidence to investors/asset owners while ensuring a continued competitive pool of resources available
- Protects against inefficient short-term exit leading to sub-optimal long-term competitive outcomes (in both seasons)

Next Steps

- Stakeholders are invited to provide general feedback on the proposed approach for forward guidance and minimum target threshold to engagement@ieso.ca by **June 18** using the feedback form on the engagement webpage
- Further details will be communicated through the Annual Acquisition report in June



Transition to Qualified Capacity/UCAP

Purpose

- Discuss transition to a new capacity qualification framework for the Capacity Auction
- UCAP will be foundational for all future capacity acquisition mechanisms and planning processes
 - This design work will inform the design of other procurements within the Resource Adequacy Framework

Approach and Expectations

- The following slides will highlight principles and considerations to help guide this transition
- Draft design proposals presented are meant as a starting point to support and inform collaborative discussion
- Some resource proposals reflect well-established processes, others will require further discussion and refinement to work within Ontario's market framework
- **Goal:** Build a collaborative framework with stakeholders to ensure we get to practical solutions that will meet objectives

Background

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

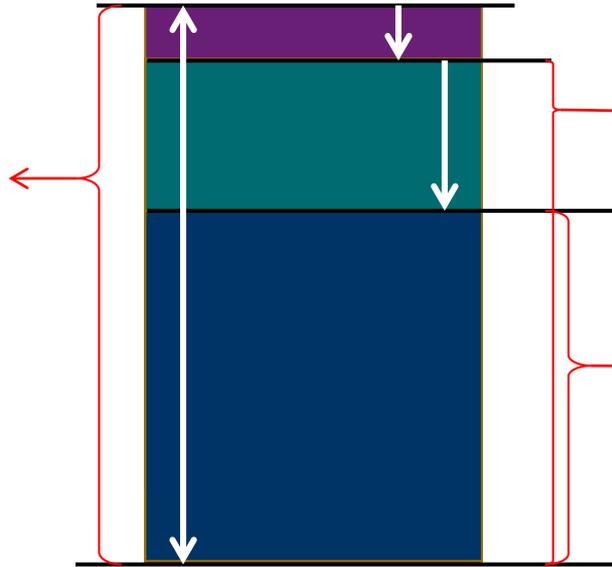
- Ensures resources are capable of delivering their capacity obligation in real-time, and that resources are compensated consistent with the reliability value they provide
- A key measure to improve resource performance and alignment with adequacy needs

Background (continued)

- Achieved by establishing a Qualified Capacity (QC) process that determines the maximum amount of capacity in terms of UCAP value each resource can offer into the Capacity Auction
 - Currently, capacity is procured under an installed capacity (ICAP) definition
- The use of UCAP values is expected to be rolled out to all framework mechanisms once the process is implemented for the Capacity Auction

Transition from ICAP to UCAP

Nameplate Capacity - a resource's full-load output capability as provided by the manufacturer



ICAP - represents a resource's expected capacity that accounts for seasonal and ambient weather conditions

UCAP - represents a resource's un-forced/effective capacity (i.e., ICAP value further reduced by forced outage)

Transition From ICAP to UCAP (continued)

- By transitioning to the use of UCAP, a common format will be established to compare the capacity contribution of different types of resources to meeting resource adequacy needs
- Resource type characteristics and behaviour, such as seasonal effects and the impact of forced outages, will be captured
- Values are expected to be established for summer and winter seasons

Defining the Auction Product

Availability product with an obligation to provide up to four hours of generation or demand reduction during expected hours of system peak

- The definition needs to balance system and operational needs with cost to the ratepayer

Reliability Risk

Shorter duration may increase supply but insufficient to meet operational needs during peak times that are at least 4 hours in duration

vs

Higher Cost

24/7 availability is not necessary in a diversified supply mix and would increase participation costs and limit participation

4 hours



Qualified Capacity Design Principles and Objectives

Qualified Capacity Process General Overview

- Resources' contribution to resource adequacy needs is typically defined by the amount of capacity it can be expected to provide, on average, during a pre-defined window of peak hours in the obligation period
- Aims to equalize the contribution of each MW of UCAP across all resource types
- Ensuring parity between participating resources allows the IESO to secure capacity in a transparent, open, and fair manner

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

Qualified Capacity Design Considerations

- Historical energy production is a key factor in determining qualified capacity (QC) values
 - Historical approved planned outages do not impact QC values however, forced outage rates do
- Seasonal capability is considered – different QC values for summer and winter

Qualified Capacity Design Considerations (continued)

- Performance during an Obligation Period may affect future QC
- Zonal constraints are sufficient to capture the impact of transmission limitations on deliverability of cleared capacity
- Class-average approaches may be used where historic availability and/or performance data is limited



Proposed Resource-Specific QC Methodologies

Context – QC *Proposals*

- The proposed resource-specific QC methodologies are meant to start the discussion with stakeholders and solicit their input
 - Some proposals draw on design proposals from previous engagements
 - Others informed by practical experience, observed performance and/or best practices
- Stakeholder input will be critical in establishing QC methodologies that capture the unique characteristics of resource types while ensuring integrity is maintained in the Auction

Context – QC *Proposals* (continued)

- A collaborative approach with a good flow of information, data and communication on both sides will help ensure a successful transition
- Stakeholder engagement on QC methodologies expected for the remainder of 2021 and into 2022 with full implementation in advance of the December 2022 capacity auction
 - Design work to develop QC methodologies will likely require smaller, group meetings to 'deep-dive' into resource-specific details

QC Proposal for Dispatchable Thermal Generation

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

- 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 for Dispatchable Thermal Generation (2)

- Equivalent Forced Outage Rate on Demand (EFORd) reflects the uncertainty in the availability of thermal generators due to unforeseen outages
 - IESO proposes to apply EFORd on an annual basis using the existing IESO processes (5 years of historical data)

QC Proposal for Dispatchable Storage Generation

$$UCAP (MW) = [\min (Full Power Operating Mode, Energy Rating (MWh)/4 hrs)] * (1 - EFORD)$$

- 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
 - If no historical data is available, an EFORd of 5% is proposed as a reasonable metric

QC Proposal for Dispatchable Load Resources

UCAP (MW) = Average of up to 1 year of historical dispatchable energy market bids from the hours coincident with the four consecutive hours of highest demand within the qualification window*, from each business day, within each obligation period

* A qualification window may use a subset of hours within the availability window

QC Proposal for Dispatchable Load Resources (2)

- Propose dispatchable load resources be qualified by using real-time bid data, for peak hours during the qualification window, from the previous year
- Provides reasonable estimation for future availability of the resource during this window of peak hours; longer lookback may create distortions due to changing business operations and associated consumption
- IESO may also use test results in addition to bid data
- For new dispatchable load resources, a class average factor can be established

QC Proposal for Hourly Demand Response Resources

$$\text{UCAP (MW)} = \text{ICAP (MW)} * (1 - \text{Performance Adjustment Factor})$$

- Seasonal Performance Adjustment Factor (PAF) based on previous capacity test results, resource's response to historical activations and/or bid data
 - Need to refine inputs to calculate the PAF (e.g., number of capacity tests, average versus weighted values, limited number of real-time bid hours etc)

QC Proposal for Hourly Demand Response Resources (2)

- Need to consider approaches for physical and virtual resources
- Will need to incorporate findings from hourly demand response (HDR) baseline methodology review and other considerations including timing of tests as an input into QC process
 - HDR baseline methodology review is expected to be completed by Q4 2021
- For new HDR resources, a class average de-rating factor can be established

QC Proposal for Dispatchable Hydro Resources

UCAP (MW) = Average of up to 5 years of historical production data selected from the hours coincident with the four consecutive hours of highest demand within the qualification window* of peak hours, from each business day, within each obligation period

* A qualification window may use a subset of hours within the availability window

QC Proposal for Dispatchable Hydro Resources (2)

- 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
 - Provides reasonable estimation for future availability of the resource during this window of peak hours

QC Proposal for System-Backed Imports

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

- 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
 - This capacity is expected to represent only a small portion of the overall external control area's total generation capability

QC Proposal for Resource-Backed Imports

$$\text{UCAP (MW)} = \text{IESO Resource type-specific UCAP formula} * [1 - \text{tie line outage rate}] * [1 - \text{transmission losses rate}]$$

- Generator-Backed Capacity Imports will be qualified using the same methodology as the corresponding resource type located in Ontario
- For regions with a fungible UCAP product (MISO, NYISO), IESO could consider utilizing host system UCAP accreditation methods

QC Proposal for Resource-Backed Imports (2)

- Discussion with stakeholders required to determine appropriate de-rating factors to account for in methodology
- De-rating factors will need to account for intertie outage rates and losses up to the border
- Expected to be calculated on a case by case basis and considering best practices in other jurisdictions

Stakeholder Feedback Requested

- Will the initial qualified capacity proposals presented result in a UCAP value that is consistent with the qualified capacity design principles for the resource types considered? If not, what changes would you suggest? Please offer alternatives.
- Are the sources of data suggested as inputs into each UCAP formula appropriate? If not, please explain why and suggest alternatives.
- Are there any incorrect assumptions the IESO has included that may not be appropriate?
- Is there anything the IESO may not have considered that may contribute to the development of an accurate UCAP methodology?

Stakeholder Feedback Requested (continued)

UCAP Resource-Specific Meetings

- Please indicate your interest in participating in these meetings sooner than June 18, if possible.
- Are bi-weekly meetings appropriate? What should the format be? How should attendance be managed.
- Please provide feedback to engagement@ieso.ca by June 18 using the feedback form on the [engagement webpage](#)



Recap and Next Steps

Recap: Stakeholder Feedback Requests

Resource Adequacy Information Guide

- Is there any important Resource Adequacy-related information not already considered in this guide?

Forward Guidance and Minimum Target Threshold

- Stakeholders are invited to provide general feedback on the proposed approach for forward guidance and minimum target threshold

Recap: Stakeholder Feedback Requests (continued)

Transition to Qualified Capacity/UCAP

- Will the initial qualified capacity proposals presented result in a UCAP value that is consistent with the qualified capacity design principles for the resource types considered? If not, what changes would you suggest? Please offer alternatives.
- Are the sources of data suggested as inputs into each UCAP formula appropriate? If not, please explain why and suggest alternatives.
- Are there any incorrect assumptions the IESO has included that may not be appropriate?

Recap: Stakeholder Feedback Requests (continued)

Transition to Qualified Capacity/UCAP (continued)

- Is there anything the IESO may not have considered that may contribute to the development of an accurate UCAP methodology?

UCAP Resource-Specific Meetings

- Please indicate your interest in participating in these meetings sooner than June 18, if possible.
- Are bi-weekly meetings appropriate? What should the format be? How should attendance be managed?

Recap: Stakeholder Feedback Requests (continued)

- Please provide all written feedback to engagement@ieso.ca by June 18 using the feedback form on the [engagement webpage](#)

Next Steps

- June Resource Adequacy engagement meeting
 - 2021 AAR Key Findings
 - Capacity Auction
 - Discussion of proposals to expanding participation to resource-backed imports

Draft Capacity Auction Stakeholder Plan 2021

- Internal Design
- Stakeholder

Work Items	Q1	Q2	Q3	Q4
Enhance Auction Administrative Processes	Identify enhancements and process improvements	Discuss 2021 admin changes		
Expand Participation in the CA (Enable Resource-backed imports)		Design: identify challenges and propose solutions		
			Design proposals and participation frameworks	
Increase Certainty in the CA (Establish minimum-target Capacity)		Design: identify challenges and propose solutions		
		Discussion on min. target		
Establish QC Methodologies for Enabled Resources (Transition to UCAP)		Design: identify challenges and propose solutions	Develop QC Methodologies for Enabled Resources Including Imports	
		QC design principles and considerations		Stakeholder developed QC methodologies
Review Performance Obligations and Assessment (Incl. charges, HDR baseline)		Review current obligations	Update current Performance Obligations & Assessment framework	
		Stakeholder and solicit input on proposals		Stakeholder (as required)

Thank You

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