

Capacity Auction Design Memo 7.1

Engagement Topic: Demand Curve Review

Engagement Status: Complete

Date: January 2023

Objective

Updates to the demand curve for the 2023 Capacity Auction will focus on adjustments to the Reference Price and Maximum Auction Clearing Price (MACP). These changes will ensure the curve reflects current economic conditions and auction design such that it continues to clear reliable, low-cost incremental capacity to help meet Ontario's emerging Resource Adequacy needs.

Price updates for the 2023 Capacity Auction will aim to ensure the auction continues to:

1. Procure sufficient capacity to meet incremental resource adequacy needs
2. Provide a stable and appropriate investment signal to market participants
3. Drive competition and ratepayer value

Background

The existing method for deriving the demand curve was established in 2015 to support the competitive acquisition of demand response via the Demand Response Auction (DRA). Since that time, the purpose of the auction has evolved from a mechanism that primarily supports the growth of demand response as a capacity resource in Ontario, to procuring incremental capacity from a broader set of resource types to help meet short-term reliability needs.

Ontario is also entering a period of tight supply, meaning appropriate market signals will play an important role in meeting emerging capacity needs.

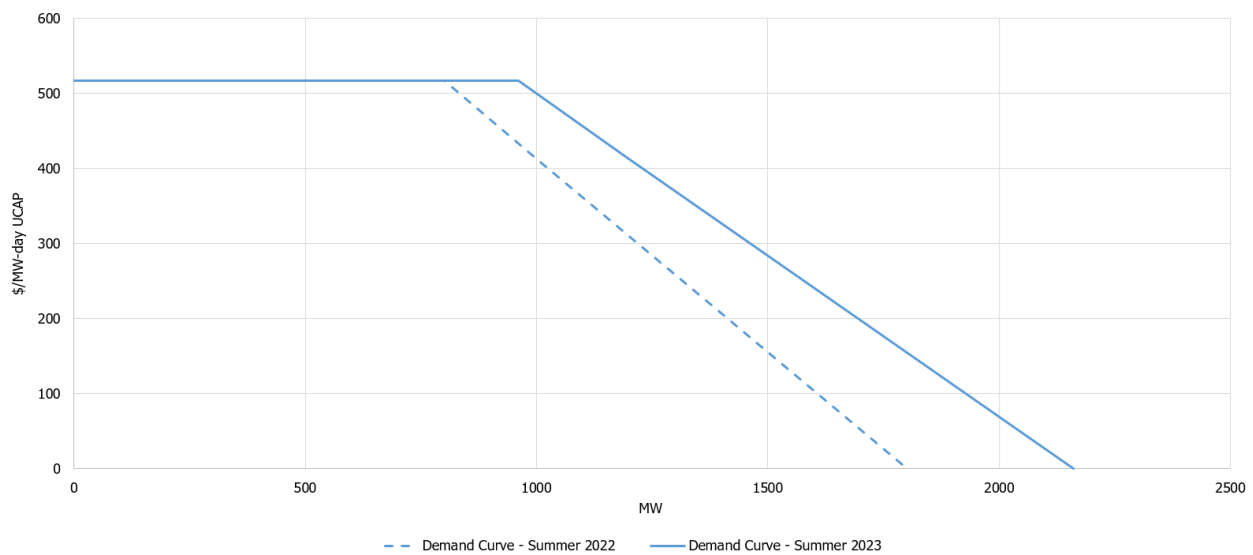
Engagement on future capacity auction enhancements will consider a more fulsome review of the demand curve that could include parameter design, curve shape, as well as potential updates to the reference technology. This will ensure that any substantive changes to how the demand curve parameters are set are considered comprehensively, including allowing for sufficient stakeholder

input and internal IESO assessment to ensure alignment across procurement mechanisms and IESO planning processes.

Target Capacity and the Demand Curve

Prior to presenting the recommended updates to the Reference Price and MACP, it is important to clarify how changes to the target capacity also impact the demand curve. The target capacity is adjusted each obligation period based on incremental capacity needs, as identified in the Annual Acquisition Report. As target capacity increases, the width of the demand curve expands and the downward sloping portion of the curve becomes flatter. Figure 1 demonstrates this effect using the target capacity from Summer 2022 vs. Summer 2023. If the same capacity offered into the auction in 2022 is offered in 2023, any uncleared capacity in the 2022 auction would be more likely to clear in 2023 due to the outward shift of the curve resulting from the increase in the target capacity.

Figure 1. Demand Curve – Summer 2022 vs. Summer 2023 Obligation



Analysis Approach

IESO retained the Brattle Group to review and update demand curve price parameter recommendations provided in 2019. Using the 2019 Reference Price recommendation of \$542/MW-day ICAP, Brattle updated the 2019 Reference Price to account for inflation and the change to qualifying resources on an Unforced Capacity (UCAP) basis in the 2023 Capacity Auction.

The conversion from ICAP to UCAP assumes an Equivalent Forced Outage Rate on Demand (EFOR_d) of 5.13% based on the EFOR_d of the reference technology (currently based on a gas CT plant) in Ontario, per the 2021 Annual Planning Outlook. The methodology for deriving EFOR_d for thermal generators accounts for both forced and planned outages and forced de-ratings, which includes de-rates associated with the impacts of ambient conditions on operational capability.

Brattle provided two options for updating the MACP above the current 1.25x Reference Price multiplier. The maximum auction clearing price was not recommended to be set below 1.5x the Reference Price, and up to 2x the Reference Price. For further detail on the Brattle analysis and

how the price caps compare to maximum clearing prices in neighbouring jurisdictions see [Discussion Brief 3.0 – Demand Curve Review](#).

Options

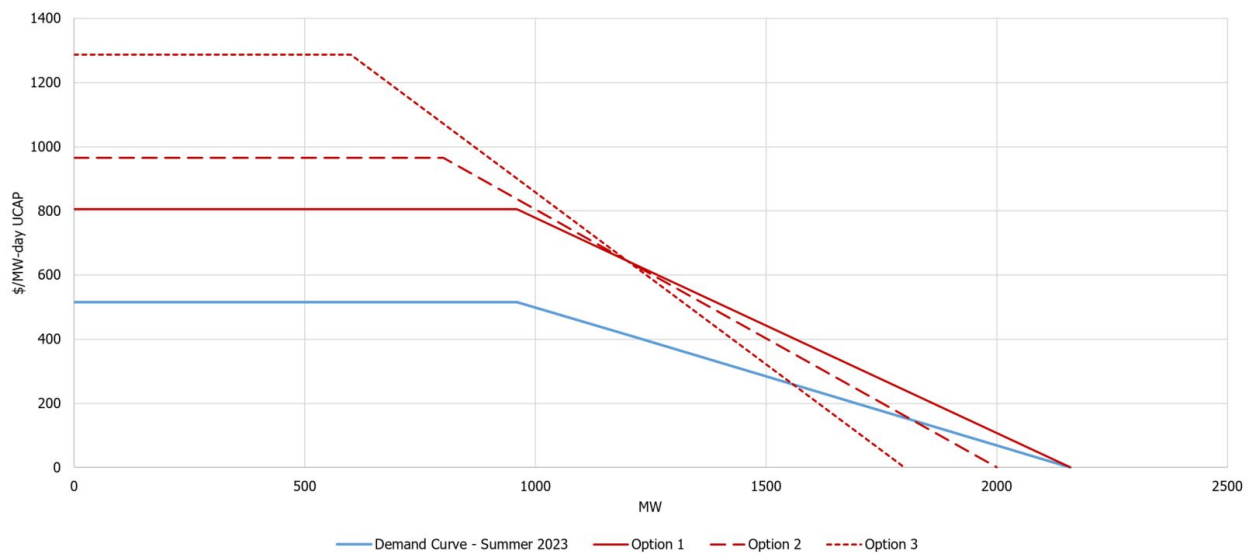
The table below outlines three options for updates to the demand curve, each compared to the status quo. All three options use the same Reference Price update of \$644/MW-day UCAP based on the Brattle analysis.

The options presented differ by the magnitude of the multiplier used to derive the MACP. Multipliers of 1.25, 1.5, and 2 are applied to the updated Reference Price to derive price caps of \$805/MW-day UCAP, \$966/MW-day UCAP, and \$1288/MW-day UCAP, respectively.

Demand Curve Parameter	Options			
	Status Quo	1	2	3
Reference Price (\$/MW-day UCAP)	413	644	644	644
MACP Multiplier	1.25	1.25	1.5	2
MACP (\$/MW-day UCAP)	516	805	966	1288

In, Figure 2 the Summer 2023 target capacity of 1200 MW is used to illustrate how the shape of the curve differs between Option 1, Option 2 and Option 3 compared to the status quo curve. The shape of each curve impacts clearing prices and quantities, depending on the capacity auction offers received that determine the offer curve.

Figure 2. Demand Curve Options



Under Option 1, the updated Reference Price shifts the curve upward, allowing an opportunity for higher prices in scarcity conditions due to the higher MACP. A similar effect would occur under Option 2 and Option 3, but the higher MACP multipliers – of 1.5x and 2x respectively – result in a relatively steeper slope than Option 1. A flatter demand curve will procure more capacity at a higher price than a steeper demand curve for volumes procured above the target capacity. Due to this effect, Option 3 is not being considered for implementation. The MACP in Option 3 is also relatively high compared to the price cap in other jurisdictions (see Brattle analysis).

While Option 2 has a steeper slope than the status quo curve, it would clear more capacity at a higher price for most volumes procured until near the bottom of the curve, at which point prices would be relatively low under either curve. Therefore, Option 2 is preferred to the status quo.

Option 2 is also preferred to Option 1 because while the slope is slightly steeper under Option 2, it provides sufficient opportunity for higher clearing prices and quantities, while mitigating the risk of over-procurement if the market is long on supply. For quantities procured below the target capacity, Option 2 would result in more capacity cleared at higher prices than Option 1.

Further, the relatively higher MACP in Option 2 compared to Option 1 is better aligned with the auction price caps in neighbouring jurisdictions, and allows for resources with a potentially higher cost of new entry than the reference resource to participate in the auction. For example, the National Renewable Energy Laboratory (NREL) Annual Technology Baseline Data for 2022 estimates the Gross CONE for a storage resource to be \$314,902 2022\$ CAD/MW-year (approximately \$1250/MW-day UCAP).¹

¹ [NREL 2022 Annual Technology Baseline Cost and Performance Data for Electricity Generation Technologies](#)

Existing Design

The current Capacity Auction demand curve includes a reference price currently set at \$413/MW-business day in ICAP terms and a multiplier of 1.25x the reference price to determine the Maximum Auction Clearing Price of \$516/MW-day.

2023 Enhancements

As part of the 2023 Capacity Auction enhancements, IESO will proceed with the following recommended updates to the demand curve price parameters:

- Update current Reference Price from the 2019 Brattle recommendation of \$542/MW-day ICAP to account for inflation and the transition to UCAP
 - Results in a Reference Price update to **\$644/MW-day UCAP**
- Update the MACP to 1.5x the Reference Price
 - Results in an MACP update to **\$966/MW-day UCAP**
 - The MACP is an input into the methodologies which determine the maximum capacity auction limit at the MACP, and the maximum auction capacity limit.
 - Under the existing design where the MACP is equal to 1.25x the Reference Price, the maximum auction limit at the MACP is equal to 80% of the target capacity, and the maximum auction capacity limit is equal to 180% of the target capacity.
 - Under the updated curve with an MACP equal to 1.5x the Reference Price, the maximum auction limit at the MACP will be equal to 66.7% of the target capacity, and the maximum auction capacity limit is equal to 167.7% of the target capacity.

Market Rule/Market Manual Impacts

Changes to the demand curve parameters based on the above recommendation will be reflected in Market Manual 12 Section 2.5.3. The Reference Price update does not result in a change to the Market Manuals, meaning the primary change will be to the multiplier used to derive the MACP.