

IESO Capacity Auction Reference Price and Maximum Auction Clearing Price Updates

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PRESENTED TO:

**IESO Capacity Auction
Stakeholders**

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Agenda

Overview

2019 Demand Curve Review

2022 Updated Analysis

Future Considerations

Overview

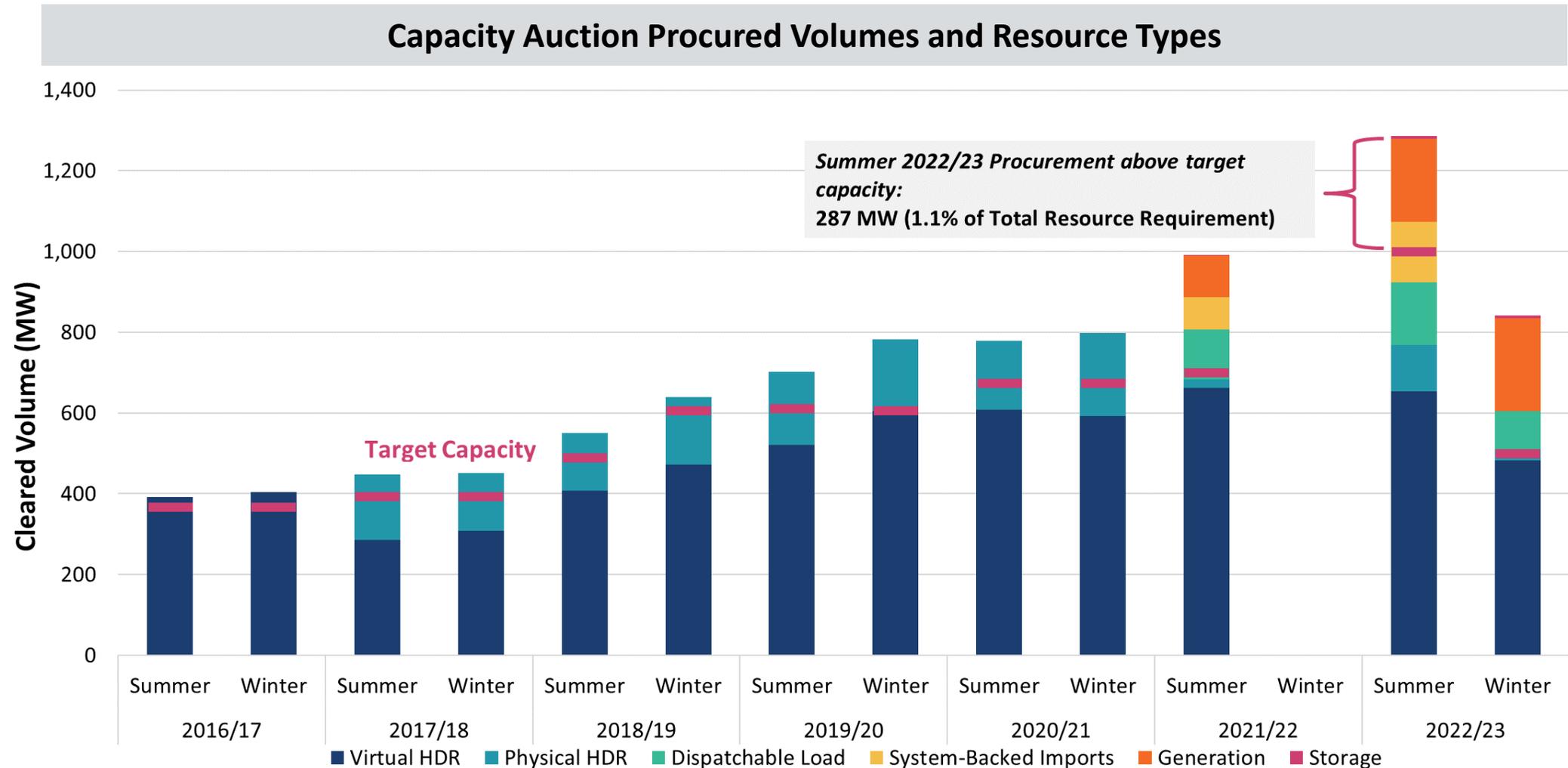
Scope of 2022 Updated Analysis

IESO retained Brattle to perform an update to the analysis that informed the 2019 Demand Curve Review recommendations, specifically:

- Limited update to the Reference Price to account for inflation and changes to capacity auction functioning (ICAP to UCAP based procurement)
- Review of 2019 Demand Curve Review recommendations for the MACP and the extent they are still relevant for today

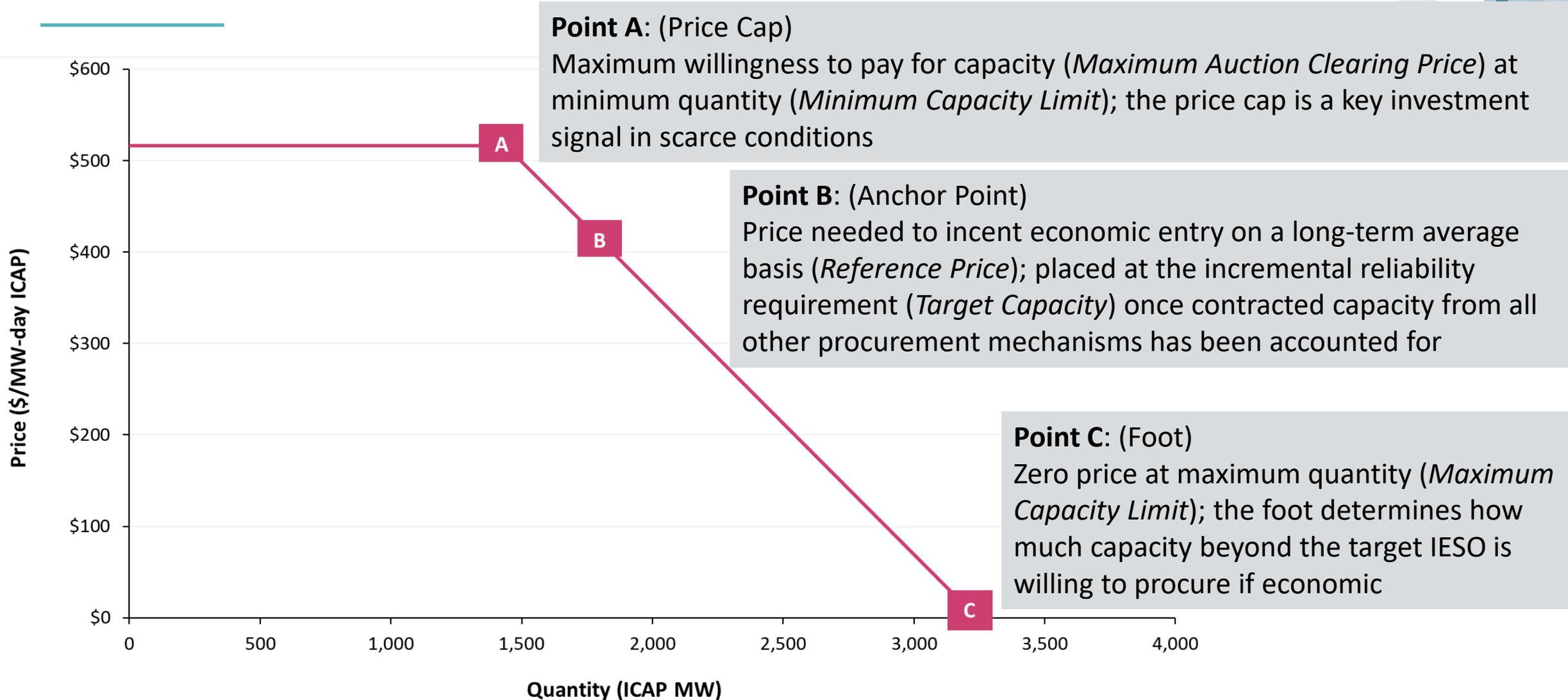
OVERVIEW

The Capacity Auction Has Evolved Over Time to Include More Resource Types Than Demand Response



Sources and Notes: IESO, [Demand Response Auction Post-Auction Reports](#); IESO, [Capacity Auction Post-Auction Reports](#); IESO, [Demand Response Auction Pre-Auction Reports](#); IESO, [Capacity Auction Pre-Auction Reports](#).

Demand Curve Design



Sources and Notes: Illustrative demand curve based on the 2022/23 capacity auction parameters. The Summer target capacity is the maximum forecasted volume (1,800 MW) the Capacity Auction could be needed to procure in 2026. See [IESO, Capacity Auction: Pre-Auction Report for delivery year 2022/2023, September 01, 2021](#) and [IESO, 2021 Annual Acquisition Report, July 2021, Table 1](#).

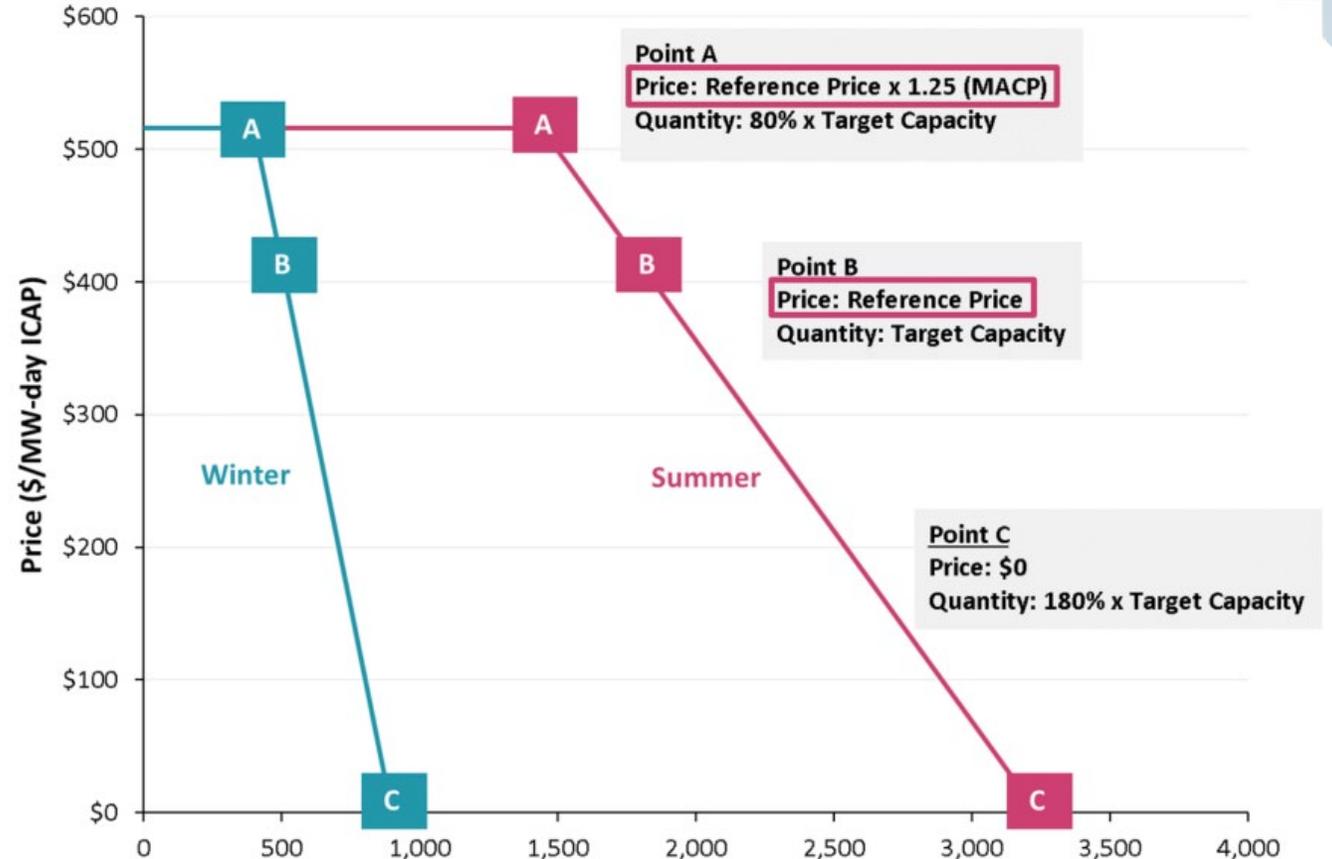
OVERVIEW

Current Demand Curve Slope Changes Depending on Target Capacity

Defined as a straight line from Point A through Point B down to zero price (Point C)

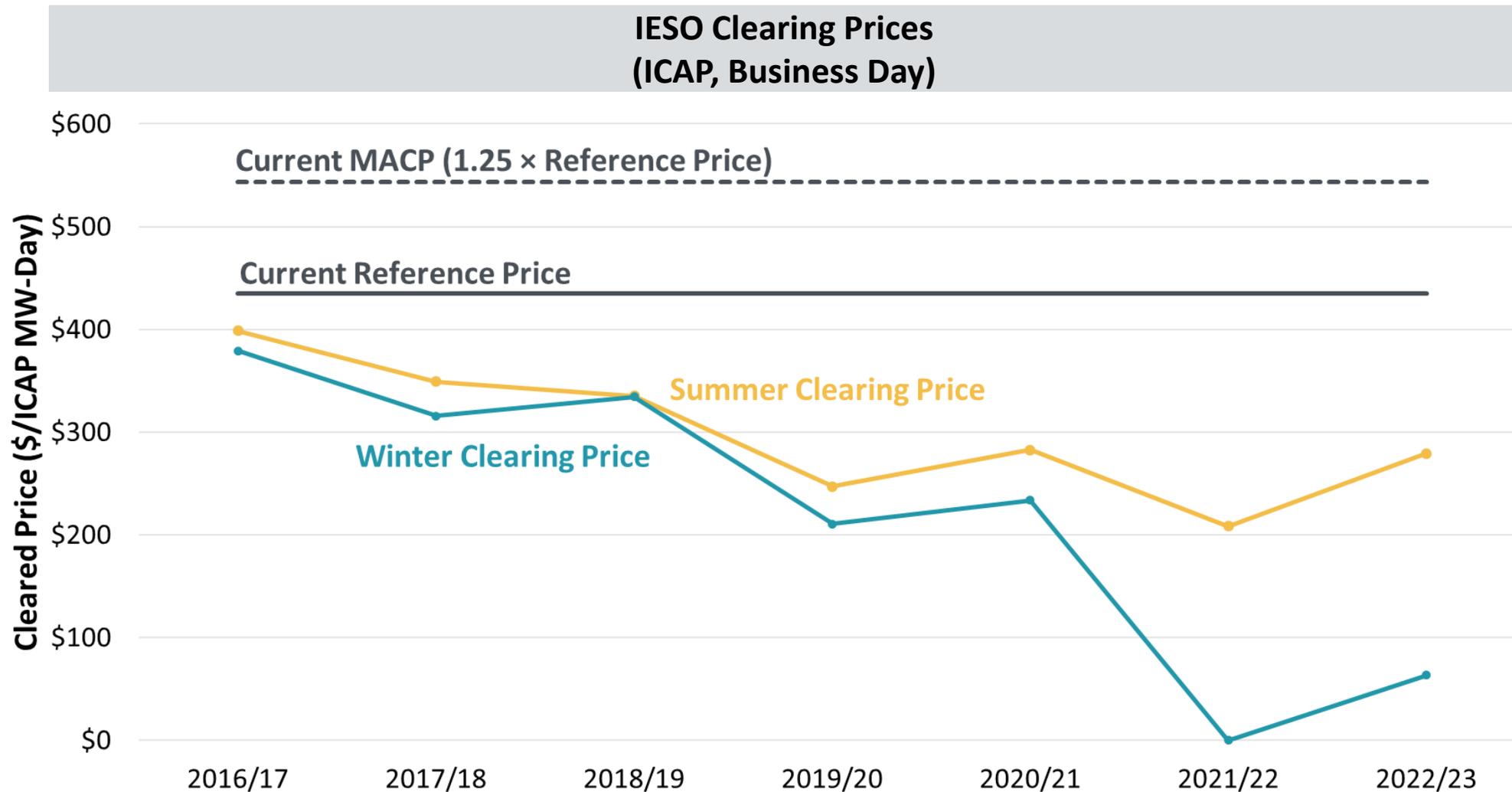
Reference Price and Maximum Auction Clearing Price (MACP) set demand curve parameters, but do not set clearing prices (set via competitive forces)

Current Capacity Auction Demand Curve Parameters (ICAP, Business Day)



Sources and Notes: Illustrative demand curve based on the 2022/23 capacity auction parameters. The Summer Target Capacity is the maximum forecasted volume (1,800 MW) the Capacity Auction could be needed to procure in summer 2026. The winter capacity is the minimum Target Capacity of 500 MW. See [IESO, Capacity Auction: Pre-Auction Report for delivery year 2022/2023, September 01, 2021](#) and [IESO, 2021 Annual Acquisition Report, July 2021, Table 1](#).

Ontario Capacity Auction - Historic Clearing Prices



Sources and Notes: All prices in \$CAD. See IESO, [Demand Response Auction Post-Auction Reports](#) and IESO, [Capacity Auction Post-Auction Reports](#).

2019 Demand Curve Review

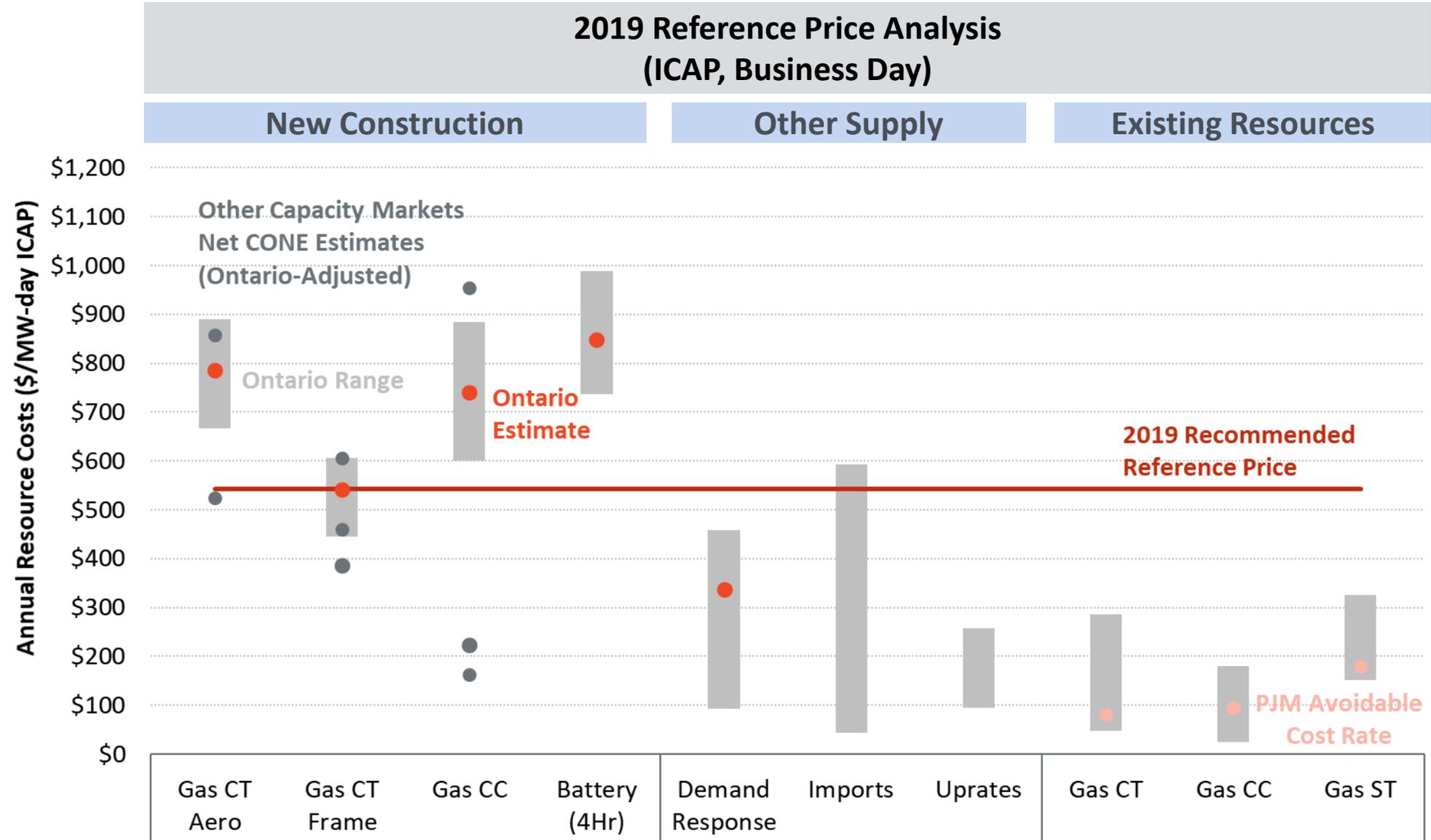
2019 Reference Price and MACP Revisions

In 2019 the IESO engaged Brattle to review the capacity auction demand curve and in 2020 IESO published a Reference Price update and Maximum Auction Clearing Price revision that ultimately were not implemented

Considerations behind 2019 Review:

- Reference Price based on an indicative value of Net CONE of Gas CT plants in Ontario (recommendation of increase to \$542/MW-day ICAP)
- Gas CT chosen as reference technology since it was the most cost-effective and likely marginal source of capacity at that time
- MACP recommended as $2 \times$ Reference Price to support prices at the incremental cost of capacity supply on a long-run average basis while accounting for the possibility of significantly differentiated prices in the two-season auction

2019 Reference Price Was Chosen to Enable a Range of Resource Types



2022 Updated Analysis

Objectives of 2022 Reference Price and MACP Update

The Reference Price should:

- be high enough for a wide range of economic resources to participate competitively, including imports from neighbouring jurisdictions
- not exceed the estimated long-run cost of supply or Net CONE across regions in Ontario to mitigate potential excess procurement
- enable pricing consistent with the anticipated cost of new generating capacity (on a long-run average basis)

The Maximum Auction Clearing Price should:

- be high enough to attract supply and compete with prices in neighbouring jurisdictions (on an absolute, units-adjusted basis)
- be high enough to account for the possibility of significantly differentiated seasonal prices
- account for administrative uncertainty in competitive supply costs and variability in prices across zones

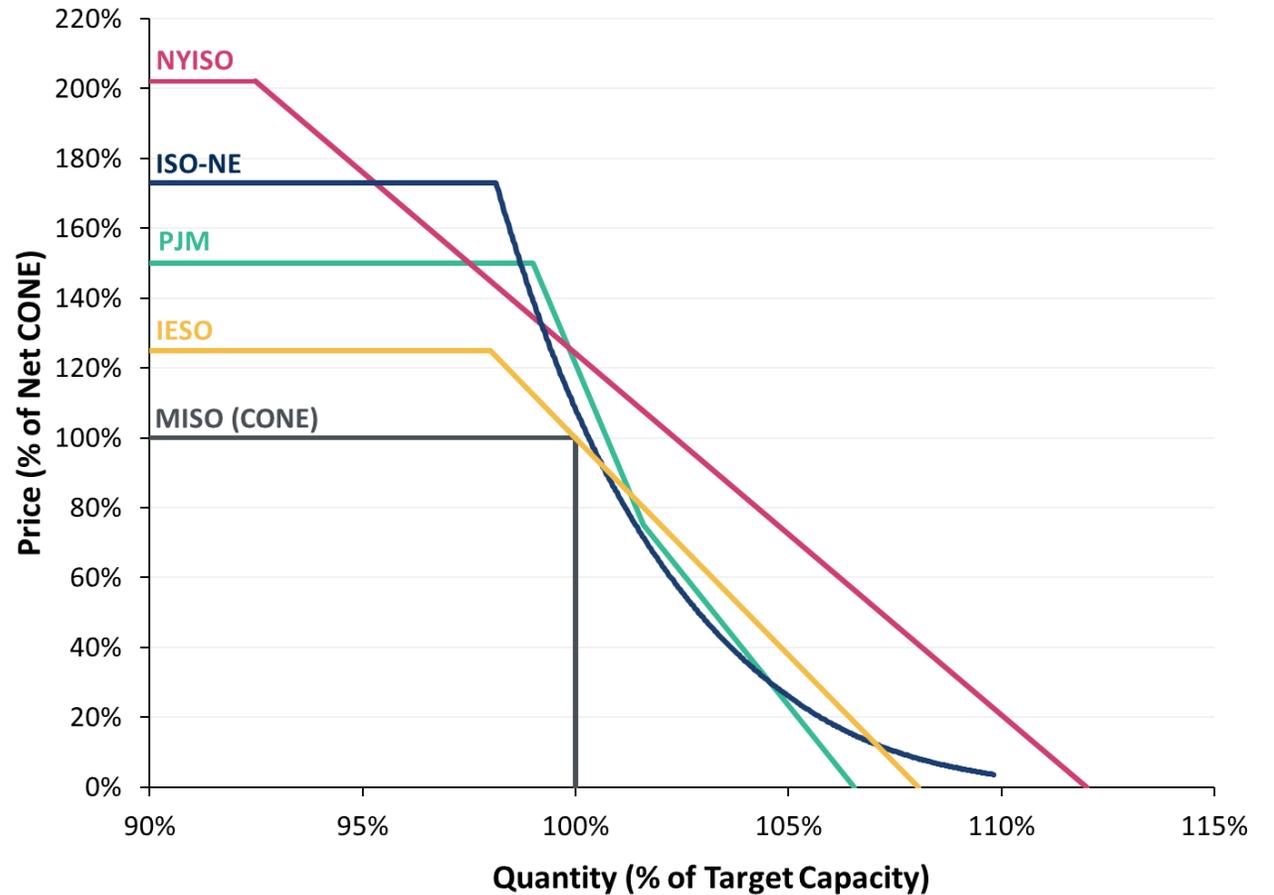
Price Caps and Demand Curves of Neighbouring Jurisdictions Will Impact Ontario's Ability to Attract Imports

The current MACP is notably lower than most other markets

Additionally other markets use Net CONE as their reference price

MISO is moving to a four season capacity market with an MACP equivalent to 4 × Reference Price

Current Demand Curves Comparison



Sources and Notes: IESO curve is constructed as an illustrative example shown in relation to Ontario's total reliability requirement and based on target capacity the most recent 2022/23 Summer target capacity. MISO does not report a Net CONE number and instead sets its vertical demand curve based on CONE. See IESO, [Demand Response Auction Post-Auction Reports](#) and IESO, [Capacity Auction Post-Auction Reports](#); PJM [Base Residual Auction Results](#); NYISO, [State of the Market Reports](#); ISO-NE, [Results of the Annual Forward Capacity Auctions](#); MISO, [Planning Resource Auction Results](#), 2022.

2022 Reference Price and MACP Update

2022 Updated Reference Price and MACP			
Parameter	2019 Recommendation	IESO Current	2022 Updates
Reference Price	<p>\$542/MW-day ICAP business day in 2021/22</p> <p>Based on indicative Net CONE value (gas CT)</p> <p>Updated with inflation for 2022/23+</p> <p>Same Reference Price in summer and winter seasons</p>	<p>\$413/MW-day ICAP business day</p> <p>Not updated with inflation</p> <p>Same Reference Price in summer and winter seasons</p>	<p>\$644/MW-day UCAP business day in 2023/24</p> <p>Based on indicative Net CONE value (gas CT)</p> <p>Updated with inflation for 2023/24+</p> <p>Same Reference Price in summer and winter seasons</p>
Maximum Auction Clearing Price	<p>2 × Reference Price</p> <p>Same MACP in summer and winter seasons</p>	<p>1.25 × Reference Price</p> <p>Same MACP in summer and winter seasons</p>	<p>1.5 to 2 × Reference Price</p> <p>Same MACP in summer and winter seasons</p>

Prices are expressed in \$/MW-business day, assuming 252 business days in a calendar year.

Reference Price Update

We have updated the 2019 Reference Price Recommendation accounting for: (i) inflation realized since the 2019 analysis and (ii) changing from the IESO's prior Installed Capacity (ICAP) to its new Unforced Capacity (UCAP) accounting methodology

Inflation methodology:

- Used Bank of Canada CPI data for historic inflation (2019 to 2021) and the inflation forecast from the Bank of Canada Monetary Policy Report for projected 2022 inflation
- Inflation Adjustment: $\$542 \times 1.127^* = \$611/\text{MW-day ICAP in 2023\$}$

ICAP to UCAP Conversion:

- Used a 5.13% EFORd from historic Ontario Gas CT plant data
- ICAP to UCAP price: $\$611/(1-5.13\%) = \mathbf{\$644/\text{MW-day UCAP in 2023\$}}$

*Approximate equivalent inflation index, calculation based on historical inflation from Bank of Canada CPI.

MACP Update

Impact of increasing MACP multiplier:

MACP of $1.5 \times$ Reference Price = $\$644 \times 1.5 = \$965/\text{MW-day UCAP in 2023\$}$

MACP of $2 \times$ Reference Price = $\$644 \times 2 = \$1,287/\text{MW-day UCAP in 2023\$}$

- In Ontario's two-season capacity market, we have observed and expect that only one season (currently summer) is likely to produce high prices when capacity is needed while the other season (currently winter) may continue to produce moderate or low prices
- A higher MACP would enable full price formation in the tight summer season
- Furthermore, the Ontario capacity market would need to enable seasonal prices twice as high in order to offer the same annual revenue potential as neighbouring jurisdictions with annual capacity markets

Updated Reference Price and MACP Would Allow Capacity Auction To Better Compete for Imports in Scarce Conditions

The current Reference Price and MACP would likely not attract imports if other markets also experience tight supply

The updated Reference Price and 2 × multiplier would result in an MACP substantially higher than all other jurisdictions (except MISO), however a 1.5 × multiplier would still be slightly higher

Net CONE and Price Cap Comparison (UCAP, Business Day)

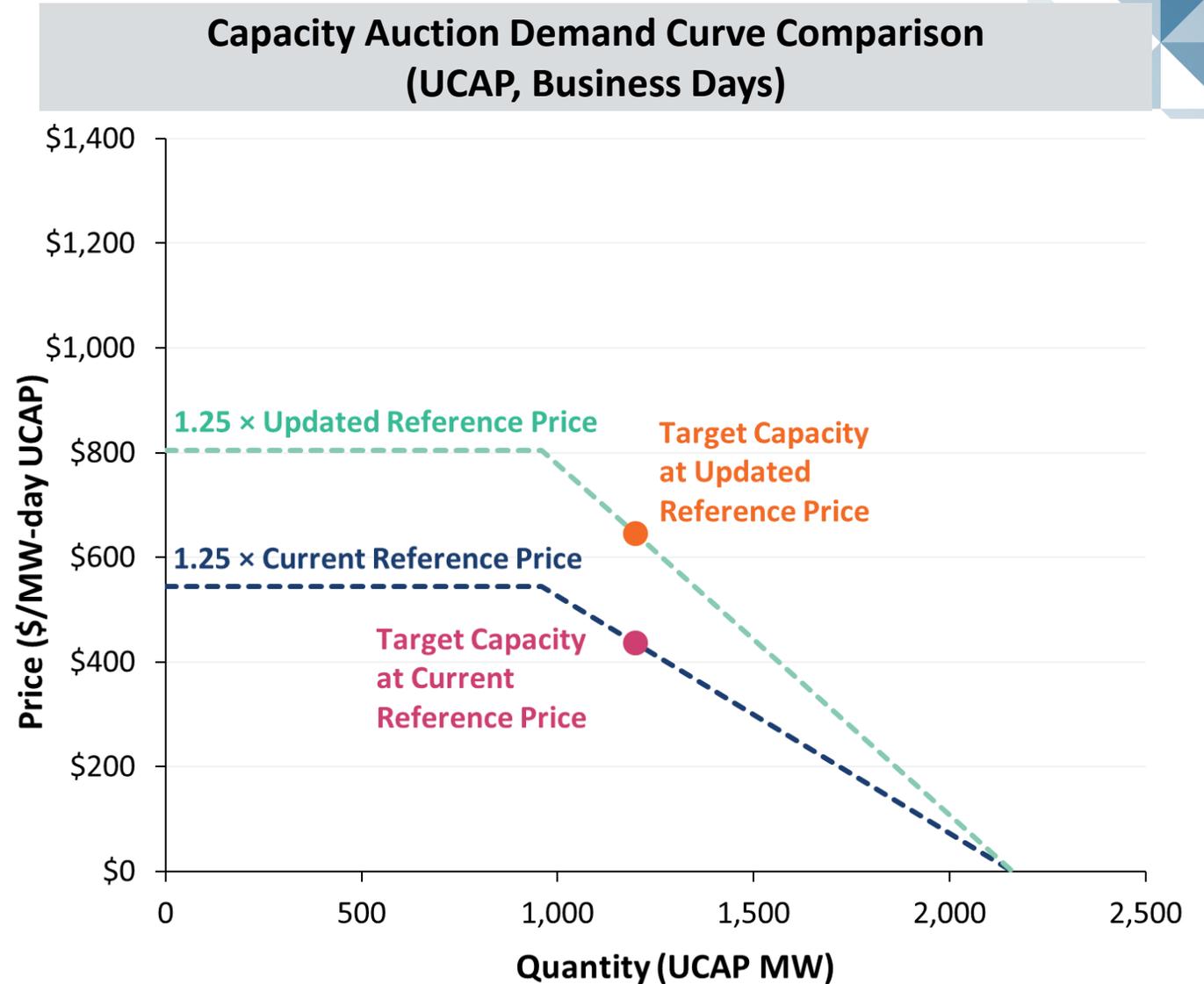
	Net CONE (\$/MW-day UCAP)	Price Cap (% of Net CONE)	Price Cap (\$/MW-day UCAP)
PJM	\$499	150%	\$749
NYISO	\$472	202%	\$954
ISO-NE	\$439	173%	\$762
MISO (Prior Annual)*	\$430 (CONE)	100%	\$430
MISO (New Four-Season)*	\$430 (CONE)	400%	\$1,719
IESO Current	\$435	125%	\$544
IESO Updated (MACP = 1.5 x Reference Price)	\$644	150%	\$965
IESO Updated (MACP = 2 x Reference Price)	\$644	200%	\$1,287

Sources and Notes: All prices in \$CAD on a UCAP MW and Business Day basis assuming 252 business days in a calendar year and adjusted for inflation to 2023\$. *MISO does not report a Net CONE number and instead uses a reference price based on CONE. See IESO, [Demand Response Auction Post-Auction Reports](#) and IESO, [Capacity Auction Post-Auction Reports](#); PJM [Base Residual Auction Results](#); NYISO, [Spot Auction Results, 2022](#); PJM, [Base Residual Auction Results, 2019-2022](#); PJM, [Planning Parameters, 2019-2022](#); ISO-NE, [Results of the Annual Forward Capacity Auctions](#); Illinois Power Agency, [Block Energy and Capacity Procurement Results, 2016-2025](#); Bank of Canada, [Consumer Price Index, 2000 to Present](#), Accessed 8/3/2022; Bank of Canada, [Monetary Policy Report, 2022](#); EIA, [Regional Cost Adjustments, 2020](#); NYISO, [DCR Report, 2016](#); PJM, [Default Avoidable Cost Rates; 2018](#). AESO, [Cost of New Entry Analysis, 2018](#).

Demand Curve Comparison

The current demand curve (dashed blue curve) is relatively flat and has a low MACP

Updating the Reference Price shifts the curve upward (dashed green curve) and would also allow for higher prices in scarcity conditions due to a higher MACP

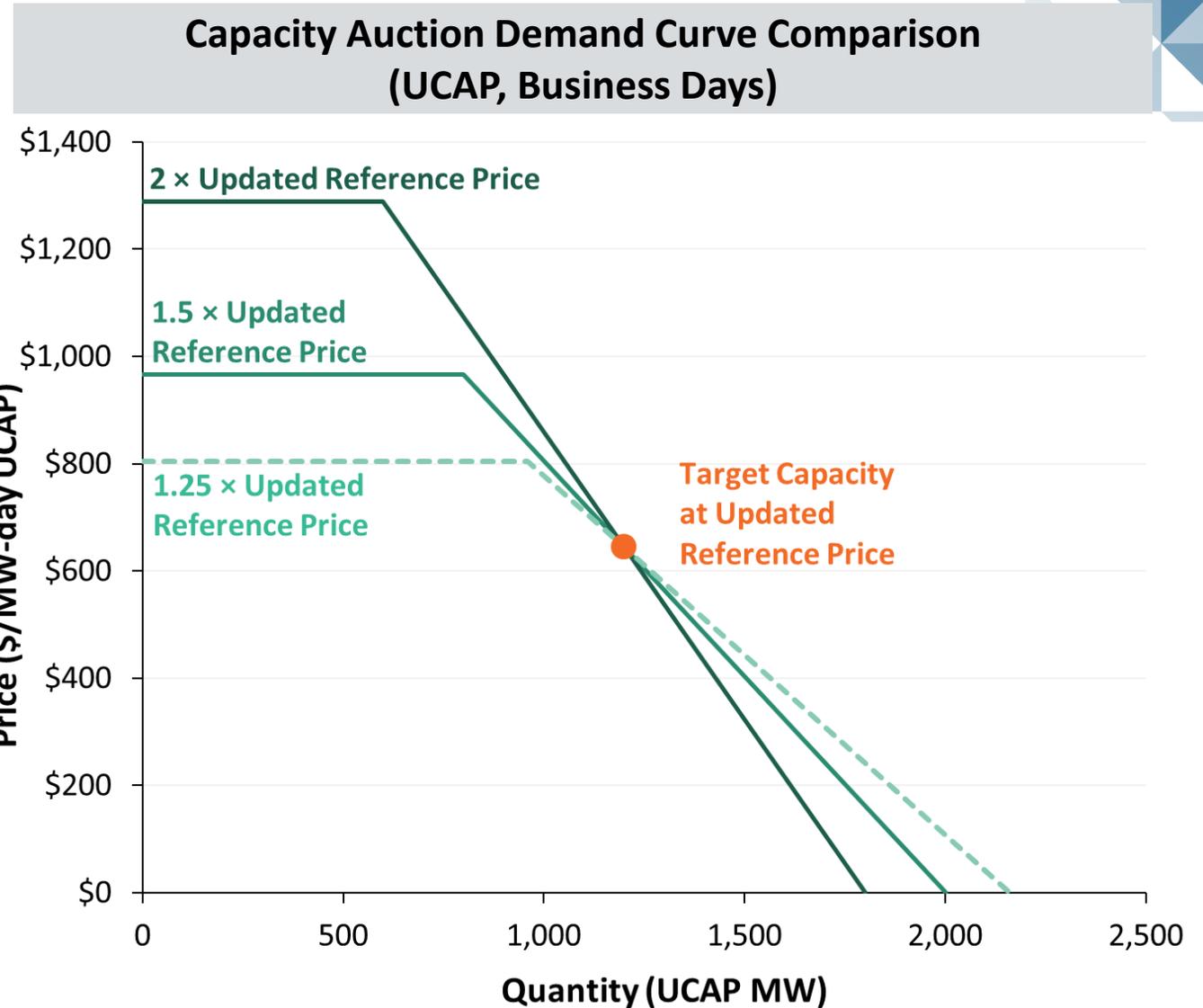


Sources and Notes: Illustrative demand curves based on the 2022/23 capacity auction. See [IESO, Capacity Auction: Pre-Auction Report for delivery year 2022/2023, September 01, 2021](#) and [IESO, 2021 Annual Acquisition Report, July 2021, Table 1.](#)

Demand Curve Comparison

Increasing the MACP shifts the price cap upward and the Minimum Capacity Limit quantity leftward

As MACP increases so does the demand curve slope which causes foot position to move leftward

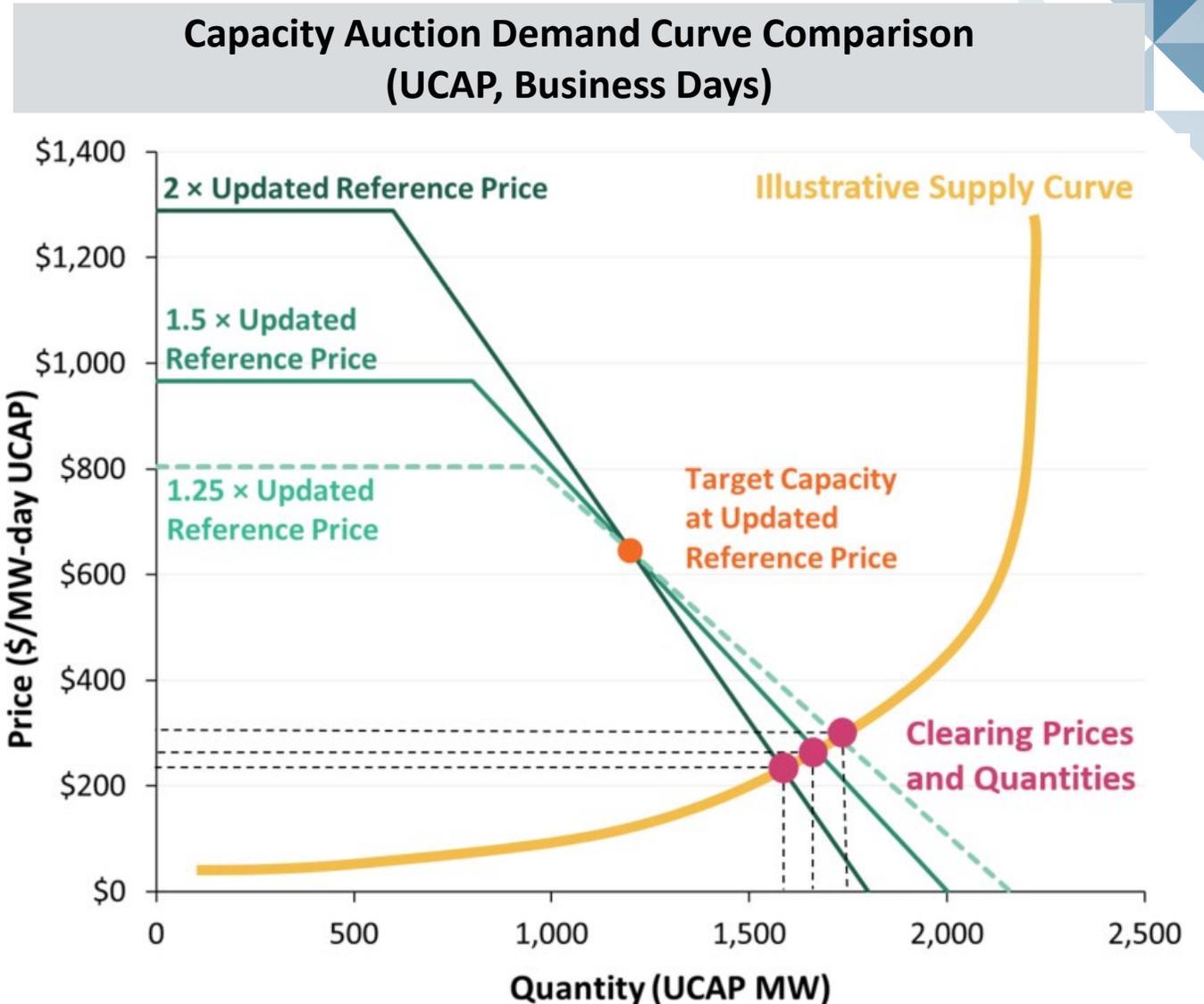


SOURCES AND NOTES: Illustrative demand curves based on the 2022/23 Capacity Auction. See [IESO, Capacity Auction: Pre-Auction Report for delivery year 2022/2023, September 01, 2021](#) and [IESO, 2021 Annual Acquisition Report, July 2021, Table 1](#).

Demand Curve Comparison

A flatter demand curve will procure more capacity at a higher price than a steeper demand curve

The extent to which differences in demand curve slopes impact market clearing is also dependent on supply curve shape



Sources and Notes: Illustrative demand curves based on the 2022/23 capacity auction. See [IESO, Capacity Auction: Pre-Auction Report for delivery year 2022/2023, September 01, 2021](#) and [IESO, 2021 Annual Acquisition Report, July 2021, Table 1](#).

Future Considerations

Considerations for Future Reviews

Reference Price

- Evaluation of whether the reference technology should be changed in the future, in particular to a battery or hybrid storage resource, to align with potential Ontario policy requirements

MACP

- Analysis of whether the MACP should be adjusted based on an updated estimate of the costs of a potentially different reference technology and the outcome of upcoming auctions

Curve Width/Shape

- Evaluation of whether altering the demand curve shape is necessary in the future, particularly as the system faces tighter supply and if the IESO increases the volume of capacity acquired through the capacity auction

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