New York ISO
Independent System Operator

2025 - 2029 ICAP Demand Curve Reset: Reference Point Price Proposal

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ICAPWG/MIWG

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Agenda

- RFP Update
- Review: Reference Point Price Proposal
- CPMax and CPMin Values
- High Winter Reliability Risk Examples
- Next Steps
- Appendix

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RFP Update

RFP Update

- The RFP for the 2025-2029 ICAP Demand Curve reset (DCR) independent consultant was issued on March 27, 2023
- The NYISO anticipates receiving responses from six entities based on feedback received to date
- Final proposals in response to the RFP are due May 8, 2023
- NYISO anticipates completing the selection of the independent consultant by the end of June 2023

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Review: Reference Point Price Proposal

Reference Point Price Proposal

- **At the 02/21/2022 ICAPWG meeting, the NYISO reviewed two sets of potential changes to the ICAP Demand Curve reference point price calculations:**
  1. Calculating separate summer and winter reference point prices to capture seasonal reliability risks
  2. Adjusting how seasonal differences in available ICAP is incorporated

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Reference Point Price Proposal

- The NYISO proposed to separately calculate summer and winter reference point prices, resulting in separate curves for each season
  - The following slides provide an overview of the proposed formula changes
- The NYISO proposed adjustments to the numerators of the reference point price formulas to allocate the annual revenue requirement of the peaking plant (i.e., "$ARV_z * AssmdCap_z$") between the Summer and Winter Capability Periods, based upon the percentage of reliability risk in each season (i.e., "$SLOLE$" and "$WLOLE$"), subject to guardrails on the maximum and minimum percentage to be recovered in a season (i.e., "$CPMax$" and "$CPMin$")
- The NYISO proposed adjustments to the denominators of the formulas to improve the accounting for seasonal differences in capacity availability and the seasonal "level of excess" conditions considered in establishing the curves

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Reference Point Price Proposal

- Current Monthly Reference Point Price Formula:[1]

$$RP_z = \frac{ARV_z * AssmdCap_z}{6 * [SDMNC_z * \left(1 - \frac{LOE_z - 1}{ZCPR_z - 1}\right) + WDMNC_z * \left(1 - \frac{LOE_z - 1 + WSR_z - 1}{ZCPR_z - 1}\right)]}$$

- Proposed Summer Monthly Reference Point Price Formula[2]:

$$SRP_z = \frac{ARV_z * AssmdCap_z * max[min(CPMax, SLOLE), CPMin]}{6 * SDMNC_z * \left(1 - \frac{SLOE_z - 1 + max(0, SWR_z - 1)}{ZCPR_z - 1}\right)}$$

- Proposed Winter Monthly Reference Point Price Formula[2]:

$$WRP_z = \frac{ARV_z * AssmdCap_z * max[min(CPMax, WLOLE), CPMin]}{6 * WDMNC_z * \left(1 - \frac{WLOE_z - 1 + max(0, WSR_z - 1)}{ZCPR_z - 1}\right)}$$

New Terms
- $CPMax$
- $CPMin$
- $SLOLE$
- $WLOLE$
- SWR_z
- $SLOE_z$
- $WLOE_z$

[1]Detailed in Section 5.5 of the ICAP Manual
[2]Additions to existing reference point price formula noted in red

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Reference Point Price Proposal

- **New Terms in proposed reference point price formulas**
  - $\boldsymbol{CPMax}$: the maximum percentage of the Annual Reference Value ($\boldsymbol{ARV_z}$) to be recovered by the peaking plant in one Capability Period
  - $\boldsymbol{CPMin}$: the minimum percentage of the Annual Reference Value ($\boldsymbol{ARV_z}$) to be recovered by the peaking plant in one Capability Period (equal to 1 minus $\boldsymbol{CPMax}$)
  - $\boldsymbol{SLOLE}$: the percentage of the annual loss of load expectation expected to occur in the Summer Capability Period based on the preliminary base case, as approved by the NYSRC, for the NYCA Installed Reserve Margin study covering the Capability Year for which the monthly ICAP reference point price is calculated
  - $\boldsymbol{WLOLE}$: the percentage of the annual loss of load expectation expected to occur in the Winter Capability Period based on the preliminary base case, as approved by the NYSRC, for the NYCA Installed Reserve Margin study covering the Capability Year for which the monthly ICAP reference point price is calculated (equal to 1 minus $\boldsymbol{SLOLE}$)
  - $\boldsymbol{SWR_z}$: the ratio of the amount of ICAP available in the ICAP Spot Market Auctions in the Summer Capability Period to the amount of ICAP available in the ICAP Spot Market Auctions for the Winter Capability Period for location z (equal to 1 divided by $\boldsymbol{WSR_z}$)
  - $\boldsymbol{SLOE_z}$: the ratio of level of excess that would occur in the Summer Capability Period (i.e., the applicable minimum ICAP requirement, plus $\boldsymbol{SDMNC_z}$) to the applicable minimum ICAP requirement for location z
  - $\boldsymbol{WLOE_z}$: the ratio of level of excess that would occur in the Winter Capability Period (i.e., the applicable minimum ICAP requirement, plus $\boldsymbol{WDMNC_z}$) to the applicable minimum ICAP requirement for location z

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CPMax and CPMin Values

CPMax and CPMin Values

- **The CPMax and CPMin values of the proposed seasonal reference point price formulas set the maximum and minimum percentages of the annual revenue requirement to be recovered by the peaking plant in a season**
  - CPMax and CPMin are binding when either SLOLE or WLOLE is greater than CPMax or less than CPMin
- **These "guardrail" values are intended to help ensure that the ICAP Demand Curves incentivize capacity market participation during all months of the year**
  - Capacity market participation during all months of the year provides value to system operations by incentivizing resources to participate in the NYISO's day-ahead market and outage scheduling process, which support the efficiency and reliability of the system

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CPMax and CPMin Values

- **The NYISO proposes to set the CPMax and CPMin values at 65% and 35%, respectively, for the 2025-2029 reset period**
  - The NYISO also proposes to include the evaluation of the CPMax and CPMin values as part of the quadrennial reset process beginning with the next reset (i.e., the 2029-2033 DCR)
- **The proposed CPMax and CPMin values are intended as conservative bounds on the impact of seasonal reliability risk on the ICAP Demand Curves**
  - Conservative bounds are appropriate while the IRM modeling is undergoing the consideration and incorporation of modifications to enhance winter modeling assumptions
- **The proposed CPMax and CPMin values are also informed by the implicit historically assumed seasonal spread in revenue recovery (i.e., ~65% summer and ~35% winter) for the proxy unit and actual market outcomes (see the following slide for additional information)**

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Historical Seasonal Spread of ICAP Market Revenues

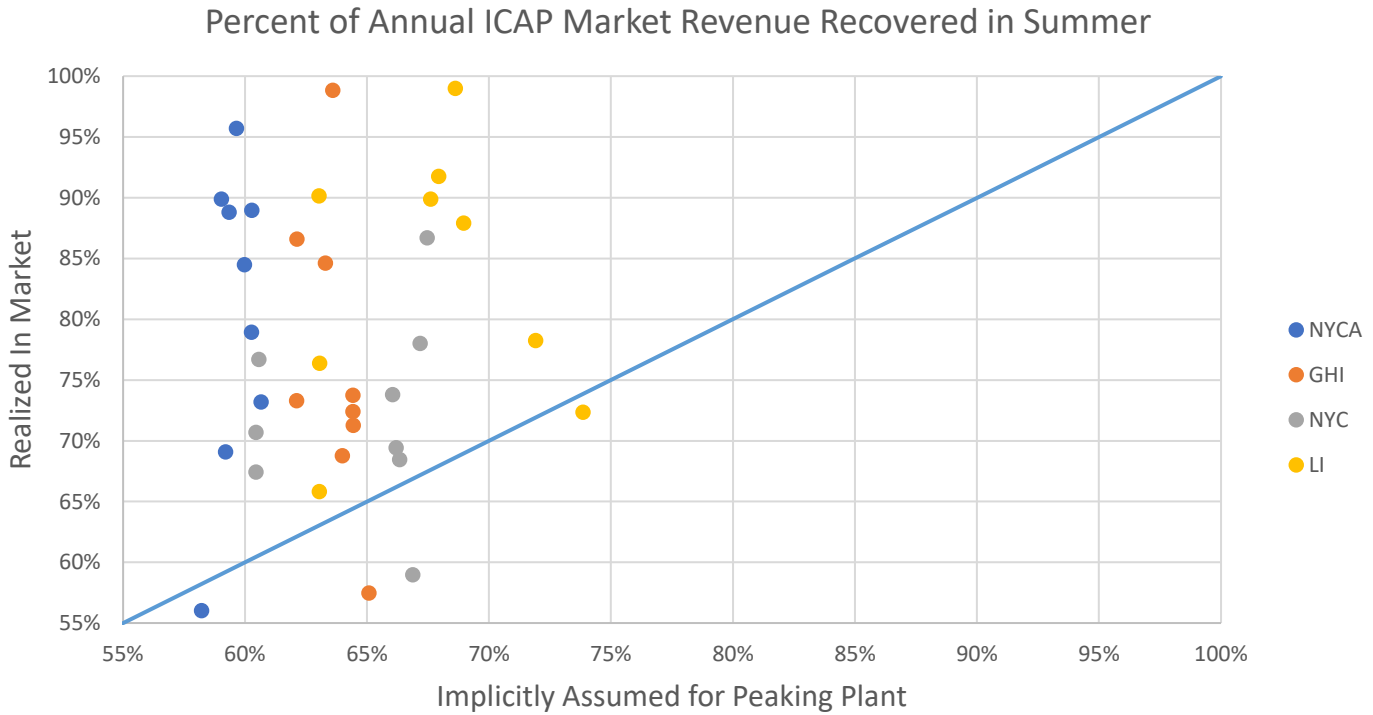

Chart reflects data for Capability Years 2014/2015 through 2022/2023

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CPMax and CPMin Examples

- **The following charts are illustrative examples of the ICAP Demand Curves that would result from the application of the seasonal reference point price proposal and proposed CPMax and CPMin values using the ICAP Demand Curve parameters for the 2022-2023 Capability Year**
  - Under the "High Summer Reliability Risk" examples, CPMax is assumed to be binding in setting the Summer ICAP Demand Curves and CPMin is assumed to be binding in setting the Winter ICAP Demand Curves
  - Under the "High Winter Reliability Risk" examples, CPMax is assumed to be binding in setting the Winter ICAP Demand Curves and CPMin is assumed to be binding in setting the Summer ICAP Demand Curves
  - The first point on each curve is the reference point price and the second point is the price at the "level of excess" conditions considered in establishing the curves (i.e., the applicable minimum requirement, plus the capacity value of the peaking plant)[1]

[1]The prices at the "level of excess" conditions for the Winter ICAP Demand Curves also account for the applicable winter-to-summer ratio ("WSR")

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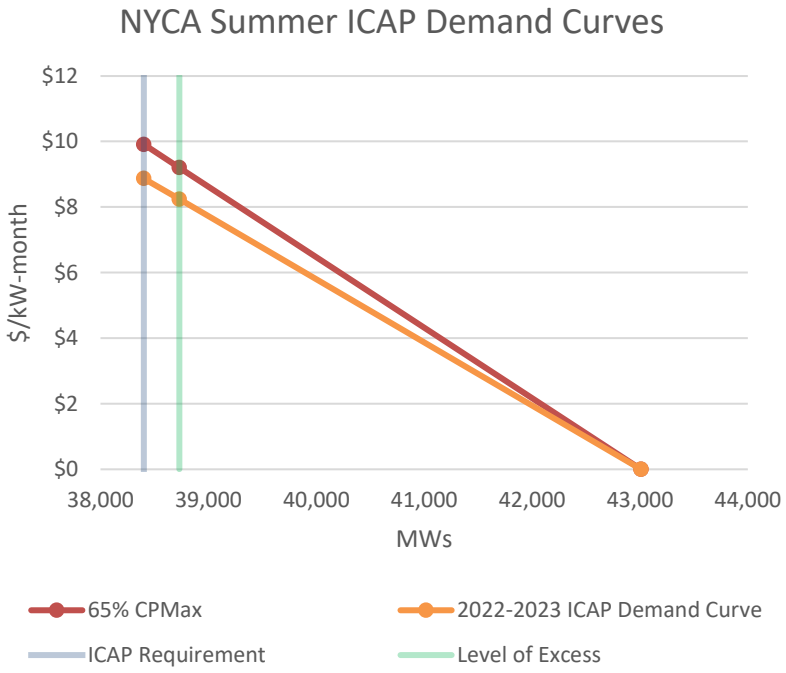
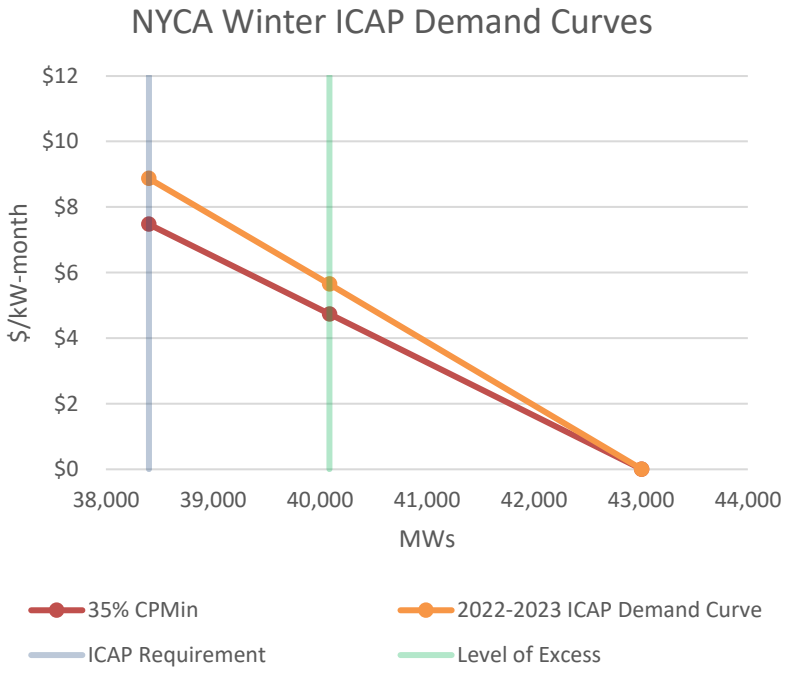
NYCA – High Summer Reliability Risk





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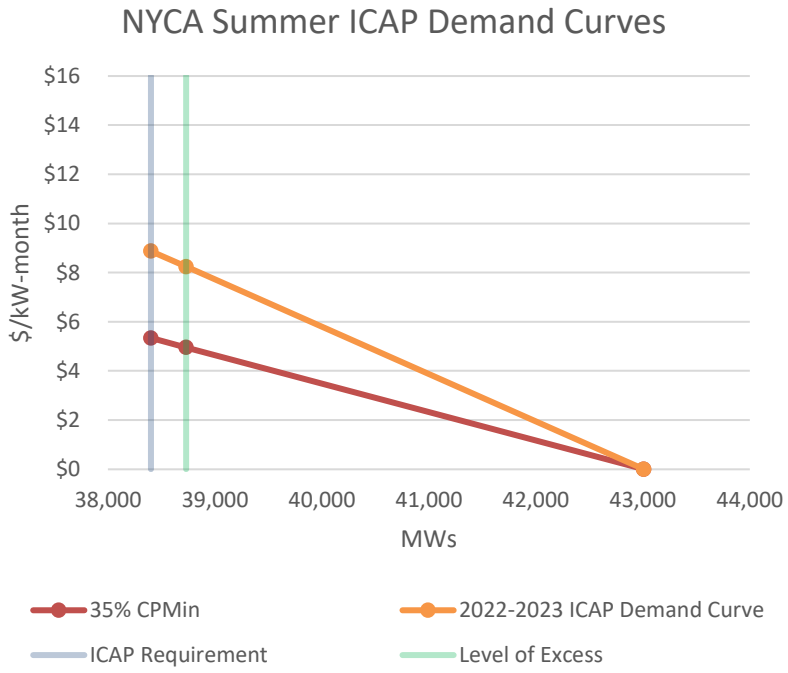
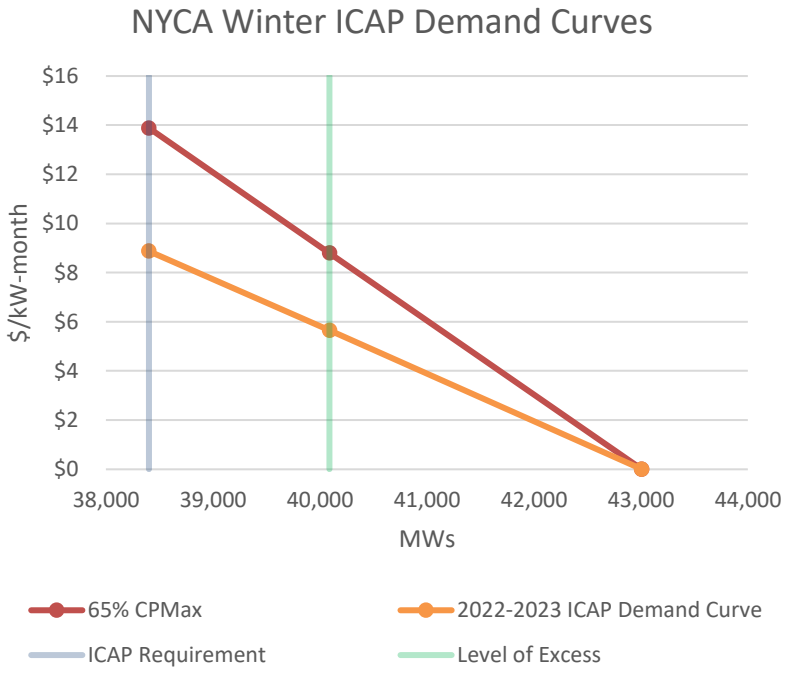
NYCA – High Winter Reliability Risk





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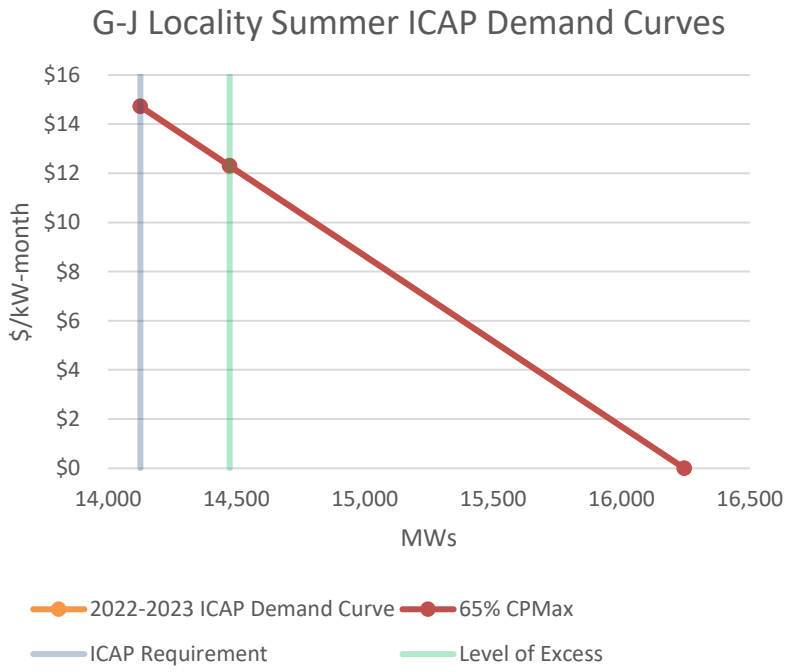
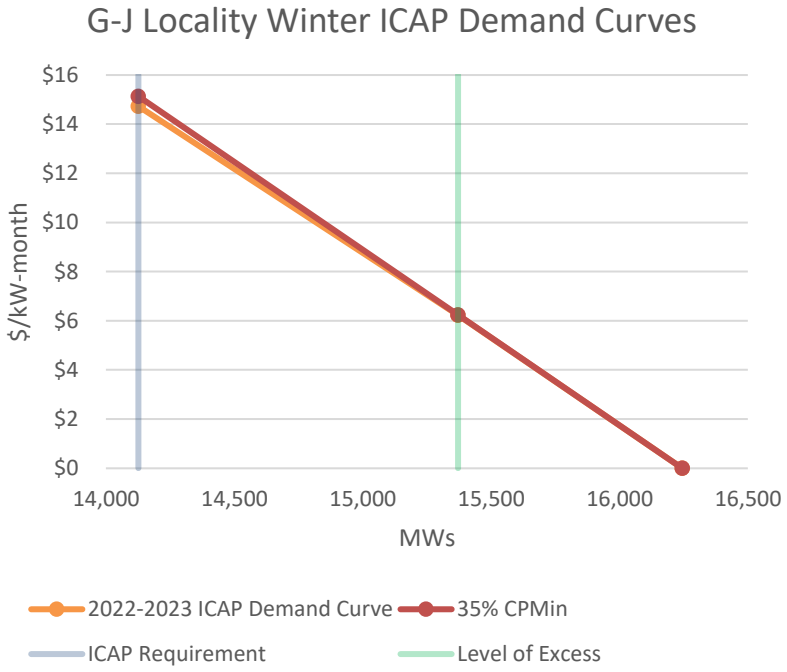
G-J Locality – High Summer Reliability Risk





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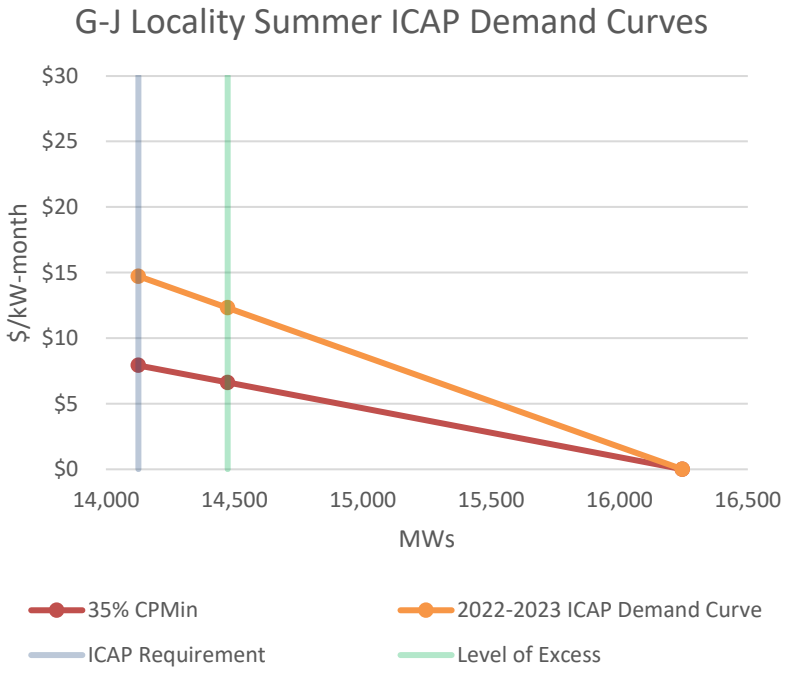
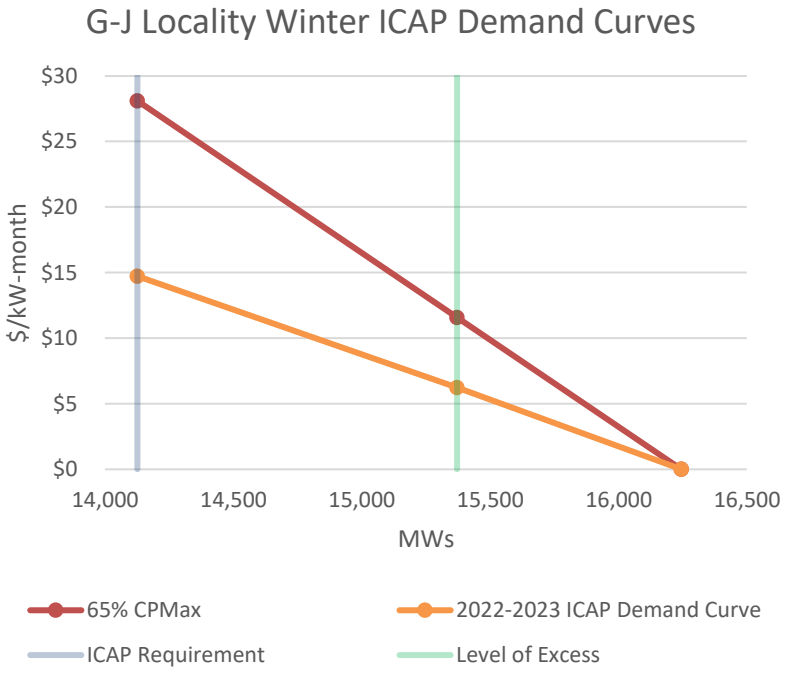
G-J Locality– High Winter Reliability Risk





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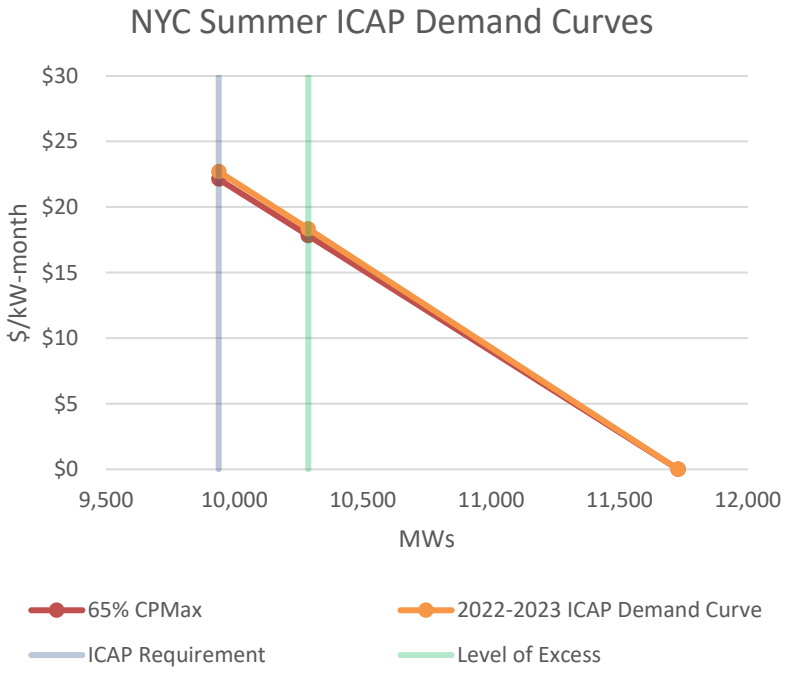
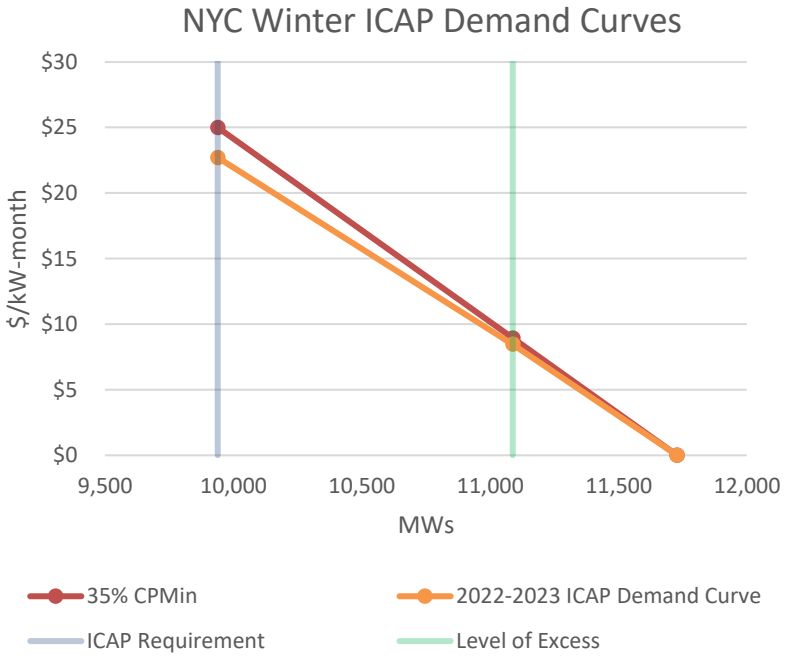
NYC – High Summer Reliability Risk





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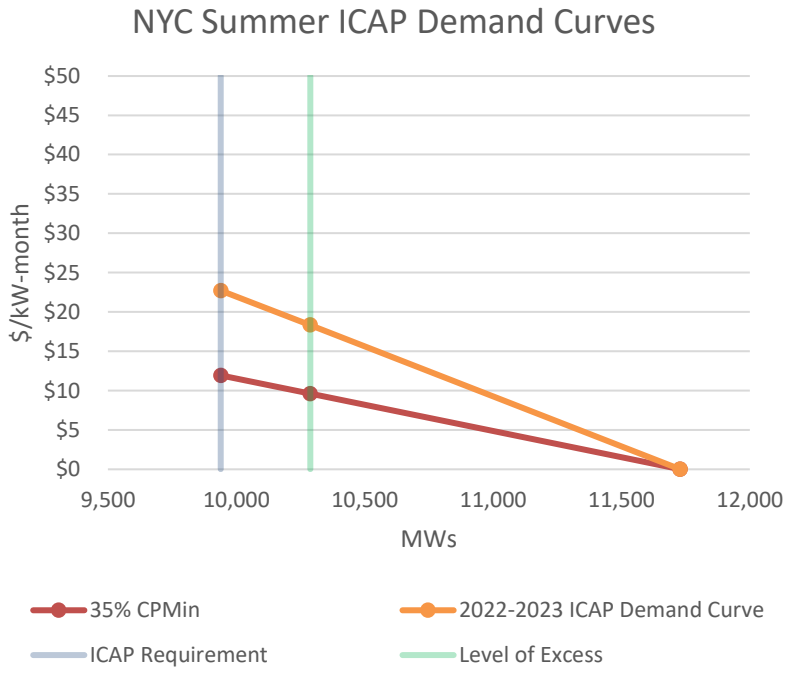
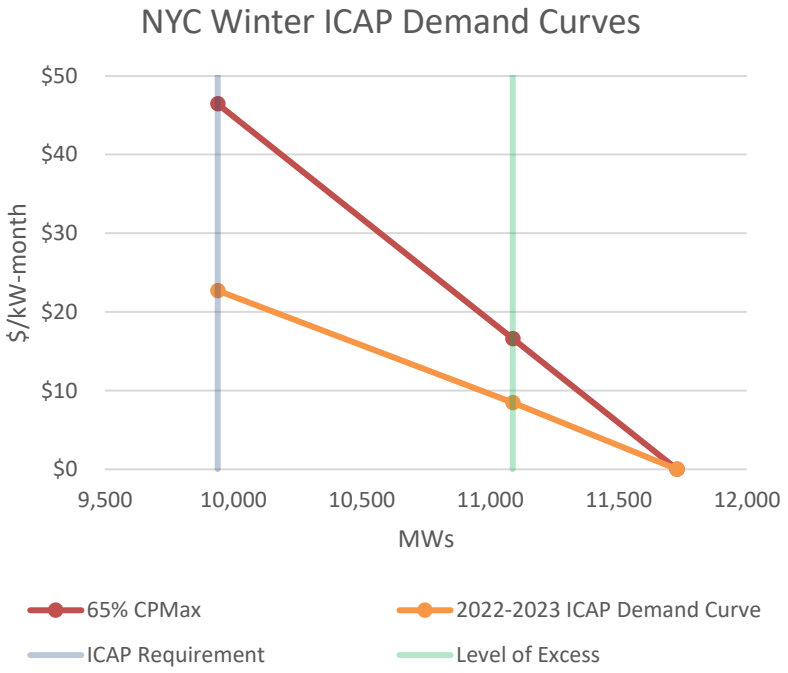
NYC – High Winter Reliability Risk





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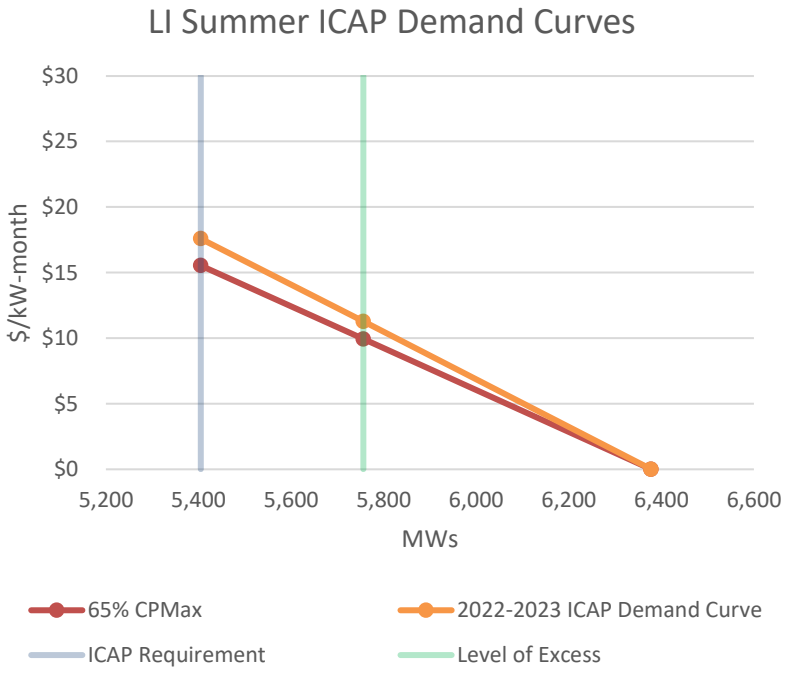
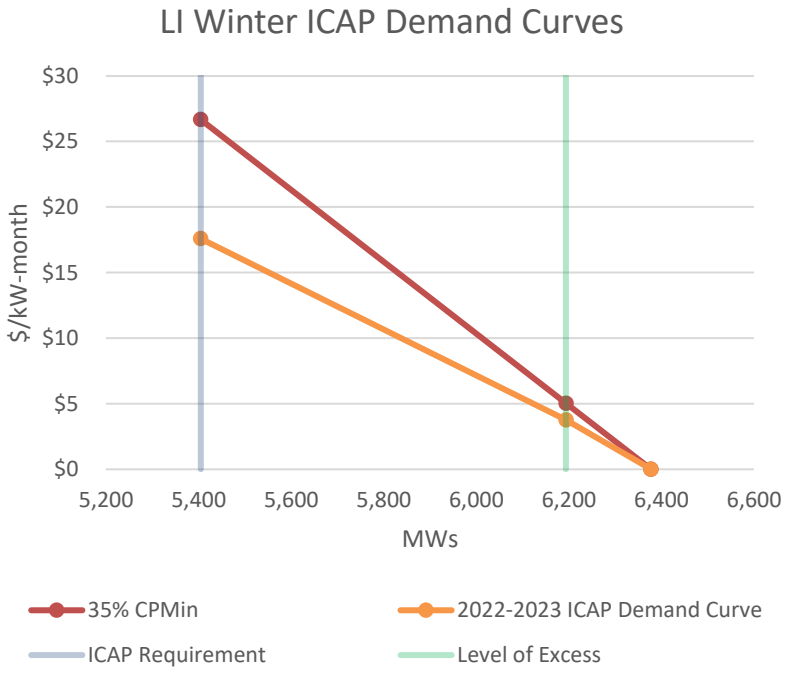
LI – High Summer Reliability Risk





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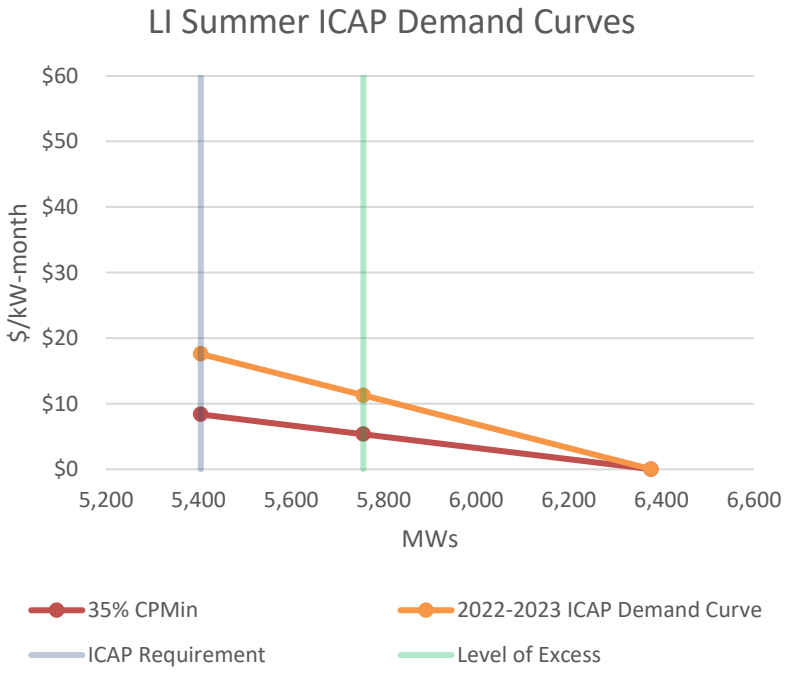
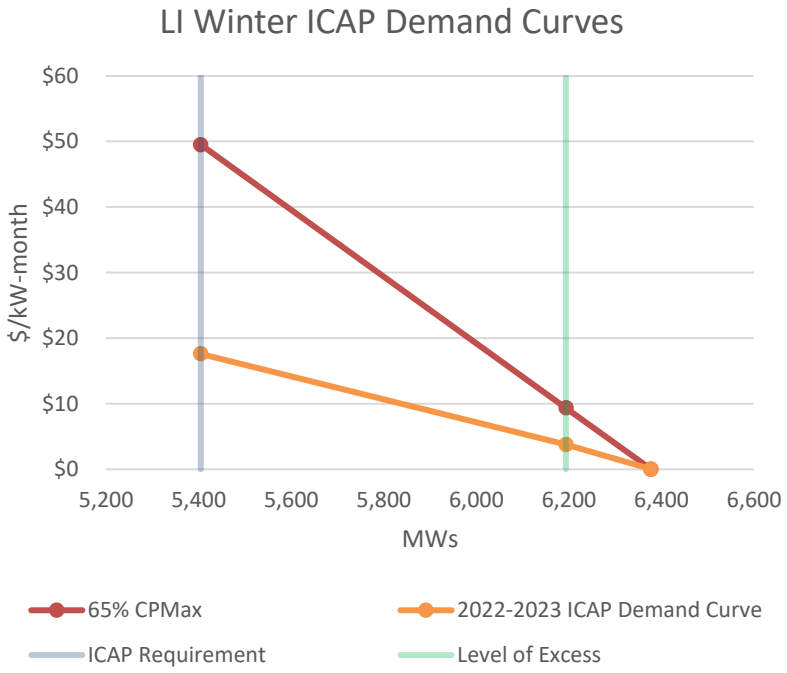
LI – High Winter Reliability Risk





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High Winter Reliability Risk Examples

High Winter Reliability Risk Examples

- The hypothetical examples included in the 02/21/2022 ICAPWG presentation assumed all reliability risk occurred in the Summer Capability Period[1]
- To illustrate the impact of the proposal under system conditions with high winter reliability risk, the following hypothetical examples assume all reliability risk occurs in the Winter Capability Period[2] and incorporates the proposed CPMax and CPMin values

[1]The SLOLE and WLOLE terms in the proposed reference point price formulas were assumed to be 1 and 0, respectively
[2]The SLOLE and WLOLE terms in the proposed reference point price formulas are assumed to be 0 and 1, respectively

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Example 1: Summer and Winter Available ICAP is Equal

- **Example 1 utilizes the ICAP Demand Curve parameters for the NYC Locality for the 2022/2023 Capability Year except:**
  - Assumed WSR = 100% (or 1.0)
- **The following values are used for the new terms proposed for the enhancements to the reference point price formulas:**
  - SLOE[1] = 103.5%
  - WLOE[1] = 103.8%
  - SWR[2] = 100% (or 1.0)
- **Assumed values for remaining new terms of the proposed reference point price formulas are:**
  - SLOLE = 0%
  - WLOLE = 100%
  - CPMax = 65%
  - CPMin = 35%

NYC Locality	Current RP Formula	Proposed RP Formula
Summer RP ($/kW-mo.)	$16.42	$11.92
Winter RP ($/kW-mo.)	$16.42	$20.99
Summer Price at LOE ($/kW-mo.)	$13.22	$9.59[3]
Winter Price at LOE ($/kW-mo.)	$13.22	$16.60[3]
Summer Revenue ($000)	$27,646	$20,063
Winter Revenue ($000)	$29,677	$37,260
Annual Revenue ($000)	$57,322	$57,322
Revenue Requirement ($000)	$57,322	$57,322
Revenue Shortfall ($000)	$0	$0

[1]Calculated according to the definition on slide 9 and the ICAP Demand Curve parameters for the NYC Locality for the 2022/2023 Capability Year. Rounded to the tenth decimal for illustration; however, the full calculated values are used in all following examples

[2]Calculated according to the definition on slide 9, assuming WSR = 100%

[3]Calculated using SLOE and WLOE respectively

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Example 1: Summer and Winter Available ICAP is Equal

- **Results breakdown (NYC):**
  - Current RP Formula:

$$RP = \frac{ARV_z * AssmdCap_z}{6 * [SDMNC_z * \left(1 - \frac{LOE_z - 1}{ZCPR_z - 1}\right) + WDMNC_z * \left(1 - \frac{LOE_z - 1 + WSR_z - 1}{ZCPR_z - 1}\right)]} =$$

$$\frac{\$164.34/kW - Year * 348.8MW}{6 * [348.5MW * \left(1 - \frac{1.035 - 1}{1.18 - 1}\right) + 374.1MW * \left(1 - \frac{1.035 - 1 + 1 - 1}{1.18 - 1}\right)]} =$$

$$\frac{\$57,322/kW - Year}{6 * [348.5 * (0.805) + 374.1 * (0.805)]} = \$16.42/kW - Month$$

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Example 1: Summer and Winter Available ICAP is Equal

- **Results breakdown (NYC):**
  - Proposed Summer RP Formula

$$SRP = \frac{ARV_Z * AssmdCap_Z * max[min(CPMax, SLOLE), CPMin]}{6 * SDMNC_Z * \left(1 - \frac{SLOE_Z - 1 + max(0, SWR_Z - 1)}{ZCPR_Z - 1}\right)} =$$

$$\frac{\$164.34/kW - Year * 348.8MW * max[min(0.65, 0.00), 0.35]}{6 * 348.5MW * \left(1 - \frac{1.035 - 1 + max(0, 1 - 1)}{1.18 - 1}\right)} =$$

$$\frac{\$57,322/kW - Year * 0.35}{6 * 348.5 * (0.805)} = \frac{\$20,063/kW - Year}{6 * 348.5 * (0.805)} = \$11.92/kW - Month$$

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Example 1: Summer and Winter Available ICAP is Equal

- **Results breakdown (NYC):**
  - Proposed Winter RP Formula

$$WRP = \frac{ARV_Z * AssmdCap_Z * max[min(CPMax, WLOLE), CPMin]}{6 * WDMNC_Z * \left(1 - \frac{WLOE_Z - 1 + max(0, WSR_Z - 1)}{ZCPR_Z - 1}\right)} =$$

$$\frac{\$164.34/kW - Year * 348.8MW * max[min(0.65, 1.00), 0.35]}{6 * 374.1MW * \left(1 - \frac{1.038 - 1 + max(0, 1 - 1)}{1.18 - 1}\right)} =$$

$$\frac{\$57,322/kW - Year * 0.65}{6 * 374.1 * (0.791)} = \frac{\$37,260/kW - Year}{6 * 374.1 * (0.791)} = \$20.99/kW - Month$$

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Example 2: Less Available ICAP in Winter than Summer

- **Example 2 utilizes the same assumptions as Example 1 except:**
  - Assumed WSR = 96% (or 0.96)
  - Assumed SWR = 104.2% (or 1.042)
- **Because less ICAP is available in the winter than the summer and the seasonal difference is larger than the size of the relevant peaking plant in the winter (i.e., SWR > WLOE), the proposed formulas result in assuming that the market is at the prescribed level of excess conditions in the winter for this example**
  - If the market was assumed to be at the level of excess in the summer, the ICAP market would be deficient in the winter

NYC Locality	Current RP Formula	Proposed RP Formula
Summer RP ($/kW-mo.)	$14.37	$16.72
Winter RP ($/kW-mo.)	$14.37	$20.99
Summer Price at LOE ($/kW-mo.)	$8.24[1]	$9.59[1]
Winter Price at LOE ($/kW-mo.)	$11.36[2]	$16.60[2]
Summer Revenue ($000)	$17,234	$20,063
Winter Revenue ($000)	$25,510	$37,260
Annual Revenue ($000)	$42,743	$57,322
Revenue Requirement ($000)	$57,322	$57,322
Revenue Shortfall ($000)	-$14,579	$0

[1]Calculated at SLOE + SWR – 1
[2]Calculated at WLOE

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Example 2: Less Available ICAP in Winter than Summer

- **Results breakdown (NYC):**
  - Current RP Formula:

$$RP = \frac{ARV_z * AssmdCap_z}{6 * [SDMNC_z * \left(1 - \frac{LOE_z - 1}{ZCPR_z - 1}\right) + WDMNC_z * \left(1 - \frac{LOE_z - 1 + WSR_z - 1}{ZCPR_z - 1}\right)]} =$$

$$\frac{\$164.34/kW - Year * 348.8MW}{6 * [348.5MW * \left(1 - \frac{1.035 - 1}{1.18 - 1}\right) + 374.1MW * \left(1 - \frac{1.035 - 1 + 0.96 - 1}{1.18 - 1}\right)]} =$$

$$\frac{\$57,322/kW - Year}{6 * [348.5 * (0.805) + 374.1 * (1.027)]} = \$14.37/kW - Month$$

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Example 2: Less Available ICAP in Winter than Summer

- **Results breakdown (NYC):**
  - Proposed Summer RP Formula

$$SRP = \frac{ARV_Z * AssmdCap_Z * max[min(CPMax, SLOLE), CPMin]}{6 * SDMNC_Z * \left(1 - \frac{SLOE_Z - 1 + max(0, SWR_Z - 1)}{ZCPR_Z - 1}\right)} =$$

$$\frac{\$164.34/kW - Year * 348.8MW * max[min(0.65, 0.00), 0.35]}{6 * 348.5MW * \left(1 - \frac{1.035 - 1 + max(0, 1.042 - 1)}{1.18 - 1}\right)} =$$

$$\frac{\$57,322/kW - Year * 0.35}{6 * 348.5 * (0.574)} = \frac{\$20,063/kW - Year}{6 * 348.5 * (0.574)} = \$16.72/kW - Month$$

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Example 2: Less Available ICAP in Winter than Summer

- **Results breakdown (NYC):**
  - Proposed Winter RP Formula

$$WRP = \frac{ARV_Z * AssmdCap_Z * max[min(CPMax, WLOLE), CPMin]}{6 * WDMNC_Z * \left(1 - \frac{WLOE_Z - 1 + max(0, WSR_Z - 1)}{ZCPR_Z - 1}\right)} =$$

$$\frac{\$164.34/kW - Year * 348.8MW * max[min(0.65, 1.00), 0.35]}{6 * 374.1MW * \left(1 - \frac{1.038 - 1 + max(0, 0.96 - 1)}{1.18 - 1}\right)} =$$

$$\frac{\$57,322/kW - Year * 0.65}{6 * 374.1 * (0.791)} = \frac{\$37,260/kW - Year}{6 * 374.1 * (0.791)} = \$20.99/kW - Month$$

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Next Steps

Next Steps

- **RFP**
  - Final proposals from bidders are due May 8, 2023
  - NYISO anticipates completing the selection of the independent consultant for the 2025-2029 DCR by the end of June 2023
  - NYISO currently anticipates that the independent consultant will initiate discussions with stakeholders in August 2023
- **Reference Point Price Proposal**
  - June 2023: Return to ICAPWG to discuss potential conforming changes to other ICAP Demand Curve parameters. This may include potential adjustments to the maximum clearing price, winter-to-summer ratio, and zero-crossing points

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Questions?

Appendix

Background

Background

- **The Market Services Tariff requires the NYISO and its stakeholders undertake a periodic comprehensive review to determine the necessary inputs and assumptions for developing the ICAP Demand Curves for the period covered by each such review**
  - This review process is undertaken every four years and is commonly referred to as the DCR
  - Each ICAP Demand Curve is based on the estimated cost to construct and operate a hypothetical new capacity supply resource in various locations throughout New York
- **The 2023 project deliverable is a Q3 Study Defined**

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Previous Discussions

Previous Discussions

Date	Working Group	Discussion Points and Links to Materials
February 7, 2023	ICAPWG	DCR Kickoff: https://www.nyiso.com/documents/20142/36079056/2%202023-02-07%20ICAPWG%20DCR%20Kickoff.pdf/90011547-9c0b-bead-ac10-f56ff479415d
February 21, 2023	ICAPWG	Overview of draft DCR schedule, RFP schedule, draft RFP sections, and ICAP Demand Curve Reference Point Price Proposal: https://www.nyiso.com/documents/20142/36339783/2023-02-21%20ICAPWG%20-%20Demand%20Curve%20Reset.pdf/75b586ad-7725-e47a-8f34-89705e5004f4
March 7, 2023	ICAPWG	Review of updated DCR schedule and RFP sections: https://www.nyiso.com/documents/20142/36639552/2023-03-07%20ICAPWG%20-%20Demand%20Curve%20Reset%20v2.pdf/ae66691e-224d-ce7d-afbe-40f8f6fcb9a7

New York ISO

Our Mission & Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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