New York ISO
Independent System Operator

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

Maddy Mohrman, Market Design Specialist

ICAPWG/MIWG

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Agenda

- Maximum Clearing Price Calculation
- Winter-to-Summer Ratio (WSR)/Summer-to-Winter Ratio (SWR) and Zero Crossing Point (ZCP) Interaction
- Next Steps
- Appendix

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Maximum Clearing Price Calculation

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Maximum Clearing Price Calculation: Background

- **MST 5.14.1.2.2.3 requires the maximum clearing price on each ICAP Demand Curve to be established at 1.5 times the monthly value of the applicable peaking plant gross cost**
  - The NYISO currently accounts for the applicable winter-to-summer ratio and the percentage of capacity at the prescribed level of excess conditions when translating the annual value of the applicable peaking plant gross cost to a monthly value (see ICAP Manual Section 5.5)
    - $\text{Maximum Clearing Price} = 1.5 * WSR_z * LOE_z * (\frac{Gross\ CONE_z}{12})$

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Maximum Clearing Price Calculation: Issue

- **The current calculation of the maximum clearing price could, under certain conditions, produce a maximum clearing price that is less than the seasonal reference point price resulting from the proposed enhancements previously discussed with stakeholders**
  - Hypothetical example on the next slide
  - See Appendix for overview of proposed enhancements to the reference point price formula
    - Previously presented at the 2/21/2023 and 4/27/2023 ICAPWG meetings

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Maximum Clearing Price Calculation : Issue

- **Hypothetical Example:**
  - If all reliability risk occurs in the winter (*i.e.*, *WLOLE =1*), the seasonal reference point prices that would result under the proposal,[1] utilizing the ICAP Demand Curve parameters for the NYC Locality for the 2022/2023 Capability Year, would be:
    - Summer reference point price: $11.92 / kW-month
    - Winter reference point price: $46.42 / kW-month
  - The maximum clearing price as calculated under the current methodology would be:
    - Maximum Clearing Price = $1.5 * 1.078 * 1.035 * (\frac{195.05}{12}) =$ $27.21 / kW-month
  - Thus, the maximum clearing price would be less than the winter reference point price

[1] As presented at the 04/27/2023 ICAPWG, the proposal includes the use of the 65% CPMax and 35% CPMin values

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Maximum Clearing Price Calculation: Proposal

- In order to ensure that the maximum clearing price is greater than the seasonal reference point prices, the NYISO is proposing to calculate seasonal maximum clearing prices
- The proposed seasonal maximum clearing price calculations utilize the seasonal reference point price formulas but replace net cost of new entry (CONE) with 1.5 times gross CONE
  - Shown on the next slide

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Maximum Clearing Price Calculation: Proposal

- Proposed Summer Maximum Clearing Price Formula:

$$SRP_z = \frac{1.5 * Gross\ CONE_z * AssmdCap_z * max[min(CPMax, SLOLE), CPMin]}{6 * SDMNC_z * \left(1 - \frac{SLOE_z - 1 + max(0, SWR_z - 1)}{ZCPR_z - 1}\right)}$$

- Proposed Winter Maximum Clearing Price Formula:

$$WRP_z = \frac{1.5 * Gross\ CONE_z * AssmdCap_z * max[min(CPMax, WLOLE), CPMin]}{6 * WDMNC_z * \left(1 - \frac{WLOE_z - 1 + max(0, WSR_z - 1)}{ZCPR_z - 1}\right)}$$

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Maximum Clearing Price Calculation: Proposal

- **Hypothetical Example:**
  - Utilizing the same assumptions as slide 6, the seasonal maximum clearing prices for the NYC ICAP Demand Curves as calculated under the proposed formulas would be:
    - Summer Maximum Clearing Price =

$$\frac{1.5 * \$195.05/kW\text{-}Year * 348.8MW * max[min(0.65,0.00),0.35]}{6 * 348.5MW * \left(1 - \frac{1.035 - 1 + max(0,0.928 - 1)}{1.18 - 1}\right)} = \$21.21 / \text{kW-month}$$

    - Winter Maximum Clearing Price =

$$\frac{1.5 * \$195.05/kW\text{-}Year * 348.8MW * max[min(0.65,1.00),0.35]}{6 * 374.1MW * \left(1 - \frac{1.035 - 1 + max(1.078 - 1)}{1.18 - 1}\right)} = \$82.65 / \text{kW-month}$$

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WSR/SWR and ZCP Interaction

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WSR/SWR and ZCP Interaction

- **As discussed on the following slides, the seasonal reference point price proposal could result in an extreme or infeasible seasonal reference point price under certain conditions**
  - These conditions arise with very high WSR or SWR values that when combined with the level of excess condition assumed for the DCR produce capacity supply excess values that are very close to or greater than the capacity excess at the applicable zero crossing point
- **Because this potential concern relates to the shape, slope and zero crossing point of the ICAP Demand Curves, the NYISO proposes that these considerations should be evaluated by the independent consultant during the ICAP Demand Curve reset (DCR) and, if necessary, develop remedial action(s)**
  - The tariff already requires that the shape, slope, and zero-crossing point of each ICAP Demand Curve be assessed as part of the DCR
  - The NYISO believes that evaluation of these considerations is most appropriate within the context of the DCR

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WSR/SWR and ZCP Interaction: Background of the WSR/SWR

- The purpose of the WSR and the new SWR term is to account for seasonal differences in capacity availability given the operating characteristics of capacity supply resources
  - Additional information regarding the calculation of the WSR and SWR terms are included in the Appendix
- By accounting for the seasonal difference in available capacity, the seasonal reference point prices ensure the peaking plant can recover its annual revenue requirement upon market entry given anticipated supply conditions

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WSR/SWR and ZCP Interaction: Background of the WSR/SWR

- In order to set seasonal reference point prices that ensure the peaking plant can recover its annual revenue requirement, the WSR/SWR, prescribed level of excess terms (WLOE/SLOE), and zero crossing point (ZCP) interact to account for the position on the ICAP Demand Curve that the market is expected to clear at in each season after the market entry of the applicable peaking plant
  - This is accomplished through the terms colored in red in the proposed formulas
- Proposed Summer Monthly Reference Point Price Formula:

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

- Proposed Winter Monthly Reference Point Price Formula:

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

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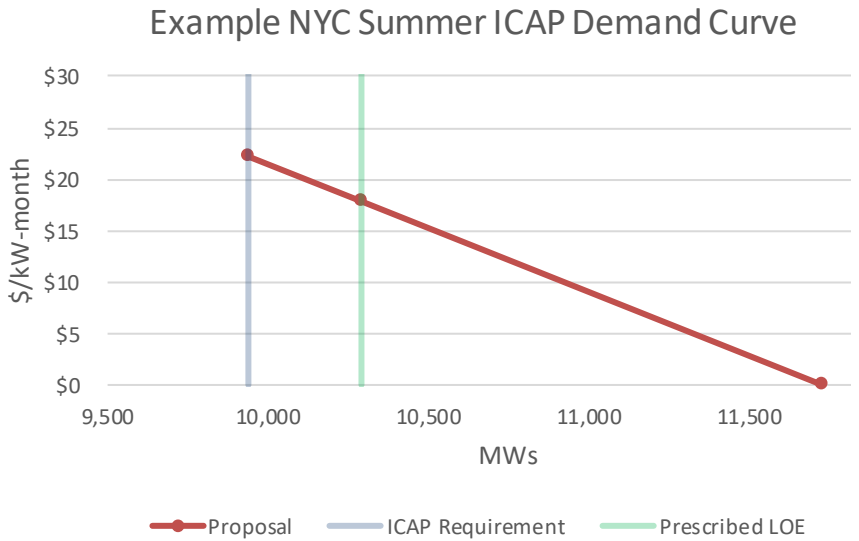
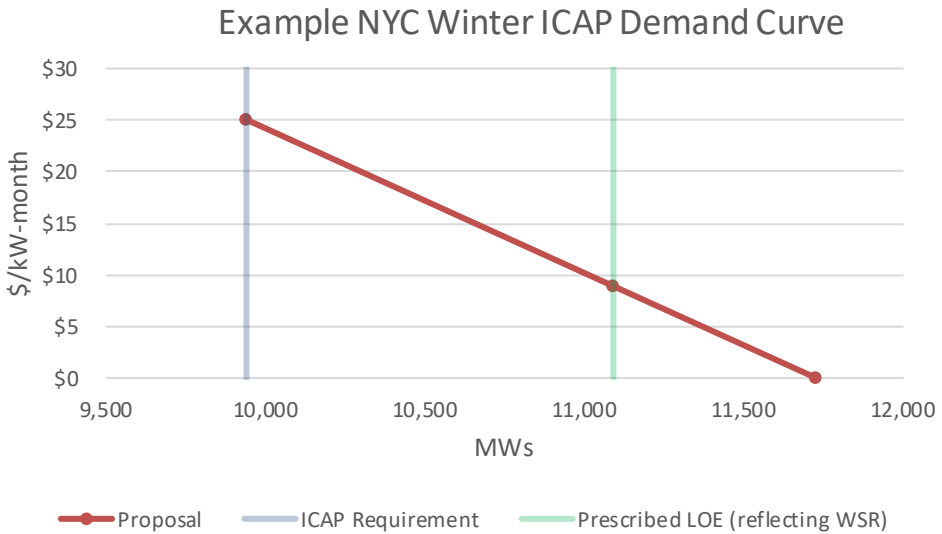
WSR/SWR and ZCP Interaction: Background of the WSR/SWR





The examples utilize the seasonal reference point price proposal and the NYC Locality ICAP Demand Curve parameters for the 2022/2023 Capability Year. The examples also assume the proposed CPMax of 65% and CPMin of 35% bind in setting the Summer and Winter ICAP Demand Curves, respectively

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WSR/SWR and ZCP Interaction: Issue

- **If (WLOE-1) + (WSR-1) > (ZCP-1):**
  - The winter reference point price will be negative due to the red colored term below being negative:

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

  - As (WLOE - 1) + (WSR - 1) approaches (ZCP - 1), the winter reference point price increases exponentially
    - Hypothetical example provided on slides 17-18
- **If (SLOE-1) + (SWR-1) > (ZCP-1):**
  - The summer reference point price will be negative due to the red colored term below being negative:

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

  - As (SLOE - 1) + (SWR - 1) approaches (ZCP - 1), the summer reference point price increases exponentially

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WSR/SWR and ZCP Interaction: Issue

- **Hypothetical Example 1: (WLOE-1) + (WSR-1) > (ZCP-1)**
  - Example 1 utilizes the ICAP Demand Curve parameters for the NYC Locality for the 2022/2023 Capability Year except:
    - WSR = 115%
  - WLOE = 103.8%
    - Thus, (WLOE – 1) + (WSR – 1) = 3.8% + 15% = 18.8%
  - ZCP - 1= 18%
  - SLOLE = 100%

NYC Locality	Current RP Formula	Proposed RP Formula[1]
Summer RP ($/kW-mo.)	$35.39	$22.13
Winter RP ($/kW-mo.)	$35.39	- $210.61
Summer Price at LOE ($/kW-mo.)	$28.49	$17.82
Winter Price at LOE ($/kW-mo.)	$0	---
Summer Revenue ($000)	$59,570	$37,260
Winter Revenue ($000)	$0	---
Annual Revenue ($000)	$59,570	---
Revenue Requirement ($000)	$57,322	$57,322
Revenue Surplus/Shortfall ($000)	$2,248	---

[1] As presented at the 04/27/2023 ICAPWG, the proposal includes the use of the 65% CPMax and 35% CPMin values

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WSR/SWR and ZCP Interaction: Issue

- **Hypothetical Example 2: (WLOE - 1) + (WSR - 1) Approaching (ZCP - 1)**
  - Example 2 utilizes the ICAP Demand Curve parameters for the NYC Locality for the 2022/2023 Capability Year except:
    - WSR = 114%
  - WLOE = 103.8%
    - Thus, (WLOE – 1) + (WSR – 1) = 3.8% + 14% = 17.8%
  - ZCP - 1 = 18%
  - SLOLE = 100%

NYC Locality	Current RP Formula	Proposed RP Formula[1]
Summer RP ($/kW-mo.)	$32.86	$22.13
Winter RP ($/kW-mo.)	$32.86	$681.53
Summer Price at LOE ($/kW-mo.)	$26.45	$17.82
Winter Price at LOE ($/kW-mo.)	$0.90	$8.94
Summer Revenue ($000)	$55,312	$37,260
Winter Revenue ($000)	$2,010	$20,062
Annual Revenue ($000)	$57,322	$57,322
Revenue Requirement ($000)	$57,322	$57,322
Revenue Surplus/Shortfall ($000)	$0	$0

[1] As presented at the 04/27/2023 ICAPWG, the proposal includes the use of the 65% CPMax and 35% CPMin values

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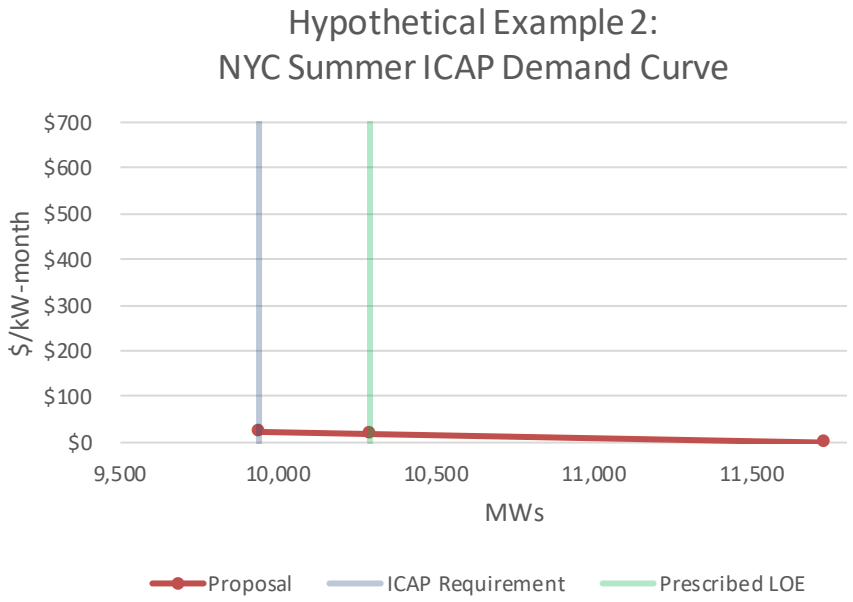
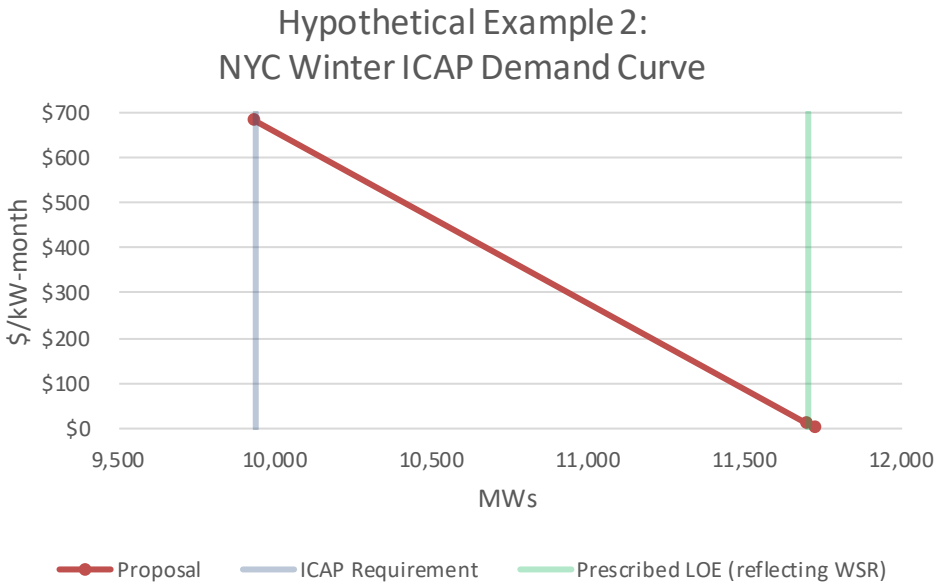
WSR/SWR and ZCP Interaction: Issue





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WSR/SWR and ZCP Interaction: Issue

- **As previously noted, the NYISO proposes that these considerations be evaluated by the independent consultant during the DCR**
  - The tariff already requires assessment of the shape, slope, and zero crossing point of the ICAP Demand Curves as part of the DCR
  - The NYISO believes that evaluation of these considerations as part of determining updated curves within the context of the DCR is a more appropriate forum for assessment and, if necessary, development of potential remedial action(s) in collaboration with stakeholders

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Next Steps

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Next Steps

- The NYISO anticipates returning to stakeholders in August to further discuss the seasonal reference point price proposal and supporting tariff revisions

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Questions?

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Appendix

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Reference Point Price Formula: Proposed Enhancements

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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]Proposed 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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Background

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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

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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
April 27, 2023	ICAPWG	ICAP Demand Curve Reference Point Price Proposal – CPMax and CPMin Values: https://www.nyiso.com/documents/20142/37254128/2025-2029%20DCR%20Reference%20Point%20Price%20Proposal%20-%20ICAPWG%20042720233%20v3%20-%20clean.pdf/1f5ff7b9-17b9-84cd-5b90-dce23952291e

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WSR/SWR Calculation

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WSR/SWR Calculation

- **The methodology for calculating the WSR is detailed in Section 5.14.1.2.2.3 of the Market Services Tariff**
  - The calculation requires using the average amount of capacity available in the ICAP Spot Market Auctions for the Summer Capability Period months and Winter Capability Period months (with specific adjustments for market entry and exit) in each 12-month period encompassed by the same three-year historical period utilized by the net revenue model to calculate the net Energy and Ancillary Services of the applicable peaking plant

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WSR/SWR Calculation

- **The WSR calculation accounts for all capacity that is available to be offered to the market**
  - The calculation is not based solely on the capacity that cleared each month during the historical data period
- **Capacity that is treated as unavailable includes, but is not limited to, capacity in Inactive Reserves or seasonally unavailable due to emissions restrictions**
  - For example, capacity that will be out-of-service in the summer ozone season to comply with the DEC Peaker Rule will be treated as unavailable in the summer ozone season months for the WSR calculation
- **The NYISO proposes to calculate the SWR as the inverse of the WSR (*i.e.*, SWR = 1/WSR)**

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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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