

# Modeling Improvements for Capacity Accreditation: SCR Modeling

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Maddy Mohrman, Market Design Specialist

**ICAPWG/MIWG**

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# Agenda

- **Project Update**
- **Current IRM Modeling vs Historical SCR Performance**
- **Exploratory Testing Methodology**
- **Next Steps**
- **Appendix**

# Project Update

# Project Update

- **The NYISO has completed benchmarking the 2022 SCR CAF testing results<sup>1</sup> on the 2023 LCR case**
  - The results from testing alternative SCR modeling techniques will be compared to these benchmarked SCR CAF results in the future
- **For next steps, the NYISO plans to explore treating SCRs as duration limited resources, with the duration limits and hourly response rates based on historical SCR performance during mandatory events**

<sup>1</sup> Results of the 2022 SCR CAF testing were presented at the [July 28<sup>th</sup>, 2022 ICAPWG](#)

# Current IRM Modeling vs Historical SCR Performance

# Current IRM Modeling vs Historical SCR Performance

- **In the current IRM modeling, SCRs are modeled as an EOP step with the following characteristics:**
  - Subject to a maximum of 5 activations per month
  - Available for the whole day when called
  - Modeled by zone at a derated capacity based on zonal performance factors and zonal Average Coincident Load (ACL) to Customer Base Load (CBL) factors
    - Zonal performance factors and ACL to CBL factors are based on historical SCR performance during all event hours, by zone, for each mandatory event from the most recent five years in which a mandatory event was initiated by the NYISO (but not older than summer 2012) and all performance test hours accumulated during the same timeframe even when there were no mandatory events<sup>1</sup>
      - The look back window is limited to summer 2012 because an alternative capacity baseline methodology was in place to measure SCR performance prior to 2012

<sup>1</sup>For more details on the zonal performance factor and ACL to CBL factor calculations, please see the [“Demand Response: Final Model Values for 2023 IRM Studies & SCR Performance Analysis”](#) presentation to the August 3<sup>rd</sup>, 2022, meeting of the NYSRC Installed Capacity Subcommittee

# Current IRM Modeling vs Historical SCR Performance

## For 2023 IRM - Final SCR Model Values

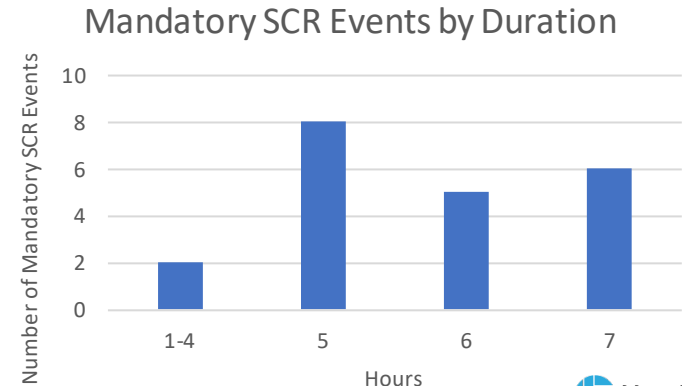
Program	Super Zone	Superzone Performance Factor	ICS Adjustment Factors		Effective Performance Factor	SCR ICAP MW based on July 2022	Final Model Values MW
			ACL to CBL Factor	Fatigue Factor			
SCR	A-F	87.3%	93.6%	100%	81.7%	694.5	567.7
SCR	G-I	76.8%	84.2%	100%	64.7%	79.1	51.2
SCR	J	70.5%	74.4%	100%	52.5%	417.5	219.1
SCR	K	69.6%	76.3%	100%	53.1%	33.7	17.9
<b>Total</b>						<b>1224.8</b>	<b>855.9</b>
							<b>69.9%</b>

**Note:** Zonal Level SCR Performance Factors are included in the IRM Modeling. The Super-Zone values denoted above are the average of each of the Zonal Performance Factors included in the respective Super-Zone.

# Current IRM Modeling vs Historical SCR Performance

- In the NYISO's market, curtailment duration requests have ranged from 1 to 7 hours in mandatory SCR events since 2012
  - There are no restrictions on the length of a curtailment request, the time periods in which a curtailment request may be initiated, or the number of times during a month or Capability Period that a curtailment request may be executed by the NYISO
    - However, the NYISO must follow the advanced notification procedures, as detailed in Section 4.12.4 of the ICAP Manual, before a mandatory curtailment request can be implemented

	Number of Mandatory SCR Events	Average Length of Mandatory SCR Events
Since 2012	21	5.6 hours





# Current IRM Modeling vs Historical SCR Performance

- **Individual SCR performance is required for a minimum of 4 consecutive hours during mandatory events**
  - Performance beyond 4 consecutive hours is voluntary
- **If an SCR was called to perform during one or more mandatory events in the last two like-Capability Periods, the SCR's best four hours of consecutive response during each event is included in calculating the SCR's performance factor used to determine the SCR's UCAP**
  - SCRs can choose which 4 hours within the call window to maximize their performance
- **On average, some level of SCR response has historically been seen across all hours of mandatory calls**
  - Because of this, the NYISO will be exploring treating SCRs as duration limited resources in GE MARS, with the duration limits and hourly response rates based on historical SCR performance during mandatory events

# Exploratory Testing Methodology

# Exploratory Testing Methodology– Existing SCRs

- **Existing SCRs will be modeled as zonal duration limited resources with hourly response rates, subject to a 1 call per day limit**
  - The duration limited resources can be called as needed up to once per day (e.g., a 4-hour duration limited resource can be called for 4 consecutive hours up to once per day)
    - A start window may also be needed to prevent the model from using the duration limited SCRs too early in the day when imports may also be available and/or when SCRs would not generally be called in the market
- **In this testing, SCRs will continue to be deployed as the first EOP step even when modeled as zonal duration limited resources**

# Exploratory Testing Methodology– Existing SCRs

- The maximum modeled capacities of the zonal SCR duration limited resources will be calculated based on zonal SCR enrollments from the prior year and the zonal ACL to CBL factors
  - Using the SCR values for the 2023 IRM study, the maximum modeled capacities of the zonal SCR duration limited resources (aggregated by capacity region<sup>1</sup>) would be:

Capacity Region	SCR ICAP MW based on July 2022	ACL to CBL Factor	Max Modeled Capacity (MWs)
ROS	694.5	93.6%	650.3
GHI	79.1	84.2%	66.6
J	417.5	74.4%	310.7
K	33.7	76.3%	25.7

<sup>1</sup>Aggregated by capacity region for illustrative purposes only. SCRs are modeled by load zone in GE MARS

# Exploratory Testing Methodology- Existing SCRs

- The Energy Limited Resource (ELR) modeling construct in GE MARS will be used to model SCRs as duration limited resources
- The duration limit of the zonal SCR resources will vary by load zone based on the maximum historical call length that has occurred in the zone since 2012

	Hourly Duration Limit by Zone			
	A-E	F	G-J	K
Duration Limit	5	7	6	7

# Exploratory Testing Methodology – Existing SCRs

- **Because 1) the maximum historic SCR call lengths are longer than the 4-hour SCR program requirement and 2) SCR responses beyond 4-hours is voluntary, the NYISO does not see 100% SCR participation across all hours of the maximum call lengths**
  - In addition, because SCRs can choose which 4 hours within a call to maximize their performance, the NYISO sees variable response rates across each hour of an SCR call
- **Therefore, modeling hourly response rates – in conjunction with the ELR modeling construct – is needed to reflect the staggered participation and performance of SCRs within the maximum call lengths**

# Exploratory Testing Methodology– Existing SCRs

- **The hourly response rates of the zonal SCR duration limited resources will be calculated from hourly mandatory event performance data**
  - For each hour of an activation, the response rate is the percentage of the zonal SCR duration limited resource’s maximum modeled capacity that will be deployed in GE MARS
  - The hourly response rates will vary by zone and hour of activation based on historical hourly SCR performance within the zone across all mandatory events for the zone since 2012
  - Hypothetical example of zonal hourly response rates:

	Hypothetical Zonal Hourly Response Rates					
Hour	1	2	3	4	5	6
Response Rate	86%	82%	87%	86%	82%	70%

# Exploratory Testing Methodology- Existing SCRs

- **Illustrative Modeling Example**

- The following is an illustrative example of how a zonal SCR duration limited resource would be modeled in an SCR activation, triggered by moving to the first EOP step in GE MARS

		Hour of SCR Activation					
		1	2	3	4	5	6
Maximum Modeled Capacity	A	310.7					
Hypothetical Hourly Response Rate	B	86%	82%	87%	86%	82%	70%
MWs Available	$C=A*B$	267.2	254.8	270.3	267.2	254.8	217.5



# Exploratory Testing Methodology – Representative SCR Unit

- The NYISO is still determining the appropriate way to model the representative SCR unit – which would be utilized for the CAF calculations – in conjunction with the exploratory testing methodology for the existing SCRs
- The NYISO will return to a future ICAPWG to discuss the modeling of the representative SCR unit that will be tested in conjunction with the exploratory testing methodology for existing SCRs

# Next Steps

# Next Steps

- **The NYISO anticipates returning to stakeholders in May to discuss the modeling of the representative SCR unit that will be tested in conjunction with the exploratory testing methodology for existing SCRs**

# Questions?

# Appendix

# Background

# Background: Modeling Improvements for Capacity Accreditation

- **As part of the 2022 Improving Capacity Accreditation project, the NYISO identified that the functionality utilized in the current resource adequacy analysis -- used to establish New York State installed reserve margins and used as the basis of determining Capacity Accreditation Factors -- related to the modeling of and accounting for attributes, such as correlated fuel unavailability for non-renewable resources, long start up notification requirements, non-fuel-related correlated outages, etc., may limit the basis for identifying certain Capacity Accreditation Resource Classes (CARCs) and calculating Capacity Accreditation Factors(CAFs) for some resource types**
  - Enhancing the model's functionality will enable more accurate calculations of the Resource Adequacy requirements needed to maintain reliability and the Capacity Accreditation Factors, which will reflect the marginal reliability contributions of each Capacity Accreditation Resource Class
- **The Modeling Improvements for Capacity Accreditation project deliverable is the development of Functional Requirements due in Q4 2023**

# Background: SCR Modeling

- **Special Case Resources (SCRs) are modeled in the IRM/LCR model. However, the current modeling of SCRs in the IRM/LCR model is not sufficiently aligned with the expected performance and obligations of SCRs in the NYISO's market. Therefore, SCRs cannot currently be treated as a separate CARC, for which to separately calculate CAFs, using the current modeling of SCRs**
  - The following slide highlights differences in the modeling of SCRs in the IRM/LCR model compared to the expected performance and obligations of SCRs in the NYISO's market
  - Until the IRM/LCR model reflects the expected performance and obligations of SCRs in the NYISO's market, SCRs will be assigned to the 4-hour Energy Duration Limitation Capacity Accreditation Resource Class
- **As part of this project, the NYISO will examine and recommend how to better reflect the expected performance and obligations of SCRs in the IRM/LCR study**
  - Changes to the design of the SCR program are not within the scope of this project. Discussions on the needs of demand side resources and DERs, and gaps of the current NYISO DR/DER programs will take place as part of the Engaging the Demand Side initiative.



# Background: SCR Modeling

- **IRM/LCR modeling**
  - SCRs are modeled as a step in the Emergency Operating Procedure (EOP)
    - GE MARS activates EOP steps if there is not enough capacity to supply load in the simulation
  - GE MARS does not consider certain market requirements such as advanced notice for SCRs
  - The SCR EOP is limited to a maximum of 5 activations per month
  - SCRs are modeled without output hour limitations and therefore can be available for the whole day
  - All SCRs in the NYISO are activated as part of the EOP
  - SCRs are modeled at a derated capacity based on zonal performance factors and zonal Average Coincident Load (ACL) to Customer Base Load (CBL) derates
- **Expected performance and obligations in the NYISO market**
  - Similar to an EOP, the NYISO activates SCRs only when the Day-Ahead Market indicates potential serious shortages of supply for the next day. (ICAP Manual Section 4.12.5)
  - The NYISO is required to provide SCRs with advanced notice at least 21-hours prior to activation
  - There is no maximum number of SCR activations per month in the NYISO market
  - When activated, SCRs have a minimum 4-hour performance obligation. SCRs are not expected to reduce load for the entire day
  - SCRs can be activated separately by LBMP zone
  - SCRs receive capacity payments based on the Aggregation’s seasonal performance factor, which “recognizes over-performance by one SCR to compensate for underperformance by another SCR in the same SCR Aggregation in the same hour” (ICAP Manual Section 4.12.2)

# Previous Discussions

# Previous Discussions – SCR Modeling

Date	Working Group	Discussion Points and Links to Materials
January 26, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation: Project Kick Off - <a href="https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff">https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff</a>
February 28, 2023	ICAPWG	SCR Modeling Kick Off - <a href="https://www.nyiso.com/documents/20142/36499713/2023-02-28%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/c1a52495-bc30-3e7c-f5c1-61c38f30fbe4">https://www.nyiso.com/documents/20142/36499713/2023-02-28%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/c1a52495-bc30-3e7c-f5c1-61c38f30fbe4</a>

# Previous Discussions – Gas Constraints

Date	Working Group	Discussion Points and Links to Materials
January 26, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation: Project Kick Off - <a href="https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff">https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff</a>
February 28, 2023	ICAPWG	Gas Constraints Kick Off - <a href="https://www.nyiso.com/documents/20142/36499713/Gas%20Constraints%2002_28_2023%20ICAPWG_Final.pdf/e258d867-12f9-8453-c93b-49bc94b8e803">https://www.nyiso.com/documents/20142/36499713/Gas%20Constraints%2002_28_2023%20ICAPWG_Final.pdf/e258d867-12f9-8453-c93b-49bc94b8e803</a>

# Previous Discussions – Correlated Derates

Date	Working Group	Discussion Points and Links to Materials
January 26, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation: Project Kick Off - <a href="https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff">https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff</a>
February 28, 2023	ICAPWG	Correlated Derates Kick Off - <a href="https://www.nyiso.com/documents/20142/36499713/Correlated_Derates_MIWG_022823_FINAL.pdf/35eaab46-740e-aed0-9e2d-2207c06a0659">https://www.nyiso.com/documents/20142/36499713/Correlated_Derates_MIWG_022823_FINAL.pdf/35eaab46-740e-aed0-9e2d-2207c06a0659</a>

# 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