New York ISO
Independent System Operator

Modeling Improvements for Capacity Accreditation: SCR Modeling

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Agenda

- **Project Review**
- **Project Update**
- **Appendix**
  - Previous Discussions
  - Background
  - Proposed SCR Modeling Overview

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Project Review

Project Review

- **At the 04/27/2023 ICAPWG and 06/07/2023 ICAPWG, the NYISO presented an exploratory testing methodology for modeling SCRs in the IRM, LCR, and capacity accreditation studies (hereafter referred to as the "proposed SCR modeling")**
  - The purpose of the proposed SCR modeling is to better reflect the expected performance and obligations of SCRs in the NYISO's market for use in the IRM, LCR and capacity accreditation studies by modeling SCRs as duration limited resources with hourly response rates based on historical performance
    - A more detailed overview of the proposed SCR modeling is included in the Appendix
  - Until changes are made to the SCR modeling in the IRM/LCR base case, SCRs will be assigned to the 4-hour Energy Duration Limitation Capacity Accreditation Resource Class (CARC)
    - The NYISO will begin working with the NYSRC this fall to adopt and implement the recommended modeling enhancements

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Project Update

Project Update

- **At the 07/11/2023 ICAPWG, the NYISO presented an initial set of CAF results for the proposed SCR modeling**
  - The NYISO later identified an error in the case used to test the proposed SCR modeling (*i.e*, the Exploratory Testing Methodology Case)
    - The error was related to retaining the 2023 IRM rather than letting the LCR Optimizer solve for both the IRM and LCRs in re-establishing an at-criteria base case
    - The 07/11/2023 ICAPWG presentation has been reposted with the actual IRM and LCRs used in that case

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Project Update

- At the 07/11/2023 ICAPWG, the NYISO also committed to evaluate the proposed SCR modeling within the broader possible EOP modeling changes being considered as part of the NYSRC's EOP whitepaper effort
- As part of the EOP whitepaper effort, the NYSRC has approved a new modeling of emergency assistance (EA) from neighboring areas for inclusion in the Final Base Case (FBC) of the 2024 IRM study
  - The new EA modeling applies additional topology limits to NYISO's ties with its neighbors to constrain EA based on the historical extra reserves of the neighboring areas
  - The NYISO presented the recommendation at the 08/02/2023 meeting of the NYSRC's Installed Capacity Subcommittee
- The NYISO is testing the combined impact of the proposed SCR modeling with the new EA modeling and is planning to return to an October ICAPWG to discuss the results of this testing

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Project Update

- The NYISO is planning to begin discussions of the proposed SCR modeling with the NYSRC at the 10/04 ICS meeting

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Questions?

Appendix

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 - https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff
February 28, 2023	ICAPWG	SCR Modeling Kick Off - https://www.nyiso.com/documents/20142/36499713/2023-02-28%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/c1a52495-bc30-3e7c-f5c1-61c38f30fbe4
April 27, 2023	ICAPWG	Exploratory Testing Methodology for Existing SCRs - https://www.nyiso.com/documents/20142/37254128/2023-04%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/30382824-7468-24d2-e567-56c770d6a185
June 7, 2023	ICAPWG	Exploratory Testing Methodology for the Representative SCR unit - https://www.nyiso.com/documents/20142/38023757/2023-06-07%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/250f8f1d-9dfe-5756-640b-c1e31f3a6328
July 11, 2023	ICAPWG	Exploratory Testing Methodology Initial Results - https://www.nyiso.com/documents/20142/38699263/2023-07-11_ICAPWG Modeling Improvements - SCR Modeling v2 - clean.pdf/2f27473b-2292-31d4-ecb7-5d30d6b860f0

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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

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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.

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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)

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Proposed SCR Modeling Overview

Proposed SCR Modeling Overview

- **At the 04/27/2023 ICAPWG, the NYISO presented an exploratory testing methodology for modeling existing SCRs as duration limited resources with hourly response rates in the IRM model**
  - This modeling is intended to reflect the aggregate performance and staggered responses of individual SCRs during activations
  - The hourly response rates reflect the historical hourly performance of SCRs within each zone during mandatory events from Summer 2012–Summer 2022
    - Hourly response rates are presented on the following slide
- **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**

	SCR Activation Duration Limit by Zone (hours)			
	A-E	F	G-J	K
Duration Limit	5	7	6	7

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Proposed SCR Modeling Overview

Response Rate by Hour of SCR Activation							
Zones	1	2	3	4	5	6	7
A-E[1]	79%	85%	83%	71%	70%		
F	75%	81%	84%	85%	84%	67%	64%
G-I[1]	59%	68%	70%	72%	74%	72%	
J	55%	61%	66%	68%	69%	66%	
K	50%	57%	62%	65%	65%	64%	53%

[1] Reflects capacity-weighted averages of zonal response rates. Zonal response rates will be used in the proposed SCR modeling

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Proposed SCR Modeling Overview

- **Zone J Modeling Example**
  - If an SCR activation is triggered in GE MARS, the MWs available from the existing SCRs in Zone J will vary across the hours of the activation based on the maximum modeled capacity for the month and the hourly response rates for Zone J

		Hour of SCR Activation					
Zone J		1	2	3	4	5	6
July Maximum Modeled Capacity (MWs)[1]	α	310.7					
Hourly Response Rates	β	55%	61%	66%	68%	69%	66%
MWs Available	$\gamma = \alpha * \beta$	171	190	205	211	214	205

[1] The maximum modeled capacities are calculated for each month using the total ICAP of SCRs enrolled in the zone in the same month of the prior year and the zonal ACL to CBL factor, as described on slide 12 of the 04/27/23 ICAPWG presentation. For example, the maximum modeled capacity for Zone J for July (310.7 MWs) was calculated by multiplying the Zone J SCR enrollments from July 2022 [417.5 MWs] by the Zone J ACL to CBL factor, as calculated for the 2023 IRM study [74.4%]

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Proposed SCR Modeling Overview

- **The representative SCR unit – which will be utilized for the CAF calculations– will be modeled as a 4-hour duration limited resource with 100% availability (*i.e.*, 100% hourly response rates across 4 consecutive hours)**
  - Under marginal capacity accreditation, Capacity Accreditation Factors should reflect the marginal reliability contribution expected from adding one additional unit of a Capacity Accreditation Resource Class to the system in order to send economically efficient signals for market entry and exit
  - Individual SCR units have a 4-hour performance obligation
  - The activation of the representative SCR unit will be tied to the activation of the existing SCRs in the same zone
  - The representative SCR unit will not be subject to an ACL to CBL derate

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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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