

Modeling Improvements for Capacity Accreditation: SCR Modeling

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Agenda

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- **Enhanced SCR Modeling Results**
- **Next Steps**
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Project Review

Project Review

- **As part of the Modeling Improvements for Capacity Accreditation project, the NYISO has developed an enhanced modeling of SCRs for use in the IRM, LCR, and capacity accreditation studies**
 - The purpose of the enhanced SCR modeling is to better reflect the expected performance and obligations that SCRs have in the NYISO's market by modeling SCRs as duration limited resources with hourly response rates based on historical performance
 - A more detailed overview of the enhanced 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 Limited Capacity Accreditation Resource Class (CARC)
 - The enhanced SCR modeling is not included in the 2024 IRM Final Base Case, based on the FBC assumptions approved by the NYSRC Executive Committee

Project Review

- **As part of the EOP whitepaper effort, the NYSRC 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 has tested the enhanced SCR modeling on a base case that incorporates the new EA modeling**
 - Results of this testing are presented on the following slides

Enhanced SCR Modeling Results

Disclaimer

- Under the normal NYSRC process to incorporate any underlying modeling changes, the NYSRC would perform the Tan45 process to establish an at-criteria base case
- To test the enhanced SCR modeling changes, the NYISO used the LCR Optimizer to re-establish an at-criteria base case, instead of the Tan45 process
 - The Tan45 process requires significantly more time and resources to establish an at-criteria base case than the LCR Optimizer
- The two different ways to establish an at-criteria base case can result in different IRM/LCRs, CAFs, and other model results
- Therefore, the model results within this presentation should be considered as an indicator of the potential directional and possible magnitude impacts of the enhanced SCR modeling and should not be viewed as an indication of final impacts that would occur in a Tan45-established at-criteria base case

Enhanced SCR Modeling Results

- The NYISO used the 2023 LCR case as the starting database and then incorporated both the new EA modeling and enhanced SCR modeling
- When re-establishing the at-criteria base case after incorporating the new EA modeling and enhanced SCR modeling, the NYISO utilized the LCR Optimizer from the 2023 LCR study to set both the IRM and LCRs
 - The IRM and LCRs set by the LCR Optimizer for this enhanced SCR + EA modeling case are:
 - NYCA IRM: 119.7%
 - G-J LCR: 85.6%
 - J LCR: 81.7%¹
 - K LCR: 109.1%

¹2023 TSL floor remained binding

Enhanced SCR Modeling Results

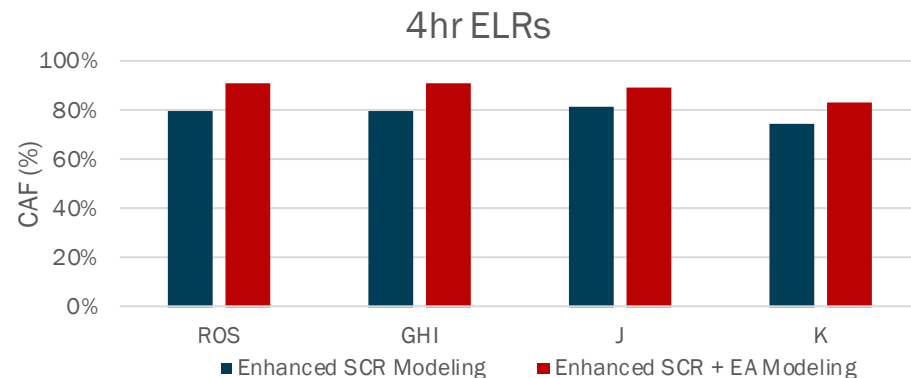
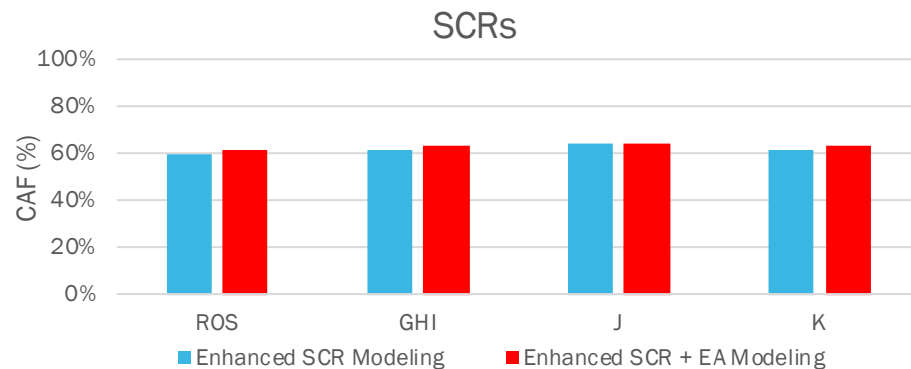
- For comparative purposes, the NYISO also calculated CAFs on a re-established at-criteria base case that 1) used the 2023 LCR case as the starting database, 2) incorporated the addition the enhanced SCR modeling, and 3) was re-established using the LCR Optimizer to set both the IRM and LCRs¹
 - The IRM and LCRs set by the LCR Optimizer for this enhanced SCR modeling case are:
 - NYCA IRM: 116.0%
 - G-J LCR: 85.4%²
 - J LCR: 81.7%²
 - K LCR: 109.4%

¹The case presented at the [07/11/2023 ICAPWG](#) did not utilize the LCR Optimizer to set both the IRM and LCRs

²2023 TSL floor remained binding

Enhanced SCR Modeling Results

- The SCR CAFs of the enhanced SCR + EA modeling case remained consistent with the SCR CAFs of the enhanced SCR modeling case¹
- The 4hr ELR CAFs are higher in the enhanced SCR + EA modeling case compared to the enhanced SCR modeling case¹
 - The higher 4hr ELR CAFs is likely due to a combination the higher IRM and shifted LOLE distribution of the enhanced SCR + EA modeling case, as shown on the next slide



¹ CAFs for the enhanced SCR modeling case differ from the CAFs presented at the [07/11/2023 ICAPWG](#) due the change in the IRM between the two cases

Enhanced SCR Modeling Results

- Comparing the two test cases, the enhanced SCR + EA modeling case has a higher percentage of LOLE in the evening hours

- This difference is due to less EA being available when the duration limited SCRs are no longer available in the enhanced SCR + EA modeling case
- This LOLE distribution difference likely explains why the 4hr ELR CAFs are higher while the SCR CAFs remained the same
 - 4hr ELRs are energy limited and thus more flexible and able to meet the evening loss of load events compared to the duration limited SCRs

Percentage of LOLE by Hour

HB	Enhanced SCR Modeling Case	Enhanced SCR + EA Modeling Case	<i>Delta</i>
14	5%	4%	-1%
15	11%	8%	-3%
16	18%	15%	-3%
17	22%	21%	-1%
18	10%	11%	1%
19	11%	14%	3%
20	6%	9%	3%
21	2%	5%	3%

Next Steps

Next Steps

- **The NYISO plans to work with the NYSRC to continue discussion and analysis of the enhanced SCR modeling**

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_ModelingImprovements_-_SCR_Modeling_v2_-_clean.pdf/2f27473b-2292-31d4-ecb7-5d30d6b860f0
October 3, 2023	ICAPWG	Project Update - https://www.nyiso.com/documents/20142/40342797/2023-10-03%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/e5b6faa3-7865-c92a-dbf2-39e1ea6c65e8

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)

Enhanced SCR Modeling Overview

Enhanced 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

Enhanced SCR Modeling Overview

<u>Response Rate by Hour of SCR Activation</u>							
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 are used in the enhanced SCR modeling

Enhanced 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

		<u>Hour of SCR Activation</u>					
<u>Zone J</u>		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

¹The 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%]

Enhanced 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

Our Mission & Vision



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