New York ISO
Independent System Operator

Capacity Accreditation

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ICAPWG/MIWG

November 21, 2022
Revised: November 17, 2022

Agenda

- Previous Discussions
- Background
- ICAP Manual and Tariff Revisions
- 2023 IRM PBC - CAF Results
- Next Steps
- Appendix

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Previous Discussions

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Previous Discussions

Date	Working Group	Discussion Points and Links to Materials
August 5, 2021	ICAPWG	Review of Existing Capacity Accreditation Rules: https://www.nyiso.com/documents/20142/23590734/20210805%20NYISO%20-%20Capacity%20Accreditation%20Current%20Rules%20Final.pdf
August 9, 2021	ICAPWG	Capacity Accreditation Proposal: https://www.nyiso.com/documents/20142/23645207/20210809%20NYISO%20-%20Capacity%20Accreditation%20Straw%20Proposal.pdf
August 30, 2021 & August 31, 2021	ICAPWG	Capacity Accreditation Proposal: https://www.nyiso.com/documents/20142/24172725/20210830%20NYISO%20-%20Capacity%20Accreditation_v10%20(002).pdf
September 28, 2021	ICAPWG	Comprehensive Mitigation Review Proposal and Tariff: https://www.nyiso.com/documents/20142/24925244/20210928 NYISO - CMR Final.pdf/769828a1-f224-0140-240b-0762ec18efec
October 18, 2021	ICAPWG	Comprehensive Mitigation Review Proposal and Tariff Updates: https://www.nyiso.com/documents/20142/25440628/20211018%20NYISO%20-%20CMR%20v9.pdf/4475e775-159c-75c7-9cf8-7050dad9a363
October 29, 2021	ICAPWG	Comprehensive Mitigation Review Proposal and Tariff Updates: https://www.nyiso.com/documents/20142/25780701/20211029%20NYISO%20-%20CMR.pdf/ea8494b0-0860-b260-89b6-0c418d28a91d

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Previous Discussions (cont.)

Date	Working Group	Discussion Points and Links to Materials
November 2, 2021	ICAPWG	NYISO CMR Consumer Impact Analysis: https://www.nyiso.com/documents/20142/25835955/CIA%20-%20Comprehensive%20Mitigation%20Review.pdf/36d447d4-5b33-8ab1-2654-90a529ff1dfe Potomac CMR Consumer Impact Analysis: https://www.nyiso.com/documents/20142/25835955/MMU%20ICAP%20Accreditation%20Consumer%20Impact%20Analysis%2011-02-2021.pdf/637ba21e-db75-a4c1-5b41-f770dd26e529
November 9, 2021	BIC	Comprehensive Mitigation Review Proposal and Tariff: https://www.nyiso.com/documents/20142/25928340/5%2020211109%20NYISO%20-%20CMR%20v3.pdf/84d8b429-126c-68dd-0308-caa50886de92 Comprehensive Mitigation Review Approved Motion: https://www.nyiso.com/documents/20142/25928340/110921%20bic%20final%20motions.pdf/785d5869-1e04-9f97-e330-e2e632ae7a9c
November 17, 2021	MC	Comprehensive Mitigation Review Proposal and Tariff: https://www.nyiso.com/documents/20142/26119798/05%20CMR.pdf/11217ade-152a-74a2-d478-6b5ae5e21207 Comprehensive Mitigation Review Approved Motion: https://www.nyiso.com/documents/20142/26119798/111821%20MC_Final_Motions.pdf/bbf15d66-4108-7173-1596-9b20677914e6
January 20, 2022	ICAPWG	2022 Market Projects: https://www.nyiso.com/documents/20142/27799605/2022%20Projects%20Presentation.pdf/4553eb95-177d-7cbc-f2fe-7754b7c66644

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Previous Discussions (cont.)

Date	Working Group	Discussion Points and Links to Materials
February 3, 2022	ICAPWG	Improving Capacity Accreditation Plan: https://www.nyiso.com/documents/20142/28227906/Improving%20Capacity%20Accreditation%20Plan.pdf/92560e95-5703-4c57-45cb-7706c36f4656
February 24, 2022	ICAPWG	Improving Capacity Accreditation Project Kick Off: https://www.nyiso.com/documents/20142/28687884/Capacity%20Accreditation%20Kick%20Off%2002-24-22%20v7.pdf/5ab742c4-650b-5094-6a22-d41a2f29da6f MARS Review (GE Consulting): https://www.nyiso.com/documents/20142/28687884/GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_0224-v4.pdf/d302df1c-5607-16a8-ba01-fba700d5bbd1
March 3, 2022	ICAPWG	CMR Draft Deficiency Response: https://www.nyiso.com/documents/20142/28897222/CMR%20Deficiency%20Draft%20Responses%2003-03%20ICAPWG.pdf/0a3c8303-515e-7725-dee5-a9dda1398672
March 16, 2022	ICAPWG	Capacity Accreditation Resource Class Criteria, Resource-Specific Derating Factors, and Areas of Needed Change: https://www.nyiso.com/documents/20142/29177064/Capacity%20Accreditation%2003-16-22%20v7.pdf/b26e6a99-5f4e-29cc-c60c-47608c78c983
March 31, 2022	ICAPWG	Capacity Accreditation Representative Unit Modeling: https://www.nyiso.com/documents/20142/29607069/2%20CA%20Representative%20Unit%20Modeling%2003-31-22%20ICAPWG.pdf/1c3af8ac-625a-5066-3977-8c3d9ae0ddda ELCC and MRI Overview (GE): https://www.nyiso.com/documents/20142/29607069/3%20GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_0331.pdf/08355c9a-d104-e1b6-6b8a-8266c61b74a3

Previous Discussions (cont.)

Date	Working Group	Discussion Points and Links to Materials
April 19, 2022	ICAPWG	Capacity Accreditation Adjusted Resource Specific Derating Factors and External Resources: https://www.nyiso.com/documents/20142/30025560/04-19-22%20CA%20Adjusted%20Derating%20Factors%20and%20External%20Resources.pdf/5dd1f4b2-092d-6a6a-3b99-4d768ea6c5eb
April 28, 2022	ICAPWG	Preliminary Capacity Accreditation Resource Classes: https://www.nyiso.com/documents/20142/30276257/04-28-22%20Capacity%20Accreditation%20-%20Preliminary%20CARCs.pdf/c82c47c5-28c2-cf19-c602-16bf3cfc4aca Preliminary ELCC and MRI Results (GE): https://www.nyiso.com/documents/20142/30276257/GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_0428.pdf/3c761f16-7bc0-b469-b1e8-c2a69feb58ef
May 24, 2022	ICAPWG	Updated Preliminary CARCs and Annual Process to Establish CARCs: https://www.nyiso.com/documents/20142/30888946/3%2005-24-22%20Capacity%20Accreditation.pdf/cd61d855-f634-0fe8-6109-7d8c0547beda Additional Preliminary ELCC and MRI Results (GE): https://www.nyiso.com/documents/20142/30888946/2%20GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_0524.pdf/0976330d-f4eb-4db3-2613-c8be9bafe452
June 16, 2022	ICAPWG	Sensitivity Scenarios and Seasonal CAFs: https://www.nyiso.com/documents/20142/31532822/2%20Capacity%20Accreditation%20v6.pdf/4ffe4fa9-bdaf-2c23-77be-d49ed04c5ea5

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Previous Discussions (cont.)

Date	Working Group	Discussion Points and Links to Materials
June 28, 2022	ICAPWG	Annual Peak Load Window (PLW) Review and Energy Duration Limitation Proposals: https://www.nyiso.com/documents/20142/31790818/06-28-22%20PLW%20and%20EDL%20Proposal.pdf/ffca7c8a-767e-3de1-9b46-404f661351b3 Revised Shape-based Resource Results and ELR Modeling Functionality in MARS (GE): https://www.nyiso.com/documents/20142/31790818/GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_0628.pdf/999c7dfa-0b5d-a6bc-a57a-b35a1cda5aa4
July 21, 2022	ICAPWG	Capacity Accreditation: Project Schedule Update: https://www.nyiso.com/documents/20142/32356084/7-21-2022%20ICAPWG%20Project%20Schedule.pdf/958ef86a-12de-32a1-c115-5c1af39abb54
July 28, 2022	ICAPWG	Capacity Accreditation: SCR CAF Results and Proposal: https://www.nyiso.com/documents/20142/32491922/2%207282022%20ICAPWG%20Capacity%20Accreditation.pdf/3f991228-5011-7cc2-cfd3-a7762fa8c8f6 Sensitivity Scenario Methodologies (GE): https://www.nyiso.com/documents/20142/32491922/3%20GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_0728.pdf/9fd89cbc-2baa-3c54-dc74-17c2e8cf588a
August 9, 2022	ICAPWG	Modeling Discussion and ICAP Manual Revision Process Options: https://www.nyiso.com/documents/20142/32687686/08-09-22%20Capacity%20Accreditation.pdf/1009a4dc-bb9f-17f3-bb34-908fd8d5704d

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Previous Discussions (cont.)

Date	Working Group	Discussion Points and Links to Materials
August 29, 2022	ICAPWG	Annual CAF Proposal, Winter PLW Assessment, and CAF Interaction with the ICAP Demand Curves: https://www.nyiso.com/documents/20142/32977661/Capacity%20Accreditation%2008292022%20ICAPWG.pdf/13c04d12-f77f-3184-15c4-8f0b22897f3d Compiled Preliminary CAF Results: https://www.nyiso.com/documents/20142/32977661/GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_LCR-results.pdf/e9fdeb01-1ee0-7651-6a3f-0823aedcef1d
September 30, 2022	ICAPWG	Resource Specific Derating Factor Proposal for Performance-based Resources, CAF Interaction with ICAP Demand Curves, ISO Review of Peak Load Windows, and Modeling CAFs At Criteria vs Level of Excess: https://www.nyiso.com/documents/20142/33520089/9-30-2022%20ICAPWG%20Capacity%20Accreditation%20v3.pdf/0178b3b4-4398-ce4a-3197-224e24086c51 Capacity Value Results for 2022 LCR at LOE and 2022 RNA 2030 Base Case (GE): https://www.nyiso.com/documents/20142/33520089/GEEC-CapacityAccreditation-LOEandBaseRNA-results%20v5%20-%20clean.pdf/4e05032a-91c3-ff78-08a2-9202efead08a Consumer Impact Analysis Methodology: https://www.nyiso.com/documents/20142/33520089/CIA%20Methodology%20-%20Capacity%20Accreditation_Final.pdf/37c9b5f5-ab29-8eb0-afd2-fdc369f097f5
October 19, 2022	ICAPWG	Translation Factors for IRM/LCR Studies and Deliverability Testing, Sensitivity Scenario Update, and ICAP Market Resource Adequacy 5 Year Plan: https://www.nyiso.com/documents/20142/33857891/02a_10-19-22%20ICAPWG%20Capacity%20Accreditation.pdf/cae2063d-76d6-b4d3-25d5-fadd0c5e1f50 Compiled CAF Results (Excel file): https://www.nyiso.com/documents/20142/33857891/02b_10-19-22%20ICAPWG%20Compiled%20CAF%20Results.xlsx/cf5ad8f9-b4fb-9f44-9df2-672f9a190331 Capacity Accreditation - Consumer Impact Analysis: https://www.nyiso.com/documents/20142/33857891/03_Consumer%20Impact%20-%20Capacity%20Accreditation.pdf/1e9097c6-c0ae-b137-dd44-15ce1f5a7841

Previous Discussions (cont.)

Date	Working Group	Discussion Points and Links to Materials
October 27, 2022	ICAPWG	Proposed Modeling Technique for Calculating CAFs and Summary of Initial ICAP Manual and Tariff Revisions - Reposted: https://www.nyiso.com/documents/20142/34087499/10-27-22%20ICAPWG%20Capacity%20Accreditation%20v2%20-%20repost.pdf/23474d78-642b-c476-8f4d-26953fe57bd5 ICAP Manual Revisions – First Set: https://www.nyiso.com/documents/20142/34087499/ICAP%20Manual%20Revisions%20for%20Discussion%20v3.pdf/f69334aa-da69-54dd-a805-9f2148439561 ICAP Manual Attachment Revisions – First Set: https://www.nyiso.com/documents/20142/34087499/ICAP%20Manual%20Attachments%20v2.pdf/e1e2ec96-4cfc-fb78-01de-c8a97e2ed449 Updated Compiled CAF Results (Excel file): https://www.nyiso.com/documents/20142/34087499/10-27-22%20ICAPWG%20Compiled%20CAF%20Results%20v3.xlsx/46982a75-2fac-fcc6-01a8-ae9161edb742 Capacity Value Results for 2022 RNA 2030 Cases and IRM 2023 PBC Cases – Reposted (GE): https://www.nyiso.com/documents/20142/34087499/GEEC-CapacityAccreditation-RNA-and-2023-PBC-results%20v4%20-%20repost.pdf/2ecbb723-7a84-cd0f-b8a5-ae385a80214b

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Previous Discussions (cont.)

Date	Working Group	Discussion Points and Links to Materials
November 8, 2022	ICAPWG	Capacity Accreditation ICAP Manual & Tariff Revisions: https://www.nyiso.com/documents/20142/34285499/7b%20ICAPWG%20Capacity%20Accreditation%20-%20ICAP%20Manual%20and%20Tariff%20Revisions.pdf/4591f7ee-d6a6-8559-01ca-a066bcc559a1 ICAP Manual Revisions - Full Set: https://www.nyiso.com/documents/20142/34285499/7d%20ICAP%20Manual%20Revisions%20-%20Full%20Set%20v2.pdf/aaeb115e-de81-0411-76b3-9a4f0c0302fc ICAP Manual Attachments - Full Set: https://www.nyiso.com/documents/20142/34285499/7c%20ICAP%20Manual%20Attachments%20-%20Full%20Set%20v2.pdf/3cb7f313-1064-dfc7-1da5-88eb152865eb Tariff Revisions to MST 5.12.7: https://www.nyiso.com/documents/20142/34285499/7e%20MST%205.12.pdf/b030d99a-54b4-f52a-9b61-e51c585065a2 Capacity Accreditation - Updated CIA – Reposted: https://www.nyiso.com/documents/20142/34285499/11-08-22%20ICAPWG%20Capacity%20Accreditation%20-%20Updated%20CIA%20-%20repost.pdf/0e08be26-8bd5-76da-92a3-45867136f3d0 Capacity Accreditation Market Design Summary: https://www.nyiso.com/documents/20142/34285499/7%20ICAPWG%20Capacity%20Accreditation%20-%20Market%20Design%20Summary.pdf/aa364bb3-766b-19fd-d5b3-dfc6af730e89

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Background

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Background

- **The NYISO has begun stakeholder discussions to (1) develop the implementation details and technical specifications for establishing Capacity Accreditation Factors (CAFs) and Capacity Accreditation Resource Classes (CARCs) and (2) propose necessary ICAP Manual revisions**
  - The NYISO has contracted with GE Energy Consulting to support the NYISO and its stakeholders in the development of the implementation details and technical specifications
- **The 2022 Improving Capacity Accreditation project deliverable is a Q3 Market Design Complete**
  - Completion of the project is delayed. The NYISO is now targeting a Q4 Market Design Complete

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ICAP Manual and Tariff Revisions

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ICAP Manual and Tariff Revisions

- Based on stakeholder feedback, the NYISO has made clarifying edits to the ICAP Manual, ICAP Manual Appendix and Market Services Tariff revisions presented at the 11/08/22 ICAPWG
- The updated ICAP Manual, ICAP Manual Appendix, and Market Services Tariff revisions include:
  - ICAP Manual
    - Section 4.2.2.2
    - Section 4.5
    - Section 4.8.1 - 4.8.2
    - Section 7
  - ICAP Manual Appendix
    - Attachment J
      - Section 3.1.1(a)
      - Section 5
      - Section 6
    - Attachment M
  - Market Services Tariff
    - Section 5.12.7
- The following slides summarize the edits to the ICAP Manual, ICAP Manual Appendix and Market Services Tariff revisions presented at the 11/08/22 ICAPWG
  - Edits are highlighted in blue in today's meeting materials

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ICAP Manual and Tariff Revisions

- **ICAP Manual – Section 7.1.1**
  - Clarification added on how the combination of an ICAP Supplier's participation model, elected Energy Duration Limitation, and resource characteristics will determine the CARC to which the ICAP Supplier will be assigned
    - Participation models and CARCs are not synonymous. Participation models exist today and define a Resource's participation in the ICAP Market
    - Resources using the same participation model could be assigned to different CARCs based on differing elected Energy Duration Limitations or resources characteristics. Additionally, Resources using different participation models could be assigned the same CARC due to having the same elected Energy Duration Limitation or other resource characteristics
  - Opportunity added for ICAP Suppliers to review and notify the NYISO of an incorrect CARC assignment
    - If an ICAP Supplier and the NYISO are unable to resolve a disputed CARC assignment, the ICAP Supplier can provide, and the NYISO shall use, a CARC assignment for the Installed Capacity Supplier for the upcoming Capability Year. The ICAP Supplier-provided CARC assignment would be subject to potential audit by the NYISO's Market Mitigation and Analysis department and applicable shortfall penalties if the ICAP Supplier-provided assignment is deemed inaccurate
  - Reference to deadlines to elect a new participation model and Energy Duration Limitation were removed as those deadlines are listed elsewhere in the ICAP Manual and/or Market Services Tariff
  - Clarified that an ICAP Supplier's CARC is applicable for the entire Capability Year

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ICAP Manual and Tariff Revisions

- **ICAP Manual – Section 7**
  - Section 7.2
    - Replaced the “evaluated area” term with “capacity zone” for clarity
    - Opportunity added for ICAP Suppliers to review and notify the NYISO of an incorrect CAF assignment
      - If an ICAP Supplier and the NYISO are unable to resolve a disputed CAF assignment, the ICAP Supplier can provide, and the NYISO shall use, a CAF assignment for the Installed Capacity Supplier for the upcoming Capability Year. The ICAP Supplier-provided CAF assignment would be subject to potential audit by the NYISO’s Market Mitigation and Analysis department and applicable shortfall penalties if the ICAP Supplier-provided assignment is deemed inaccurate
    - Added clarity regarding which years would be used to calculate the representative unit historic hourly production profiles for IPRs and LCROR Hydro Resources for CAF modeling purposes
  - Section 7.3
    - Added subsection heading
    - Clarifying edits added
    - Added requirement for the NYISO to advise the Business Issues Committee if it determines a new Peak Load Window is required under ICAP Manual Section 7.3.3

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ICAP Manual and Tariff Revisions

- **ICAP Manual - Section 4.5**
  - Removed the inclusion of CARC and CAF assignments in the derating factor dispute process
  - Clarifying edits added

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ICAP Manual and Tariff Revisions

- **MST 5.12.7 and ICAP Manual Sections 4.2.2.2 and 4.8.1-4.8.2**
  - Clarification added regarding the applicable hours for the bidding, scheduling, and notification requirements and DMNC testing requirements for Resources with Energy Duration Limitations longer than the Peak Load Window

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ICAP Manual and Tariff Revisions

- **ICAP Manual – Attachment J**
  - Revised the new UCAP calculation for IPRs and LCROR for clarity
  - Replaced the Market Services Tariff section reference with the ICAP Manual section reference in the ICAP Obligation Hours descriptions
- **ICAP Manual – Attachment M**
  - Clarification added regarding the applicable hours for the DMNC testing requirements for Resources with Energy Duration Limitations longer than the Peak Load Window

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2023 IRM PBC - CAF Results

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2023 IRM PBC Overview

- **As part of the annual Installed Reserve Margin ("IRM") study process, a Preliminary Base Case ("PBC") is established to perform initial data updates and sensitivity studies**
  - Each fall, the PBC is updated with final inputs to produce the Final Base Case ("FBC"). The FBC is used in determining the IRM for the upcoming Capability Year
- **In establishing the PBC, input data is updated from the prior year's IRM FBC in order to reflect expected grid conditions**
  - Coincident and non-coincident peak loads are adjusted to the forecasted 2023 peak loads based on the 2022 Gold Book
  - Production profiles for intermittent resources and outage rates for non-intermittent resources and transmission lines are updated with the last 5 years of historical data
  - Expected supply additions and retirements for the upcoming Capability Year are included
    - 317.5 MWs of wind additions and 1,266.5 MWs of thermal retirements are included in the 2023 PBC compared to the 2022 FBC
  - Interface limits are updated based on expected grid conditions
  - For a complete summary of the study assumptions such as load, generation, topology and external transactions included in the 2023 PBC, see the 2023 PBC Assumptions Matrix presented at the 06/29/2022 meeting of the NYSRC Installed Capacity Subcommittee ("ICS")

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2023 IRM PBC Sensitivity

- **In addition to routine data updates, the PBC may capture the modeling changes that have been accepted by the ICS and a sensitivity case with reversing back to historical modeling may be conducted to confirm the impact of such modeling changes**
  - For example, the dynamic Energy Limited Resource ("ELR") modeling was adopted in the base modeling of the 2023 PBC and a sensitivity case with historical fixed-shape modeling for ELRs was conducted
- **New modeling enhancements may also be conducted as sensitivity cases to inform the potential decision of adopting the enhancements into the base modeling of the FBC**
- **A sensitivity case of adopting the new load shapes was conducted on the 2023 PBC**
  - The New Load Shape Sensitivity utilizes load shapes from 2013, 2017, and 2018 in place of the 2002, 2006, and 2007 load shapes used in prior years' models[1]
    - The new load shapes are adjusted to the forecasted peak loads for 2023 and adjusted for the expected BTM solar penetration level in 2023
  - This New Load Shape Sensitivity was conducted following the Tan45 process
- **GE calculated CAFs using the New Load Shape Sensitivity Case of the 2023 PBC**
  - The new load shapes have also been adopted in the 2023 FBC

[1] For more information on the new load shapes see the 09/14/2022 presentation to the NYSRC Installed Capacity Subcommittee: https://www.nysrc.org/PDF/MeetingMaterial/ICSMeetingMaterial/ICS%20Agenda%20266/IRM23_New_Load_Shape_Sensitivity_ICS_09142022[7888].pdf

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2023 IRM New Load Shape Sensitivity Case

- **The new load shapes have a steeper decline from the peak hour, particularly in Bin 2, as shown in the load duration curve on the following slide**
  - There are seven Load Forecast Uncertainty bins in the IRM models. Bin 2 represents higher than forecasted peak loads with relatively higher probability and therefore drives the majority of LOLE
- **Under the New Load Shape Sensitivity Case, the high-risk hours for LOLE are also shifted to later in the day**
  - This is more consistent with the expectation of future load patterns, especially with an increase in BTM solar penetration

HB	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Preliminary Base Case	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	6%	10%	18%	22%	22%	11%	4%	3%	1%	0%	0%	0%
New Load Shapes	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	4%	5%	7%	14%	22%	24%	12%	7%	3%	1%	0%	0%

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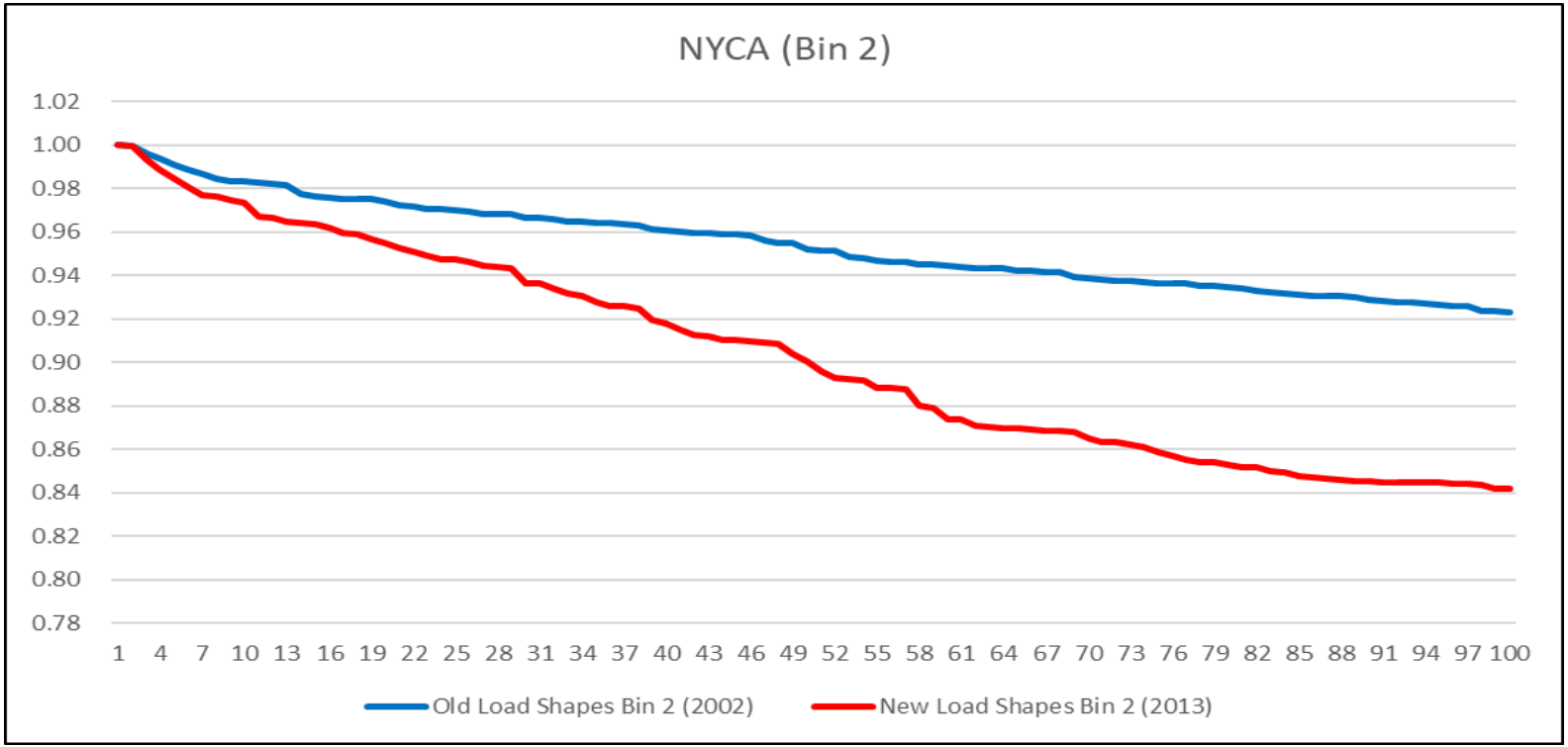
NYCA Normalized Load Shapes Duration Curve (Bin 2)



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CAF Results with 2023 IRM New Load Shape Sensitivity Case

- **The following slide compares the CAF results from the 2022 final LCR model to the CAF results from the New Load Shape Sensitivity Case of the 2023 PBC**
  - The biggest changes from the 2022 LCR are:
    - Increase in offshore wind CAF and reduction in solar CAF
      - Driven by the shift in high LOLE risk hours to later in the day when wind production increases and solar production decreases
    - Increase in 4hr and 6hr ELR CAFs
      - Driven by steeper load shapes and a higher concentration of LOLE events that are less than or equal to 6 hours in length
        - » 71% of LOLE events in the New Load Shape Sensitivity are less than or equal to 6 hours compared to 64% in the 2022 LCR

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CAF Comparison

- **The table on the right shows the CAF results by resource type for the 100 MW size, averaged across zones, using the MRI technique[1]**
  - The CAF values reflect the NYCA-average production shape for all performance-based resources (i.e., biomass, LCROR, onshore wind, and solar), except offshore wind
    - Offshore wind was modeled with area specific simulated shapes
  - The CAF values from the dynamic model were used for ELRs and large hydro
    - ELRs could be used by the model starting at the hours listed below:
      - 2h and 4h ELRs: 2pm
      - 6h ELR: 1 pm
      - 8h ELR: 12 pm

	Average MRI Capacity Value (100 MW)		Change from 2022 LCR
Type	2022 LCR	2023 PBC[2]	
Thermal 5% EFOR	96.4%	93.2%	-3.3%
Thermal 10% EFOR	90.3%	92.6%	2.3%
Biomass	66.6%	71.3%	4.7%
Run of river	33.8%	39.2%	5.3%
Onshore wind	10.6%	13.3%	2.8%
Offshore wind	26.5%	42.8%	16.3%
Solar	33.1%	16.7%	-16.4%
2h ELR	46.9%	52.1%	5.2%
4h ELR	75.7%	89.5%	13.8%
6h ELR	82.9%	93.4%	10.5%
8h ELR	97.7%	98.6%	0.9%
Large Hydro	98.9%	100.0%	1.1%

[1] For the complete set of CAF results, see the CAF spreadsheet posted to the 10/27/2022 ICAPWG
[2] New Load Shape Sensitivity of the 2023 PBC

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Next Steps

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Next Steps

- December 6th and/or 13th ICAPWG
  - Discuss Updated Consumer Impact Analysis from the 11/08/2022 ICAPWG
  - If needed, discuss additional edits to the ICAP Manual, ICAP Manual Appendix, and Market Services Tariff
- December 14th - Business Issues Committee
- December 21st - Management Committee

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Questions?

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Appendix

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ICAP Manual and Tariff Revisions Summary

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ICAP Manual and Tariff Revisions - Summary

- **Comprehensive list of existing sections revised, and new sections proposed:**

First Subset (10/27)

Document	Section	Section Title
ICAP Manual	2.5	The NYCA Minimum Unforced Capacity Requirement
	2.6	Locational Minimum Installed Capacity Requirements
	4.1.1	Energy Duration Limitations and Duration Adjustment Factors for Installed Capacity Suppliers
	4.2.1	DMNC Test Periods
	4.2.2.2	Installed Capacity Suppliers with an Energy Duration Limitation
	4.8.2	Energy Limited and Capacity Limited Resources
	4.12	Special Case Resources
	5.5	Demand Curve and Adjustments
	7.3	Peak Load Window and Annual Review Process
ICAP Manual Appendix	Attachment M	Procedure to Apply for a Capacity Limited Resource (CLR), Energy Limited Resource (ELR), Ambient Condition-Dependent Classification and/or for an Energy Duration Limitation
MST	5.12.7	Availability Requirements

Second Subset (11/08)

Document	Section	Section Title
ICAP Manual	4.5	Calculation of the Amount of Unforced Capacity each Resource may Supply to the NYCA
	4.8.1	Generators and System Resources
	7.1-7.2	Capacity Accreditation Resource Classes and Capacity Accreditation Factors
ICAP Manual Appendix	Attachment N	Procedure to Calculate Translation Factors for an Intermittent Power Resource or Limited Control Run of River Hydro Resource
	Attachment J	Unforced Capacity for Installed Capacity Suppliers

- **The NYISO does not anticipate revisions to additional sections of the ICAP Manual, Appendix, or Tariff as part of the 2022 Capacity Accreditation Project**

New York ISO

ICAP Manual and Tariff Revisions (10/27)

- **ICAP Manual - Section 2.5-2.6**
  - Revised for clarity and to reflect the replacement of "Adjusted Installed Capacity" with "Installed Capacity" in the translation of ICAP requirements to UCAP, beginning with the 2024 Capability Year
    - This revision reflects the update to MST 5.10 and MST 5.11 accepted by FERC on August 10th, 2022
  - Sunsets the current calculation of Adjusted Installed Capacity with the 2024 Capability Year
    - The current calculation also sunsets with the 2024 Capability Year in MST 5.12.14.2
    - The updated calculation will be included in Section 4.5 of the ICAP Manual as part of the next set of ICAP Manual revisions for the Capacity Accreditation project

New York ISO

ICAP Manual and Tariff Revisions (10/27)

- **ICAP Manual - Section 4.1.1**
  - Revised to reflect the sunsetting of the Duration Adjustment Factors for ICAP Suppliers with Energy Duration Limitations and existing Peak Load Windows with the 2024 Capability Year
    - Capacity Accreditation Factors will replace Duration Adjustment Factors for all resources beginning with the 2024 Capability Year
    - The annual review process for establishing the Peak Load Windows beginning with the 2024 Capability Year will be included in a new section of the ICAP Manual
      - New section included as Section XX in today's materials and discussed on slide 31
- **ICAP Manual - Section 4.12**
  - Revised to replace the Duration Adjustment Factor with the applicable Capacity Accreditation Factor for SCRs beginning with the 2024 Capability Year

New York ISO

ICAP Manual and Tariff Revisions (10/27)

- **ICAP Manual - Section 4.2.1 and Section 4.2.2.2**
  - Revised to reflect the DMNC test period requirements for ICAP Suppliers with Energy Duration Limitations longer than the Peak Load Window
- **ICAP Manual - Section 4.8.2**
  - Revised to reflect the bidding, scheduling, and notification requirements for ICAP Suppliers with Energy Duration Limitations longer than the Peak Load Window
- **ICAP Manual - Attachment M**
  - Revised to reflect the registration requirements and bidding and scheduling, details for ICAP Suppliers with Energy Duration Limitations longer than the Peak Load Window
- **MST 5.12.7**
  - Revised to reflect the bidding, scheduling, and notification requirements for ICAP Suppliers with Energy Duration Limitations longer than the Peak Load Window
  - Revisions shown on the following slides

New York ISO

ICAP Manual and Tariff Revisions (10/27)

- **MST 5.12.7 Revision for Installed Capacity Suppliers with Energy Duration Limitations that are not Energy Storage Resources**
  - Until the Capability Year that begins in May 2024, Installed Capacity Suppliers with Energy Duration Limitations corresponding to a Duration Adjustment Factor, as described in Section 5.12.14 below, must on a daily basis during the Peak Load Window and for the number of consecutive hours that correspond to its Energy Duration Limitation, or for the entirety of the Peak Load Window for an Energy Storage Resource : (i) schedule a Bilateral Transaction; (ii) Bid Energy in the Day-Ahead Market in accordance with the applicable provisions of Section 5.12.1 of this Tariff; or (iii) notify the ISO of any outages.
  - Starting with the Capability Year that begins in May 2024, Installed Capacity Suppliers with Energy Duration Limitations less than or equal in length to the number of hours inside the Peak Load Window, must on a daily basis during the Peak Load Window and for at least the number of consecutive hours that correspond to its Energy Duration Limitation, or for the entirety of the Peak Load Window for an Energy Storage Resource: (i) schedule a Bilateral Transaction; (ii) Bid Energy in the Day-Ahead Market in accordance with the applicable provisions of Section 5.12.1 of this Tariff; or (iii) notify the ISO of any outages. Installed Capacity Suppliers with Energy Duration Limitations greater in length than the number of hours inside the Peak Load Window, must on a daily basis during the entirety of the Peak Load Window and for each hour immediately preceding and following the Peak Load Window, for the remaining hours of the Installed Capacity Supplier's Energy Duration Limitation that are not captured in the Peak Load Window: (i) schedule a Bilateral Transaction; (ii) Bid Energy in the Day-Ahead Market in accordance with the applicable provisions of Section 5.12.1 of this Tariff; or (iii) notify the ISO of any outages.

New York ISO

ICAP Manual and Tariff Revisions (10/27)

- **MST 5.12.7 Revision for Installed Capacity Suppliers with Energy Duration Limitations that are Energy Storage Resources**
  - Until the Capability Year that begins in May 2024, Energy Storage Resources with an Energy Duration Limitation must, on a daily basis, and for each hour outside of the Peak Load Window: (i) Bid in the Day-Ahead Market in accordance with the applicable provisions of Section 5.12.1 of this Tariff; or (ii) notify the ISO of any outages, the maximum of the Energy Storage Resource's (a) negative Installed Capacity Equivalent, or (b) Lower Operating Limit. The amount scheduled, Bid, and/or declared to be unavailable must reflect the Energy Storage Resource's entire withdrawal operating range.
  - Starting with the Capability Year that begins in May 2024, Energy Storage Resources with an Energy Duration Limitation less than or equal in length to the number of hours inside the Peak Load Window must, on a daily basis, and for each hour outside of the Peak Load Window: (i) Bid in the Day-Ahead Market in accordance with the applicable provisions of Section 5.12.1 of this Tariff; or (ii) notify the ISO of any outages, the maximum of the Energy Storage Resource's (a) negative Installed Capacity Equivalent, or (b) Lower Operating Limit. Energy Storage Resources with an Energy Duration Limitation greater in length than the number of hours inside the Peak Load Window must, on a daily basis, and for each hour outside of the hours that the Energy Storage Resources must schedule, bid, or declare to be unavailable in accordance with paragraph three of Section 5.12.7 of this Tariff: (i) Bid in the Day-Ahead Market in accordance with the applicable provisions of Section 5.12.1 of this Tariff; or (ii) notify the ISO of any outages, the maximum of the Energy Storage Resource's (a) negative Installed Capacity Equivalent, or (b) Lower Operating Limit.

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ICAP Manual and Tariff Revisions (10/27)

- **ICAP Manual - Section 5.5**
  - Revised to:
    - Remove the Duration Adjustment Factor of the peaking unit from the calculation of the monthly reference point prices for the ICAP Demand Curves
    - Clarify the translation of the quantities on the ICAP Demand Curve to UCAP terms
    - Update the translation of the ICAP Demand Curve prices to UCAP terms to include the Capacity Accreditation Factor and applicable derating factor of the peaking unit for the respective ICAP Demand Curve beginning with the 2024 Capability Year

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ICAP Manual and Tariff Revisions (10/27)

- **ICAP Manual - Section 7.3**
  - This is a new section describing the annual review process to establish the Peak Load Windows beginning with the 2024 Capability Year

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ICAP Manual and Tariff Revisions (11/08)

- **ICAP Manual - Section 4.5**
  - Revised to:
    - Include the updated calculation of Adjusted Installed Capacity beginning with the 2024 Capability Year
      - Adjusted ICAP = ICAP * CAF
    - Require that the NYISO assign CARCs and CAFs to Resources by the deadline identified in the ICAP Event Calendar
    - Detail the dispute resolution process for an ICAP Supplier assigned the incorrect CARC and/or CAF
    - Update the calculation of UCAP for IPRs and LCROR Hydro to reflect the new resource specific derating factor methodology beginning with the 2024 Capability Year
    - Update the initial UCAP calculation for new generating Resources to reflect the use of CAFs

New York ISO

ICAP Manual and Tariff Revisions (11/08)

- **ICAP Manual - Section 4.8.1**
  - Revised to reflect the bidding, scheduling, and notification requirements for Generators and System Resources with Energy Duration Limitations longer than the Peak Load Window

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ICAP Manual and Tariff Revisions (11/08)

- **ICAP Manual – Section 7.1 – 7.2**
  - This is a new section describing the annual process for establishing CARCs, calculating CAFs, and assigning CARCs and CAFs to ICAP Suppliers beginning with the 2024 Capability Year
    - Section 7.1 covers the annual process for establishing CARCs and the considerations for assigning each ICAP Supplier to a CARC
    - Section 7.2 covers the annual process for calculating CAFs and assigning CAFs to ICAP Suppliers
      - Section 7.2.1 details the MRI technique for calculating CAFs and the representative unit modeling for each type of CARC

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ICAP Manual and Tariff Revisions (11/08)

- **ICAP Manual – Attachment N**
  - This is a new Attachment describing the procedure for calculating translation factors for IPRs and LCROR Hydro for use in the shifting methodology in the IRM and LCR studies and for studying resources in deliverability testing
  - For more details on the procedure, see the presentation at the October 19th ICAPWG meeting

New York ISO

ICAP Manual and Tariff Revisions (11/08)

- **ICAP Manual – Attachment J**
  - Sunsets the existing UCAP calculations with the 2024 Capability Year
  - Beginning with the 2024 Capability Year:
    - The Duration Adjustment Factor term in each UCAP formula is replaced with the Installed Capacity Supplier's assigned CAF
    - The UCAP calculation for IPRs and LCRORs is revised to reflect the new resource specific derating factor methodology
    - The Peak Load Window term is replaced with the newly defined ICAP Obligation Hours term for use in measuring the availability of resources with Energy Duration Limitations
      - ICAP Obligation Hours: "The hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Section 5.12.7 of the NYISO Services Tariff."
  - Since most components of the existing UCAP calculations remain the same beginning with the 2024 Capability Year, changes from the existing UCAP calculations are highlighted in yellow in today's meeting materials

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CAFs vs Resource Specific Derating Factors

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Capacity Accreditation Factors

- **CAFs will reflect the marginal reliability contribution of the representative unit of each CARC for each location that is evaluated**
- **The impact of the following characteristics would be captured by CAFs:**
  - Energy Duration Limitations
  - Correlated unavailability due to weather and/or fuel supply limitations
  - Synergistic and antagonistic effects
  - Start-up notification time limitations

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Resource Specific Derating Factors

- **As discussed previously, resource specific derating factors will capture differences in availability that is specific to an individual resource and not captured in the CAF of the resource's CARC**
  - Examples:
    - Forced outages, forced derates, failed starts, etc.
    - Resource output that is different from the modeled production profile of the CARC
- **Generally, a Resource's UCAP will be determined by combining the Resource's ICAP, CAF, and resource specific derating factor as illustrated below**
  - UCAP = Adjusted ICAP x (1 – resource specific derating factor)
    - Where:
      - Adjusted ICAP = ICAP * CAF
      - ICAP = min(DMNC, CRIS)
    - So, UCAP = min(DMNC, CRIS) * CAF * (1 – resource specific derating factor)
  - For more information on current resource-specific derating factors, see the 03/16/22 ICAPWG presentation

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Draft 5 Year ICAP Market Resource Adequacy Plan

New York ISO

Draft 5 Year ICAP Market Resource Adequacy Plan

- **The NYISO has been coordinating with the NYSRC Executive Committee on the needs for updating the Resource Adequacy model and methods for use with the ICAP Market**
  - These needs encompass the changing electricity system and the need to refine the calculations of both Resource Adequacy Reliability Targets and the Capacity Accreditation value of resources
  - The following slides are a draft of a 5-year plan to enhance the Resource Adequacy model and methods for use with the ICAP Market

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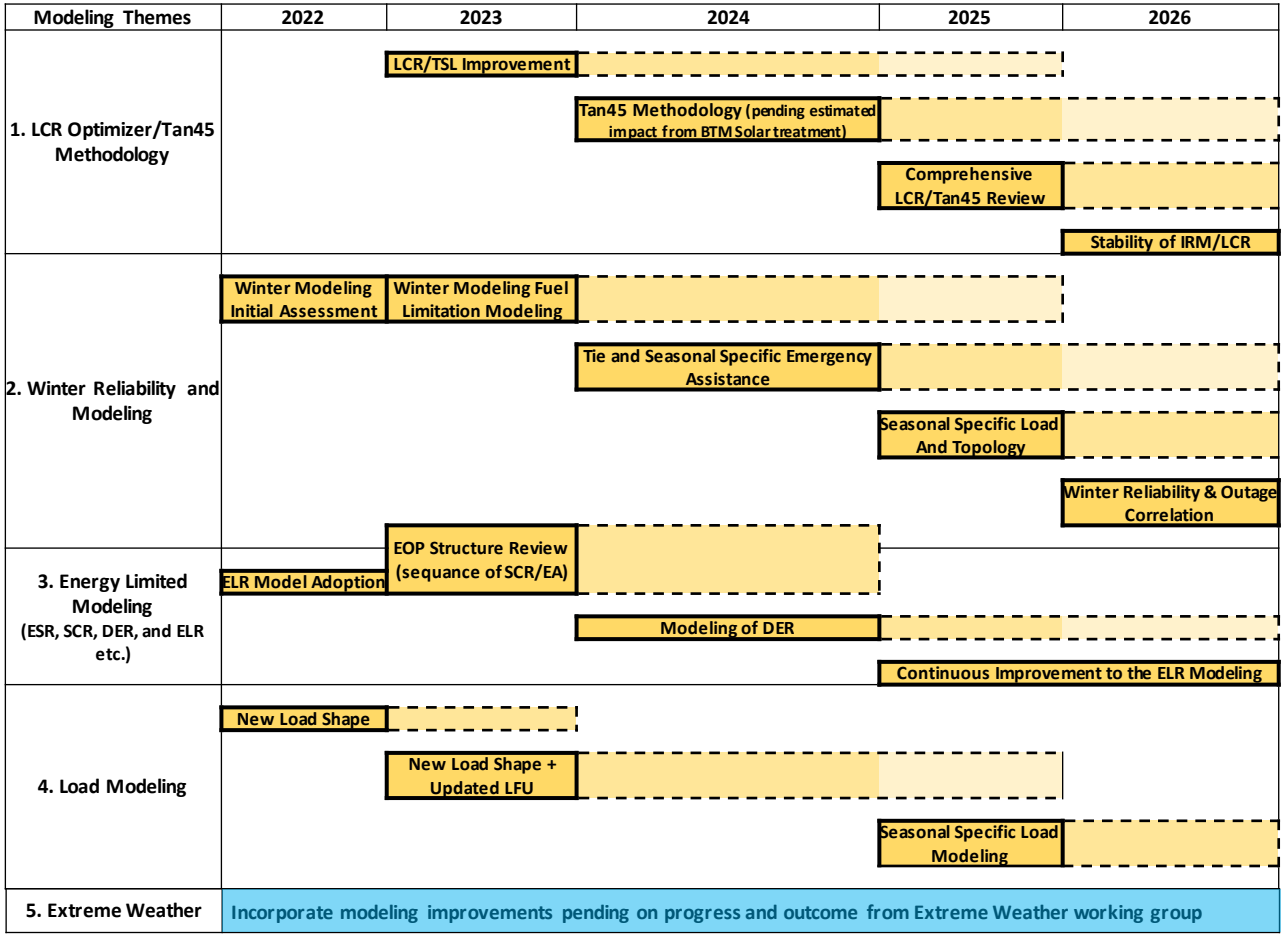
The Proposed RA Model Improvements & Strategic Priorities



LEGEND:

NYISO Proposed Prioritized Modeling Improvements

Expected Implementation Phase for IRM and Capacity Accreditation Process

Extended Implementation Phase for IRM and Capacity Accreditation Process

Specific model improvements are to be determined

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NYSRC Modeling Priorities for 2023

- **Theme 1: Improvement to the LCR optimizer tool**
  - Consider inputs from MMU to ensure intuitive LCR outcome and stability of model results
- **Theme 2: Winter Reliability Modeling**
  - Fuel limited modeling with the focus on gas constraints during winter season
- **Theme 3: Investigate and improve the sequence within EOP steps, particularly Emergency Assistance and SCRs**
  - Improvement in this area will have an impact on the ELR modeling and set up for winter reliability modeling improvement for 2024
- **Theme 4: Adopt the new load shapes and improve LFU scaling in the IRM study**
  - LFU modeling improvement (LFU Phase 3 Whitepaper)
  - New load shapes combining with improved scaling from the LFU phase whitepaper
- **Additional items may be desired:**
  - (by RA team) Testing of the impact of BTM solar to inform prioritization for 2024 Tan45/LCR/TSL improvement
  - (by NYSRC) Theme 5 - Extreme weather event modeling, improve ESR modeling and offshore wind impact

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NYSRC Modeling Priorities for 2024

- **Theme 1: Comprehensive review of the IRM setting process, particularly the Tan45 methodology**
  - The current Tan45 methodology will require improvement in shifting capacity between upstate and downstate
  - The improved LCR optimizer may offer an alternative methodology to the Tan45 process
  - Pending on estimated impact, incorporate the BTM solar methodology in the comprehensive Tan45/LCR review
- **Theme 2: Winter Reliability Modeling**
  - Improve the modeling for emergency assistance from individual intertie and seasonal assumptions (summer and winter)
  - Effort to improve and simplify the external area modeling may also be included
- **Theme 3: Modeling for emerging resources/participation modes, i.e. DER, CSR and Hybrid resources**
  - Improvement to the ELR model may be required
- **Additional Items that may be desired:**
  - (by RA team) Investigate impacts on LCRs post peaker retirement
  - (by NYSRC) Theme 5 - Extreme weather event modeling, improve ESR modeling
  - (by NYISO) Support the Capacity Demand Curve reset process

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NYSRC Potential Focus for 2025-2026

- **Theme 1: Continue the enhancement of Tan45 and LCR processes**
  - Shifting methodology in Tan45 process may start to fail after significant resource and topology changes between upstate and downstate
  - Impact from changes to southeast reliability due to combination of peaker retirement and offshore wind entry
  - Methodology review between the Tan45 and the LCR optimizer, with the potential of optimizing the IRM
  - Ensure the stability of IRM and LCR outcomes amid significant system changes and modeling enhancements
- **Theme 2: Continue to refine assumptions during winter season and assess the reliability during winter**
  - Winter assumptions include incorporating winter peak in load modeling (Theme 4), seasonal topology limits, as well as weather correlated outages
- **Theme 3: Continue the modeling improvement for energy limited resources, particularly the modeling for DER, SCR and large penetration of ESRs**
- **Additional Items that may be desired by the NYSRC includes**
  - Theme 5 - Extreme weather event modeling and additional reliability standards

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Capacity Accreditation (5-Year Plan)

- **The Capacity Accreditation project is expected to involve continuous model improvement and implementation for the next 5 years. The anticipated work scope includes:**
  - 2023
    - Implementation of Capacity Accreditation process and software
    - Research on Gas Constraints, Start up time, and SCR modeling
  - 2024
    - Implementation of Gas Constraints, Start up time, and SCR modeling
    - Research on Winter Reliability issues
  - 2025
    - Implementation of Winter Reliability Issues
    - Research on Correlated outages and unit size
  - 2026
    - Implementation of Correlated outages and unit size
    - Research on alignment of load and resource output profiles

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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