NYISO Resource Adequacy Model
Strategic Plan (2024-2028)

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EC Meeting

September 8, 2023

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Background of 5-year Strategic Plan

- Late 2022, the NYISO worked with the NYSRC to develop a 5-year Resource Adequacy (RA) Modeling Improvement Strategic Plan with the following objectives:
    - Prioritize modeling improvement initiatives
    - Align the strategic priorities with other NYSRC or NYISO initiatives affecting the RA model (e.g. Extreme Weather Working Group, Capacity Accreditation,, etc.)
    - Guide the ICS's whitepaper development and resource allocation
- As work progresses along the direction of the strategic plan, priorities for 2023 are on track for completion:
    - LFU Phase 3 Whitepaper: completed with no near-term impact; long-term load model improvement in progress
    - EOP Whitepaper: on track to complete with advanced schedule; modeling recommendation proposed
    - Gas Constraint Whitepaper: on track to complete by the end of 2023
- It is prudent to update the strategic plan, to reflect new priorities and updated timelines
    - The NYISO also aims to align the updated strategic plan with the latest goals of the NYSRC Executive Committee
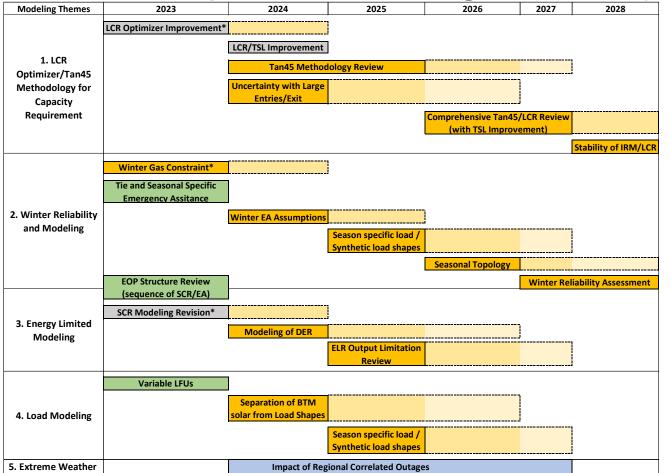
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Major Updates to Strategic Priorities

- The NYISO considers winter modeling a major priority for RA modeling improvements and aims to continue to improve the RA model to properly reflect the winter risk
  - Implement the revised EA model and gas constraints
  - Continue to research winter EA assumptions and update the model when appropriate
  - The next focus for winter modeling would be reflecting the winter load level and profiles

- Review of the Tan45 methodology in conjunction with the LCR/TSL improvements continue to be prioritized. The uncertainty regarding large entries and exit is added to this modeling theme
  - Example: large unit/transmission project is included in the IRM study but did not come in service during capability period

- The load modeling improvement will continue towards the establishment of synthetic forward-looking load shapes with separation of the BTM solar being completed in advance

- The Extreme Weather Working Group had identified wind lull across the Northeast region. Research on the impact of regional correlated outages is also considered
  - This initiative is expected to be led by the NYSRC and supported by the ICS/NYISO

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The RA Model Improvements Strategic Priorities (2024-2028)

Modeling Themes	2023	2024	2025	2026	2027	2028
1. LCR Optimizer/Tan45 Methodology for Capacity Requirement	LCR Optimizer Improvement*					
		LCR/TSL Improvement				
		Tan45 Methodology Review				
		Uncertainty with Large Entries/Exit				
				Comprehensive Tan45/LCR Review (with TSL Improvement)		
						Stability of IRM/LCR
2. Winter Reliability and Modeling	Winter Gas Constraint*					
	Tie and Seasonal Specific Emergency Assitance					
		Winter EA Assumptions				
			Season specific load / Synthetic load shapes			
				Seasonal Topology		
					Winter Reliability Assessment	
3. Energy Limited Modeling	EOP Structure Review (sequence of SCR/EA)					
	SCR Modeling Revision*					
		Modeling of DER				
			ELR Output Limitation Review			
4. Load Modeling	Variable LFUs					
		Separation of BTM solar from Load Shapes				
			Season specific load / Synthetic load shapes			
5. Extreme Weather		Impact of Regional Correlated Outages				

LEGEND:

- NYISO Proposed Modeling Priority
- NYSRC Proposed Modeling Priority
- NYISO Initiatives related to RA Modeling
- Expected Implementation Phase for IRM and Capacity Accredidtation
- Extended Implementation Phase for IRM and Capacity Accredidtation
- Completed Modeling Improvement Priorities

Expected to complete by end of 2023

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Recommended Near-Term Project Plan (2024-2025)

- **Recommended 2024 projects and initial whitepaper scope**
  - Tan45 Review: assess feasibility of current Tan45 process on future system and identify improvement options if necessary
  - Uncertainty with Large Entry/Exit: determine the threshold for large uncertainties based on impacts and recommend process and methodology for managing these large uncertainties
    - The in-service date of a major transmission project, such as AC Tx, can have a big swing on the IRM and LCRs.
    - As the ICAP Auction is run on a monthly basis, the actual in-service date of these major project will have critical impact the requirement and pricing
    - Example: Recent market issue at PJM
  - Winter EA Assumptions: continue research to develop winter specific EA assumptions; consider impact of maintenance
  - Separation of BTM Solar: determine methodology and input assumptions to model BTM solar as resource
  - Modeling of DERs: develop modeling approach for DERs

- **Expected 2025 projects and initial whitepaper scope; to be confirmed with ICS at the end of 2024**
  - Tan45 Review: continuation of 2024 project; evaluate potential improvements or alternative methods
  - Season Specific Load: capture winter load forecast; evaluation of potential synthetic load shapes
  - ELR Output Limitation Review: identify alternative options for output window limitations for ELRs

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Recommended Near-Term Project Plan (2024-2025) *con'd*

- **Other initiatives being considered in the near term**
  - LCR/TSL Improvement: review applicability of TSL in LCRs – Recommended NYISO project in 2024
  - Calendar Year vs. Capability Year: expected to be addressed with season specific load
  - Impact of Regional Correlated Outages: proposed from Extreme Weather Working Group
    - This important priority is expected to have significant impact on the longer-term horizon
      - Currently, the penetrations of offshore wind in NY and neighboring systems are low.
      - Delay in the offshore wind development is expected due to the industry rising production costs and ramp-up challenges
      - Modeling improvement of limitation of Emergency Assistance through the EOP whitepaper can largely mitigate this issue in the near term
    - The NYSRC, with support from the NYISO via ICS, will lead the development of the scope for this initiative. Depending on the scope, potential action items can include:
      - Constructing a standing sensitivity case in the IRM study cycle to monitor the impact over time – *near-term*
      - Further constraining Emergency Assistance particularly for winter – *near-term*
      - Collaborate with neighboring areas via NPCC to establish consistent modeling assumption/database – *near-to-mid-term*
      - Identifying a "bad year" for production profiles considering correlation with external intermittent units – *near-to-mid-term*
      - Comprehensive regional weather correlation study for reliability impacts (e.g. transmission security) – *mid-to-longer-term*

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Next Step

- If ICS accepts the recommendations, presents the updated RA modeling improvement strategic plan and the near-term project plan to Executive Committee for support

- Work with ICS to prioritize 2024 whitepapers and finalize the detailed scopes and timelines for the whitepapers
  - The prioritization would consider the updated RA modeling improvement strategic plan and near-term projects
  - Additional whitepapers on topics other than RA modeling improvements, i.e. Review of Policy 5, will be considered and prioritized by the NYSRC and its consultants

- On-going review and refine the RA Modeling Improvement Strategic Plan
  - Allow modifications to the staging of the modeling improvements and new strategic priorities to be added based on system changes and updated policy directions (e.g. extreme weather modeling)

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Appendix

- Detailed Description of RA Modeling Priorities

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2023 RA Model - in flight / completed

- **<u>Theme 1</u>**: Improvement to the LCR optimizer tool – expected completion Q3 2023
  - Consider inputs from MMU to ensure intuitive LCR outcome and stability of model results

- **<u>Theme 2</u>**: Winter Gas Constraint Modeling – expected completion end of 2023
  - Fuel limited modeling with the focus on gas constraints during winter season
  - The modeling of bin-specific gas constraints triggered by load level is expected
  - Current sensitivity testing of winter gas constraints at 3500 MW and 7000 MW

- **<u>Theme 3</u>**: Investigate the EOP steps, proposed revised modeling for EA – expected completion Q3 2023
  - Bin-specific and tie and seasonal specific EA modeling has been recommended
  - Advanced completion of previously-planned 2024 project

- **<u>Theme 4</u>**: Improve LFU scaling in the IRM study - completed
  - LFU modeling improvement (LFU Phase 3 Whitepaper)

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Modeling Priorities for 2024

- **<u>Theme 1</u>**: Comprehensive review of the IRM setting process as relate to market requirements
  - The current Tan45 methodology will require improvement in shifting capacity between upstate and downstate
    - the improved LCR optimizer may off an alternative methodology to the Tan45 process
  - Large entry and exit for both resource and transmission are expected in the next few years. The IRM process will need to account for the uncertainty with the timing of such entry and exit as they have significant impact on the ICAP Markets

- **<u>Theme 2</u>**: Winter Reliability Modeling
  - Continue the research on potential methodology for winter specific EA assumptions
  - Research on the impact of modeling maintenance in the IRM study under the tighter assumptions for winter

- **<u>Theme 3</u>**: Modeling for emerging resources/participation modes, i.e. DER, CSR and Hybrid resources
  - DER participation is expected to increase, and modeling approach is needed

- **<u>Theme 4</u>**: Load modeling improvement
  - BTM solar is currently embedded in the IRM load shapes. Separation of the BTM solar from the load shapes is needed before further improvement on the load modeling can be considered

- **Additional Items that may be desired:**
  - (by NYSRC) <u>Theme 5</u> – research on the impact of regional correlated outages among renewable fuel types [TBD]
  - (by NYISO) Investigate the applicability of TSLs in the LCR setting process

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Modeling Priorities for 2025

- **<u>Theme 1</u>: Comprehensive review of the IRM setting process, particularly the Tan45 methodology**
  - Continue with the 2024 priorities and prepare for comprehensive Tan45/LCR review

- **<u>Theme 2&4:</u> Winter reliability modeling and load modeling improvement**
  - Improve the load modeling to capture and reflect the winter load forecast
  - Pending the progress of the development of synthetic load shapes, review the synthetic load shapes for potential adoption

- **<u>Theme 3</u>: Modeling for emerging resources/participation modes, i.e. DER, CSR and Hybrid resources**
  - Improve the GE ELR functionality to establish alternative approach to the current output window limitation

- **Additional Items that may be desired:**
  - (by NYSRC) <u>Theme 5</u> – continue the research on the impact of regional correlated outages among renewable fuel types [TBD]

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Potential Focus for 2026-2028

- **<u>Theme 1</u>**: Continue the comprehensive review of Tan45 and LCR processes
  - Implementation of improvements to the Tan45 and LCR methodology, including process capturing the uncertainties of large entry and exit
  - Comprehensive review of updated Tan45 and LCR methodology and ensure stability of IRM and LCRs

- **<u>Theme 2</u>**: Continue to refine assumptions during winter season and assess the reliability during winter
  - Winter topology limits will be considered and assess the overall winter risk

- **<u>Theme 3</u>**: Continue the modeling improvement for energy limited resources, particularly the modeling for DER, SCR and large penetration of ESRs

- **<u>Theme 4</u>**: Continue with the potential adoption of synthetic load shapes

- **Additional Items that may be desired by the NYSRC includes**
  - <u>Theme 5</u> - Extreme weather event modeling and additional reliability standards

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Capacity Accreditation Long Term Plan

- The Capacity Accreditation project is expected to involve continuous model improvement and implementation over the next several years. The anticipated work scope includes: (Red notes a change from the previously presented 5-Year Plan[1])
  - 2023
    - Implementation of Capacity Accreditation process and software
    - Research on Gas Constraints, start-up time, SCR modeling, and Correlated Outage issues identified in the Q3 2022 SOM presentation
  - 2024
    - Implementation of work associated with Gas Constraints, Start up time, SCR modeling, and Correlated Outage issues identified in the Q3 2022 SOM presentation
    - Research on Winter Reliability issues, unit size, and, if necessary, any remaining Correlated Outage issues beyond those identified in the Q3 2022 SOM presentation
  - 2025
    - Implementation of work associated with Winter Reliability Issues
    - Continue to investigate techniques to address unit size and, if necessary, any remaining Correlated Outage issues beyond those identified in the Q3 2022 SOM presentation
  - 2026
    - Implementation of unit size and, if necessary, any remaining Correlated Outage issues
    - Research on alignment of load and resource output profiles

[1]As presented at the 10/19/22 ICAPWG meeting

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Potential Modeling Improvements Attracting Stakeholder attention

- Review of intermittent resource modeling techniques, potentially supplementing the 5 years of historical data currently used in Resource Adequacy models
- Review of cable and generator forced outage data, potentially supplementing the 5 years of historical data currently used in Resource Adequacy models
- Use of forecasting tools for intermittent resource output
- Review of the reliability implications of maintenance scheduling given that other control areas have begun to experience tight operating conditions during maintenance seasons due to rapidly fluctuating intermittent resource output
- Process changes necessary to accommodate a winter peaking system
- Review high renewable impact with external areas with high renewable penetration
- Dynamic modeling of winter gas availability for thermal units
- Replacing the Resource Adequacy software platform with a different software platform
- Review the LCR Optimization method and enhance as necessary
- Expand software to consider additional localities or changes to the current zonal modeling
- Modeling separate summer and winter EFORd values
- Modeling of internal controllable line
- Calendar Year vs. Capability Year modeling
- Reviewing the NYSRC "parametric study" process and identifying enhancements

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Questions?

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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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