New York ISO
Independent System Operator

NYISO Resource Adequacy Model
Draft Strategic Plan

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Resource Adequacy Model Overview

- **Currently, the Resource Adequacy ("RA") model supports three cyclical studies and fulfills additional tariff and compliance obligations**
  - IRM Study, for the New York State Reliability Council (NYSRC)
  - LCR Study, pursuant to ISO Tariff
  - ICAP Import Rights Study, pursuant to ISO Tariff
  - Support the Buyer-Side Mitigation assessments
  - Several annual reports to certify compliance with NYSRC Reliability Rules
- **The RA model also supports the NYISO ICAP Market evolution, and particularly starting 2023, the RA study model will serve as the base for NYISO's Capacity Accreditation process**
  - Capacity Accreditation process will be based off the IRM/LCR study model and calculate Capacity Accreditation Factors to facilitate resources' participation in the NYISO ICAP Markets
- **In addition, the RA model is used for planning studies such as the Reliability Needs Assessment ("RNA") and Short-Term Assessment of Reliability ("STAR") and the NYISO seeks to align major modeling approaches, techniques and assumptions between these studies and the IRM Study**

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The RA Modeling Improvement Plan

- **Improvements to the RA model have been implemented through the NYSRC whitepapers, followed by sensitivity studies before final adoption in the IRM database**
  - Whitepapers are prioritized every year with the ICS
  - The prioritization considers the importance of the modeling improvements and the expected impact on the IRM, as well as resources available for research and model testing
- **With the progress of Capacity Accreditation, improvements to the Capacity Accreditation process, as well as the RA model, are also being considered**
- **A broader, and longer-term strategic plan for RA modeling improvements is needed to ensure the efforts are focused on important topics and resources are properly allocated**
- **The NYISO aims to develop a draft 5-year strategic plan with the modeling priorities aligned with the NYSRC**
  - Initial prioritization was conducted and the NYISO proposes five modeling themes as strategic priorities for the next 5 years

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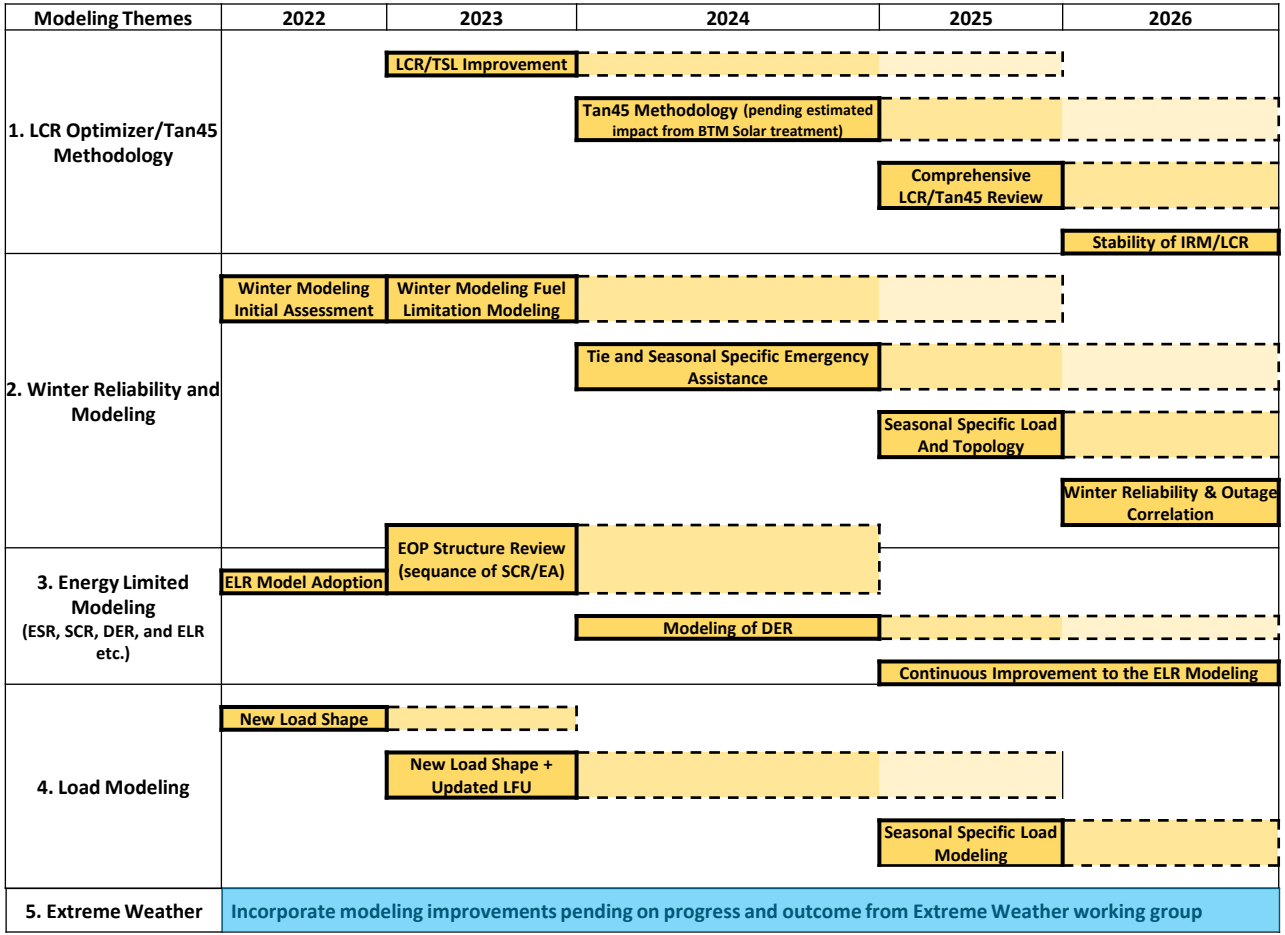
The Proposed RA Model Improvements & Strategic Priorities



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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Recommended Near-Term Project Plan (2023-2024)

- **Based on the proposed strategic plan on RA modeling improvements, the NYISO recommends the following projects for consideration in 2023 and 2024**
- **Recommended 2023 projects and initial whitepaper scope**
  - Winter Gas Modeling: determine gas constraints during winter and recommend the modeling approach for IRM
  - Emergency Operating Procedure ("EOP") Sequence Review: review the source of Emergency Assistance ("EA") and recommend alternative sequencing of EA as well as associated adjustments to SCR modeling
  - Testing and implementing LFU Phase 3 whitepaper recommendations
- **Expected 2024 projects and initial whitepaper scope; to be confirmed with ICS at the end of 2023**
  - Comprehensive Tan45 Methodology Review: Review the shifting methodology during the Tan45 process and recommend alternative methodology for shifting MW (e.g. Improved LCR Optimizer)
  - Tie and Seasonal Specific Emergency Assistance: review and recommend alternative EA modeling from individual interties for both summer and winter seasons
  - Modeling of DERs: develop modeling approach for DERs
- **Other initiatives to be considered in the near term**
  - Improving the LCR Optimizer – Recommended NYISO project in 2023
  - Review treatment of BTM solar in conjunction with the new load shapes and updated LFUs – if resources available
  - Review calendar year vs. capability year modeling – if resources available

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Next Step

- If ICS accepts the recommendations, presents the RA modeling improvement strategic plan and the near-term project plan to Executive Committee for support
- Work with ICS to prioritize 2023 whitepapers and finalize the detailed scopes and timelines for the whitepapers
  - The prioritization would consider the approved 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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2022 RA Model - in flight / completed

- **Modeling changes expected in the base case:**
  - Withholding 350 MW Operating Reserve at the time of load shedding
  - Adopt GE ELR functionality for modeling existing elected Energy Limited Resources
- **Determine the impact of adopting new load shapes**
  - New load shapes are in the sensitivity case; pending NYSRC EC direction may be included in base case modeling
- **Modeling for ESRs based on the learnings from the high renewable study**
  - Initial modeling for small scale of ESRs can be accommodated with current modeling capability
  - Future improvement is required for large scale of ESR penetration beyond the initial entry
- **Assess the impact of implementing winter specific assumptions in the IRM model**
  - To inform the future prioritization of winter reliability modeling
- **Other improvement being considered include establishing process for regular topology updates for the IRM**

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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
  - (by NYISO) Peak Load Window study and ESR Capacity Value study

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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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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 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

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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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