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Independent System Operator

NYISO Resource Adequacy Modeling Improvements *Strategic Plan (2026-2030)*

Dylan Zhang

Manager, Resource Adequacy

NYISO

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Background

- **In 2022, the NYISO worked with the NYSRC to develop a 5-year Resource Adequacy (RA) Modeling Improvement Strategic Plan with the following objectives:**
  1. Prioritize modeling improvement initiatives, as reflected in a 5-year plan (Strategic Plan)
  2. Align the strategic priorities with other NYSRC or NYISO initiatives affecting the RA model (e.g., Extreme Weather Working Group, market design improvements, capacity accreditation, etc.)
  3. Guide the whitepaper development and resource allocation for the Installed Capacity Subcommittee (ICS)
- **Strategic Plan is revisited regularly to consider updates to priorities and timelines**
- **The NYISO aims to align the updated Strategic Plan with the latest goals of the NYSRC Executive Committee**

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Strategic Priorities

- **The NYISO recommends continued assessment of winter modeling improvements to facilitate proper accounting of winter risks in meeting the reliability criteria**
  - Continuous review of assumptions is needed as electrification and system topology and resource changes unfold to reflect changes in load modeling, generation performance, fuel availability, and system topology
  - Consider changing system risk profiles as winter loss of load expectation (LOLE) increases relative to summer, as well as the implications of the NYISO's ongoing initiatives to enhance consideration of winter reliability risks in its capacity market
- **The NYISO recommends continued evaluation of load modeling to capture winter load characteristics, large loads, and energy limited resource (ELR) modeling improvements to properly reflect the changing characteristics of the power system and resource fleet**
  - Continue development of load modeling improvements to capture the winter load shapes, along with operating characteristics of new large load facilities (data centers, crypto-mining, etc.)
  - Continue refining the ELR functionality to mitigate adverse impacts of the limitations in the GE Multi-Area Reliability Simulation (MARS) model, and continual refinement of assumptions based on operational experience with respect to energy limited resources such as hydro, energy storage resources (ESRs), hybrid storage resources, distributed energy resources (DERs), and other new flexible resource technologies
- **The NYISO recommends the addition of "Maintenance Outage and Derates" and "Parametric Process Improvements" initiatives for better generation modeling and improved representation of expected Tan45 IRM outcomes.**
- **The NYISO recommends continued collaboration with the Extreme Weather Working Group to improve accounting of regional weather impacts and correlated outages, as well as refinements to intermittent resource modeling**
  - This initiative is expected to be led by the NYSRC and supported by the ICS and NYISO

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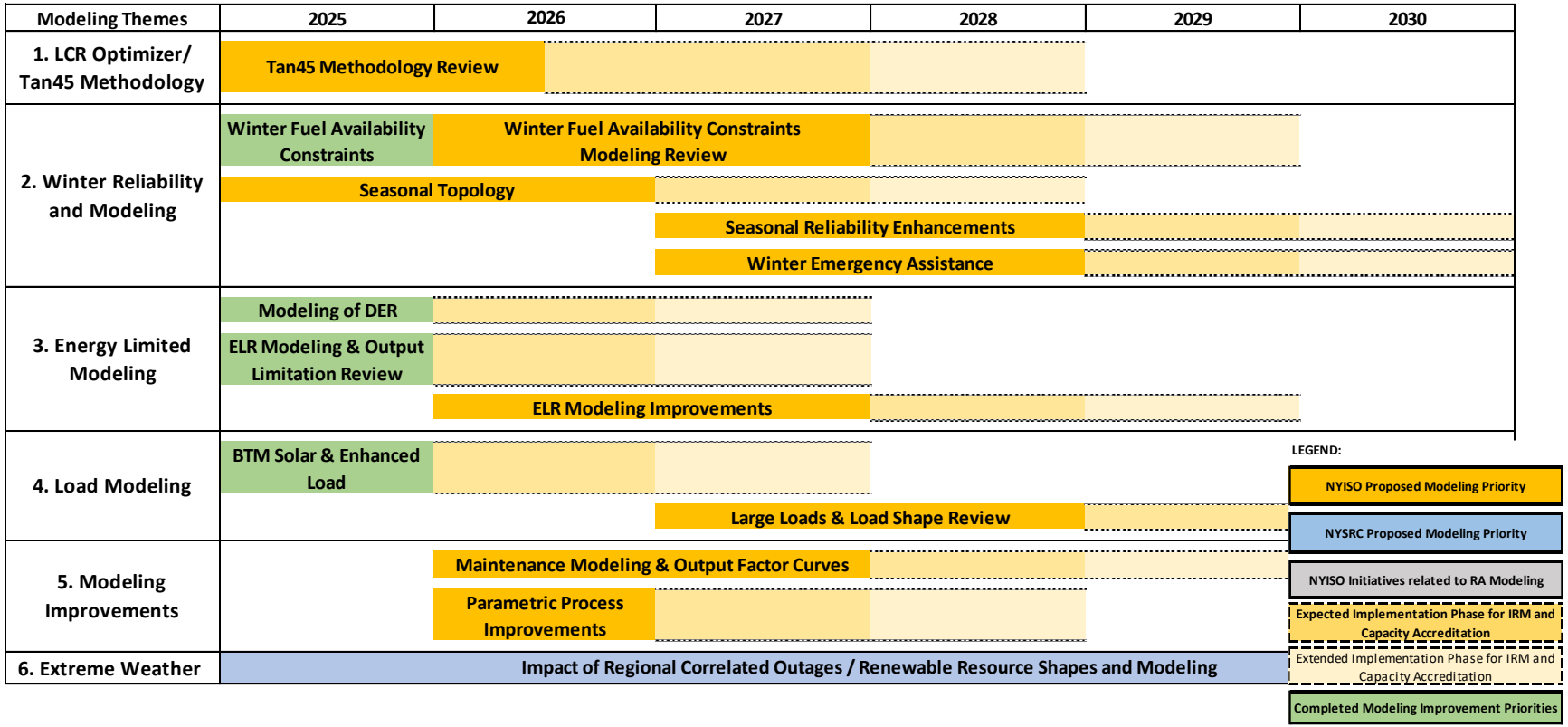
The RA Model Improvements Strategic Priorities (2026-2030)



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Recommended Strategic Plan Updates

- **Deprioritize future work on "Tan45 Methodology Review" for 2026, and remove "Comprehensive IRM/LCR Stability Review" from the strategic priorities**
  - Defer work on the offshore wind and associated Tan45 methodology concerns due to expected delay in significant offshore wind development in the near-term
  - Continue research focused on the cause of changes in the Load Zone K Tan45 curve shape and potential impacts of the transmission upgrades selected in response to the Long Island Offshore Wind Export Public Policy Transmission Need
  - Recommend a focus on other modeling improvements such as winter fuel availability constraints, winter modeling assumptions, maintenance modeling, load shape improvements, and energy limited resources
- **Continue "ELR Modeling Improvements" into 2027**
  - Continue efforts to improve ELR modeling
- **Defer the "Winter Emergency Assistance" review to 2027**
- **Expand the "Synthetic Load Shapes" initiative and reframe as "Large Loads & Load Shape Review"**
- **Addition of "Maintenance Modeling & Output Factor Curves" and "Parametric Process Improvements" starting in 2026**

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2026 Project Backgrounds, Proposed Scopes and Timelines

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Tan45 Methodology Review (Continued Current Effort)

- **Background**
  - The Tan45 Methodology Review (2024 Phase) Whitepaper demonstrated concerns with the ability of the current Tan45 process to determine an installed reserve margin (IRM) under certain future scenarios, along with challenges to the fundamentals behind the process. As a result, the whitepaper identified the need to further assess the results and evaluate potential methodology improvements
  - The IRM/Load Zone K LCR curve of the 2026-2027 IRM Preliminary Base Case exhibited a steep curve and warrants further investigation
  - NYISO to complete an “interim report” for Phase 2 in Q4 2025
- **Objective**
  - Identify potential alternative methodologies and/or enhancements for determination of the IRM along with any potential revisions necessary for NYSRC Policy 5
- **Continuing scope and potential timeline:**
  - Q3 2025 - Identify guiding principles from the current Tan45 process that should be maintained when exploring alternative methodologies and enhancements, considering changing system dynamics
  - Q4 2025/Q1 2026 – Identify potential alternative methodologies and/or enhancements to the current Tan45 process
  - Q4 2025/Q1 2026 - Develop test cases for assessing impacts of incorporating the transmission upgrades selected in response to the Long Island Offshore Wind Export Public Policy Transmission Need and anticipated near-term supply resource deactivations
  - Q2/Q3 2026 - Present findings and key insights, and prepare a final Phase 2 report

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Winter Fuel Availability Constraints Modeling Review

- **Background**
  - The implementation of winter fuel availability constraints in the 2026-2027 IRM study helps to account for the reliability impacts of fuel availability constraints during peak winter periods (December-February).
  - Key information and analysis will be completed in the near term related to generator "firm fuel" characteristic elections for capacity accreditation along with the NYISO's 2025 Fuel Constraints Study. Information from these ongoing initiatives can be taken into consideration for future IRM study modeling assumptions.
- **Objective:**
  - Introduce additional information from the NYISO's 2025 Fuel Constraints Study and generator "firm fuel" elections, and consider modeling refinements to fuel availability constraints for future IRM studies
- **Potential scope and timeline:**
  - Q4 2025/Q1 2026: Review findings of the NYISO's 2025 Fuel Constraints Study and potential implications for the fuel availability constraints modeling in the IRM study
  - Q1/Q2 2026: Provide analysis and summary of generator "firm fuel" elections received by thermal generation resources for the 2026-2027 Capability Year (i.e., elections are due November 1, 2025)
  - Q3/Q4 2026: Consider modeling updates to fuel availability assumptions for 2027-2028 IRM study
    - Updates may include exploring zonal specific derates, derates to oil-only units, consideration of generator "firm fuel" election information, and assessing the presence of fuel constraints in regions beyond Load Zones F-K
  - Q2 2027: Consider winter 2026-2027 operational performance data from "firm fuel" resources
  - Q2/Q3 2027: Identify and provide recommendations for potential improvements to IRM modeling assumptions

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Seasonal Topology

- **Background**
  - Currently, the IRM study interface limits are developed from summer system conditions and are applied for both the summer and winter period. Winter specific interface limits should be considered for more accurate representation of winter topology.
- **Objective**
  - Update IRM topology to capture winter interface limits.
- **Potential scope and timeline:**
  - Q1 2026: Provide background on current topology update process for the IRM study
  - Q2 2026: Identify candidate studies and data sources for winter topology and special considerations for studied interfaces
  - Q2 2026: Identify a methodology/sources for determining winter interface limits for IRM study consideration
  - Q3/Q4 2026: Recommendation for incorporation and development of a whitepaper

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ELR Modeling Improvements

- **Background**
  - Currently, ELRs are utilized by GE MARS “as-needed” when loss of load events occur without consideration of future shortage hours or the potential to hold energy for more critical intervals. Therefore, the current utilization of ELRs could lead to sub-optimal outcomes with the potential to distort the resulting system LOLE
- **Objective**
  - Refine modeling of Energy Limited Resources and Energy Storage Resources in the IRM model to better capture parameters such as round-trip efficiency, monthly/annual energy limits, and seasonal limitations on energy, and potential refinements to start time and optimal utilization using current GE MARS logic.
- **Potential scope and timeline:**
  - Q1 2026: Provide overview of current GE MARS ELR/ES modeling and potential parameters to evaluate for updates/improvements
  - Q2 2026: Identify potential improvements to IRM modeling and assess impacts
  - Q3/Q4 2026: Provide recommendations and develop a whitepaper

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Maintenance Modeling & Output Factor Curves

- **Background**
  - Currently, only forced outages and 50 MW of planned summer maintenance (allocated equally between Load Zones J and K) are assumed to occur in the IRM study. With the increasing winter risks, renewable penetration and thermal resource deactivations, accurate planned maintenance modeling is critical to understand reliability risks in both the peak and shoulder seasons.
  - With the introduction of winter fuel availability constraints modeling in December-February, prevention of duplicate derates of non-firm resources will be critical to ensure accurate modeling assumptions.
- **Objective**
  - Introduce planned maintenance derates and outages into the IRM study.
- **Potential scope and timeline:**
  - Q1 2026: Provide overview of current planned outage modeling assumptions and GE MARS logic for maintenance modeling
  - Q2/Q3 2026: Introduce potential options for improvements and special considerations for periods when winter fuel availability constraints apply
  - Q3/Q4 2026: Identify recommendations and development of a whitepaper
  - Q1/Q2 2027: Extended timeline for potential implementation of any approved enhancements

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Parametric Process Improvements

- **Background**
  - The parametric process is a methodology used in the preliminary base case and final base case study timeframe to assess the potential impact of individual changes to the IRM study assumptions on the IRM and locational requirements. Since the parametric results occur prior to the execution of the Tan45 procedure and under different capacity removal/shifting procedures, significant differences have been observed between parametric and Tan45 results.
- **Objective**
  - Identify potential improvements to the parametric assessment process to provide for better alignment with expected Tan45 outcomes.
- **Potential scope and timeline:**
  - Q1/Q2 2026: Review and discuss differences between the parametric and Tan45 methodologies
  - Q2 2026: Identify potential improvements to the parametric process to better align with the expected outcomes of the Tan45 process
  - Q3/Q4 2026: Provide recommendations and development of a whitepaper

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2027 Project Backgrounds

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Winter Reliability Enhancements

- **Historically, the IRM model has only observed LOLE within the summer season due to higher peak loads, low intermittent resource penetration, and not reflecting the fuel availability constraints for thermal generation in tight winter conditions.**
- **The purpose of this effort is to discuss and assess impacts to the IRM study process from the introduction of winter LOLE and explore whether additional metrics and reliability criteria should be leveraged in the IRM study for determination of the IRM and locational requirements.**
  - Annual capacity removals are implemented in determining the IRM, and the resulting study may have significantly different summer and winter reliability statistics
  - Seasonal specific capacity removals and adjustments may have implications for the NYISO capacity market and signals regarding capacity value which are important to consider in assessing potential seasonal specific reliability criteria

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Large Loads & Load Shape Review

- **Several efforts are taking place within the NYISO stakeholder process in 2026 to identify process and market design improvements to better facilitate the interconnection, and accounting for the flexibility characteristics, of large loads such as data centers.**
  - The NYISO's "Flexible Large Loads" initiative will explore whether improvements to existing market participation models or new models are required to facilitate flexible large loads such as data centers.
  - The NYISO's "Reliability Planning & Large Load Integration" initiative will explore potential improvements to the current load interconnection process to address bulk system reliability concerns, while seeking to accelerate the load interconnection process.
- **NYISO intends to provide project overviews to NYSRC of NYISO market projects in 2026 and explore whether future IRM study refinements may be warranted.**
  - The NYISO also intends to provide NYSRC an overview of the current load forecast process and methodology

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Questions?

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Our Mission and 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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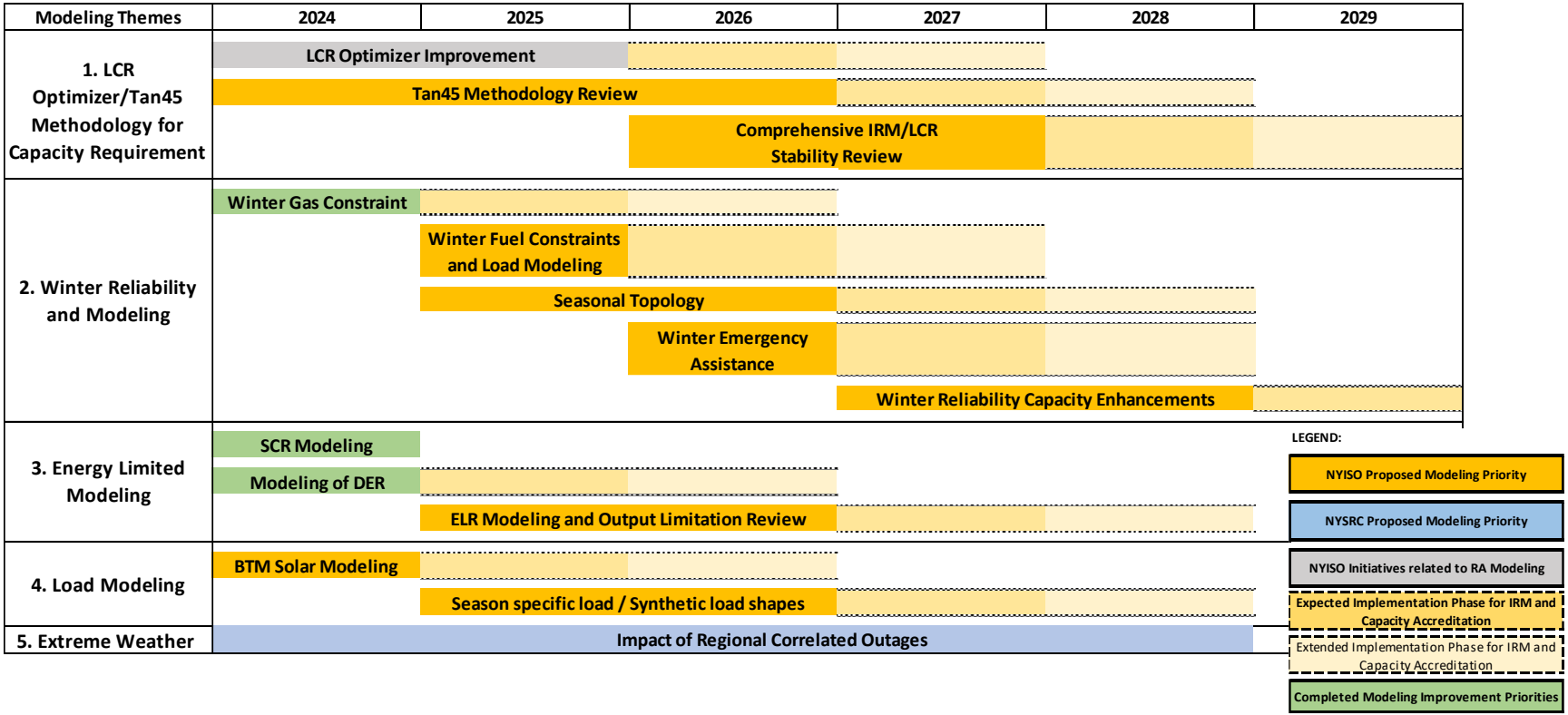
The RA Model Improvements Strategic Priorities (2025-2029)



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