New York ISO
Independent System Operator

Standard Error Analysis

Bianca Prinsloo

ICS Meeting #296

November 6, 2024

Background

- Under the Policy 5, Section 3.8, the standard error of the Installed Reserve Margin ("IRM") study should be 0.025 of the mean loss of load expectation (LOLE).
- Based on the standard error analysis, the 2025-2026 IRM Final Base Case (FBC) with 3,250 replications yields the standard error of 0.0287, which is not compliant with the Policy 5 requirement.
- The NYISO followed the Policy 5 instruction and increased the number of iterations in increments of 250. The standard error of 0.025 is achieved with 4,250 replications, with a non-material impact of a 0.03% increase to the IRM.
  - The higher replications increases the LOLE by 0.00077. The 2025-2026 IRM FBC did not meet the 0.100 LOLE criterion. Therefore, a solver case had to be run to bring the LOLE back to 0.100 event-days per year

New York ISO

Standard Error Over Time & Key Drivers

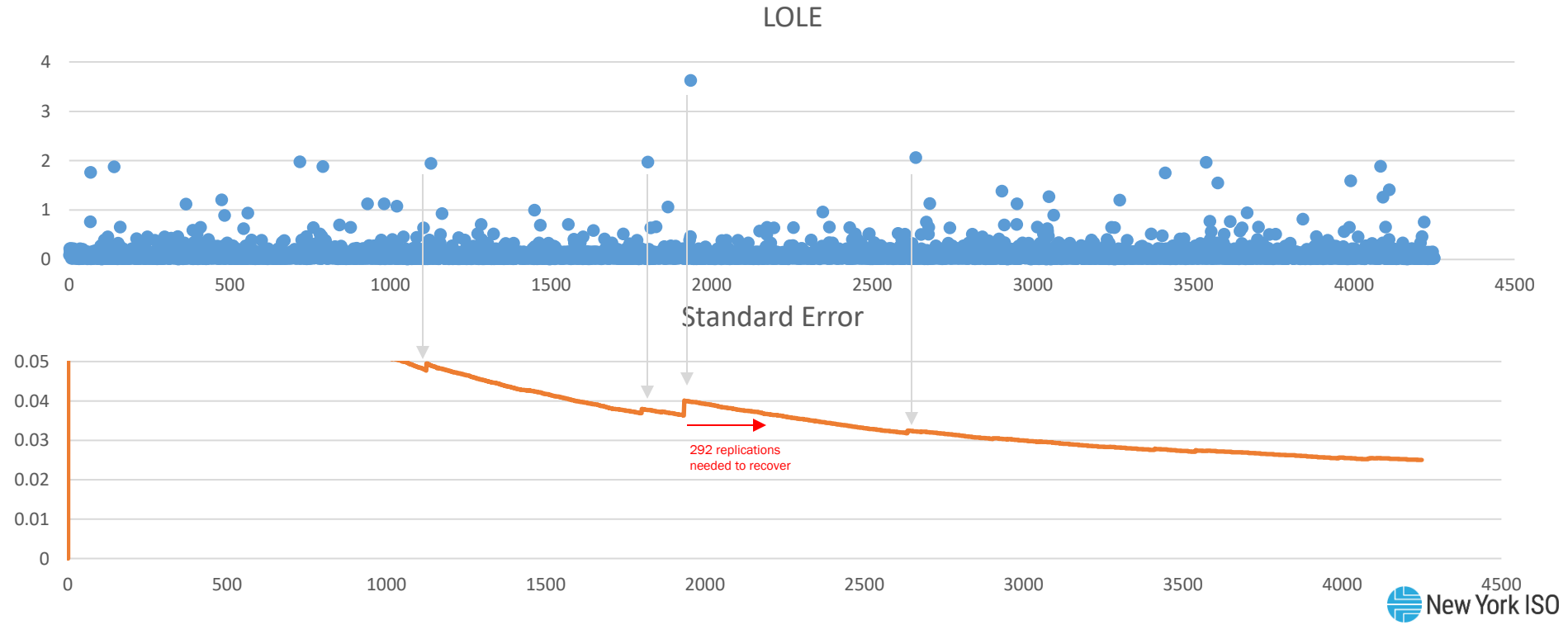
- **With increased modeling changes in recent years of the IRM study, the number of replications to achieve targeted standard error has been increasing**
  - In the 2023-2024 study, the energy limited resource (ELR) functionality was adopted and retaining operating reserves was implemented
  - In the 2024-2025 study, new offshore wind modeling and new emergency assistance (EA) modeling was included, as well as increased LOLE in the external areas
  - In the 2025-2026 study, the new "SCR enhanced modeling" was adopted into the study along with reduced reliance on certain emergency operating procedures and dynamic emergency assistance interface group limits for the external areas
- **Moving forward, additional Resource Adequacy modeling changes are expected**
  - For example, the implementation of fuel availability constraint modeling, as well as other modeling improvements addressed in the Strategic Plan, are expected to add to the complexity of the IRM model

Table 1: Number of Replications to Achieve 0.0250 Standard Error

Study Year	Replications
2020-2021	1,185
2021-2022	1,517
2022-2023	1,140
2023-2024	2,577
2024-2025	3,237
2025-2026	4,236

New York ISO

Standard Error Per Replication: 2025-2026 IRM FBC



New York ISO

Recommendations & Next Steps

- Proceed with 4,250 replications for the 2025-2026 IRM FBC in compliance with Policy 5 requirement of 0.025 Standard Error
- Continue to monitor and analyze the key drivers of increased replications
- Consider relevant updates to Policy 5, Section 3.8 if necessary

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

New York ISO

Policy 5, Section 3.8

3.8 Standard Error

Another step in assuring a quality result is to determine whether the standard error is acceptable. The MARS model is run for a set number of iterations at increments of 250. Ideally, the standard error value remains less than 0.025 throughout the entire IRM Study. However, to provide a quality result, the ICS has determined that the desired standard error value for the mean Loss of Load Expectation (LOLE) at the 95% confidence level shall be less than or equal to 0.025 at the final iteration at three critical points; a) the beginning of the IRM Study; b) at the conclusion of the Preliminary Base Case prior to the Tan 45 process; and c) at the conclusion of the Final Base Case prior to the Tan 45 process. If the standard error is not met at these critical points, the number of iterations is increased by 250 iterations until the condition is met. The MARS model is then returned to criteria as necessary and the results reported to ICS as part of the parametric analysis of the respective base cases. The Tan 45 process then proceeds as planned for either the preliminary or final Base Case.

By default, the standard error at the beginning of the IRM study is met as the study begins with the final Base Case from the prior year IRM study. However, if the number of iterations has become excessive with a corresponding standard error well below the 0.025 standard error value, it may be appropriate to decrease the number of iterations. In general, the more iterations used by MARS, the better the convergence and the better the confidence in the result. Unless the MARS runtime is seriously impacted, there is no technical reason to reduce the number of iterations necessary to achieve the standard error value.

New York ISO