

Energy Limited Resource (ELR) Modeling and Output Limitation Review

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ELR Modeling and Output Limitation Review ¹

■ Background

- Currently, ELRs are utilized by GE Multi-Area Reliability Simulation software program (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 and impact the resulting system loss of load expectation (LOLE).

■ Objective

- Assess potential refinements/enhancements to the modeling of Energy Limited Resources and Energy Storage Resources in the IRM model in response to the anticipated increased development of energy limited resources such as battery storage, Distributed Energy Resources (DERs), and flexible load assets such as Special Case Resources (SCRs).
- A long-term solution to optimize energy limited scheduling should be continually pursued as software improvements become available.

■ Scope

- Review current GE MARS logic, existing software limitations, and recent software improvements.
- Review the utilization of ELRs within the IRM model and impacts thereof on LOLE.
- Consider historical availability and operations of energy limited resources, optimal scheduling, and potential improvements to the current modeling.
- 2025 – Recommend potential improvements.
- 2025/2026 – Test alternative ELR scheduling strategies and continue to Phase 2.

1. <https://www.nysrc.org/wp-content/uploads/2025/01/d6b73f97027bfa25602c1d091d316da2f493f7d0d76f00646a2644611eb.pdf>

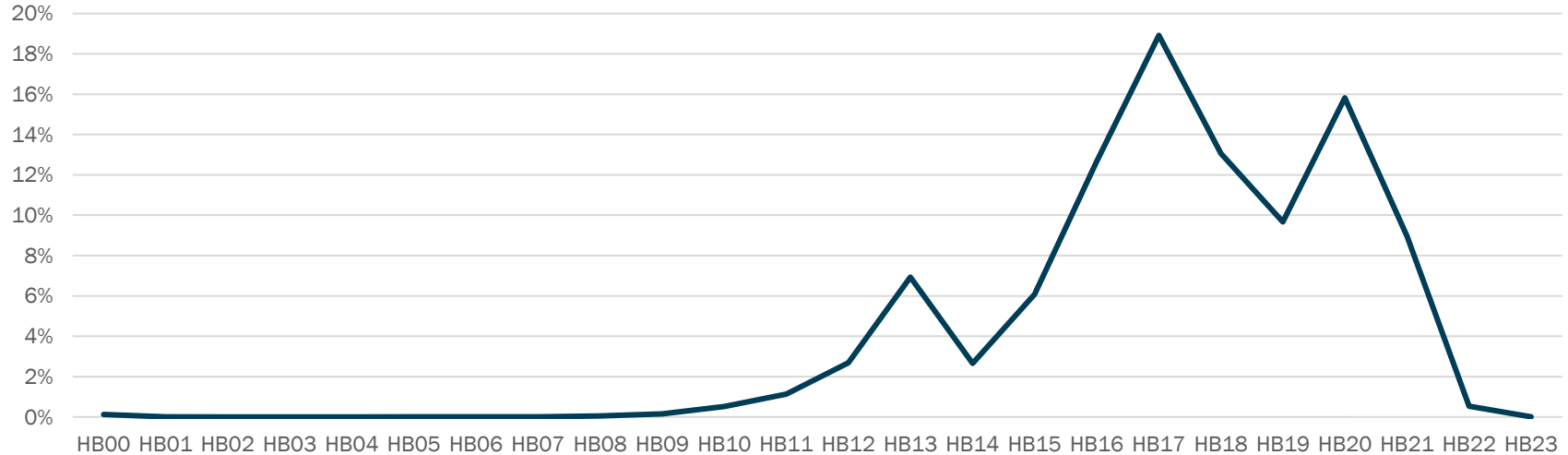
Current Modeling

- **In August 2023, the NYSRC ICS adopted an update to the output limitation for ELR units.² The change establishes ELR output limitations based on the LOLE distribution window from the prior year's Locational Minimum Installed Capacity Requirement (LCR) study model.**
 - ES and Small EL3: output limitations should be lifted at the beginning of the 90% of LOLE risk window.
 - The process aims to align ELR output in close proximity to the period with the highest risk.
 - Large EL3: maintain the TC4C configuration (gradually start between 7am and 11am)
- **The ELR output limitation for the 2025-2026 IRM study was lifted at hour beginning (HB) 14.**
 - 90% of the LOLE risk window for the 2025-2026 LCR study model hourly LOLE distribution starts at HB13. The NYISO proposes that ICS defer modeling this update to the lifting of the output limitation for the 2026-2027 IRM study and instead retain the current HB14 assumption.

2. https://www.nysrc.org/wp-content/uploads/2023/08/ELR_ICP_Presentation_Updated0801.pdf

Hourly LOLE Distribution

Hourly LOLE - 2025-2026 LCR Model



	HB00	HB01	HB02	HB03	HB04	HB05	HB06	HB07	HB08	HB09	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
2025-2026 LCR Model	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	3%	7%	3%	6%	13%	19%	13%	10%	16%	9%	1%	0%

2021 ELR Modeling Whitepaper

- **The 2021 NYSRC ICS Whitepaper on ELR modeling³ identified the following recommendations for medium-term and long-term modeling improvements:**
 - **Medium-term:**
 - As the prevalence of ELR capacity in the New York Control Area increases, the generation window may need to be fine tuned to smooth capacity available for larger units. With larger amounts of ELRs, it may be necessary to widen the output windows and analyze historical operating patterns.
 - Beyond widening the output windows, additional changes may include establishing different output windows based on unit size or using combinations of output windows and dispatching ELRs after the emergency operating procedures (EOPs).
 - **Long-term:**
 - It might be beneficial to include additional capabilities to better align the dispatch of ELRs with the highest system risk hours. This could include the ability of GE MARS to assess whether it is more beneficial to generate at a given hour or hold ELR output to a later period.
 - This would require GE MARS to include a look-ahead functionality and, possibly, the inclusion of forecast errors that would affect such a decision.

3. <https://www.nysrc.org/wp-content/uploads/2023/03/ELR-Modeling-White-Paper-May-2021-FINAL.pdf>

Enhanced SCR Modeling

- **The Enhanced SCR Modeling technique utilizes a new ELR functionality to model SCRs as duration limited resources with hourly response rates.⁴**
 - This modeling enhancement was adopted into the 2025-2026 IRM study.
 - With implementation of the Enhanced SCR Modeling technique, the output limitation for all SCRs is lifted at the same time as other ES and small EL3 ELRs, which was HB14 in the 2025-2026 IRM study.
 - The 2025-2026 IRM study modeled a maximum SCR capacity of 1,280.8 MW.
- **The Enhanced SCR Modeling technique increases the utilization of the ELR functionality and significance of the output window limitation for ELR units.**
 - The hourly LOLE distribution for the 2025-2026 IRM study exhibited a drop in HB14 coincident with the lifting of the output limitation for SCRs (see Slide 4).

4. <https://www.nysrc.org/wp-content/uploads/2024/01/SCR-Modeling-ICS-01302024-Market-Sensitive27154.pdf>

Next Steps

- **For the 2026-2027 IRM study, the NYISO recommends maintaining the current assumption to lift the output limitation for ES and small EL3 at HB14.**
- **In 2025, focus on assessment of the ELR modeling and utilization of SCRs in MARS.**
 - Consider historical availability, operations and scheduling of SCRs for potential improvements to the modeling.
- **Continue to work with GE on potential MARS improvements on the ELR functionality for implementation beyond 2025.**

ELR Modeling and Output Limitation

Proposed Timeline

Milestone	Anticipated Timeline
Present draft scope to the ICS for approval	January 8, 2025
Review current GE MARS logic, existing software limitations, and recent software improvements	April 2, 2025
Review the utilization of ELRs within the IRM model and LOLE relationship	Q1 2025
Discuss historical availability and operations of energy limited resources, optimal scheduling, and potential improvements to the modeling	Q1 – Q3 2025
Recommend near-term modeling improvements	Q3 2025
Prepare whitepaper report on near-term improvements (Phase 1)	Q4 2025
Test alternative ELR scheduling strategies and continue to Phase 2	2025/2026

Questions?

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

