New York ISO
Independent System Operator

# EOP Review Whitepaper Progress Update for EC

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## EC Meeting

July 14, 2023

# Purpose of Today's Presentation

- During the 6/30 meeting, the ICS proposed to give more detailed updates to the Executive Committee ("EC") on the progress of the EOP Whitepaper
- This presentation provides a summery of key information discussed at the previous two ICS meetings (5/30 and 6/28)
- The purpose of the presentation is to obtain alignment with EC on the conclusion of the whitepaper and solicit EC inputs on the whitepaper direction
- Provide an update to EC on upcoming development of the EOP whitepaper

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# Emergency Assistance Review Progress

- The current IRM assumptions for EA from external areas are based on the conditions of the Northeast regional system about 5 years ago
  - Back then, the regional system had relatively high reserve margins and stable supply mix
- The NYISO reviewed the effect of the EA assumptions in today's IRM simulation as well as the Northeast regional conditions, and concluded that the current EA assumptions in the IRM study are too optimistic
- 4 modeling improvement options were reviewed and the NYISO proposed to proceed with implementing additional topology limits to reduce EA from the external areas in the IRM study

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# Effect of EA in IRM Simulation

- **The effect of EA in the IRM simulation is subject to *ALL* Policy 5 requirements:**
  - Alignment of the top 3 peak load days across the region,
  - Individual intertie capabilities and,
  - 3500 MW total EA limit
- **In the at-criteria 2023-2024 IRM database, maximum EA of 3500 MW is reached for Bin 1-3**
  - Bin 4 (50/50 forecast) requires maximum EA about 1000 MW

| LFU Bins | Max EA (MW) | Expected Hours with EA *- per replication* |
|---|---|---|
| Bin 1 [1 in 160 years] | 3500 | 35.11 (21.98 @ LOLE) |
| Bin 2 [1 in 15 years] | 3500 | 8.92 (2.68 @ LOLE) |
| Bin 3 [90/10 forecast] | 3500 | 0.37 (0.17 @ LOLE) |
| Bin 4 [50/50 forecast] | 995 | 0.03 (0.02 @ LOLE) |
| Bin 5 | 404 | <0.01 |
| Bin 6 | 0 | 0 |
| Bin 7 | 0 | 0 |

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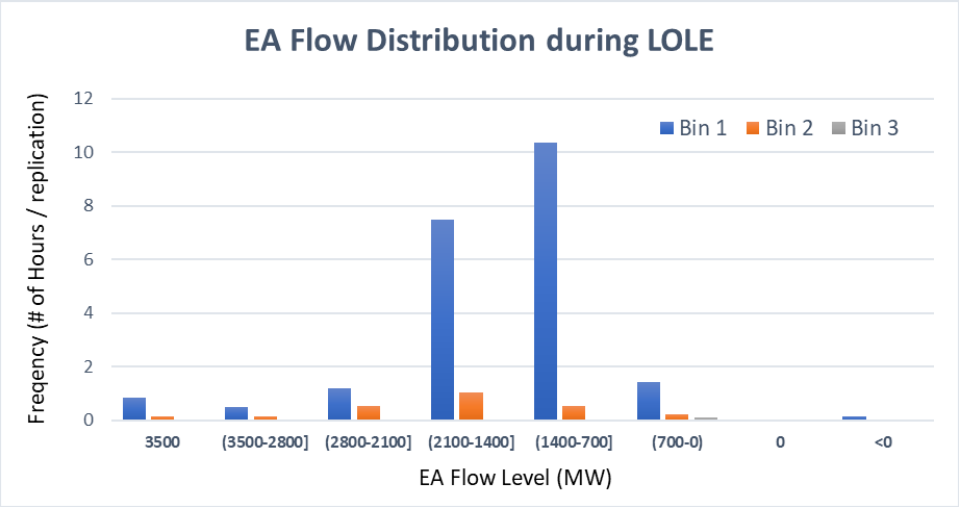
# Effect of EA in IRM Simulation (con'd)

- In the at-criteria 2023-2024 IRM database, NYCA requires EA for Bin 1-5, with upper LFU bins containing more EA flow than lower LFU bins




| EA Flow Level Distribution during LOLE | | | | |
|---|---|---|---|---|
| **EA Flow (MW)** | **Bin1** | **Bin2** | **Bin3** | **Bin 4** |
| 3500 | 4% | 5% | 1% | 0% |
| (3500-2100] | 8% | 26% | 10% | 0% |
| (2100-700] | 81% | 59% | 28% | 4% |
| (700-0] | 7% | 9% | 62% | 96% |
| <0 | 1% | 2% | 0% | 0% |
| EA Hours | 21.98 | 2.68 | 0.17 | 0.02 |

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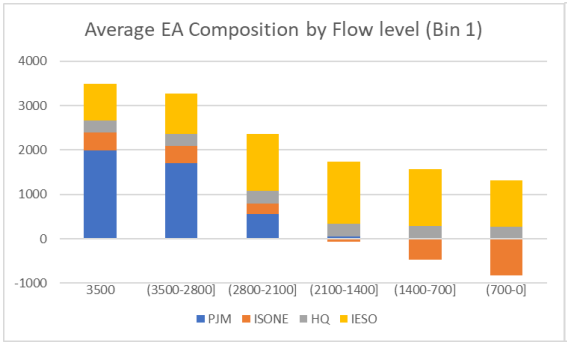
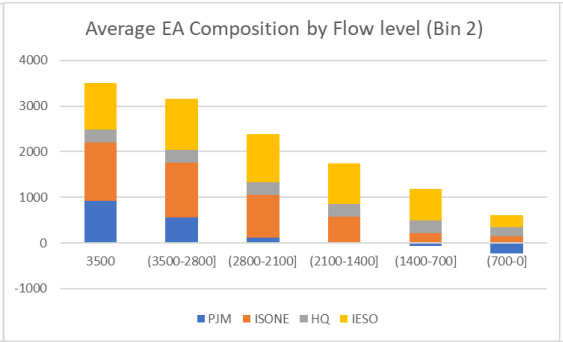
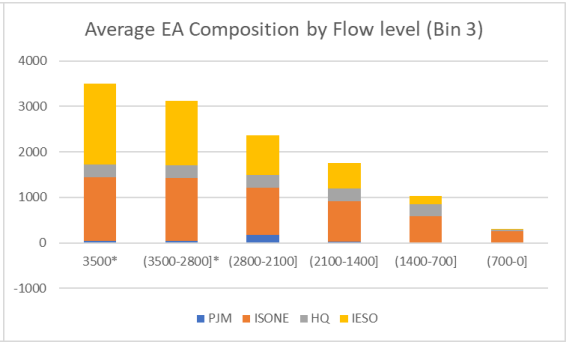
# Effect of EA in IRM Simulation (con'd)

- **In the at-criteria 2023-2024 IRM database, NYCA relies mostly on IESO and ISONE**
  - Support from PJM increases in upper bins at the higher flow level
  - HQ consistently provides at close to the maximum interface limit




*Less than 10 data points

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# Regional Historical Observation

- **Historical real-time operations shows that NYCA peaks summer load coincides with ISONE and IESO**
  - PJM's summer loads do not always coincide with NYCA, so it allows NYCA to rely on PJM more during summer peak load days, followed by IESO and HQ
  - IESO is primary supplier of imports during winter peak days, followed by PJM and HQ
  - NYCA tends to export to ISONE during these events regardless of the season

| NYCA Peak Load Days Coinciding with Neighbors (past 5 years) | | | |
|---|---|---|---|
| Neighboring ISO | IESO | PJM | ISONE |
| Summer | 67% | 50% | 100% |
| Winter | 83% | 33% | 100% |

- **NYSRC's 2015 EOP whitepaper shows neighboring systems assumed lower EA or Tie Benefits in their respective RA model. The 2021 NPCC Tie Benefits Study also shows similar observation**

| External Area | EA / Tie Benefits *- 2015 Whitepaper* | EA / Tie Assistance Required *- NPCC 2021 Tie Benefits Study* |
|---|---|---|
| IESO | 0 MW | 70 – 1,400 MW |
| ISONE | 1,624 MW | 1,735 – 1,940 MW |
| HQ | 1,100 MW (only winter) | 1,600 MW |
| PJM | 3,500 MW | N/A; Expect to be reduced |

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# Regional Outlook Conditions

- The NERC Long-Term Reliability Assessment highlighted IESO and ISONE with high and elevated risk for not meeting Resource Adequacy criteria
- The NPCC and NERC Short-Term Reliability Assessment shows low operating margins in Ontario and New England for summer 2023 at all forecast levels
- NPCC's most recent winter assessment (2022-2023) shows low margins in New England and Quebec, beyond the 50/50 forecast level
  - PJM announced significant shift in reliability risk to the winter based on preliminary analysis with updated reliability risk modeling (*5/30 Stakeholder Presentation*)
  - IESO's 2022 Annual Planning Outlook shows switching to winter peaking system in early 2030s, and can be further advanced with significant electrification uptake in the industrial sector (*2022 Annual Planning Outlook*)
    - Summer peaking was forecasted to continue beyond 2040 in the 2021 Planning Outlook

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# Regional Outlook Conditions (con'd)

Table 4-4: New England Operable Capacity Forecast (MW)

| Week Beginning June 25, 2023 | 50/50 Forecast | 90/10 Forecast | Above 90/10 Forecast |
|---|---|---|---|
| Installed Capacity (+) | 28,869 | 28,869 | 28,869 |
| Net Interchange (+) | 1,030 | 1,030 | 1,030 |
| Dispatchable DSM (+) | 447 | 447 | 447 |
| Total Capacity | 30,346 | 30,346 | 30,346 |
| Peak Demand Forecast (-) | 24,664 | 26,479 | 28,154 |
| Interruptible Load (+) | 0 | 0 | 0 |
| Known Maintenance & Derates (-) | 346 | 346 | 346 |
| Operating Reserve Requirement (-) | 2,305 | 2,305 | 2,305 |
| Unplanned Outages (-) | 2,800 | 2,800 | 2,800 |
| Operating Margin | 231 | -1,584 | -3,259 |
| Operating Margin (%) | 0.9 | -6.0 | -11.6 |

Table 4-6: Ontario Operable Capacity Forecast[22] (MW)

| Summer 2023 | 50/50 Forecast | 90/10 Forecast | Above 90/10 Forecast |
|---|---|---|---|
| Installed Capacity (+) | 38,273 | 38,273 | 38,273 |
| Net Interchange (+) | 223 | 223 | 223 |
| Dispatchable DSM (+) | 687 | 687 | 687 |
| Total Capacity | 39,183 | 39,183 | 39,183 |
| Interruptible Load (+) | 0 | 0 | 0 |
| Known Maintenance & Derates (-) | 13,690 | 14,704 | 14,722 |
| Operating Reserve Requirement (-) | 1,401 | 1,401 | 1,401 |
| Unplanned Outages (-) | 1,565 | 873 | 873 |
| Peak Load Forecast (-) | 22,439 | 24,420 | 27,021 |
| Operating Margin | 88 | -2,438 | -5,058 |
| Operating Margin (%) | 0.4 | -10.0 | -18.7 |

Source: NPCC Reliability Assessment for Summer 2023

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# Conclusion

- **The reviews indicate that the current EA assumptions in the IRM study are too optimistic**
  - Substantial amount of EA is required in the IRM study, mainly from IESO and ISONE
  - During real time operations under tight conditions, PJM can provide primary support to NYCA; NYCA typically export to support ISONE
  - Tight supply conditions are expected across all the Northeast region, especially for IESO in summer and ISONE / HQ during winter
  - Other area's RA models generally have lower EA assumptions compared to the IRM
- **Supply mix changes are underway in neighboring systems, with traditional thermal fleet being replaced by intermittent and renewable resources, resulting in downward pressure on systems' resource adequacy conditions**
  - The homogeneity of the supply mixes (i.e., predominantly intermittent and renewables) can also lead to increasing risks of shared resource outages across multiple regions
- **Concerns over winter start to emerge across the Northeast region as several systems are showing tight conditions during winter seasons**
  - In addition, NYCA and ISONE, and potentially PJM, also share the common gas constraints due to limitation of the gas pipeline, especially during winter cold spell

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# Modeling Considerations

| Options / Considerations | 1. Improve Data<br>*- Get better and more detailed external data* | 2. Increase LOLE<br>*- Model the external area at higher LOLE* | 3. Model EOPs<br>*- Include the EOPs in the external area during Policy 5* | 4. Topology limits<br>*- Add limits to transfer capabilities into NYCA* |
|---|---|---|---|---|
| Feasibility | • Limited control over source data<br>• Lead time required to coordinate<br>• Not able to replicate external's own RA study | • Can be implemented easily | • Can be implemented if EOP data is available | • Can be implemented easily |
| Seasonality | • Depends on the seasonal representation of external data | • The annual LOLE criteria will not facilitate seasonal assumptions | • The EOP steps are applied annually and will not facilitate seasonal assumptions | • Topology limits can be seasonal specific |
| LFU Bin Specific | • Depends on the LFU bin specific modeling in external data | • The annual LOLE criteria will not facilitate LFU bin specific assumptions | • LFU bin specific assumption can be facilitated if structured in the EOP data<br>• Same application across all LFU bins is the current default | • Topology limits can vary by LFU bins |
| Goal of Policy 5 | • May not address the issue of overly optimistic EA support in the current model | • Likely address the issue of overly optimistic EA support in the current model | • Including EOPs will result in holding more MW in external areas (except for IESO) and therefore will lead to more optimistic EA support compared to the current model | • Likely address the issue of overly optimistic EA support in the current model |
| Justifiable and Repeatable | • Owners are on the external areas to submit representative data | • Higher than required criteria is arbitrary | • Owners are on the external areas to provide up-to-date EOP data | • Depends on the analysis supporting the additional topology limits |

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# Next Steps

- The NYISO to conduct analysis with historical data from 2021 to 2023 to review the amount of extra reserves available in the external areas during NYCA's high load period, at both aggregated level and at the individual area level
- The NYISO to present the review of historical extra reserve data and potential IRM implications at the 8/2 ICS meeting, and initial recommendations for the EOP whitepaper
  - The NYISO aims propose seasonal, area and LFU bin – specific recommendations
  - The NYISO also aims develop process to review and update the EA assumptions on a regular basis
- The NYISO aims to have the draft whitepaper report for ICS review at the 8/30 meeting

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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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# Questions?

# Appendix

*- Study Scope and Timeline*

# Whitepaper Scope

- The Emergency Operation Procedure ("EOP") whitepaper is part of the 5-year strategic plan for Resource Adequacy ("RA") modeling improvement
- The purpose of the EOP whitepaper is to research how EOPs, especially Emergency Assistance ("EA"), are accounted for in the IRM base case model, and recommend changes that are appropriate
- The scope of the whitepaper includes 4 major questions:
  - How are EOPs, especially EA, accounted for in GE MARS model?
  - How do neighboring systems support NYCA during emergency conditions?
  - How much can NY depend on neighboring jurisdictions during emergency situations?
  - Is it appropriate to consider advancing some support from neighboring systems ahead of the EOPs in the IRM study?

Scope of the whitepaper is presented at 2/1 ICS meeting:
https://www.nysrc.org/PDF/MeetingMaterial/ICSMeetingMaterial/ICS%20Agenda%20273/EOP_Whitepaper_Scope_revised[13442].pdf

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# Timeline of the Whitepaper

| Milestone | Date |
|---|---|
| Present Scope to NYSRC | 2/1/2023 |
| Finalize Scope | 2/15/2023 (Following NYSRC approval) |
| Monthly NYSRC Updates | Ongoing |
| Review of EA Model and EA in Grid Operations Complete | April 2023 |
| Determine Potential Changes to EA Model and Modeling Test | May-July 2023 |
| Present Research and Recommendations to NYSRC | August ICS Meeting |
| Potential New Modeling Adoption and Sensitivity Cases | Pending ICS Review (2024/25 FBC) |
| Final Modeling Change (if applicable)<br>*-- adoption in the FBC of 2024/25 IRM, or*<br>*-- sensitivity in the PBC of 2025/26 IRM* | Following NYSRC Review |
| Initiate Scoping for Tie and Seasonal EA Modeling Whitepaper (2024 initiative)<br>*--consider mid-year 2024 completion* | Q4 2023 |

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