

Seasonal Topology Update: Thermal Transmission Constraints

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Resource Adequacy

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Seasonal Topology Whitepaper Overview

■ Background

- The current Installed Reserve Margin (IRM) study process considers the transmission system topology reflective of summer operating conditions, which are updated annually in consideration of the NYISO reliability planning process and operating studies
- All New York Control Area (NYCA) internal transfer capabilities are based on thermal transfer limits, except for the Central-East (Load Zone E to Load Zone F) and UPNY-CONED (Load Zone G to Load Zone H) interfaces which are limited by voltage constraints

■ Today's Objective

- Discuss considerations for seasonal impacts on internal transfer limits
- Discuss methodology and results of testing expected seasonal interface transfer limit increases for winter system conditions

Equipment Considerations

- **During the winter season, the thermal transfer limits for above-ground transmission lines are expected to be higher compared to the summer season due to lower ambient temperatures**
 - Because the transfer limits are dependent on equipment ratings, seasonal ratings changes can result in transfer limit increases across an interface
- **NYISO seasonal operating studies show increases in thermal transfer limits between NYCA Load Zones from summer to winter periods**
 - Seasonality also impacts transmission on thermally-constrained interfaces in other ways (i.e., equipment availability, changes in imports, etc.) which can result in lower thermal transfer limits reported by the NYISO in winter operating studies compared to interface limits reported for summer operating conditions

Other Equipment Considerations

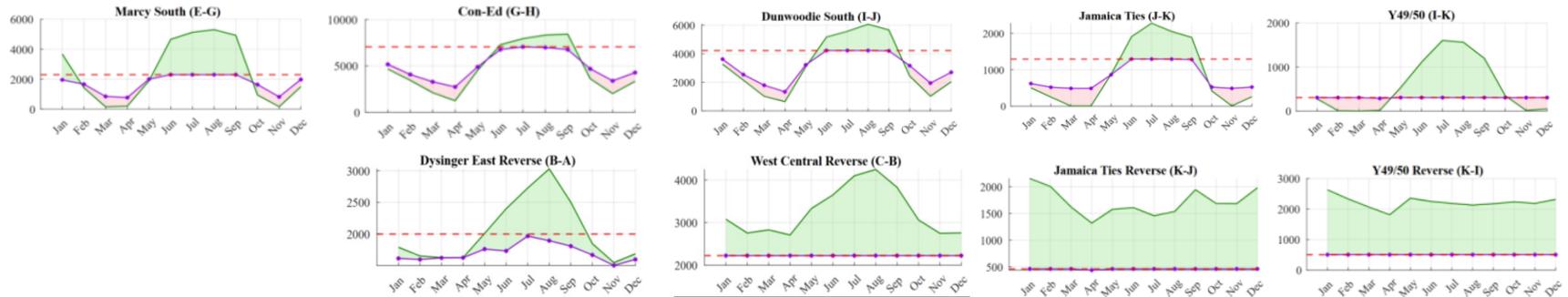
- **Thermally-constrained transmission interfaces primarily comprised of underground transmission cables are not expected to have significant seasonal transfer capability differences**
 - Underground facilities are isolated from the ambient environment and are typically equipped with a separate cooling mechanism
- **Voltage transfer limits are determined by the available voltage support resources in proximity to the interface**
 - The transfer limit of interfaces with voltage-limited constraints are not expected to change when accounting for seasonal temperature differences
 - Certain generation outages can significantly affect voltage transfer limits. NYISO voltage limit studies account for transmission capability changes with respect to availability of relevant generators and equipment

Identifying Relevant Thermally-Constrained Interfaces

Internal NYCA Transmission Constraints

- At the 9/3/2025 ICS meeting, the 2026-2027 IRM Sensitivity Case (S02): No Internal NYCA Transmission Constraints study results were reviewed and discussed.^[1] The study measured the maximum monthly MW flow on interfaces with all internal interfaces unconstrained
- Based on the results of this sensitivity case study, the following interfaces were identified for further consideration as potentially impactful with increased winter transfer limits as the current summer transfer limits are binding
 - These interfaces are Marcy-South (E-G), UPNY-ConEd (G-H), Dunwoodie South (I-J), Jamaica Ties (J-K) and Reverse (K-J), Y49/Y50 (I-K) and Reverse (K-I), Dysinger-East Reverse (B-A), West-Central Reverse (C-B), and Volney East Reverse (E-C).

Max Monthly MW Flow on Interface



[1] IRM26 Sensitivities Review

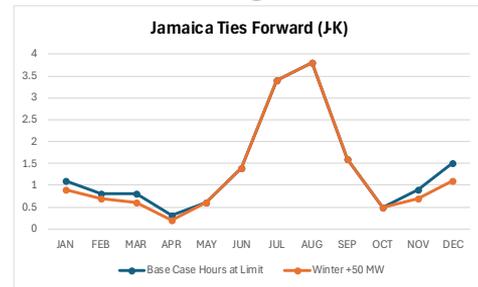
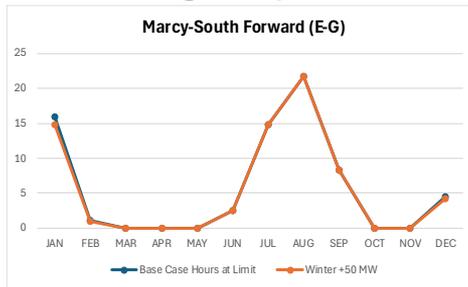
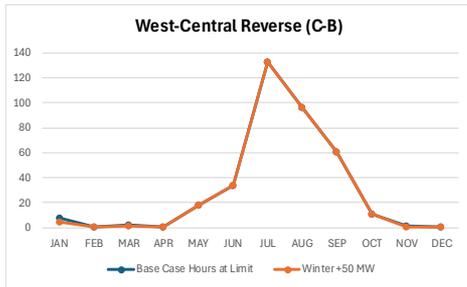
Impact Assessment of Seasonal Limits

- **To assess the potential impact of implementing seasonal limits, the NYISO conducted a test on the 2026-2027 IRM Preliminary Base Case (PBC), with certain interfaces transfer limits increased during the winter period**
 - Any interface limit that had no constrained hours at maximum transfer levels reported for the entire study year were not considered for testing purposes
 - Interfaces with limits that were binding only during the summer months were also not included in the test
 - Each identified interface limit was increased by 50 MW during the winter period (November-April) in the study period while remaining unchanged in the summer months (May-October).
 - The loss of load expectation (LOLE) and hours of interface congestion were recorded for each case and compared to the 2026-2027 IRM PBC results

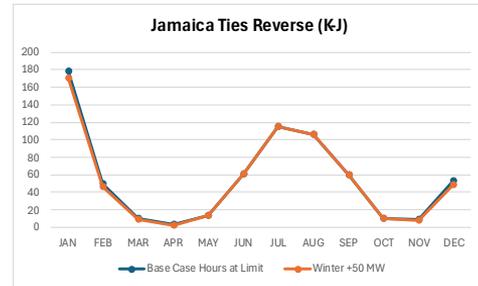
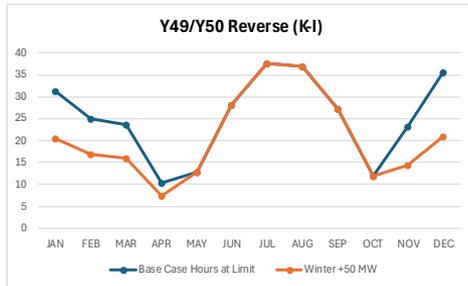
Results

- Based on the results of the analysis, the following interfaces were identified as potentially impactful to study results with winter transfer limits increases in the model
 - West-Central Reverse (B-C), Marcy-South Forward (E-G), Y49/Y50 (I-K) Reverse, and Jamaica Ties (J-K) for both directions of flow
- This increased transfer limit can impact power flow across interfaces and the number of hours the interface is transmission limited. However, there was no meaningful impact on LOLE observed after testing

Hours at transmission limit



Case	LOLE	Delta
West-Central Reverse	0.10027	0
Marcy-South Forward	0.10027	0
Y49/Y50 Reverse	0.10027	0
Jamaica Ties Forward	0.10027	0
Jamaica Ties Reverse	0.10023	-0.00004



Discussion and Next Step

- **The results of this analysis indicate that a small change to an interface limit can reduce the monthly hours that the interface is transmission-constrained, but this change may not materially impact LOLE**
 - While the Jamaica Ties Reverse (K-J) interface showed a minor impact to LOLE, the higher winter interface limits evaluated for this analysis have not been reported by equipment owners; based on historical information, a seasonal ratings change of the magnitude evaluated for this assessment is not expected in actual operations for this limit
 - The other internal interfaces that were identified as potentially impactful to system power flow conditions when unconstrained (i.e., Marcy-South (E-G) and West-Central Reverse (C-B)) were not impactful to LOLE when ratings were increased in the winter study months based on historical information from NYISO operations studies
- **The next steps are to complete additional analysis to confirm impacted interfaces, and to examine the data sources to enhance the annual update process to capture seasonal topology inputs in the IRM study model**

Questions?

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Mission

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Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

