New York ISO
Independent System Operator

NYISO Operating Study Summer 2025

A Report by the New York Independent System Operator

May 2025

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Executive Summary

This NYISO 2025 Summer Operating Study is conducted as a seasonal review of the projected thermal transfer capability for the Summer 2025 capability period. The study evaluates the projected internal and external thermal transfer capabilities for the forecasted peak load and dispatch conditions studied.

Internal interfaces transfer limits have changed due to network alterations in the New York Control Area (NYCA) and modeling assumptions. Notable findings for the Summer 2025 operating period are:

- Dysinger East thermal transfer limit decreased by 200 MW mainly due to redistribution of flows and load changes in the West area.
- Total East thermal transfer limit increased by 900 MW due to the increase in rating of Sugarloaf – Sterling Forest (28) 138 kV line and modeling of Knickerbocker series compensation in-service.
- Central East thermal transfer limit increased by 100 MW mainly due to the modeling of the Knickerbocker series compensation in-service.
- UPNY-SENY thermal transfer limit decreased by 75 MW mainly due to redistribution of flows attributed to addition of the Dover PAR and modeling of Knickerbocker series compensation in-service.
- Moses South thermal transfer limit increased by 625 MW mainly due to the Chases Lake – Porter (11) 230 kV and Moses – Willis (MW2) 230 kV line being in service during the Summer capability period.

External interface transfer limits have changed due to network alterations in the New York Control Area (NYCA) and neighboring areas and modeling assumptions. Notable findings for the Summer 2025 operating period are:

- The New York to Ontario thermal transfer limit increased by 50 MW mainly due to the increase in line ratings on the Beck – Niagara (PA27) 230 kV line.
- The Ontario to New York thermal transfer limit increased by 75 MW mainly due to the increase in line ratings on the Beck – Niagara (PA27) 230 kV line.

- The New England to New York thermal transfer limit increased by 150 MW mainly due to the modeling of the Dover PAR and the Knickerbocker Series Compensation being modeled in-service.

INTRODUCTION

The NYISO 2025 Summer Operating Study report, prepared by the Operating Studies Task Force (OSTF) at the direction and with the guidance of the System Operations Advisory Subcommittee (SOAS), highlights the thermal analysis evaluation for the Summer 2025 capability period. This analysis indicates that, for the Summer 2025 capability period, the New York interconnected bulk power system can be operated reliably in accordance with the New York State Reliability Council Reliability Rules and the NYISO System Operating Procedures.

Thermal transfer limits cited in this report are based on the forecasted peak load and dispatch assumptions and are intended as a guide to system operations. Changes in generation dispatch or load patterns that significantly change pre-contingency line loadings may change limiting contingencies or limiting facilities, resulting in higher or lower interface transfer capabilities.

System Operators should monitor the critical facilities noted in the included tables along with other limiting conditions while maintaining bulk power system transfers within secure operating limits.

PURPOSE

The purpose of the study is to determine:

- The total transfer capabilities (TTC) between NYISO and adjacent areas including IESO, PJM and ISO-NE for normal conditions in the summer periods. The TTC is calculated based on NERC TPL-001-5.1 Category P1 and P2 contingencies and a set of selected Category P4, P5 and P7 contingencies.
- The TTC between NYISO and adjacent areas including IESO, PJM and ISO-NE for emergency conditions in the summer periods. The TTC is calculated based on NERC TPL-001-5.1 Category P1 and P2 contingencies.

System Operating Limit (SOL) Methodology

As identified in " FAC-011-4_Methodology for Establishing SOL for the Operations Horizon_20250401", the NYSRC Reliability Rules provide the documented methodology for use in

developing System Operating Limits (SOLs) within the NYISO Reliability Coordinator Area. NYSRC Reliability Rules require compliance with all North American Electric Reliability Corporation (NERC) Standards and Northeast Power Coordinating Council (NPCC) Standards and Criteria. NYSRC Rule C.1, Tables C-1 and C-2 address the contingencies to be evaluated and the performance requirements to be applied. Rule C.1 also incorporates by reference Attachment H, NYISO Transmission Planning Guideline #3-1, "Guideline for Stability Analysis and Determination of Stability-Based Transfer Limits" of the NYISO Transmission Expansion and Interconnection Manual.

STUDY PARTICIPANTS

First Name	Last Name	Company Name	First	Last Name	Company
Hoa	Fu	PSEG Long Island*	Joseph	Koltz	ISO-NE
John	Koziatek	PSEG Long Island*	Alex	Parsell	ISO-NE
Daniel	Head	ConEd	Raj	Dontireddy	NYISO
Mohammed	Rahman	ConEd	Francisco	Sandoval	NYISO
Frank	Grimaldi	NYPA	Declan	Cahill	NYISO
Brent	Blanchard	NYPA	Asna	Altaf	NYISO
Phil	Nichols	National Grid	Elvin	D'Souza	IESO
Jeffery	Maher	National Grid	Sasa	Mizdrak	IESO
Sarah	Ambrose	O&R	Robert	Dropkin	PJM
Tom	Brown	O&R	Akash	Patel	PJM
Leen	Almadani	Central Hudson	Gabriel	Dion Marcotte	HQ
Caroline	Decker	Central Hudson	Jonathan	Landry-Leclerc	HQ
Robert	Gollogly	RG&E			
Robert	Houston	RG&E			
Brian	Gordon	NYSEG			
Jin	Hao	NYSEG			
John	McDonald	NextEra Energy			
Jeffrey	Mullen	NextEra Energy			
Matthew	Senus	LS Power			
Jason	Kampschaefer	LS Power			
Phil	Tatro	Transco			
Jim	McCloskey	Transco			

*Agent for LIPA

SYSTEM REPRESENTATION AND BASE STUDY ASSUMPTIONS

System Representation

The representation was developed from the NYISO Data Bank and assumes the forecast summer coincident peak load of 31,471 MW. The other NPCC Balancing Areas and adjacent regional representations were obtained from the RFC-NPCC Summer 2025 Reliability Assessment power flow base case and have been updated to reflect the Summer 2025 capability period. The base case model includes:

- The NYISO Transmission Operator area
- All Transmission Operator areas contiguous with NYISO
- All system elements modeled as in service
- All generation represented
- Phase shifters in the regulating mode in accordance with the NYISO Available Transfer Capability Implementation Document (ATCID)
- The NYISO Load Forecast
- Transmission Facility additions and retirements
- Generation Facility additions and retirements
- Remedial Action Scheme (RAS) models where currently existing or projected for implementation within the studied time horizon.
- Series compensation for each line at the expected operating level unless specified otherwise in the ATCID.
- Facility Ratings as provided by the Transmission Owner and Generator Owner

Generation Resource Changes

The status and dispatch level of generation represented in this analysis is a reasonable expectation based on the information available at the time of the study. Those modeling assumptions incorporate known unit outage status. The inter-Area schedules represented in the study base case are summarized in Appendix A. The following table shows generation deactivations and additions since the Summer 2024 capability period:

Deactivations	
Glenwood GT 01	-16 MW
West Babylon 4	-52 MW
Shoreham 2	-19 MW
Coxsackie GT	-22 MW
59th St GT 1	-17 MW
Madison Wind Power	-12 MW
Total Retirements	**-138 MW**
Additions	
Morris Ridge Solar	177 MW
Calverton Solar	36 MW
Arthur Kill Energy Storage	15 MW
Total Additions	**228 MW**

Transmission Facilities Changes

Significant facility changes since the Summer 2024 capability period include:

- Dover PAR (Y17, T398-A, T-398-B) 345 kV addition
- Gowanus-Greenwood (42233) 138 kV PAR & feeder addition
- Goethals-Fox Hills (39291) 138 kV PAR & feeder addition
- Chases Lake-Porter (11) 230 kV line modeled in-service
- Moses – Willis (MW2) 230 kV line modeled in-service
- E13 St. (BK13) 345/69 kV transformer modeled in service
- Moses-Reynold 115kV (MR3) modeled out of service
- Station 23 – Station 42 115kV (920) modeled out of service
- Farragut 345kV TR11 and TR12 modeled out of service
- Laurel Lake – Goudey (952) tie line modeled out of service

The addition of the Dover 345 kV PAR impacts the NYISO-ISONE interface definition. It intersects the pre-existing Cricket Valley-Long Mountain (398) 345 kV line and changes the definition to Dover - Long Mountain (398) 345 kV.

System Representation

The Siemens PTI PSS™E and PowerGEM's Transmission Adequacy and Reliability Assessment (TARA) software packages were used to calculate the thermal limits based on Normal and Emergency Transfer Criteria as defined in the NYSRC Reliability Rules. The thermal transfer limits presented have been determined for all transmission facilities scheduled in service during the Summer 2025 period.

The schedules used in the base case power flow for this analysis assumed a net flow of 0 MW from Public Service Electric & Gas (PSE&G) to Consolidated Edison via the PAR transformer controlling the Linden – Goethals interconnection, and 0 MW on the South Mahwah – Waldwick circuits from Consolidated Edison to PSE&G, controlled by the PARs at Waldwick. The Hopatcong – Ramapo (5018) 500 kV circuit is scheduled to 316 MW from PJM to New York. The four Ontario – Michigan PARs are modeled in-service and scheduled to a 0 MW transfer. These schedules are consistent with the scenarios developed in the RFC-NPCC Inter-Regional Reliability Assessment for Summer 2025, and the MMWG Summer 2024 power flow base cases. The Dysinger – East Stolle Rd. PAR is scheduled to 400 MW from Dysinger to East Stolle Rd. The series reactors on the Sprain Brook – W. 49th St. (M51 and M52) 345 kV and Dunwoodie – Mott Haven (71 and 72) 345 kV, the Packard – Sawyer (77 and 78) 230 kV, and the E. 179th St. – Hell Gate (15055) 138 kV circuits are in-service in the base case. The series reactors on the Farragut – Gowanus (41 and 42) 345 kV and the Sprain Brook – East Garden City (Y49) 345 kV cable are bypassed. The series capacitors on the Marcy – Coopers Corners (UCC2-41) 345 kV, the Edic – Fraser (EF24-40) 345 kV and the Fraser – Coopers Corners (33) 345 kV circuits are in-service in the base case. The series capacitors on the Knickerbocker – Pleasant Valley (Y57) 345 kV circuit are modeled in-service in the base case.

The NYISO Niagara generation was modeled using a 50-50 split on the 230 kV and 115 kV generators. The total output for the Niagara facility was modeled at 2,100 MW. The Ontario Niagara generation was modeled at an output of 1,300 MW.

DISCUSSION

Resource Assessment

Load and Capacity Assessment

The forecast peak demand for the Summer 2025 capability period is 31,471 MW[1]. This forecast is approximately 70 MW (0.22%) lower than the forecast of 31,541 MW for the Summer 2024 capability period, and 2,485 MW (7.32%) lower than the all-time New York Control Area (NYCA) seasonal peak of 33,956 MW, which occurred on July 19, 2013.

The Installed Capacity (ICAP) requirement for the Summer capability period is 39,147 MW based on the NYSRC 24.4% Installed Reserve Margin (IRM) requirement for the 2025 Capability Year. NYCA generation capacity for Summer 2025 is 37,682 MW, and net external capacity purchases of 1,769 MW have been secured for the Summer period. The combined capacity resources represent a 25.4% margin above the forecast peak demand of 31,471 MW. These values were taken from the 2025 Load & Capacity Data report produced by the NYISO.

The equivalent forced outage rate is 4.21%, and includes forced outages and de-ratings based on historical performance of all generation in the NYCA. For Summer 2024, the equivalent forced outage rate assumed was 3.21%.

Cross-State Interfaces

Transfer Limit Analysis

This report summarizes the results of thermal transfer limit analyses performed on power system representation modeling the forecast peak load conditions for Summer 2025. Normal and emergency thermal limits were calculated according to Normal and Emergency Transfer Criteria definitions in the NYSRC Reliability Rules. For this assessment period the most severe single generation contingency is Nine Mile Point 2 at 1,310 MW. Facility ratings applied in the analysis were from the online MW ratings in the EMS, and are detailed in Appendix D.

Figure 1 presents a comparison of the Summer 2025 thermal transfer limits to Summer 2024 thermal transfer limits. Changes in these limits from previous years are due to changes in the base case load flow generation and load patterns that result in different pre-contingency line loadings, changes in limiting contingencies, changes in circuit ratings, or line status. Appendix H presents a

[1] Forecast Coincident Peak Demand (50th percentile baseline forecast)

summary comparison of Cross-State thermal transfer limits between Summer 2025 and 2024, with limiting element/contingency descriptions. Significant differences in these thermal transfer limits are discussed below.

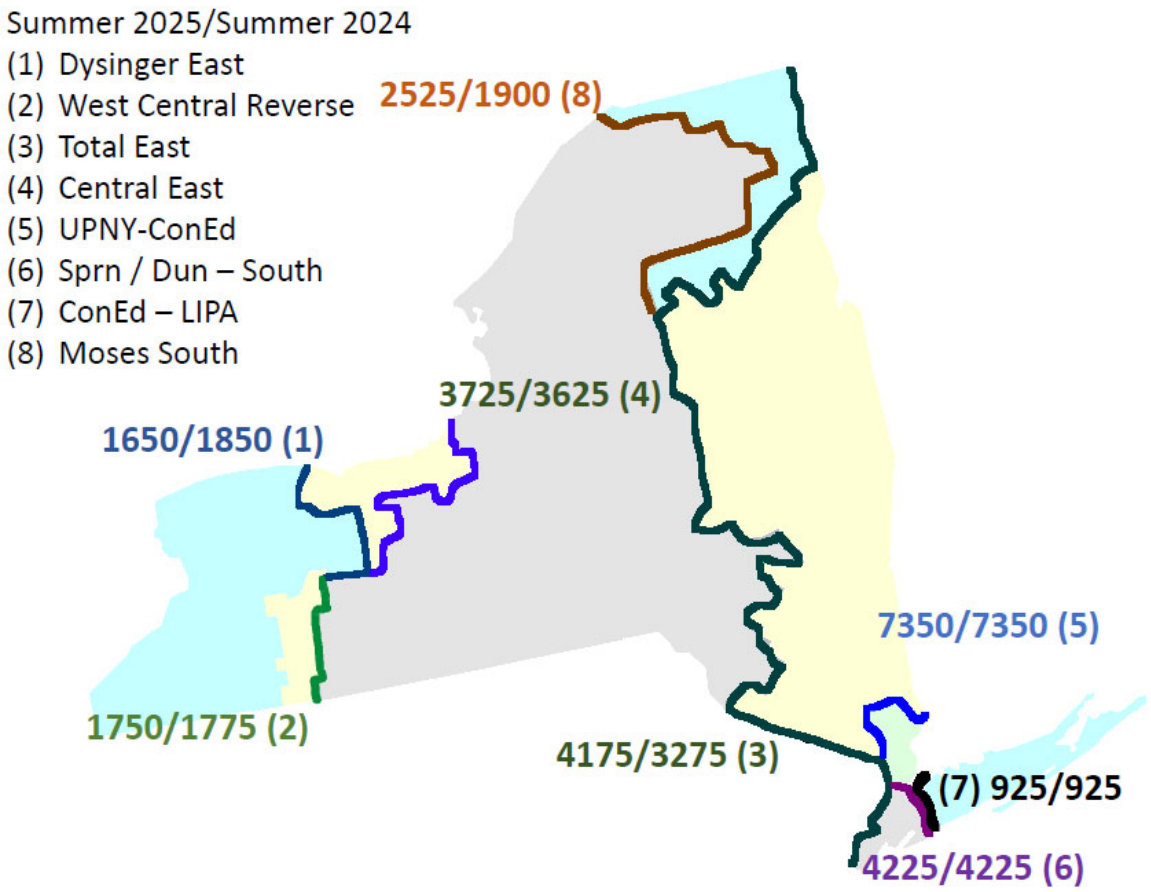

Figure 1 – Cross-State Thermal Transfer Limits

Dysinger East (1) interface thermal transfer limit decreased by 200 MW mainly due to redistribution of flows and load changes in the West area.

Total East (3) interface thermal transfer limit increased by 900 MW mainly due to the increase in rating of Sugarloaf – Sterling Forest (28) 138 kV line and modeling of Knickerbocker series compensation in-service.

Central East (4) interface thermal transfer limit increased by 100 MW mainly due to the

modeling of Knickerbocker series compensation in-service.

Moses South (8) interface thermal transfer limit increased by 625 MW mainly due to the Chases Lake – Porter (11) 230 kV and Moses Willis (MW2) 230 kV line being I/S during the summer period.

West Woodbourne Transformer

The Total-East interface may be limited at significantly lower transfer levels for certain contingencies that result in overloading of the West Woodbourne 115/69 kV transformer. Should the West Woodbourne tie be the limiting facility, it may be removed from service to allow higher Total-East transfers. Over-current relays are installed at West Woodbourne to protect for contingency overloads.

ConEd – LIPA Transfer Analysis

Normal transfer capabilities were determined using the base case generation dispatch and PAR settings as described in Appendix B. Emergency limits are dispatch dependent, and can vary based on generation and load patterns in the LIPA system.

For emergency transfer capability analysis, the PARs controlling the LIPA import were adjusted to allow for maximum transfer capability into LIPA:

ConEd – LIPA PAR Settings

	Normal	Emergency
Jamaica – Lake Success 138 kV	-200 MW	81 MW
Jamaica – Valley Stream 138 kV	-100 MW	227 MW
Sprain Brook – E. Garden City 345 kV	637 MW	637 MW

ISO-NE – LIPA PAR Settings

Norwalk Harbor – Northport 138 kV	100 MW	286 MW

The PAR schedules referenced above and the ConEd - LIPA transfer assessment assume the following loss factors and oil circulation modes in determination of the facility ratings for the 345 kV cables:

- Y49 has a 70% loss factor in slow oil circulation mode.
- Y50 has a 70% loss factor in rapid circulation mode.

Emergency Transfer via the 138 kV PAR-controlled Jamaica ties between ConEdison and LIPA

Con Edison and LIPA have determined possible emergency transfer levels via the Jamaica - Valley Stream (901) 138 kV and Jamaica - Lake Success (903) 138 kV PAR-controlled ties that could be used to transfer emergency power between the two entities during peak conditions. The emergency transfer levels were calculated in both directions, for system peak load conditions with all transmission lines in service and all generation available at full capacity.

ConEd to LIPA emergency assistance

Based on analysis of historical conditions performed by LIPA and Con Edison, Con Edison anticipates being able to supply a total flow up to 308 MW of emergency transfer from Con Edison to Long Island, if requested, via the ties.

LIPA to ConEd emergency assistance

LIPA anticipates being able to supply a total flow up to 505 MW of emergency transfer from Long Island to Con Edison, if requested, via the ties under ideal conditions (i.e. all lines and generation in-service, imports via Neptune, Norwalk Harbor to Northport Cable - NNC and Cross Sound Cable - CSC).

Transfer Limits for Outage Conditions

Transfer limits for scheduled outage conditions are determined by the NYISO Scheduling and Market Operations groups. The NYISO Real-Time Dispatch system monitors the EHV transmission continuously to maintain the secure operation of the interconnected EHV system.

Transient Stability and Voltage transfer Limits

The interface transfer limits shown in “SUMMARY OF RESULTS – THERMAL TRANSFER LIMIT ANALYSIS” section are the results of a thermal transfer limit analysis only. Transient stability and voltage interface transfer limits for all lines in-service and line outage conditions are summarized and available through the NYISO website located under “Interface Limits & Op Studies” at the following link: https://www.nyiso.com/reports-information

Thermal Transfer Capabilities with Adjacent Balancing Areas

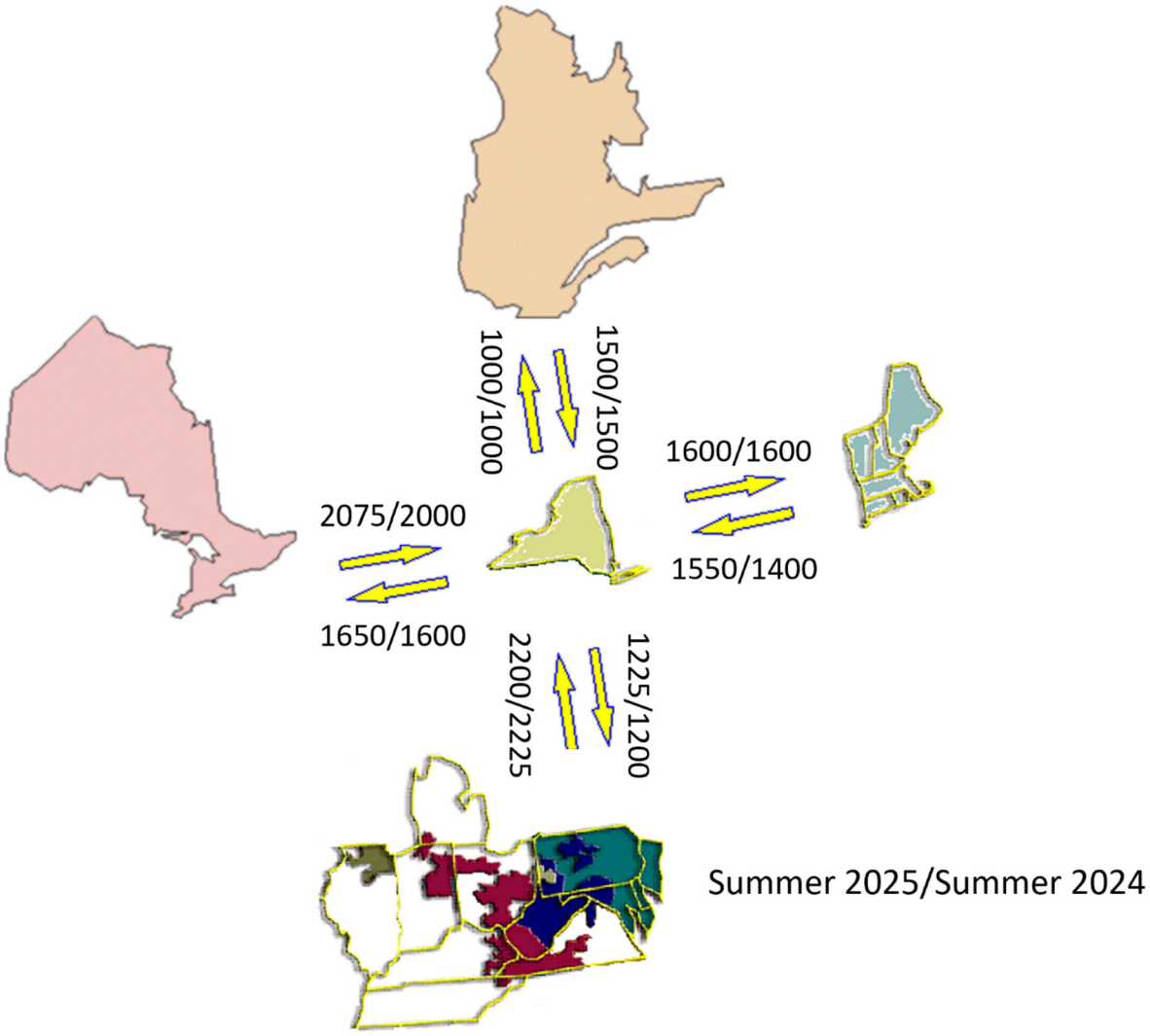

Figure 2 – Inter-Area Thermal Transfer Capabilities[2]

NYISO – Ontario thermal transfer limit increased by 50 MW mainly due to the increase in line ratings on the Beck – Niagara (PA27) 230 kV line.

Ontario – NYISO thermal transfer limit increased by 75 MW mainly due to the increase in line ratings on the Beck – Niagara (PA27) 230 kV line.

ISO-NE – NYISO thermal transfer limit increased by 150 MW mainly due to the modeling of the Dover PAR.

[2] TE-NY transfer capabilities shown in Figure 2 are not thermal transfer limits; for more information see page 19

Thermal transfer limits between New York and adjacent Balancing Areas also are determined in this analysis. These transfer limits supplement, but do not change, existing internal operating limits. There may be facilities internal to each system that may reduce the transfer limits between Balancing Areas. Reductions due to these situations are considered to be the responsibility of the respective reliability authority. Some of these potential limitations are indicated in the summary tables by "Reliability Coordinating Facility" limits, which supplement the "Direct Tie" limits between the Balancing Areas. Transfer conditions within and between neighboring Balancing Areas can have a significant effect on inter- and intra-Area transfer limits. Coordination between Balancing Areas is necessary to provide optimal transfer while maintaining the reliability and security of the interconnected systems.

New York – New England Analysis

New England Transmission/Capacity Additions

Transmission

For the Summer 2025 study period, there are no major generation projects coming into service that will significantly impact the New York – New England transmission capability. For transmission projects, the Dover PAR is expected to be in service May 2025 and will have an affect on the real-time flow of real power through the 398 line connecting New York and New England.

Capacity

In the New England Control Area, from April through September 2025, two major generation additions are anticipated. This includes Carver Energy Storage (150 MW) and Cross Town Energy (175 MW). Approximately 92 MW of Solar Photovoltaic, and 377 MW of Battery Alternative Energy Resources are anticipated to become commercial by the end of September 2025.

Approximately 122 MW of Gas Turbines are expected to retire by the end of September 2025. These retirements include the West Springfield GT-1 (39 MW), West Springfield GT-2 (39 MW), Rutland 5 GT (10.4 MW), Woodland Road (16.7 MW), and West Springfield 10 (17.2 MW) units.

Thermal Transfer Limit Analysis

The transfer limits between the NYISO and ISO New England for normal and emergency transfer criteria are summarized in Tables 2.a and 2.b.

Cross-Sound Cable

The Cross-Sound Cable (CSC) is an HVDC merchant transmission facility connecting the New Haven Harbor 345 kV (United Illuminating, ISO-NE) station and Shoreham 138 kV (LIPA, NYISO) station. It has a design capacity of 330 MW. This facility is not metered as part of the NYISO – ISO-NE interface, and HVDC transfers are independent of transfers between the NYISO and ISO-NE.

Smithfield – Salisbury 69 kV

CHG&E and Eversource will normally operate the Smithfield - Salisbury 69 kV (FV/690) line closed. The maximum allowable flow on this line is 31 MVA based on limitations in the Eversource 69 kV system. When the ISO-NE to NYISO transfer is greater than approximately 400 MW, the line will be opened due to post contingency limits within the Eversource system. The FV/690 line has directional over-current protection that will trip the FV/690 line in the event of an overload when the flow is into ISO-NE. No protection exists to trip the FV/690 line in the event of an overload when the flow is into NYISO.

Northport – Norwalk Harbor Cable Flow

Flow on the NNC Norwalk Harbor to Northport facility is controlled by a PAR transformer at Northport. As system conditions vary, the scheduled flow on the NNC may be used to optimize transfer capability between the Balancing Areas. The NYISO-ISONE thermal transfer limits are presented in Table 2 for different PAR schedule assumptions on the Northport – Norwalk Harbor interconnection.

Whitehall – Blissville 115 kV

The PAR transformer on the K7 line at the VELCO Blissville substation will control pre-contingency flow between the respective stations. For the analyses, the pre-contingency schedule is 25 MW from Blissville (ISO-NE) to Whitehall (NYISO). The scheduled flow may be adjusted to protect the National Grid local 115 kV transmission south of Whitehall for 345 kV contingency events in southern Vermont pursuant to joint operating procedure developed by VELCO, National Grid, ISO-NE and NYISO.

Plattsburgh – Sand Bar 115 kV (i.e. PV20)

The PAR transformer on the PV20 line at the VELCO Sand Bar substation was modeled holding a pre-contingency flow of approximately 100 MW on the PV20 tie. This modeling assumption was premised upon common operating understandings between ISO-NE and the NYISO given local

operating practice on the Moses – Willis – Plattsburgh 230 kV transmission corridor. ISO-NE's analysis examined and considered New England system limitations given this modeling assumption and did not examine generation dispatch or system performance on the New York side of the PV20 tie.

New York - PJM Analysis

Thermal Transfer Limit Analysis

The transfer limits for the NYISO – PJM and PJM – NYISO interfaces are summarized in Tables 3.a and 3.b respectively of the "SUMMARY OF RESULTS – THERMAL TRANSFER LIMIT ANALYSIS" section of this report. The Marion-Farragut 345 kV B and C cables are expected to remain open and the Waldwick E, F, O and Goethals A paths are expected to deliver a percentage of the scheduled interchange as referenced in the NYISO-PJM JOA. The Hopatcong – Ramapo 500 kV (5018) circuit is scheduled in accordance with the "TCC Market PJM -NYISO Interconnection Scheduling Protocol", February 28th, 2020.

Opening of PJM - New York 115 kV Ties as Required

The normal criteria thermal transfer limits presented in "SUMMARY OF RESULTS – THERMAL TRANSFER LIMIT ANALYSIS" section were determined for an all lines in-service condition. The 115 kV interconnections between First Energy East and New York (Warren – Falconer, North Waverly – East Sayre, and Laurel Lake – Westover) may be opened in accordance with NYISO and PJM Operating Procedures provided that this action does not cause unacceptable impact on local reliability in either system. Over-current protection is installed on the Warren - Falconer and the North Waverly – East Sayre 115 kV circuits; either of these circuits would trip by relay action for an actual overload condition. This North Waverly-East Sayre scheme is expected to be designated as a RAS in the future and hence the line could be expected to be operated as in-service more often. There is no overload protection on the Laurel Lake - Westover circuit, but it may be opened by operator action if there is an actual or post-contingency overload condition. However, opening the Laurel Lake – Westover tie could potentially cause local thermal and pre- and post-contingency voltage violations for the 34.5 kV distribution system within First Energy East transmission zone. Sensitivity analysis performed indicated that the thermal and voltage conditions were exacerbated for conditions that modeled high simultaneous interface flows from NY to PJM and NY to Ontario.

DC Ties

Neptune DC tie is expected to be available. Hudson Transmission Project (HTP) DC tie is expected to be available.

Variable Frequency Transformer (VFT) Tie

The Variable Frequency Transformer Tie is a transmission facility connecting the Linden 230 kV (PSEG, PJM) to Linden 345 kV (ConEd, NYISO). For Summer 2025, Linden VFT will have 330 MW non-firm withdrawal right and 300 MW firm injection rights into PJM market.

Ontario – New York Analysis

Thermal Transfer Limit Analysis

The thermal transfer limits between the NYISO and Ontario's Independent Electricity System Operator (IESO) Balancing Areas for normal and emergency transfer criteria are presented in Tables 4 and 5. The NYISO Niagara generation was modeled at an output of 2,100 MW.

The Ontario – New York ties at St. Lawrence, L33P and L34P PARs were controlling to 0 MW in all four scenarios. The interconnection flow limit across these ties is 300 MW, as presented in Table B3 "Interconnection Flow Limits" from the document "Reliability Outlook Tables" available at:

https://www.ieso.ca/-/media/Files/IESO/Document-Library/planning-forecasts/reliability-outlook/ReliabilityOutlookTables_2023Mar.ashx

Transient Stability Limitations

Transient stability limits for the NYISO - IESO interconnection are reported in "NYPP-OH TRANSIENT STABILITY TESTING REPORT on DIRECT TIE TRANSFER CAPABILITY - OCTOBER 1993" available at:

https://www.nyiso.com/documents/20142/3694079/NYPP-OH_1993-2.pdf/2e21484a-22cf-739a-7a10-69dfd69f5d58

Ontario – Michigan PARs

All of the PARs on the four transmission lines interconnecting Ontario and Michigan are in service and regulating. For this study, the PARs were scheduled to regulate at 0 MW.

Impact of the Queenston Flow West (QFW) Interface on the New York to Ontario Transfer Limit

The QFW interface is defined as the sum of the power flows through the 230 kV circuits out of Beck. QFW is the algebraic sum of the following:

- Total generation in the Niagara zone of Ontario including the units at the Beck #1, #2 & Pump Generating Stations, Thorold and Decew Falls GS
- The total load in the zone
- The import from New York

For a given QFW limit, the import capability from New York depends on the generation dispatch and the load in the Niagara zone. The Ontario Niagara generation is set to 1,300 MW. The import capability from New York can be increased by decreasing generation in the Ontario Niagara zone contingent on water and tourism regulations, increasing demand in the Ontario Niagara zone, or both.

TransÉnergie–New York Interface

Thermal transfer limits between TransÉnergie (Hydro-Quebec) and New York are not analyzed as part of this study. Respecting the NYSRC and NYISO operating reserve requirements, the maximum allowable delivery into the NYCA from TransÉnergie on the Chateauguay – Massena (MSC-7040) 765 kV tie is 1310 MW. However in real-time the total flow is limited to 1800 MW; the additional flow is a "wheel-through" transaction to another Balancing Authority Area. Maximum delivery from NYCA to Quebec on the 7040 line is 1000 MW.

The Dennison Scheduled Line represents a 115 kV dual-circuit transmission line that interconnects the New York Control Area to the Hydro-Quebec Control Area at the Dennison Substation, near Massena, NY. The Dennison Line has a nominal north to south capacity of 270 MW in summer, into New York, and a nominal south to north capacity of 200 MW into Quebec. The south to north capacity will be limited to 100 MW into Quebec until such time as HQ-Cedars obtains an updated Presidential Permit (PP24) to reflect the updated transfer capability as identified in the HQ-Cedars Export Study report as approved by the Operating Committee

SUMMARY OF RESULTS – THERMAL TRANSFER LIMIT ANALYSIS

Table 1 – NYISO CROSS STATE INTERFACE THERMAL TRANSFER LIMITS

- Table 1.a
  - Dysinger East
  - West Central Reverse
  - UPNY – SENY
  - UPNY – ConEd
  - Sprain Brook – Dunwoodie So.
  - ConEd – LIPA Transfer Capability
- Table 1.b – MSC-7040 Flow Sensitivity
  - Central East
  - Total East
  - Moses South

Table 2.a – NYISO to ISO-NE INTERFACE THERMAL TRANSFER LIMITS

- Northport-Norwalk Flow Sensitivity
- Cricket Valley Energy Center I/S and O/S

Table 2.b – ISO-NE to NYISO INTERFACE THERMAL TRANSFER LIMITS

- Northport-Norwalk Flow Sensitivity
- Cricket Valley Energy Center I/S and O/S

Table 3.a – NYISO to PJM INTERFACE THERMAL TRANSFER LIMITS

- 3-115 kV Ties I/S and O/S
- Hudson – Farragut (B3402) 345 kV and Marion – Farragut (C3403) 345 kV lines and associated PARs I/S and O/S

Table 3.b – PJM to NYISO INTERFACE THERMAL TRANSFER LIMITS

- 3-115 kV Ties I/S and O/S
- Hudson – Farragut (B3402) 345 kV and Marion – Farragut (C3403) 345 kV lines and associated PARs I/S and O/S

Table 4 – IESO to NYISO INTERFACE THERMAL TRANSFER LIMITS

Table 5 – NYISO to IESO INTERFACE THERMAL TRANSFER LIMITS

TABLE 1.a – NYISO CROSS-STATE INTERFACE THERMAL TRANSFER LIMITS - SUMMER 2025

ALL LINES IN-SERVICE

	Dysinger East	West Central Reverse	UPNY - SENY	UPNY - ConEd[1]	Sprain Brook Dunwoodie - So.	ConEd – LIPA
NORMAL	1650 MW (1)	1750 MW (3)	5900 MW (5)	7350 MW (6)	4225 MW (8)	925 MW (10)
EMERGENCY	1925 MW (2)	2225 MW (4)	6500 MW (7)	8800 MW (7)	4225 MW (9)	1400 MW (11)

	LIMITING ELEMENT	RATING		Loss of	LIMITING CONTINGENCY
(1)	Niagara – Dysinger (ND1) 345 kV	@LTE	1501 MW	L/O	Niagara – Dysinger (ND2) 345 kV
(2)	Niagara – Dysinger (ND1) 345 kV	@STE	1685 MW	L/O	Niagara – Dysinger (ND2) 345 kV
(3)	Pitsford – Sta. 89 (25) 115 kV	@STE	142 MW	L/O	Station 67 – Station 82 (903) 115 kV Station 82 – Rochester (904) 115 kV Station 82 – Rochester (905) 115 kV Station 82 – Station 48 (916) 115 kV Pitsford – Quaker Road (23) 115 kV Pitsford – Station 82 (23) 115 kV Mortimer – Station 82 (7X) 115 kV Station 128 – Station 82 (906) 115 kV
(4)	Pitsford – Sta. 89 (25) 115 kV	@STE	142 MW	L/O	Rochester – Pannell (RP2) 345 kV
(5)	Pleasant Valley – Wood St. (F30) 345 kV	@LTE	2157 MW	L/O	East Fishkill – Wood Street (F38) 345kV East Fishkill – Wood Street (F39) 345kV
(6)	Lovett – Buchanan (Y88) 345 kV	@LTE	1894 MW	L/O	Pleasant Valley – Wood St (F30) 345 kV Pleasant Valley – Wood St (F31) 345 kV
(7)	Cooper's Corner – Middletown TAP (CCRT34) 345 kV	@STE	1792 MW	L/O	Dolson – Rock Tavern (DART44) 345 kV
(8)	Mott Haven – Rainey (Q11) 345 kV	@MTE[1]	1066 MW	L/O	Rainey – Corona (PAR 5W) 138 kV Mott Haven – Rainey W. (5W) 345/138/13.8 kV Transformer
(9)	Dunwoodie – Mott Haven (71) 345 kV	@NORM	707 MW		Pre-Contingency Loading
(10)	Dunwoodie – Shore Road (Y50) 345 kV	@LTE	916 MW	L/O	Sprain Brook – East Garden City (Y49) 345 kV Sprain Brook – Academy (M29) 345 kV
(11)	Newbridge – Locust Grove (558) 138 kV	@NORM	323 MW		Pre-Contingency Loading

Note

1: The rating used for cable circuits during SCUC reliability analysis is the average of the LTE and STE rating (MTE Rating).

2: LIPA rating for Y50 circuit is based on 70 % loss factor and rapid oil circulation.

3: Dysinger East limit used the NYSRC Rules Exception No. 13 – Post Contingency Flows on Niagara Project Facilities

TABLE 1.b – NYISO CROSS-STATE INTERFACE THERMAL TRANSFER LIMITS - SUMMER 2025

ALL LINES IN-SERVICE

	MSC-7040 FLOW 800 MW	MSC-7040 FLOW 1310 MW	MSC-7040 FLOW 1600 MW
CENTRAL EAST			
NORMAL	3650 MW (1)	3725 MW (1)	3725 MW (1)
EMERGENCY	4100 MW (2)	4150 MW (2)	4175 MW (2)
TOTAL EAST			
NORMAL	4100 MW (3)	4175 MW (3)	4175 MW (3)
EMERGENCY	5125 MW (4)	5175 MW (4)	5175 MW (4)
MOSES SOUTH[1,2]			
NORMAL	2150 MW (6)	2525 MW (5)	2725 MW (5)
EMERGENCY	2650 MW (7)	2825 MW (7)	2950 MW (7)

	LIMITING ELEMENT	RATING			LIMITING CONTINGENCY
(1)	Princetown – New Scotland (55) 345 kV	@LTE	1511 MW	L/O	Princetown – New Scotland (361) 345 kV Princetown – New Scotland (362) 345 kV
(2)	Fraser – Cooper's Corner (33) 345 kV	@STE	1793 MW	L/O	Marcy – Cooper's Corner (UCC2-41) 345 kV
(3)	Sugarloaf – Sterling Forest (28) 138 kV	@STE	315 MW	L/O	Rock Tavern – Ramapo (76) 345 kV Rock Tavern – Ramapo (77) 345 kV
(4)	Cooper's Corner – Middletown TAP (CCRT-34) 345 kV	@STE	1792 MW	L/O	Dolson – Rock Tavern (DART-44) 345 kV
(5)	Moses – Adirondack (MA2) 230 kV	@LTE	386 MW	L/O	Chateauguay – Massena (MSC-7040) 765 kV Massena – Marcy (MSU1) 765 kV and TransÉnergie delivery
(6)	Moses – Adirondack (MA2) 230 kV kV	@LTE	386 MW	L/O	Marcy – Massena (MSU1) 765 kV Marcy 765/345 kV (T1) Transformer Marcy 765/345 kV (T2) Transformer
(7)	Brows Falls – Taylorville (3) 115 kV	@STE	135 MW	L/O	Brows Falls – Taylorville (4) 115 kV

Note

1: Moses South limit used the NYSRC Rules Exception No. 10 – Post Contingency Flows on Marcy AT-1 Transformer

2: Moses South limit used the NYSRC Rules Exception No. 12 – Post Contingency Flows on Marcy AT-2 Transformer

TABLE 2.a – NYISO to ISO-NE INTERFACE THERMAL TRANSFER LIMITS – SUMMER 2025

ALL LINES IN-SERVICE

	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
	Cricket Valley Energy Center Out of Service			Cricket Valley Energy Center in Service (1087 MW)		
Northport –Norwalk 0MW						
NORMAL	1975 MW (1)	1600 MW (3)	1675 MW (4)	1975 MW (1)	1650 MW (3)	1675 MW (4)
EMERGENCY	2275 MW (2)	1600 MW (3)	1975 MW (5)	2275 MW (2)	1650 MW (3)	1975 MW (5)
Northport –Norwalk 100MW						
NORMAL	1975 MW (1)	1600 MW (3)	1675 MW (4)	1975 MW (1)	1650 MW (3)	1675 MW (4)
EMERGENCY	2275 MW (2)	1600 MW (3)	1975 MW (5)	2275 MW (2)	1650 MW (3)	1975 MW (5)
Northport –Norwalk 200 MW						
NORMAL	1975 MW (1)	1600 MW (3)	1675 MW (4)	1975 MW (1)	1650 MW (3)	1675 MW (4)
EMERGENCY	2275 MW (2)	1600 MW (3)	1975 MW (5)	2275 MW (2)	1650 MW (3)	1975 MW (5)

	LIMITING ELEMENT	RATING		LIMITING CONTINGENCY
(1)	Alps – Berkshire (393) 345 kV	@LTE 1697 MW	L/O	Sandy Pond – Nicholet (HVDC) 345 kV Sandbar Reactor 115 kV
(2)	Alps – Berkshire (393) 345 kV	@NORM 1463 MW		Pre-Contingency Loading
(3)	Albany – Trinity (5) 115 kV	@STE 280 MW	L/O	Greenbush – Regeneron (9) 115 kV
(4)	Berkshire – Northfield Mountain (312) 345 kV	@LTE 1345 MW	L/O	Sandy Pond – Nicholet (HVDC) 345 kV Sandbar Reactor 115 kV
(5)	Pleasant – Blandford (1421) 115 kV	@STE 195 MW	L/O	Berkshire – Northfield Mountain (312) 345 kV

NOTE

1: The Northport – Norwalk Harbor (NNC) flow is positive in the direction of transfer
2: The Northport – Norwalk Harbor (NNC) line is no longer part of the New York – New England Interface Definition
3: Internal Non-Secured Limit: Limit to secure internal transmission elements that are not secured with pricing in the NYISO markets.

TABLE 2.b – ISO-NE to NYISO INTERFACE THERMAL TRANSFER LIMITS – SUMMER 2025

ALL LINES IN-SERVICE

	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
	Cricket Valley Energy Center Out of Service			Cricket Valley Energy Center in Service (1087 MW)		
Northport –Norwalk 0MW						
NORMAL	1550 MW (1)	1775 MW (3)	1825 MW (4)	1550 MW (1)	1750 MW (3)	1875 MW (4)
EMERGENCY	1725 MW (2)	1775 MW (3)	2400 MW (5)	1700 MW (2)	1750 MW (3)	2400 MW (5)
Northport –Norwalk 100MW						
NORMAL	1550 MW (1)	1775 MW (3)	1825 MW (4)	1550 MW (1)	1750 MW (3)	1875 MW (4)
EMERGENCY	1725 MW (2)	1775 MW (3)	2400 MW (5)	1700 MW (2)	1750 MW (3)	2400 MW (5)
Northport –Norwalk 200 MW						
NORMAL	1550 MW (1)	1775 MW (3)	1825 MW (4)	1550 MW (1)	1750 MW (3)	1875 MW (4)
EMERGENCY	1725 MW (2)	1775 MW (3)	2400 MW (5)	1700 MW (2)	1750 MW (3)	2400 MW (5)

	LIMITING ELEMENT	RATING		LIMITING CONTINGENCY
(1)	Eastover – Bear Swamp (E205W) 230 kV	@LTE 505 MW	L/O	Alps – Berkshire (393) 345 kV
(2)	Eastover – Bear Swamp (E205W) 230 kV	@STE 555 MW	L/O	Alps – Berkshire (393) 345 kV
(3)	Reynold Road 345/115 kV Transformer	@STE 646 MW	L/O	Alps – Knickerbocker (6) 345 kV
(4)	Bear Swamp – E131 Tap (E131-3) 115 kV	@LTE 440 MW	L/O	Eastover – Bear Swamp (E205W) 230 kV
(5)	Montague – Ashfield (1242-3) 115 kV	@STE 148 MW	L/O	Berkshire – Northfield Mountain (312) 345 kV

NOTE

1: The Northport – Norwalk Harbor (NNC) flow is positive in the direction of transfer
2: The Northport – Norwalk Harbor (NNC) line is no longer part of the New England – New York Interface Definition
3: Internal Non-Secured Limit: Limit to secure internal transmission elements that are not secured with pricing in the NYISO markets.

TABLE 3.a – NYISO to PJM INTERFACE THERMAL TRANSFER LIMITS – SUMMER 2025

ALL LINES IN-SERVICE

	DIRECT TIE	NYISO FACILITY$_3$	PJM FACILITY	DIRECT TIE	NYISO FACILITY$_3$	PJM FACILITY
	B&C PARs In-Service			B&C PARs Out-Of-Service		
NORMAL	1700 MW (1)	1200 MW (2)	2975 MW (9)	1500 MW (1)	1025 MW (2)	2775 MW (9)
3-115-O/S$_4$	2300 MW (5)	1225 MW (2)$_3$	3275 MW (6)	2125 MW (5)	1050 MW (2)	3075 MW (6)
EMERGENCY	1700 MW (1)	1650 MW (8)	2975 MW (9)	1500 MW (1)	1475 MW (4)	2775 MW (9)
3-115-O/S$_4$	2525 MW (3)	1975 MW (8)	3300 MW (7)	2325 MW (3)	1800 MW (4)	3100 MW (7)

	LIMITING ELEMENT	RATING			LIMITING CONTINGENCY
(1)	North Waverly – East Sayre (956) 115 kV	@STE	127 MW	L/O	Hillside – East Towanda (70) 230 kV
(2)	Oakdale (BK 2) 345/115 kV Transformer	@LTE	454 MW	L/O	Oakdale – Watercure (31) 345 kV Oakdale (BK 3) 345/115/34.5 kV Transformer
(3)	Hillside – East Towanda (70) 230 kV	@STE	630 MW	L/O	Watercure Rd – Mainesburg (30) 345 kV
(4)	S. Owego – Goudey (961) 115 kV	@STE	143 MW	L/O	Hillside – Watercure (69) 230 kV
(5)	Hillside – East Towanda (70) 230 kV	@LTE	549 MW	L/O	Watercure Rd – Mainesburg (30) 345 kV
(6)	Evert Drive – South Troy 115 kV	@STE	273 MW	L/O	Hillside – Watercure (69) 230 kV Hillside 230/115 kV (BK3) Transformer Hillside – East Towanda (70) 230 kV
(7)	Evert Drive – South Troy115 kV	@STE	273 MW	L/O	Hillside – East Towanda (70) 230 kV
(8)	Oakdale – Goudey (961) 115 kV	@STE	143 MW	L/O	Oakdale – Watercure (31) 345 kV
(9)	East Towanda – East Sayre (ETS) 115 kV	@STE	269 MW	L/O	Hillside – East Towanda (70) 230 kV

NOTE

1: Emergency Transfer Capability Limits may have required line outages as described in New York – PJM Analysis Section.
2: PAR schedules have been adjusted in the direction of transfer.
3: Internal Non-Secured Limit: Limit to secure internal transmission elements that are not secured with pricing in the NYISO markets.
4: Goudey 115 kV Bus Tie breaker is placed in-service when 115 kV tie lines are placed out-of-service.

TABLE 3.b – PJM to NYISO INTERFACE THERMAL TRANSFER LIMITS – SUMMER 2025

ALL LINES IN-SERVICE

	DIRECT TIE	NYISO FACILITY	PJM FACILITY	DIRECT TIE	NYISO FACILITY	PJM FACILITY
	B&C PARs In-Service			B&C PARs Out-Of-Service		
NORMAL	1550 MW (4)	1825 MW (5)	2175 MW (6)	1400 MW (4)	1675 MW (5)	2025 MW (6)
3-115-O/S	2200 MW (1)	2225 MW (2)	2775 MW (3)	2050 MW (1)	2000 MW (2)	2650 MW (3)
EMERGENCY	1775 MW (7)	2275 MW (2)	2400 MW (9)	1625 MW (7)	2025 MW (2)	2250 MW (9)
3-115-O/S	2400 MW (8)	2225 MW (2)	2775 MW (3)	2250 MW (8)	2000 MW (2)	2650 MW (3)

	LIMITING ELEMENT	RATING			LIMITING CONTINGENCY
(1)	Hillside – East Towanda (70) 230 kV	@LTE	549 MW	L/O	Watercure - Mainesburg (30) 345 kV
(2)	Stolle Rd. (BK 3) 345/115 kV Transformer	@NORM	249 MW		Pre-contingency loading
(3)	Homer City 345/230/23 kV (AUTO-S) Transformer	@NORM	647 MW		Pre-contingency loading
(4)	North Wavery – East Sayre (956) 115 kV	@STE	127 MW	L/O	Hillside – East Towanda (70) 230 kV Hillside – Watercure (69) 230 kV Hillside 230/115 kV Transformer
(5)	North Waverly – Hillside (962) 115 kV	@STE	145MW	L/O	Hillside – East Towanda (70) 230 kV Hillside – Watercure (69) 230 kV Hillside 230/115 kV Transformer
(6)	East Towanda – East Sayre (ETS) 115 kV	@STE	269 MW	L/O	Hillside – East Towanda (70) 230 kV Hillside – Watercure (69) 230 kV Hillside 230/115 kV Transformer
(7)	North Waverly – East Sayre (956) 115 kV	@STE	127 MW	L/O	Hillside – East Towanda (70) 230 kV
(8)	Hillside – East Towanda (70) 230 kV	@STE	549 MW	L/O	Watercure Rd – Mainesburg (30) 345 kV
(9)	East Towanda – East Sayre (ETS) 115 kV	@STE	269 MW	L/O	Hillside – East Towanda (70) 230 kV

NOTE

1: Emergency Transfer Capability Limits may have required line outages as described in New York – PJM Analysis Section.
2: PAR schedules have been adjusted in the direction of transfer.
3: Internal Non-Secured Limit: Limit to secure internal transmission elements that are not secured with pricing in the NYISO markets.

TABLE 4 – IESO to NYISO INTERFACE THERMAL TRANSFER LIMITS – SUMMER 2025

ALL LINES IN-SERVICE

	DIRECT TIE	NYISO FACILITY	IESO FACILITY[1]
NORMAL	2075 MW (1)	2850 MW (3)[2]	3600 MW (4)
EMERGENCY	2475 MW (2)	2850 MW (3)[2]	3975 MW (5)

	LIMITING ELEMENT	RATING			LIMITING CONTINGENCY
(1)	Beck – Niagara (PA27) 230 kV	@LTE	460 MW	L/O	Beck – Niagara (PA301) 345 kV
(2)	Beck – Niagara (PA27) 230 kV	@STE	558 MW	L/O	Beck – Niagara (PA301) 345 kV
(3)	Hinman – Harris Radiator (908) 115 kV	@STE	286 MW	L/O	Robinson – Stolle Rd (907) 115 kV
(4)	Mount Hope – South (Q25M) 220 kV	@LTE	420 MW	L/O	Beck – Allanburg (Q35M) 230 kV Beck – Allanburg (Q26M) 230 kV Beck#2 Unit 17&25
(5)	Middleport (T3) 500/220 kV Transformer	@NORM	713 MW		Pre-Contingency Loading

Note

1: Ontario - NYISO limit used the NYSRC Rules Exception No. 13 – Post Contingency Flows on Niagara Project Facilities

2: Internal Non-Secured Limit: Limit to secure internal transmission elements that are not secured with pricing in the NYISO markets.

TABLE 5 – NYISO to IESO INTERFACE THERMAL TRANSFER LIMITS – SUMMER 2025

ALL LINES IN-SERVICE

	DIRECT TIE	NYISO FACILITY	IESO FACILITY[1]
NORMAL	1650 MW (1) [3]	2775 MW (2)[2,3]	1300 MW (3)
EMERGENCY	1975 MW (4)[3]	2925 MW (5)[2,3]	1525 MW (6)

	LIMITING ELEMENT	RATING		LIMITING CONTINGENCY
(1)	Beck – Niagara (PA27) 230 kV	@LTE 460 MW	L/O	Beck – Niagara (PA301) 345 kV Niagara (AT3) 345/230 kV Transformer
(2)	Elbridge – Hamilton (TR1) 115 kV	@STE 185 MW	L/O	Pannell – Clay (1) 345 kV Rochester – Pannell (RP1) 345 kV
(3)	Beck – Hannon (Q24HM) 220 kV	@LTE 481 MW	L/O	Middleport – Beach - Carluke (Q25BM) 220 kV Beck – Middleport – Beach (Q29HM) 220 kV
(4)	Beck – Niagara (PA27) 230 kV	@NORM 558 MW		Pre-Contingency Loading
(5)	Elbridge – Hamilton (TR1) 115 kV	@STE 185 MW	L/O	Pannell – Clay (2) 345 kV
(6)	Beck – Hannon (Q24HM) 220 kV	@NORM 531 MW		Pre-Contingency Loading

Note

1: This limit can be increased by reducing generation or increasing demand in the Niagara zone of Ontario contingent on water and tourism regulations. See Ontario – New York Analysis for discussion.

2: Internal Non-Secured Limit: Limit to secure internal transmission elements that are not secured with pricing in the NYISO markets.

3: This limit can be increased by adjusting the PAR schedule on the Dysinger – East Stolle Rd (DES-1) 345 kV line