

2025 Comprehensive Area Transmission Review of the New York State Bulk Power Transmission System

(Study Year 2030)

A **DRAFT** Report by the
New York Independent System Operator

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Executive Summary

The New York Independent System Operator (NYISO) conducts an annual Area Transmission Review (ATR) of the New York State Bulk Power System (BPS) as required by the Northeast Power Coordinating Council (NPCC) and the New York State Reliability Council (NYSRC). The purpose of this assessment is to demonstrate conformance with the applicable NPCC Directory #1 and NYSRC Reliability Rules. The ATR is prepared in accordance with NPCC and NYSRC procedures for Area Transmission Reviews as well as NYISO guidelines and procedures. In the ATR the NYISO evaluates the Bulk Power Transmission Facilities (BPTF), which include all of the facilities designated by the NYISO to be part of the BPS in accordance with NPCC and the NYSRC requirement and certain other non-BPS facilities. Although this Comprehensive Area Transmission Review analyzed the BPTF, only BPS facilities are subject to NPCC Directory #1 and the NYSRC Reliability Rules.

This report comprises the 2025 NYISO Comprehensive Area Transmission Review (CATR) of the planned system for the year 2030. The 2020 NYISO CATR (approved by the NYSRC in March 2021 and by the NPCC Reliability Coordinating Council (RCC) in June 2021) was the last comprehensive review. In 2021, 2022, 2023 and 2024, NYISO completed interim reviews.

The system representations of neighboring areas are from the interregional transmission planning coordination conducted under the NPCC and Eastern Interconnection Reliability Assessment Group (ERAG) Multiregional Modeling Working Group (MMWG) processes. For the 2025 CATR, the external area representations are from the 2024 ERAG MMWG series library cases. The New York Control Area (NYCA) system representation is from the NYISO 2025 FERC Form 715 filing power flow models with updates according to the NYISO 2025 Load & Capacity Data Report (Gold Book).

Key changes to the five-year case for this review (2030 summer) compared to the five-year case for the 2020 CATR (2025 summer) include a 1,199 MW increase in load forecast, which includes 2,005 MW of large loads, a net decrease of approximately 400 MW in generation capacity, and addition of the 1,250 MW Champlain Hudson Power Express project.

Five assessments and two reviews were conducted to complete this CATR.

The first assessment evaluates the transmission security of the planned system for year 2030, including thermal, voltage, and stability analyses. Transmission security is the ability of the power system to withstand disturbances, such as electric short circuits or unanticipated loss of system elements and continue to supply and deliver electricity. Transmission security is assessed

deterministically with potential disturbances being applied without concern for the likelihood of the disturbance in the assessment. These disturbances are categorized as planning design criteria contingencies and are explicitly defined in NPCC Directory #1 [1] and NYSRC Reliability Rules [2]. Thermal and voltage performance is evaluated as part of steady-state analysis and is assessed under N-0, N-1, N-1-0, N-1-1, and N-1-1-0 conditions. Power system stability is a property of a power system that evaluates if the system will remain in operating equilibrium when subjected to disturbances, such as electric short circuits or unanticipated loss of system elements. Stability is assessed under both N-1 and N-1-1 conditions.

The 2030 steady-state transmission security analysis identified two thermal violations. First, the Oakdale 345/115/34.5 kV transformer and the Oakdale–North Endicott 115 kV transmission line experience thermal overloads in summer peak conditions following the loss of either the Oakdale–Westover 115kV or Oakdale–Northside 115 kV transmission lines. Second, the Gardenville 230/115/34.5 kV transformer is subject to thermal overloads in summer peak conditions for the loss of either Gardenville 230/115/34.5 kV Transformer #6 or #7. The Oakdale-area overloads are addressed through the planned reconfiguration of the Oakdale 345 kV and 115 kV system, including the installation of a second Oakdale 345/115 kV transformer, while the Gardenville overload is addressed by NYSEG’s Transformer #6, #7, #8, and Station Reconfiguration Project. These facilities are planned to be completed by Winter 2030.

In parallel to the analysis in this CATR and considering alternative system assumptions related to assessing the deactivation of generators, the NYISO’s 2025 Quarter 3 Short-Term Assessment of Reliability (“STAR”) found violations of NYSRC and NPCC criteria for the deactivations of Pinelawn, Far Rockaway GTs 1 & 2, Gowanus 2 & 3, and Narrows 1 & 2 generators through the transmission security margin calculation. The 2025 Quarter 3 STAR Report [3] includes those results and the specific generator, load, and project assumptions used in those generator deactivation assessments. The NYISO is currently in the process of addressing the transmission security margin deficiencies through the NYISO’s Short-Term Reliability Planning solicitation for solutions [4].

The stability analysis for the 2030 spring daytime light load conditions indicate that the Fitzpatrick nuclear generator can lose synchronism for a stuck breaker fault at Scriba 345 kV. The Corrective Action Plan for this stability issue is the planned restoration of the Fitzpatrick generator automatic voltage regulator (AVR) operation, which is expected to be completed by September 2026. With the Fitzpatrick generator modeled in the AVR operating mode, the loss of synchronism at Fitzpatrick is resolved.

In the second assessment, power flow and stability analysis are conducted to evaluate the performance of the BPS for low probability extreme contingencies as defined in NPCC Directory #1 and NYSRC Reliability Rules. The power flow analysis results indicate that most of the extreme contingencies do not cause significant thermal or voltage violations over a widespread area. The stability analysis results indicate that the system remains stable for most extreme contingencies. This report includes an evaluation of changes to design or operating practices to address such contingencies where the extreme contingency assessment reveals serious consequences.

The third assessment evaluates the fault current duty at BPTF buses in the short circuit representation. Overduty breakers are identified at Northport and Pilgrim 138 kV stations for year 2030. The Facilities Study for the Propel NY Alternate Solution 5 (Q1289) project is ongoing and Network Upgrade Facilities to address the adverse impacts of the project, such as overduty breakers, will be identified in that process.

The fourth assessment evaluates extreme system conditions, which have a low probability of occurrence (e.g., high peak load conditions resulting from extreme weather and the loss of fuel (gas) supply). This assessment evaluated a heatwave summer peak condition and a loss of gas supply condition in expected weather winter peak conditions. For both the heatwave summer peak load and loss of gas supply conditions, the transmission security analysis results indicate that these system conditions do not cause additional thermal or voltage violations on the BPTF.

The fifth assessment evaluates other requirements specific to the NYSRC Reliability Rules. The NYSRC requirements include System Restoration Assessment and Local Operation Area criteria. The planned system meets these NYSRC Reliability Rules.

In addition to the above-identified five assessments, this CATR also includes two reviews.

The first review conducted for 2025 CATR evaluates Remedial Action Schemes (RAS). This RAS review is completed as required by the North American Electric Reliability Corporation (NERC) PRC-012-2 standard Requirement R4 [5], and the Northeast Power Coordinating Council (NPCC) Directory #1 Requirement 12 and Directory #7 Requirement 6.4 [6]. The purpose of this evaluation is to verify the continued effectiveness and coordination of each RAS, its inadvertent operation performance, and the performance for a single component failure. Additionally, this evaluation identifies if there is a need for the reclassification of a Limited Impact RAS. The NYISO evaluated a total of nine RASs, which include two Type I RASs and seven Limited Impact RASs. This RAS evaluation identifies the need to reclassify one Limited Impact RAS as Type I. All other RAS classifications were determined to be sufficient.

The second review conducted for this CATR evaluates exclusions to NPCC Directory #1 criteria. The NYCA has no existing exclusions to NPCC Basic Criteria and no requests for new exclusions have been made.

Where the results of an assessment found potential violations of NPCC Directory #1 and the NYSRC Reliability Rules performance criteria, this CATR identifies corrective actions plans. Accordingly, this CATR indicates that the NYCA planned BPTF, as planned through year 2030, will conform to the applicable NPCC Directory #1 and NYSRC Reliability Rules.

Introduction

Background

The New York Independent System Operator (NYISO) conducts an annual Area Transmission Review (ATR) of the New York State Bulk Power System (BPS) as required by the Northeast Power Coordinating Council (NPCC) and the New York State Reliability Council (NYSRC). This study is prepared in accordance with NPCC Directory #1 [1] and NYSRC Reliability Rules and Compliance Manual (NYSRC Reliability Rules) [2], and NYISO guidelines and procedures [7]. Although this Comprehensive ATR (CATR) analyzed the New York State Bulk Power Transmission Facilities (BPTF), only BPS facilities are subject to NPCC Directory #1 and the NYSRC Reliability Rules. The ATR may conduct additional analysis to address the Long-Term Transmission Planning Horizon (years 6 through 10) if needed to address identified marginal conditions that may have longer lead-time solutions.

NPCC, a Regional Reliability Organization of the NERC, has established Regional Reliability Reference Directory #1 the “Design and Operation of the Bulk Power System” [1] which describes the Planning Design Criteria that apply to each Area of Northeastern North America. As part of NPCC’s ongoing reliability compliance and enforcement program, NPCC requires each of the five NPCC Areas (New York, New England, Ontario, Quebec, and Maritimes) to conduct and present an annual ATR: an assessment of the reliability of the planned bulk power transmission system within the Planning Coordinator Area and the transmission interconnections to other Planning Coordinator Areas for a study year timeframe of 4 to 6 years from the reporting date. The process for compliance with NPCC requirements for the annual ATR is outlined in NPCC Directory #1 [1], “Appendix B – Guidelines and Procedures for NPCC Area Transmission Review.

The NYSRC has established rules for planning and operating the New York State BPS [2]. The NYSRC Reliability Rules [2] are consistent with and, in certain cases, more specific or more stringent than the NPCC Directory #1 Planning Design Criteria [1]. The process for compliance with the NYSRC requirements for the annual ATR is outlined in the NYSRC Reliability Rules [2] Section 4, “NYSRC Procedure for New York Control Area Transmission Reviews.”

The Guidelines and Procedures for NPCC Area Transmission Reviews require each Area to conduct a Comprehensive Area Transmission Review (CATR) at least every five years and to conduct either an Interim or Intermediate ATR in each of the years between CATRs, as appropriate. An interim review is conducted when system changes compared to what was studied in the most recent CATR are relatively minor and involve a discussion of the impact of those changes on the BPS. An

intermediate review is conducted when the changes compared to what was studied in the most recent CATR are concentrated in one portion of the system, and involves analyses limited to that portion of the system. This assessment is conducted in accordance with the requirements for a Comprehensive Review, as described in NPCC Directory #1 [1]. The previous CATR of the BPTF was performed in 2020 (assessed the planned year 2025) and approved by the NYSRC in March 2021 and by the NPCC Reliability Coordinating Council (RCC) in June 2021.

This 2025 CATR assesses the planned year 2030 system. The planned system includes the updated forecast of system conditions, including a number of proposals for new, retired, or cancelled generation and transmission facilities since the previous CATR [9]. The case assumptions used in this ATR are the same as those used for the as-planned system in the 2025 Quarter 3 Short-Term Assessment of Reliability (STAR) [8] [3], which are based on the most recent cases from the 2024 Reliability Needs Assessment (RNA) with updates to reflect changes to key assumptions.

Corrective action plans to address potential violations of NPCC Directory #1 and the NYSRC Reliability Rules performance criteria are identified. Accordingly, the results of this CATR indicate that the planned bulk power transmission facilities will conform to the applicable NPCC Directory #1 and the NYSRC Reliability Rules.

The next NYISO ATR will re-evaluate the areas of the system impacted by these violations and the associated solutions to maintain the security of the New York State BPTF and supply the projected demand.

Facilities Included in this Review

The system representations of neighboring areas are from the interregional transmission planning coordination conducted under the NPCC and Eastern Interconnection Reliability Assessment Group (ERAG) Multiregional Modeling Working Group (MMWG) processes. For this 2025 CATR, the external area representation is from the 2024 ERAG MMWG series library cases. The New York Control Area (NYCA) system representation is from the NYISO 2025 FERC Form 715 filing power flow models with updates according to the NYISO *2025 Load & Capacity Data Report* (Gold Book) [9].

The New York State BPS, as defined by NPCC and the NYSRC Reliability Rules, is derived from the analysis conducted in accordance with the NPCC Classification of Power System Elements (Document A-10) methodology [10]. NYISO completed a comprehensive reassessment of BPS bus classification in 2025, the results of which are reflected in the 2025 mid-year update to the NPCC BPS Facilities List and approved by NPCC Reliability Coordinating Council in September 2025. The New York BPS

primarily consists of 765 and 345 kV transmission. Some 230 kV, 138 kV, and 115 kV transmission facilities and some facilities below 50 kV connected to BPS generator buses are also considered to be part of the NYS BPS. As part of this review, the NYISO performed simulations in accordance with the NPCC Classification of Power System Elements (Document A-10) methodology [10] to determine any changes in BPS status to existing or planned transmission facilities.

The results of the A-10 testing and the list of BPS facilities are documented in Appendix B.

The BPTF evaluated in this review includes all BPS facilities, as defined by the NPCC and the NYSRC, as well as other transmission facilities that are relevant to planning the New York State transmission system. The BPTF are listed in Appendix A. The remaining non-BPTF transmission facilities are evaluated by the local Transmission Owners and coordinated through the Local Transmission Planning Process contained in the NYISO OATT.

The generation and transmission projects, shown in Figure 1, Figure 2 and Figure 3 below reflect the changes in BPTF since the 2020 CATR. Figure 4 provides a summary of the units that are assumed unavailable to comply with state rules and climate policy. Changes to transmission plans, demand forecast, interchange, generation additions/up-rates, or shutdowns/de-ratings that occurred following the publication of the NYISO *2025 Gold Book* [9] and the 2025 Quarter 3 STAR are captured in the quarterly Short-Term Assessments of Reliability [8]. As appropriate, these changes will also be captured in future Area Transmission Reviews.

Figure 1: Changes in the Bulk Power Transmission Facilities

Bulk Transmission	2020 Comprehensive ATR	2025 Comprehensive ATR
	Included (Y/N)/IS Date (S-Summer W-Winter)	
Leeds-Hurley Series Compensation SDU	Y/2021S	Y/2025S
Rochester Transmission Reinforcement 345 kV Substation (Q#339)	Y/2020W	Y/In-Service
NYSEG Watercure 345/230 kV Transformer	Y/2020W	Y/In-Service
N. Grid Clay – Dewitt 115 kV reconductoring	Y/2021S	Y/In-Service
N. Grid Clay – Teall 115 kV reconductoring	Y/2021S	Y/In-Service
O&R Lovett 345 kV (New Station)	Y/2021S	Y/In-Service
NextEra Energy Transmission Empire State Line Project (Q#545A)	Y/2022S	Y/In-Service
NYSEG Oakdale 345/115/34.5 Transformer	N/2027S	Y/2030W
NYSEG Fraser 345/115 Transformer	Y/2022W	Y/2027S
NYSEG Coopers Corners 345/115 Transformer	N/2025W	Y/In-Service
NYSEG Wood St. 345/115 Transformer	Y/2023W	Y/In-Service
LS/NYPA (Q#556) Segment A Double Circuit	Y/2023W	Y/In-Service (1)
NY Transco (Q#543) Segment B	Y/2023W	Y/In-Service (2)
NYSEG South Perry 230/115 kV Transformer	Y/2022W	Y/2029W
NYPA (Q#1125) Smart Path Connect	N/A	Y/2025W
CHPE LLC (Q631/887)	N/A	Y/2026S
NYPA/TRANSCO (Q1289) Propel NY Alternate Solution 5	N/A	Y/2030S
Con Edison Gowanus - Greenwood Phase Angle Regulator 3	N/A	Y/2025S
Con Edison Gowanus - Greenwood Phase Angle Regulator 4	N/A	Y/2026S
Con Edison Goethals - Fox Hills Phase Angle Regulator	N/A	Y/2025S
Con Edison Astoria East - Astoria Annex reconductoring	N/A	Y/2026S
Con Edison Brooklyn Clean Energy Hub	N/A	Y/2028S
Con Edison Eastern Queens Substation	N/A	Y/2028S
LIPA Ocean Ave - Barrett Series Reactor	N/A	Y/2028S
N. Grid Clay - Lighthouse Hill 115 kV	N/A	Y/2028W
NYPA/Ngrid Stamp Substation	N/A	Y/2026S
NYSEG Stoney Ridge 230/115 xfmr upgrade	N/A	Y/2029S
NYSEG Watercure 345/115 kV Transformer	N/A	Y/2029W
NYSEG Gardenville 230/115 kV Transformer	Y/2023W	N/2030W
Con Edison Rainey - Corona Phase Angle Regulator 2	N/A	Y/In-Service

Notes

1. Final Segment A configuration near Gordon Road will be in service starting 2029S.
2. Dovar PAR portion of the Segment B project will be in service starting 2025S.

Figure 2: Additions/Up-rates in Generation Facilities

Additions/Up-rates	Queue	Size (MW) (1)	2020 Comprehensive	2025 Comprehensive
			ATR	ATR
Included (Y/N)/IS Date				
Cassadaga Wind	387	126.5	Y/2021-12	Y/In-Service
Baron Winds (Phase I)	396	121.8	Y/2021-12	Y/In-Service
Eight Point Wind	422	101.8	Y/2021-12	Y/In-Service
Bell Hill Wind	505	100	Y/2022-12	Y/In-Service
Roaring Brook Wind	546	79.7	Y/2021-12	Y/In-Service
Calverton Solar Energy Center	678	22.9	Y/2021-12	Y/In-Service
Number Three Wind Power	531	103.9	N/A	Y/In-Service
Albany County Solar I	570	20	N/A	Y/In-Service
BlueStone Wind	579	111.8	N/A	Y/In-Service
Albany County Solar II	298	20	N/A	Y/In-Service
High River Solar	618	90	N/A	Y/In-Service
East Point Solar	619	50	N/A	Y/In-Service
South Fork Wind	612/695	136	N/A	Y/In-Service
Pattersonville Solar Facility	638	20	N/A	Y/In-Service
Grissom Solar	682	20	N/A	Y/In-Service
Morris Ridge Solar	717	179	N/A	Y/In-Service
Darby Solar	730	20	N/A	Y/In-Service
Branscomb Solar	731	20	N/A	Y/In-Service
Stillwater Solar	735	20	N/A	Y/In-Service
Regan Solar	748	20	N/A	Y/In-Service
Janis Solar	768	20	N/A	Y/In-Service
Puckett Solar	775	20	N/A	Y/In-Service
Baron Winds (Phase II)	396	117	Y/2021-12	Y/2025-12
Arthur Kill Energy Storage 1	827	15	N/A	Y/2025-12
Flat Hill Solar	865	20	N/A	Y/2025-12
Clear View Solar	1003	20	N/A	Y/2025-12
Dog Corners Solar	584	20	N/A	Y/2026-04
Heritage Wind	571	200.1	N/A	Y/2026-09
KCE NY 10	804	20	N/A	Y/2026-10
Highview Solar	591	20	N/A	Y/2026-11
Excelsior Energy Center	721	280	N/A	Y/2026-11
Sky High Solar	545	20	N/A	Y/2026-12
Hills Solar	581	20	N/A	Y/2026-12
Scipio Solar	590	18	N/A	Y/2026-12
Niagara Solar	592	20	N/A	Y/2026-12
Alle Catt II Wind	596	339.1	N/A	Y/2026-12
Ticonderoga Solar	734	20	N/A	Y/2026-12
CS Hawthorn Solar	832	20	N/A	Y/2026-12
Dolan Solar	833	20	N/A	Y/2026-12
Somers Solar, LLC	1015	20	N/A	Y/2026-12
Millers Grove Solar	1047	20	N/A	Y/2026-12
Hecate Energy Cider Solar LLC	811	500	N/A	Y/2027-01
Valley Solar	828	20	N/A	Y/2027-01
Rock District Solar	564	20	N/A	Y/2027-02
Watkins Rd Solar	586	20	N/A	Y/2027-02
Bear Ridge Solar	704	100	N/A	Y/2027-04
Greene County 1	572	20	N/A	Y/2027-06
Greene County 2	573	10	N/A	Y/2027-06
NY13 Solar	855	20	N/A	Y/2027-06
Empire Wind 1	737	816	N/A	Y/2027-07
Sunrise Wind LLC	766/987	924	N/A	Y/2027-07
Brookside Solar	880	100	N/A	Y/2027-12
Trelina Solar Energy Center	720	80	N/A	Y/2028-04
Gamet Energy Center	883	200	N/A	Y/2028-04
Hemlock Ridge Solar	950	200	N/A	Y/2028-04
Fairway Solar	848	20	N/A	Y/2028-05
Grassy Knoll Solar	885	20	N/A	Y/2028-05
Somerset Solar	1079	125	N/A	Y/2028-06

Notes

1. MW size from the 2025 Gold Book

Figure 3: Completed Generator Deactivations

Owner/ Operator	Plant Name	Zone	Nameplate (MW)	CRIS (MW)		Capability (MW)		Status	Deactivation Date (5) (2020 ATR)	Deactivation Date (2) (2025 ATR)	STAR Evaluation (3)
				Summer	Winter	Summer	Winter				
International Paper Company	Ticonderoga (1)	F	9.0	7.6	7.5	9.5	9.8	I	5/1/2017	5/1/2017	-
Helix Ravenswood, LLC	Ravenswood 2-4	J	42.9	39.8	50.6	30.7	41.6	I	4/1/2018	4/1/2018	-
	Ravenswood 3-1	J	42.9	40.5	51.5	31.9	40.8	I	4/1/2018	4/1/2018	-
	Ravenswood 3-2	J	42.9	38.1	48.5	29.4	40.3	I	4/1/2018	4/1/2018	-
	Ravenswood 3-4	J	42.9	35.8	45.5	31.2	40.8	I	4/1/2018	4/1/2018	-
Rockville Centre, Village of	Charles P Keller 07	K	2.0	2.0	2.0	1.9	1.9	R	3/1/2019	3/1/2019	-
Exelon Generation Company LLC	Monroe Livingston	B	2.4	2.4	2.4	2.4	2.4	R	9/1/2019	9/1/2019	-
Innovative Energy Systems, Inc.	Steuben County LF	C	3.2	3.2	3.2	3.2	3.2	R	9/1/2019	9/1/2019	-
Consolidated Edison Co. of NY, Inc	Hudson Ave 4	J	16.3	13.9	18.2	14.0	16.3	R	9/10/2019	9/10/2019	-
New York State Elec. & Gas Corp.	Auburn - State St	C	7.4	5.8	6.2	4.1	7.3	R	10/1/2019	10/1/2019	-
Somerset Operating Company, LLC	Somerset	A	655.1	686.5	686.5	676.4	684.4	R	3/12/2020	3/12/2020	-
Energy Nuclear Power Marketing, LLC	Indian Point 2	H	1,299.0	1,026.5	1,026.5	1,011.5	1,029.4	R	4/30/2020	4/30/2020	-
Cayuga Operating Company, LLC	Cayuga 1	C	155.3	154.1	154.1	151.0	152.0	R	6/4/2020	6/4/2020	-
Energy Nuclear Power Marketing, LLC	Indian Point 3	H	1,012.0	1,040.4	1,040.4	1,036.3	1,038.3	R	4/30/2021	4/30/2021	-
Helix Ravenswood, LLC	Ravenswood GT 11	J	25.0	20.2	25.7	16.1	22.4	I	5/1/2023	12/1/2021	2022 Q1
Helix Ravenswood, LLC	Ravenswood GT 1	J	18.6	8.8	11.5	7.7	11.1	I	5/1/2023	1/1/2022	2022 Q1
Freeport Electric	Freeport 1-4	K	6.0	4.4	4.4	4.5	5.0	R	I/S	5/1/2022	-
Exelon Generation Company LLC	Madison County LF	E	1.6	1.6	1.6	1.6	1.6	I	I/S	4/1/2022	2022 Q2
Nassau Energy, LLC	Trigen CC	K	55.0	51.6	60.1	38.5	51.0	R	I/S	7/15/2022	2022 Q2
Consolidated Edison Co. of NY, Inc.	Hudson Ave 3	J	16.3	16.0	20.9	12.3	15.6	R	11/01/2019 (I)	11/1/2022	2022 Q2
Consolidated Edison Co. of NY, Inc.	Hudson Ave 5	J	16.3	15.1	19.7	15.3	18.6	R	5/1/2023	11/1/2022	2022 Q2
Astoria Generating Company, L.P.	Gowanus 1-1 through 1-8	J	160.0	138.7	181.1	133.1	182.2	R	5/1/2023	11/1/2022	2022 Q2
Astoria Generating Company, L.P.	Gowanus 4-1 through 4-8	J	160.0	140.1	182.9	138.8	183.4	R	5/1/2023	11/1/2022	2022 Q2
NRG Power Marketing LLC	Astoria GT 2-1 through 2-4	J	186.0	165.8	204.1	138.0	184.2	R	5/1/2023	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 3-1 through 3-4	J	186.0	170.7	210.0	139.1	180.4	R	5/1/2023	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 4-1 through 4-4	J	186.0	167.9	206.7	138.5	178.6	R	5/1/2023	5/1/2023	2022 Q2
Helix Ravenswood, LLC	Ravenswood 10	J	25.0	21.2	27.0	16.1	20.3	R	5/1/2023	5/1/2023	2022 Q3
Helix Ravenswood, LLC	Ravenswood 01	J	18.6	8.8	11.5	7.7	11.1	R	5/1/2023	10/14/2023	2023 Q3
Helix Ravenswood, LLC	Ravenswood 11	J	25.0	20.2	25.7	16.1	22.4	R	5/1/2023	10/14/2023	2023 Q3
Astoria Generating Company, L.P.	Gowanus 3-6	J	20.0	17.6	23.0	16.4	20.4	I	4/1/2025	4/1/2025	2025 Q2
Astoria Generating Company, L.P.	Narrows 2-1 and 2-7	J	44.0	40.1	52.3	37.9	48.8	I	5/1/2025	5/1/2025	2025 Q2
Consolidated Edison Co. of NY, Inc.	74th St. GT 1 & 2	J	37.0	39.1	49.2	37.8	43.6	R	5/1/2023	5/1/2023	2022 Q2
Consolidated Edison Co. of NY, Inc.	59 St. GT 1 (4)	J	17.1	15.4	20.1	13.9	17.4	R	5/1/2025	5/1/2025	-
Western New York Wind Corp	Western NY Wind Power	B	6.6	0.0	0.0	0.0	0.0	R	I/S	10/15/2023	2023 Q3
Central Hudson Gas & Electric Corp.	South Cairo GT	G	21.6	19.8	25.9	18.7	23.1	R	5/1/2023	3/31/2024	2023 Q4
Cubit Power One Inc.	Arthur Kill Cogen	J	11.1	11.1	11.1	11.1	10.2	I	I/S	3/2/2024	2024 Q2
NRG Power Marketing, LLC	Arthur Kill GT 1 (4)	J	20	16.5	21.6	12.4	16.1	R	5/1/2025	5/1/2025	-
Eastern Generation, LLC	Astoria GT 01	J	16	15.7	20.5	13.8	17.6	R	5/1/2025	5/1/2025	2024 Q3
Madison Windpower, LLC	Madison Windpower	E	11.6	11.5	11.5	11.6	11.6	R	I/S	5/1/2025	2025 Q1
Casella Waste Systems, Inc	Hyland LFGE	B	4.8	4.8	4.8	4.8	4.8	I	I/S	6/1/2025	2025 Q3
Total			4,628.5	4,239.3	4,576.0	4,035.3	4,410.0				

Notes

- (1) Part of SCR program
 - (2) This table only includes units that have entered into IIFO (I) or have completed the generator deactivation process (R).
 - (3) "*" denotes that the generator deactivation was assessed prior to the creation of the Short-Term Reliability Process
 - (4) Unit no longer subject to NYISO dispatch and is used for local reliability only.
 - (5) Proposed status change date due to DEC Peaker Rule or date as proposed in the deactivation notice.
- I/S - In-service

Figure 4: Proposed Generator Deactivations

Owner/ Operator	Plant Name	PTID	Zone	Nameplate (MW)	CRIS (MW)		Capability (MW)		Status (2020 ATR)	Status (2025 ATR)	Deactivation Date(2)	STAR Evaluation
					Summer	Winter	Summer	Winter				
Central Hudson Gas & Electric Corp.	Coxsackie GT	23611	G	21.6	21.6	26.0	19.7	25.2	5/1/2023 (R)	R	12/31/2025 (5) (1)	2024 Q1
MPH Cross Island Power, LLC	Pinelawn Power 1	323563	K	82.0	78.0	78.0	73.6	76.5	I/S	R	11/1/2025 (1)	2025 Q3
MPH Rockaway Peakers, LLC	Far Rockaway GT1	24212	K	60.5	53.5	73.1	48.9	52.6	I/S	R	11/1/2025 (1)	2025 Q3
MPH Rockaway Peakers, LLC	Far Rockaway GT2	23815	K	60.5	55.4	75.7	55.7	59.0	I/S	R	11/1/2025 (1)	2025 Q3
Astoria Generating Company, L.P.	Gowanus 2-1 through 2-8	24114-24121	J	160.0	152.8	199.6	142.2	182.5	5/1/2025 (R)	R	7/14/2026 (1)	2025 Q3
Astoria Generating Company, L.P.	Gowanus 3-1 through 3-8 (3)	24122-24129	J	160.0	129.2	168.7	123.8	159.7	5/1/2025 (R)	R	7/14/2026 (1)	2025 Q3
Astoria Generating Company, L.P.	Narrows 1-1 through 2-8 (4)	24228-24243	J	352.0	269.0	351.3	250.4	323.7	5/1/2025 (R)	R	7/14/2026 (1)	2025 Q3
National Grid	Shoreham 1	23715	K	52.9	48.9	63.9	46.0	50.7	I/S	R	5/1/2027 (7)	
National Grid	Shoreham 2	23716	K	18.6	18.5	23.5	16.7	21.3	I/S	R	5/1/2027 (7) (8)	2025 Q1
New York Power Authority	Gowanus 5	24156	J	47.0	45.4	45.4	40.0	40.0	I/S	R	12/31/2030 (6)	
New York Power Authority	Gowanus 6	24157	J	47.0	46.1	46.1	39.9	39.9	I/S	R	12/31/2030 (6)	
New York Power Authority	Kent	24152	J	47.0	46.9	46.9	45.7	46.0	I/S	R	12/31/2030 (6)	
New York Power Authority	Pouch	24155	J	47.0	47.1	47.1	44.7	46.0	I/S	R	12/31/2030 (6)	
New York Power Authority	Hellgate 1	24158	J	47.0	45.0	45.0	39.9	39.9	I/S	R	12/31/2030 (6)	
New York Power Authority	Hellgate 2	24159	J	47.0	45.0	45.0	39.6	40.0	I/S	R	12/31/2030 (6)	
New York Power Authority	Harlem River 1	24160	J	47.0	46.0	46.0	39.9	39.9	I/S	R	12/31/2030 (6)	
New York Power Authority	Harlem River 2	24161	J	47.0	45.2	45.2	39.6	40.0	I/S	R	12/31/2030 (6)	
New York Power Authority	Vernon Blvd 2	24162	J	47.0	46.2	46.2	40.0	40.0	I/S	R	12/31/2030 (6)	
New York Power Authority	Vernon Blvd 3	24163	J	47.0	43.8	43.8	39.9	39.9	I/S	R	12/31/2030 (6)	
New York Power Authority	Brentwood	24164	K	47.0	47.1	47.1	45.0	46.0	I/S	R	12/31/2030 (6)	

Notes:

- (1) Units that have proposed to Retire or enter Mothball Outage and have a completed generator deactivation notice but have yet to complete the generator deactivation process.
- (2) Date in which the generator proposed to Retire (R) or enter Mothball Outage (MO).
- (3) Does not include Gowanus GT 3-6. Gowanus GT 3-6 IIFO was studied as part of the 2025 Q2 STAR.
- (4) Does not include Narrows GT 2-1 and 2-7. Narrows GT 2-1 and 2-7 IIFOs were studied as part of the 2025 Q2 STAR.
- (5) In March 2024, Central Hudson submitted an update to its DEC peaker compliance plan to extend the retirement date of Coxsackie GT to December 31, 2025 until a permanent transmission and distribution solution to local non-BPTF transmission security issues is completed.
- (6) The 2023-2024 Enacted New York State Budget legislation amended the Power Authority Act to require the New York Power Authority (NYPA) to publish a transition plan by May 2025 to phase out electrical production from its eleven "small natural gas power plants" and to cease electricity production from those plants using natural gas by 12/31/2030 unless NYPA determines that such plant or plants are needed for emergency power service or electric system reliability, or existing or proposed replacement generation resources would result in more than a de minimis net increase of emissions of CO2 or criteria air pollutants within a disadvantaged community. NYPA will solicit public input on proposed plant deactivation decisions, which will be made on a plant-by-plant basis. Deactivation notices must be filed timely with the NYISO for each deactivation. For additional information see <https://legislation.nysenate.gov/pdf/bills/2023/S4006C> (Part QQ §5 on page 126). These units have not yet submitted Generator Deactivation Notices, but were modeled as out of service beginning in December 2030.
- (7) In the original compliance plan submittals to the DEC in early 2020, the plan for this unit was to install water injection by May 2023. In June 2021, National Grid Generation amended their compliance plan to eliminate the water injection upgrade with a scheduled retirement on or before May 2023. In August
- (8) This unit initially proposed retirement on December 6, 2024, but has since rescinded its Generator Deactivation Notice. The Generator is not currently participating in the ISO-Administered markets.

For this 2025 CATR, the Consolidated Edison Company of New York (Con Edison) series reactors located in Zones I and J are operated in the configuration shown in Figure 5 below, which also includes a comparison to the 2020 CATR assumptions.

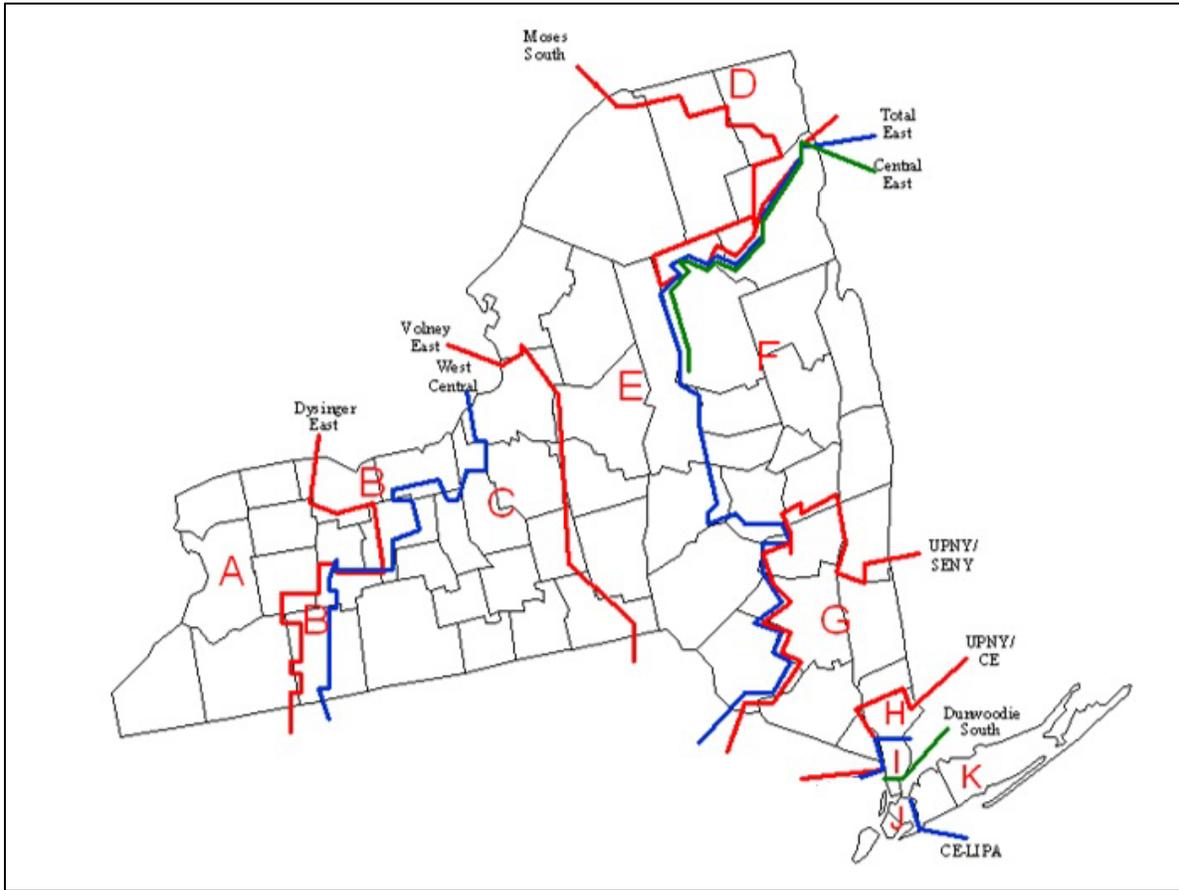
Figure 5: Con Edison Series Reactor Configuration

Series Reactor Terminals		ID	kV	2025 Summer Configuration from 2020 CATR	2030 Summer Configuration from 2025 CATR	2030 Winter and Spring Configuration from 2025 CATR
Gowanus	Farragut	41	345	In-Service	Bypassed	In-Service
Gowanus	Farragut	42	345	In-Service	Bypassed	In-Service
Sprainbrook	East Garden City	Y49	345	In-Service	Bypassed	Bypassed
Sprainbrook	W. 49 th St	M51	345	Bypassed	In-Service	Bypassed
Sprainbrook	W. 49 th St	M52	345	Bypassed	In-Service	Bypassed
Dunwoodie	Mott Haven	71	345	Bypassed	In-Service	Bypassed
Dunwoodie	Mott Haven	72	345	Bypassed	In-Service	Bypassed

Interface Definitions

The NYISO monitors and evaluates the ten major interfaces between the zones within the NYCA. Figure 6 below geographically depicts the NYCA interfaces and Locational Based Marginal Pricing (LBMP) load zones. The NYCA planning interfaces are: Dysinger East, West Central, Volney East, Moses South, Central East, Total East, UPNY-SENY, UPNY-ConEd, Sprainbrook-Dunwoodie South, and Long Island Import. The NYISO also evaluates the interfaces between the NYCA and all neighboring systems: IESO (Ontario), ISO-New England, and PJM. The Planning Interfaces are described in Appendix C.

Figure 6: NYCA Interfaces and LBMP Load Zones



Scheduled Transfers

Figure 7 below lists the NYCA scheduled inter-Area transfers modeled in all study cases between the NYCA and each neighboring system for study year 2030.

Figure 7: NYCA Scheduled Inter-Area Transfers

Region		Transaction (MW) (2)		
From	To	2030 Summer	2030 Spring Light Load	2030-31 Winter
NYCA	NE	83	83	83
NYCA	HQ (1)	-2,360	0	0
NYCA	PJM	-817	-157	-817
NYCA	Ontario	0	0	0

Notes

1. The Champlain Hudson Power Express project has an in-service date of summer 2026 and is expected to provide 1,250 MW in summer and 0 MW in winter.
2. Negative value indicates the amount of power flowing into NYCA while a positive value indicates power flowing into external areas.

Load and Capacity Forecast

Figure 8 provides a comparison of the statewide system margins under summer peak baseline normal weather expected load conditions from the 2020 CATR, as well as this 2025 CATR. The statewide system margin is a measure of the amount of generation and net imports available to supply firm load over the bulk power transmission system within applicable normal ratings and limits while maintaining 10-minute operating reserves for a certain system condition (i.e., summer peak and winter peak demand). A negative statewide system margin, on its own, is not a criteria violation under NPCC Directory #1 and the NYSRC Reliability Rules, but it is a leading indicator of the system's inability to securely serve demand under normal operations.

The statewide system margin is a measure of the amount of generation and net imports available to supply firm load within the BPTF within applicable normal ratings and limits (i.e., normal transfer criteria) while maintaining 10-minute operating reserves. The calculation includes load plus losses, plus the largest loss-of-source contingency (i.e., total capability requirement) minus the NYCA generation, NYCA generation derates, temperature-based generation derates, and external area interchanges (i.e., total resources). The NYCA generation (from line-item A) is comprised of the existing generation plus (a) additions of future generation resources that meet the reliability planning process base case inclusion rules, (b) removal of generation that has completed a generator deactivation notice, and (c) removal of generating units to comply with state rules and climate policy that are anticipated to be unavailable during the summer capability period. For the 2025 CATR, the external area interchange increases by 1,250 MW (line-item D) starting summer 2026 due to the inclusion of the Champlain Hudson Power Express (CHPE) project that provides power from Hydro Québec to New York City. For the year 2030, the statewide system margin is higher in this 2025 CATR than from the 2020 CATR.

Over the next two decades, numerous new large loads are expected to interconnect to the New York system. These large loads are concentrated in upstate New York. Most of these new loads consist of manufacturing facilities and data centers. Some large load projects, however, do not always require the entire amount of the load to be served for all hours or during peak system demand. One key assumption used for this 2025 CATR, consistent with the 2024 RNA [11] and 2025 Q3 STAR [3], is that cryptocurrency mining large loads are modeled as flexible during system peak demand conditions.

In addition to the summer peak baseline normal weather expected load conditions, some assessments in this review evaluate a summer heatwave condition (90th percentile), winter peak

under normal weather conditions, or a daytime spring light load condition. The 90th percentile forecast of the 2030 coincident summer peak load used in the Extreme Condition assessment of this review can be found in Table I-7a of the 2025 Gold Book [9] . The 2030-31 winter peak coincident load forecast used in the Extreme Condition assessment of this review can be found in Table I-3b of the 2025 Gold Book [9]. The 2030 daytime spring light load forecast used in the steady-state and stability transmission security analyses in this review is described in a May 2025 NYISO Load Forecasting Task Force meeting presentation [12].

Figure 8: Load and Capacity Forecast

	Line	Item	Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2020 Comprehensive ATR	A	NYCA Generation (1)	37,653	38,200	37,473	37,473	36,867	36,867	36,867	36,867	36,867	36,867
	B	NYCA Generation Derates (2)	(4,160)	(5,156)	(5,177)	(5,178)	(5,116)	(5,116)	(5,116)	(5,116)	(5,116)	(5,117)
	C	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
	D	External Area Interchanges (3)	1,844	1,844	1,844	1,844	1,844	1,844	1,844	1,844	1,844	1,844
	E	Total Resources (A+B+C+D)	34,887	34,887	34,140	34,139	33,595	33,595	33,595	33,595	33,595	33,594
	F	Load Forecast	(32,129)	(32,128)	(31,918)	(31,838)	(31,711)	(31,670)	(31,673)	(31,756)	(31,865)	(31,992)
	G	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
	H	Total Capability Requirement (F+G)	(33,439)	(33,438)	(33,228)	(33,148)	(33,021)	(32,980)	(32,983)	(33,066)	(33,175)	(33,302)
	I	Statewide System Margin (E+H)	1,448	1,449	912	991	574	615	612	529	420	292

	Line	Item	Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)									
			2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
2025 Comprehensive ATR	A	NYCA Generation (1a)	37,705	40,383	41,687	41,687	41,687	41,233	41,233	41,233	41,233	41,233
	B	NYCA Generation Derates (2a)	(6,700)	(9,123)	(10,292)	(10,318)	(10,343)	(10,322)	(10,347)	(10,347)	(10,373)	(10,373)
	C	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
	D	External Area Interchanges (3)	3,208	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919
	E	Total Resources (A+B+C+D)	34,212	34,179	34,314	34,289	34,263	33,830	33,804	33,804	33,779	33,779
	F	Load Forecast	(31,305)	(31,595)	(31,725)	(31,935)	(32,225)	(32,505)	(32,835)	(33,185)	(33,485)	(33,815)
	G	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
	H	Total Capability Requirement (F+G)	(32,615)	(32,905)	(33,035)	(33,245)	(33,535)	(33,815)	(34,145)	(34,495)	(34,795)	(35,125)
	I	Statewide System Margin (E+H)	1,597	1,274	1,279	1,044	728	15	(341)	(691)	(1,016)	(1,346)

Notes:

1. Reflects the 2020 Gold Book existing summer capacity plus projected additions and deactivations.
 - 1a. Reflects the 2025 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2020 Gold Book Table I-9a) and solar PV peak reductions (2020 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORD data published August 2019 (<https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx>).
- 2a. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2024 Gold Book Table I-9a) and solar PV peak reductions (2024 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORD data published August 2023 (<https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx>).
3. Interchanges are based on ERAG MMWG values.
4. Reflects the 2025 Goldbook coincident summer peak demand forecast with flexible large loads modeled offline.

Steady State and Stability Conformance Assessment

The Steady State Assessment consists of thermal transfers, voltage transfers, and transmission security analyses. The Stability Assessment consists of stability transfer and transmission security analyses. A summary of the planning transfer capability is also discussed in this section.

Steady State and Stability Methodology

The analysis for this 2025 CATR is conducted in accordance with NPCC Directory #1 [1] and NYSRC Reliability Rules [2] planning criteria. The NYISO follows specific guidelines regarding the NYISO methodology for evaluating the performance of the BPTF. Guidelines specific to thermal transfer limits, voltage transfer limits, and stability analysis are found in the NYISO Transmission Expansion and Interconnection Manual [7]. These guidelines conform to NPCC Directory #1, “Appendix B – Guidelines and Procedures for NPCC Area Transmission Reviews” [1] and the NYSRC Reliability Rules, “NYSRC Procedure for New York Control Area Transmission Reviews” [2]. The steady state and stability assessments respect all known planning horizon System Operating Limits (SOLs). The methodology used to establish SOLs is provided in the NYISO’s Process to Establish and Communicate System Operating Limits document [13].

The procedure to evaluate the performance of the BPTF consists of the following basic steps:

1. Develop a mathematical model (or representation) of the NYCA and external electrical systems for the study period (in this case, the year 2030);
2. Develop various power flow study cases to model the system conditions (load and power transfer levels, commitment and dispatch of generation and reactive power devices) to be tested; and
3. Conduct steady state power flow and stability analysis to determine if the performance of the New York State BPTF, as modeled, meets the applicable Reliability Standards [1] [2].

Description of Steady State and Stability Cases

The steady state power flow and stability models for evaluating the BPTF performance are developed from 2024 ERAG MMWG series databases. The NYCA system representation is derived from the NYISO 2025 FERC Form 715 filing. Changes are made to the NYCA system representation to reflect the updates included in the NYISO 2025 Gold Book [9]. Extended planned outages known at the start of the study, as included in the 2025 Quarter 3 STAR, are incorporated into the system model. Generation is dispatched to match load plus system losses while respecting transmission

security. Additionally, renewable generator dispatch is consistent with the assumptions used in the Reliability Planning Process, which are reviewed by NYISO stakeholders [14]. Specifically, in the summer peak cases, the land-based wind, offshore wind and solar generators were dispatched at 5%, 10% and 15% of their capacity, respectively. Similarly, for the winter case, the land-based wind and offshore wind were dispatched at 15% and 20% of their capacity, respectively, and solar generation was considered offline. For the daytime spring light load case, the land-based wind, offshore wind and solar generation were dispatched at 10%, 15% and 68% of their capacity, respectively. In addition, the daytime spring light load case models behind-the-meter solar generation and gross load levels. Details of the gross load and behind-the-meter generation are provided in Appendix D.

For this 2025 CATR, the load is modeled as constant power in all NYCA zones except the Con Edison service territory. The Con Edison voltage-varying load model is used to model the load in their service territory for all cases. Demand response is not considered to be available.

As part of the base case development process, transmission security analysis is performed on the base case using PowerGEM TARA software. If thermal or voltage violations are observed on the BPTF, system adjustments (e.g., generator output or Phase Angle Regulator (PAR) taps) are made to satisfy the NPCC Directory #1 and NYSRC Reliability Rules planning criteria. This report documents this analysis.

Summer peak load stability transfer cases are created from the 2030 summer peak load case. To confirm that power transfer levels will not be restricted by a stability constraint, the stability transfer cases are developed such that the simulation is conducted at a value of at least ten percent above the controlling thermal or voltage-based transfer limit [7].

The extreme contingency steady state and stability cases are developed from their 2030 summer peak cases, respectively, with the intra-area interface flows adjusted to values not expected to be exceeded more than 25% of the time, but not more than the Normal Transfer Limit identified in this study.

The extreme system condition steady state and stability study cases are developed from the 2030 summer peak and 2030 winter peak load base cases. The extreme weather condition evaluated is a summer peak load condition that is expected to occur no more than once in 10 years. To model the 90th percentile load, the load was increased in the 2030 summer peak case to meet the forecasted statewide coincident high peak load (i.e., 90th percentile load – forecasted to be 34,768 MW at coincident peak). The generating unit fuel shortage under normal weather peak conditions evaluated is a winter peak representation with loss of gas fuel supply modeled. To model the loss of gas scenario

in the winter case, a total of 8,465 MW of gas generation was modeled offline.

Figure 9 below provides a summary of the power flow schedule on the inter-area controllable ties in the study cases. Diagrams and descriptions of the study cases can be found in Appendix D.

Figure 9: Schedules on Inter-Area Controllable Devices

Location	MW Schedule ²			
	2020 Forecast for 2025 Summer	2025 Forecast for 2030 Summer	2025 Forecast for 2030 Spring	2025 Forecast for 2030-31 Winter
Ramapo PAR 1 ¹	135	135	0	85
Ramapo PAR 2 ¹	135	135	0	85
St. Lawrence PARs (L33/34)	0	0	0	0
Sandbar PAR (PV-20)	0	0	0	0
Goethals PAR (A2253) ¹	-11	-11	-11	-11
Farragut PAR 1 (B3402) ¹	Out-of-Service	Out-of-Service	Out-of-Service	Out-of-Service
Farragut PAR 2 (C3403) ¹	Out-of-Service	Out-of-Service	Out-of-Service	Out-of-Service
Linden VFT	315	315	315	315
Hudson Transmission HVDC	0	0	0	0
Neptune HVDC	660	660	0 ⁵	660
Cross Sound Cable HVDC	96	0	0	0
Northport PAR	0	0	0	0
Chateauguay HVDC ⁶	825	600	0	0
Blissville PAR	0	0	0	0
Waldwick PAR 1 ¹	-8	-8	-8	-8
Waldwick PAR 2 ¹	-8	-8	-8	-8
Waldwick PAR 3 ¹	-8	-8	-8	-8
CHPE ³	NA	1250	0	0
Dover PARs ⁴	NA	25	25	25
Hillside PAR ¹	NA	0	0	0

Notes:

1. Phase angle regulator is scheduled according to the NYISO and PJM Joint Operating Agreement.
2. MW Schedule towards PJM is negative and towards NY is positive.
3. For this assessment CHPE has an in-service date of summer 2026 and is expected to provide 1,250 MW in summer and 0 MW in spring and winter.
4. Dover PAR has a planned in-service date in summer 2025; prior to this element being in service, the connection from Cricket Valley to ISO-NE Long Mountain is an uncontrolled line.
5. To maintain the voltages in LIPA in off-peak cases, Neptune is disconnected and instead LIPA generators were used to supply 660 MW.
6. The import from HQ to NY at Chateauguay includes the net flow on the Chateauguay HVDC and Chateauguay generation synchronous with NYCA. The net flow in both the 2020 and 2025 CATR was 1,100 MW.

Thermal Transfer Limit Analysis

Methodology

Thermal transfer limit analysis is performed using the PowerGEM TARA program, which utilizes the Proportional Scale Transfer activity by shifting generation across the interface under evaluation. The thermal transfer limit analysis is performed on the 2030 summer peak load base case consistent with NYISO Transmission Expansion and Interconnection Manual [7] and NYISO's Process to Establish and Communicate System Operating Limits¹ [15]. The thermal transfer limit of an interface is the maximum power transfer achievable without causing either a pre-contingency or post-contingency overload of any transmission facility. A decrease in transfer capability compared to the previous CATR is not a criteria violation but indicates that expected system changes may constrain the amount of possible power transfer on a given interface. A listing of NYCA intra-area and inter-area interface definitions used for this 2025 CATR is provided in Appendix C.

The thermal transfer limit analysis monitors transmission facilities above 100 kV, including all BPTF elements under contingency conditions while shifting power across interfaces within NYCA and neighboring systems. A listing of NYCA intra-area and inter-area interface definitions used for this 2025 CATR is provided in Appendix C.

The thermal transfer limit analysis evaluates the impact of over 8,000 planning design criteria contingencies. Neighboring system design criteria contingencies are also included, as appropriate, to evaluate their impact on thermal transfer limits. The contingencies evaluated include the most severe impedance changes and include the majority of possible contingencies on the BPTF system. The applied contingencies are modeled to simulate the removal of all elements that the protection system and other automatic controls would disconnect without operator intervention. The list of these contingencies is provided in Appendix D.

For thermal transfer limit analysis, tap settings of PARs and auto-transformers regulate power flow and voltage, respectively, in the pre-contingency solution, but are fixed at their corresponding pre-contingency settings in the post-contingency solution. Similarly, switched shunt capacitors and reactors are switched at pre-determined voltage levels in the pre-contingency solution, but are held at their corresponding pre-contingency position in the post-contingency solution.

Thermal transfer limits are sensitive to the base case load and generation conditions, generation

¹ One deviation from the NYISO's Process to Establish and Communicate System Operating Limits used for this assessment as a conservative planning assumption is that all NYISO secured elements (including less than 200 kV) are secured to the LTE rating, not STE, for normal transfer criteria.

selection utilized to create the transfer, PAR schedules, and inter-Area power transfers. No attempts are made to optimize transfer limits; therefore, these parameters are not varied to determine an optimal dispatch. PAR schedules were adjusted to achieve shifts across the evaluated interfaces in the direction of the transfer.

To determine the transfer capability, the generation resources in the source and sink areas are adjusted uniformly to allow for equal participation of aggregated generators based on their reserve power ratio (i.e., difference between maximum power capability and power generation output of the unit). Wind, solar, battery, nuclear, pumped storage and run-of-river hydro units are excluded from generation shifts as part of source areas. Wind and solar are included in generation shift as part of sink areas. The general direction of generation shifts is from the north and west to southeastern New York. The results are based on deterministic summer peak load power flow analysis and may not be applicable for use in probabilistic resource adequacy analysis.

Normal transfer criteria represent the standard, non-emergency operating limits for transmission interfaces and facilities. Normal transfers are evaluated against all design criteria events with rate B as applicable rating.

Emergency transfer criteria allow NYISO to temporarily exceed normal transfer limits when adequate facilities are not available to serve firm load within normal criteria. This is done only to preserve system reliability and avoid loss of load. Emergency transfers are evaluated only against single-element outages with rate C as applicable rating.

Analysis Results

Figure 10, Figure 11, Figure 12, and Figure 13 summarize the normal and emergency thermal transfer limits determined for the NYCA intra-area and inter-area transmission interfaces. Only open interface limits are reported in the table. The assessment of thermal Transfer Capability demonstrates that the BPTF system meets the applicable NERC, NPCC, and NYSRC Reliability Rules [7], [1], [2] with respect to thermal ratings. The BPTF system transmission security is maintained by limiting power transfers according to the determined thermal constrained transfer limits. The following provides explanations for changes in transfer limits of greater than 100 MW. Details regarding the thermal transfer limit analysis are provided in Appendix E. All study assumptions used for this assessment are described earlier in this report and include several key changes such as the Q1125 Smart Path Connect project, Q1289 Propel NY Alternate Solution 5 project, Q631/Q887 CHPE project, generator deactivations, and large load projects.

Changes to Dysinger East, West Central, and Volney East limits are influenced by load interconnection projects in western New York, the Dysinger PAR schedule, and new renewable projects along the 345 kV path in western New York that result in changes in the flow pattern across these interfaces.

- Dysinger East interface's emergency transfer limits decreased compared to the 2020 CATR. The Dysinger East Interfaces' transfer limits are sensitive to the Empire State Line (Dysinger) PAR schedule. For this assessment, the Empire State Line PAR was scheduled at 200 MW from Dysinger 345 kV substation to the East Stolle 345 kV substation. No attempt was made to optimize the Dysinger PAR schedule. The interface limits are also impacted by large loads in Western New York.
- The West Central interface's normal and emergency transfer limits increased compared to the 2020 CATR. The West Central interfaces' transfer limits are sensitive to the Empire State Line (Dysinger) PAR schedule. For this assessment, the Empire State Line PAR was scheduled at 200 MW from Dysinger 345 kV substation to the East Stolle 345 kV substation. No attempt was made to optimize the Dysinger PAR schedule. The interface limits are also impacted by large loads in western New York, zonal load changes and new renewable projects along the 345 kV interface path.
- The Volney East interface's normal and emergency transfer limits increased compared to the 2020 CATR. This is primarily due to large loads in western New York, zonal load changes and new renewable projects along the 345 kV interface path.
- Moses South interface's normal and emergency transfer limits increased compared to the 2020 CATR. This increase is primarily due to the addition of Q1125 Smart Path Connect project.
- The Central East interface's emergency limit increased compared to the 2020 CATR, this is due to the increased ratings on a previous limiting element.
- The Total East interface's normal and emergency limit increased compared to the 2020 CATR. This is due to the addition of Q631/Q887 CHPE project.
- The UPNY-SENY interface's normal transfer limit increased, and emergency transfer limit decreased when compared to the 2020 CATR. This is due to a combination of changes to the local 138 kV system along with increased ratings on a previous limiting element.
- The UPNY-Con Edison interface's normal transfer limit increased, and emergency transfer limit decreased when compared to the 2020 CATR. The increase in the normal transfer limit is primarily due to differences in local topology, and updates to equipment parameters. The decrease of the emergency transfer limit is primarily due to reduced ratings on the identified limiting element and other elements along the interface.

- The Sprainbrook-Dunwoodie – South interface’s normal transfer limit decreased compared to the 2020 CATR. This is due to the change in status of series reactors and generator retirements.
- Long Island import interface’s normal and emergency transfer limit increased compared to 2020 CATR. The increase is due to the addition of Q1289 Propel NY Alternate solution 5 project.

When analyzing the inter-area transfer limits, generation dispatch assumptions in neighboring areas can have a significant impact. Pre-shift generation dispatch in neighboring Control Areas dictates generation participation factors in generation-to-generation shifts. If generation close to the NYCA border participates more as a source or a sink, transmission lines in the vicinity of the source or sink may appear to be more or less limiting. Overloads on the underlying 138 kV or 115 kV circuits were not considered limiting elements if they are not directly related to the transfer path under study. The following provides explanations for changes in inter-Area transfer limits of greater than 100 MW:

- The New York-New England interface’s normal transfer limit decreased compared to the 2020 CATR. This is primarily due to the change in location of the new PARs at the Dover 345 kV station compared to the 2020 CATR.
- The New England–New York interface’s normal and emergency transfer limit decreased compared to the 2020 CATR. This is primarily due to the change in location of the new PARs at the Dover 345 kV station compared to the 2020 CATR.
- The Ontario–New York interface’s normal transfer limit increased compared to the 2020 CATR. This increase is due to the change in the Empire State Line PAR schedule. For this assessment, the Empire State Line PAR was scheduled at 200 MW from Dysinger 345 kV substation to the East Stolle 345 kV substation. No attempt was made to optimize the Dysinger PAR schedule.
- The Ontario–New York interface’s emergency transfer limit decreased compared to the 2020 CATR. This decrease is due to the change in STE ratings of the secured elements along the interface. The interface’s transfer limits are sensitive to the Empire State Line PAR schedule. For this assessment, the Empire State Line PAR was scheduled at 200 MW from Dysinger 345 kV substation to the East Stolle 345 kV substation. No attempt was made to optimize the Dysinger PAR schedule.
- The New York-PJM interface’s normal and emergency transfer limit increased compared to the 2020 CATR. This is primarily due to the changes to tie-line topology between New York and PJM along with PJM generation dispatch changes due to retirements.

Figure 10: Normal Transfer Criteria Intra–Area Thermal Transfer Limits

Interface	2020 Comprehensive ATR	2025 Comprehensive ATR	Limiting Constraint 2020 Comprehensive ATR	Limiting Constraint 2025 Comprehensive ATR
Dysinger East	1800 (A)	1800 (F)	Niagara- Packard 230 kV (61) at 846 MW STE rating for L/O Niagara - Packard 230 kV (62) and Packard - Beck 230 kV (76)	Niagara - Dysinger 345 kV (ND1) at 1501 MW LTE for L/O Niagara - Dysinger 345kV (ND2)
West Central	575 (A)	900 (F)		
Volney East	5000	5275	Fraser–Coopers Corners 345 kV (33) at 1,721 MW LTE rating for L/O Edic-Princeton 345 kV	Fraser - Coopers Corners 345 kV (33) at 1721 MW of LTE for L/O Edic - Princeton (351) and Marcy – Coopers Corners (UCC2-41)
Moses South	2425 (B)	3175 (I)	Higley-Browns Falls 115 kV (1) at 135 MW STE rating for L/O Chateaugay–Massena–Marcy 765 kV (MSU-1)	Moses - New Haverstock 230 kV (MH3) at 500 MW of LTE rating for L/O Moses - New Haverstock 230kV (MH1) and Moses - New Haverstock 230kV (MH2)
Central East	3250	3225	New Scotland (77)–Knickerbocker 345 kV at 1,762 MW LTE rating for L/O Marcy-Coopers Corners 345 kV (UCC2-41) and Fraser-Coopers Corners 345 kV (33)	New Scotland – POWI (Q1646 POI) 345 kV at 1931 MW of LTE for L/O Marcy - Coopers Corners 345kV (UCC2-41) and Fraser - Coopers Corners 345kV (33)
Total East	6275	7475		Fraser - Coopers Corners 345 kV (33) at 1721 MW of LTE for L/O Edic - Princeton (351) and Marcy – Coopers Corners (UCC2-41)
UPNY-SENY	6425 (E)	6550 (E)	Shoemaker – Shoemaker TAP 138 kV (69) at 706.7 MW STE rating for L/O Rock Tavern - Ramapo (77) 345kV and Rock Tavern – Sugarloaf – Ramapo (76) 345 kV	Dolson Avenue – Rock Tavern 345 kV (DART44) at 1990 MW of LTE for L/O Rock Tavern - Coopers Corners 345kV (CCRT-34) and Roseton – Rock Tavern 345kV (311)
UPNY-CONED	7600 (E)	7825 (E)	Lovett – Buchanan 345 kV (Y88) at 1994 MW LTE rating for L/O Pleasant Valley - Millwood 345 kV (F30, W80), L/O Pleasant Valley - Millwood 345 kV (F31, W81), and L/O Wood St 345/115 kV	Lovett - Buchanan 345 kV (Y88) at 1993 MW of LTE for L/O Pleasant Valley - Millwood 345 kV (F30, W80), or L/O Pleasant Valley - Millwood 345 kV (F31, W81), and L/O Wood St 345/115 kV
Sprainbrook-Dunwoodie South	5475 (C) (E)	5150 (C1) (E)	Dunwoodie-Mott Haven 345 kV (71) at 925 MW LTE rating for L/O Ravenswood 3	Mott Haven - Rainey 345 kV (Q11) at 925 MW of LTE for L/O Rainey - Mott Haven 345 kV (Q12) and Rainey 345/138kV (7W) and Reactor (6W)
Long Island Import	1700 (D)	3100 (G)	Dunwoodie-Shore Rd. 345 kV (Y50) at 963 MW LTE rating for L/O Sprainbrook - East Garden City 345kV (Y49) and Academy 345kV bus	Dunwoodie-Shore Rd 345 kV (Y50) at 690 MW of normal rating for pre-contingency loading

Notes:

- A. Used Reliability Rules Exception Reference No. 13 – Post Contingency Flows on Niagara Project Facilities.
- B. Followed NYISO Emergency Operations Manual Attachment A-7 (formerly section 4.1.3).
- C. Dunwoodie North PAR1 and PAR2 are scheduled at 95 MW each into NYC.
Dunwoodie South PAR is scheduled at 220 MW into NYC.
Sherman Creek PAR1 and PAR2 are scheduled at 220 MW each into NYC.
Parkchester PAR1 and PAR2 are scheduled at 250 MW each into NYC.
- C1. Dunwoodie North PAR1 and PAR2 are scheduled at 85 MW each into NYC.
Dunwoodie South PAR is scheduled at 180 MW into NYC.
Sherman Creek PAR1 and PAR2 are scheduled at 165 MW each into NYC.
Parkchester PAR1 and PAR2 are scheduled at 245 MW each into NYC.
- D. E.G.C. PAR1 and PAR2 are scheduled at 315 MW each into Long Island.
Lake Success and Valley Stream PARs are scheduled at 200 MW and 100 MW, respectively, into NYC.
Neptune and CSC are scheduled at 660 MW, and 96 MW respectively, into Long Island.
- E. Ramapo PAR1 and PAR2 are scheduled based on the NYISO-PJM JOA.
- F. Dysinger PAR scheduled at 200MW from Dysinger to Stolle Rd
- G. All Propel NY Alternate Solution 5 project PARs are adjusted to achieve shifts in the direction of the transfer. Barrett PARs were bypassed to reflect updated topology
- H. Dunwoodie South, Dunwoodie North, Sherman Creek and Parkchester PARs are scheduled to maximize flow into NYC while ensuring the case is N-1 secure.
- I. Transfer limit is higher than the existing resources in the sending end are capable of.

Figure 11: Emergency Transfer Criteria Intra–Area Thermal Transfer Limits

Interface	2020 Comprehensive ATR	2025 Comprehensive ATR	Limiting Constraint 2020 Comprehensive ATR	Limiting Constraint 2025 Comprehensive ATR
Dysinger East	2300	2075 (E)	Niagara - Q545A Dysinger 345kV Ckt 1 at 1685 MW STE rating for L/O Niagara - Q545A_Dysinger 345 kV Ckt 2	Niagara - Dysinger 345 kV (ND1) at 1685 MW STE for L/O Niagara - Dysinger 345kV (ND2)
West Central	1075	1175 (E)		
Volney East	5450	5700	Fraser - Coopers Corners 345 kV (33) at 1793 MW of STE for L/O Marcy – Coopers Corners 345kV (UCC2-41)	Fraser - Coopers Corners 345 kV (33) at 1793 MW of STE for L/O Marcy – Coopers Corners 345kV (UCC2-41)
Moses South	2425 (C)	3700	Higley - Browns Falls 115 kV (1) at 135 MW STE rating for L/O Chateaugay–Massena–Marcy 765 kV (MSU-1)	Higley - Browns Falls 115 kV (1) at 135 MW STE for L/O Browns Falls - Flatrock 115 kV
Central East	3650	3900	New Scotland (77) - Knickerbocker 345 kV at 1,423 MW normal rating for pre-contingency loading	New Scotland – POWI (Q1646 POI) 345 kV at 1670 MW of normal rating for pre contingency loading
Total East	7100	7925		Fraser - Coopers Corners 345 kV (33) at 1793 MW of STE for L/O Marcy – Coopers Corners 345kV (UCC2-41)
UPNY-SENY	7950 (D)	7750 (D)		Dolson Avenue – Rock Tavern 345kV (DART44) at 2195 MW of STE for L/O Coopers Corners - Middletown tap 345kV ckt 1 (CCRT-34)
UPNY-CONED	10825 (D)	10100 (D)	Pleasant Valley - Wood C 345 kV (F31) at 1811 MW normal rating for pre contingency loading	East Fishkill-Wood A 345 kV (F39) at 1810 MW of normal rating for pre contingency loading
Sprainbrook-Dunwoodie South	5750 (A) (D)	5700 (A1) (D)	Dunwoodie-Mott Haven 345 kV (71) at 785 MW normal rating for pre contingency loading	Dunwoodie-Mott Haven 345 kV (71) at 785 MW normal rating for pre contingency loading
Long Island Import	2200 (B)	3800 (F,G)	Shore Road - Glenwood South 138 kV (365) at 358 MW STE rating for the L/O Sprainbrook - East Garden City 345kV (Y49)	New Shore Rd-Ruland Rd 345 kV (Y56) at 819MW of normal rating for pre-contingency loading

Notes:

- A. Dunwoodie North PAR1 and PAR2 are scheduled at 95 MW each into NYC. Dunwoodie South PAR is scheduled at 220 MW into NYC. Sherman Creek PAR1 and PAR2 are scheduled at 220 MW each into NYC. Parkchester PAR1 and PAR2 are scheduled at 250 MW each into NYC. A1. Dunwoodie North PAR1 and PAR2 are scheduled at 85 MW each into NYC. Dunwoodie South PAR is scheduled at 180 MW into NYC. Sherman Creek PAR1 and PAR2 are scheduled at 165 MW each into NYC. Parkchester PAR1 and PAR2 are scheduled at 245 MW each into NYC.
- B. E.G.C. PAR1 and PAR2 are scheduled at 315 MW each into Long Island.

Lake Success and Valley Stream PARs are scheduled at 50 MW and 210 MW, respectively, into Long Island.

Neptune and CSC are scheduled at 660 MW, and 96 MW respectively, into Long Island.

C. Followed NYISO Emergency Operations Manual Attachment A-7 (formerly section 4.1.3).

D. Ramapo PAR1 and PAR2 are scheduled based on the NYISO-PJM JOA.

E. Dysinger PAR scheduled at 200MW from Dysinger to Stolle Rd

F. All Propel NY Alternate Solution 5 PARs adjusted to achieve shifts across the evaluated interfaces in the direction of the transfer. Barrett PARs were bypassed to reflect updated topology

G. For LIPA import emergency, 901 & 903 PAR flow is 298 MW into LIPA.

H. Dunwoodie South, Dunwoodie North, Sherman Creek and Parkchester PARs are scheduled to maximize flow into NYC while ensuring the case is N-1 secure.

Figure 12: Normal Transfer Criteria Inter-Area Thermal Transfer Limits

Interface	2020 Comprehensive ATR	2025 Comprehensive ATR	Limiting Constraint 2020 Comprehensive ATR	Limiting Constraint 2025 Comprehensive ATR
NY-NE	2300	2100 (E) (F)	Cricket Valley-Long Mountain 345 kV (398) at 1880 MW LTE rating for L/O Northfield – Berkshire 345kV (312), Berkshire – Alps 345kV (393), Northfield Gen 1 & 2, and Berkshire 345/115kV	Alps - Berkshire 345 kV (393) at 1697 MW of LTE rating for L/O Sandy Pond HVDC Phase 2
NE-NY	1450	1275 (E)	Pleasant Valley-Cricket Valley 345 kV (F83) at 1382 MW LTE rating for L/O Pleasant Valley-Cricket Valley 345 kV (F84)	Reynolds Rd 345/115 kV transformer at 538 MW of LTE rating for L/O Alps - Knickerbocker 345kV (6)
NY-ON	1475	1550 (D)	Beck – Niagara 230 kV (PA27) at 460 MW LTE rating for L/O Niagara-Beck 345 kV (PA301)	Beck – Niagara 230 kV (PA27) at 450 MW LTE rating for L/O Niagara-Beck 345 kV (PA301)
ON-NY	2100	2200 (C)	Beck – Niagara 230 kV (PA27) at 460 MW LTE rating for L/O Niagara-Beck 345 kV (PA301)	
NY-PJM	1975 (A)	2275 (A1)	Westover - Laurel 115 kV (952) at 108 MW Normal rating for pre-contingency loading	Westover - Laurel Lake 115 kV (952) at 108 MW Normal rating for pre-contingency loading
PJM-NY	3250 (B)	3225 (B1)	Hopatcong - Ramapo 500 kV (5018) at 1052MW Normal rating for pre-contingency loading	Hopatcong - Ramapo 500 kV (5018) at 1052 MW Normal rating for pre-contingency loading

Notes:

- A. NY/PJM PARS are scheduled according to the NYISO-PJM JOA. Neptune is scheduled at 0 MW. Linden VFT is scheduled at 315 MW into PJM. HTP is scheduled at 0 MW.
- A1. In addition to settings in B, Hillside PAR scheduled to 0MW.
- B. PJM/NY PARS are scheduled according to the NYISO-PJM JOA. Neptune is scheduled at 660 MW into NY. Linden VFT is scheduled at 315 MW into NY. HTP is scheduled at 0 MW.
- B1. In addition to settings in A, Hillside PAR scheduled to 0MW.
- C. Dysinger PAR scheduled at 200MW from Dysinger to Stolle Rd
- D. Dysinger PAR scheduled at 0MW from Dysinger to Stolle Rd
- E. Dover PAR set to 30% of the interface flow in the direction of transfer
- F. Sandy Pond scheduled to 1500MW

Figure 13: Emergency Transfer Criteria Inter-Area Thermal Transfer Limits

Interface	2020 Comprehensive ATR	2025 Comprehensive ATR	Limiting Constraint 2020 Comprehensive ATR	Limiting Constraint 2025 Comprehensive ATR
NY-NE	2675 (C)	2600 (G)	Cricket Valley-Long Mountain 345 kV (398) at 1327 MW normal rating for pre-contingency loading	Alps-Berkshire 345 kV (393) at 1912 MW of STE rating for L/O Seabrook Unit 1
NE-NY	1900 (D)	1725 (G)	Pleasant Valley-Cricket Valley 345 kV (F83) at 1680 MW STE rating for L/O Pleasant Valley-Cricket Valley 345 kV (F84)	Reynolds Rd 345/115kV transformer at 646 MW of STE rating for L/O Alps - Knickerbocker 345 kV (6)
NY-ON	1925	1875 (F)	Beck – Niagara 230 kV (PA27) at 400 MW Normal rating for pre-contingency loading	Beck – Niagara 230 kV (PA27) at 481 MW STE rating for L/O Niagara-Beck 345 kV (PA301)
ON-NY	2525	2350 (E)	Beck – Niagara 230 kV (PA27) at 558 MW STE rating for L/O Beck – Niagara (PA 301) 345 kV	
NY-PJM	1975 (A)	2275 (I)	Westover - Laurel 115 kV (952) at 108MW Normal rating for pre-contingency loading	Westover - Laurel Lake 115 kV (952) at 108 MW Normal rating for pre-contingency loading
PJM-NY	3250 (B)	3225 (H)	Hopatcong - Ramapo 500 kV (5018) at 1052MW Normal rating for pre-contingency loading	Hopatcong - Ramapo 500kV (5018) at 1052 MW Normal rating for pre-contingency loading

Notes:

- A. NY/PJM PARS are scheduled according to the NYISO-PJM JOA. Neptune is scheduled at 0 MW. Linden VFT is scheduled at 315 MW into PJM. HTP is scheduled at 0 MW.
- A1. In addition to settings in A, Hillside PAR scheduled to 0MW.
- B. PJM/NY PARS are scheduled according to the NYISO-PJM JOA. Neptune is scheduled at 660 MW into NY. Linden VFT is scheduled at 315 MW into NY. HTP is scheduled at 0 MW.
- B1. In addition to settings in B, Hillside PAR scheduled to 0MW.
- C. Alps PAR1 and PAR2 are scheduled at 550 MW each into ISO-NE.
- D. Alps PAR1 and PAR2 are scheduled at 335 MW each into NY.
- E. Dysinger PAR scheduled at 200MW from Dysinger to Stolle Rd
- F. Dysinger PAR scheduled at 0MW from Dysinger to Stolle Rd
- G. Dover PAR set to 30% of the interface flow in the direction of transfer
- H. PJM/NY PARS set per the NYISO-PJM JOA based on transfer level Linden VFT scheduled at 315MW into NY. Hillside PAR is scheduled at 0MW.
- I. NY/PJM PARS set per the NYISO-PJM JOA based on transfer level, Neptune Set to zero and Linden VFT scheduled at 315MW into PJM. Hillside PAR is scheduled at 0MW.

Voltage Transfer Limit Analysis

Methodology

Voltage-constrained transfer limit analysis is performed using PowerGEM TARA software considering specific bus voltage limits [16]. The bus voltage limit criteria include specific minimum and maximum voltage limits for pre-contingency and post-contingency conditions. The required post-contingency voltage is typically within 5% of nominal. The voltage transfer limit analysis is performed on the 2030 summer peak load base case in accordance with the NYISO's Process to Establish and Communicate System Operating Limits [15] and consistent with NYISO Transmission Expansion and Interconnection Manual [7]. The voltage transfer limit of an interface is the maximum power transfer achievable without causing either a pre-contingency or post-contingency voltage violation of any transmission facility. A decrease in transfer capability compared to the previous CATR is not a criteria violation on its own but indicates that expected system changes may constrain the amount of possible power transfer on a given interface.

A voltage transfer case is created from the summer 2030 peak load case. A set of power flow cases with increasing transfer levels is created for each interface from the 2030 summer peak load voltage transfer case by applying generation shifts similar to those used for thermal transfer analysis. For each interface, a screening analysis is performed with all NERC [17], NPCC Directory #1 [1], and NYSRC Reliability Rules [2] planning design criteria contingencies to ensure the most limiting contingencies for the planned system and interface under analysis are included. Additional contingencies are selected for evaluation based on an assessment of cumulative historical power system analysis, actual system events, and planned changes to the system. The resulting contingencies selected for evaluation include the most severe loss of reactive capability and increased impedance on the BPTF. Then PowerGEM TARA evaluates the system response to the set of the most severe planning design criteria contingencies. The applied contingencies are modeled to simulate the removal of all elements that the protection system or other automatic controls would disconnect without operator intervention.

For the 2025 CATR, load is modeled as constant power in all NYCA zones except in the Con Edison service territory. The Con Edison voltage-varying load model is used to model the load in their service territory for all cases.

While constructing the voltage transfer cases, in order to maintain bus voltage within the applicable pre-and post-contingency limits under transfer conditions, adjustments are made to

reactive power sources (e.g., generators, PARs, autotransformers). The reactive power of generators is regulated, within the capabilities of the units, to maintain a scheduled voltage in both the pre-contingency and post-contingency power flows. Tap settings of PARs and autotransformers regulate power flow and voltage, respectively, in the pre-contingency solution, but are fixed at their corresponding pre-contingency settings in the post-contingency solution. Similarly, switched shunt capacitors and reactors are switched at pre-determined voltage levels in the pre-contingency solution, but are held at their corresponding pre-contingency position in the post-contingency solution. In accordance with the NYISO normal (pre-contingency) operating practice, SVC and FACTS devices are held at or near zero reactive power output in the pre-contingency solution but are allowed to regulate in the post-contingency power flow solution.

Voltage-constrained transfer limit analysis is performed to evaluate the adequacy of the system post-contingency voltage and to find the region of voltage instability. As the transfer level across an interface is increased, the voltage-constrained transfer limit is determined to be the lower of: (1) the pre-contingency power flow at which the pre/post-contingency voltage falls below the voltage limit criteria; or (2) 95% of the pre-contingency power flow at the “nose” of the post-contingency PV curve. The “nose” is the point at which the slope of the PV curve becomes infinite (i.e., vertical). Reaching the “nose” (which is the point of voltage collapse) occurs when reactive capability supporting the transfer of real power is exhausted. The region near the “nose” of the curve is generally referred to as the region of voltage instability.

Voltage-constrained transfer limit analysis is sensitive to the base case load and generation conditions, generation selection utilized to create the power transfers, PAR schedules, key generator commitment, SVC dispatch, switched shunt availability, and the scheduled inter-Area power transfers modeled in the study case. No attempts are made to optimize the voltage-constrained transfer limits; therefore, these parameters are not varied to determine an optimal dispatch.

In this review, the NYISO evaluates the voltage-constrained transfer limits for the Dysinger East, West Central, Volney East, Moses South, Central East, UPNY-SENY, UPNY-ConEd, Sprainbrook-Dunwoodie South, and Long Island interfaces. The Moses-South and Long Island interfaces are historically thermally limited, therefore in the previous CATR voltage-constrained transfer limits were not evaluated. However, for this CATR there are potentially significant transmission changes across these interfaces, so these interfaces were evaluated for voltage-constrained transfer limits.

Analysis Results

Figure 14 provides a summary of the voltage-constrained transfer limits. The assessment of

voltage transfer capability demonstrates that the BPTF meets the applicable NERC TPL-001-5 [17], NPCC Directory #1 [1], and NYSRC Reliability Rules [2] planning design criteria contingencies with respect to voltage performance. Explanations for changes in transfer limits of greater than 100 MW are provided below. Details regarding the voltage-constrained transfer limit analysis are provided in Appendix F.

- The Dysinger East and West Central voltage-constrained transfer limits increased compared to the 2020 CATR. This increase is primarily due to the planned addition of generation near the interfaces.
- The Volney East and Central East voltage-constrained transfer limits increased compared to the 2020 CATR. This increase is potentially due to upgraded 345 kV transmission connecting into Edic and Marcy from the Smart Path project, with new generation near the interface also impacting the transfer limits.
- The UPNY-SENY voltage-constrained transfer limit increased compared to the 2020 CATR. Factors potentially influencing this increase include different voltage schedules on plants near the interface compared to the 2020 CATR, topology changes with the addition of the Dover PARs, and shifts in power flows across the state from changes in load distribution.
- The UPNY-ConEd and Sprainbrook-Dunwoodie South voltage-constrained transfer limits increased compared to the 2020 CATR. This increase is primarily due to the Propel NY transmission project adding 345 kV lines near the interfaces which will boost the voltage.

Figure 14: Summer Voltage Transfer Limits

Summer Voltage Transfer Limits				
Interface	2020 Comprehensive ATR (Study Year 2025)		2025 Comprehensive ATR (Study Year 2030)	
	Pre/Post-Contingency Low	95% of Nose	Pre/Post-Contingency Low	95% of Nose
Dysinger East	2,875 (A)	2,800 (F)	2,925 (A)	3,250 (P)
West Central	1,600 (A)	1,575 (F)	1,925 (A)	2,250 (P)
Volney East	4,550 (B)	4,825 (G)	4,975 (J)	5,125 (Q)
Moses South	N/A	N/A	3,250 (K)(4)	3,175 (R)(4)
Central East	3,325 (B)	3,925 (H)	3,650 (L)	3,750 (S)
Total East	N/A	N/A	8,475 (L)	None (T)
UPNY-SENY	6,250 (C)	6,075 (I)(1,2)	6,425 (C)	6,425 (H)(1,3)
UPNY-CONED	7,775 (D)	7,975 (I)(1,2)	8,100 (M)	8,150 (I)(1,3)
Sprainbrook-Dunwoodie South	5,875 (E)	6,000 (I)(1,2)	6,125 (N)	6,325 (I)(1,3)
Long Island Import	N/A	N/A	4,150 (O)	3,950 (U)

Notes:

Pre/Post-Contingency Low is the pre-contingency power flow at which the pre/post-contingency voltage falls below the voltage limit criteria.

95% of Nose is 95% of the pre-contingency power flow at the "nose" of the post-contingency PV curve.

- A. Rochester 345kV bus voltage pre-contingency low limit.
 - B. Marcy 345kV bus voltage pre-contingency low limit.
 - C. Pleasant Valley 345kV bus voltage pre-contingency low limit.
 - D. Millwood 345kV bus voltage pre-contingency low limit.
 - E. Sprainbrook 345kV bus voltage pre-contingency low limit.
 - F. 95% of PV nose occurs for L/O Niagara - Dysinger 345 kV and L/O Somerset - Dysinger 345 kV.
 - G. 95% of PV nose occurs for L/O Sandy Pond HVDC.
 - H. 95% of PV nose occurs for L/O Tower 42/44 (Dolson-Rock Tavern 345kV and Coopers Corners-Rock Tavern 345kV).
 - I. 95% of PV nose occurs for L/O Tower W89/W90 (Dunwoodie-Pleasantville 345kV and Dunwoodie-Pleasantville 345kV).
 - J. Pannell 345kV bus voltage pre-contingency low limit.
 - K. Haverstock 345kV bus voltage post-contingency low limit for L/O Willis-Haverstock 345kV (#1) and Haverstock 345kV Capacitor Bank
 - L. Clay 345kV bus voltage pre-contingency low limit.
 - M. Millwood 345kV bus voltage post-contingency low limit for L/O Pleasantville East-Dunwoodie 345kV (W89) and Pleasantville West-Dunwoodie 345kV (W90)
 - N. Dunwoodie 345kV bus voltage pre-contingency low limit
 - O. Ruland Road 138kV bus voltage post-contingency low limit for fault and simultaneous non-redundant relay failure at Pilgrim 138kV
 - P. 95% of PV nose occurs for L/O Q811-Henrietta 345kV and Q580 Stamp-Q811 345kV
 - Q. 95% of PV nose occurs for L/O Scriba-Independence 345kV (25) and Clay-Independence 345kV (26)
 - R. 95% of PV nose occurs for L/O Willis-Haverstock 345kV (#1) and Willis-Patnode 230kV
 - S. 95% of PV nose occurs for L/O Marcy-Massena 765kV (MSU-1)
 - T. No nose point identified in analysis for this interface, pre-contingency low will be limiting.
 - U. 95% of PV nose occurs for fault and simultaneous non-redundant relay failure at Pilgrim 138kV
1. Ramapo PAR1 and PAR2 are scheduled at 80% of the RECO load.
 2. Dunwoodie North PAR1 and PAR2 are scheduled at 115MW each into NYC.
Dunwoodie South PAR is scheduled at 235MW into NYC.
Sherman Creek PAR1 and PAR2 are scheduled at 200MW each into NYC.
Parkchester PAR1 and PAR2 are scheduled at 245MW each into NYC.
 3. Dunwoodie North PAR1 and PAR2 are scheduled at 85MW each into NYC.
Dunwoodie South PAR is scheduled at 181MW into NYC.
Sherman Creek PAR1 and PAR2 are scheduled at 165MW each into NYC.
Parkchester PAR1 and PAR2 are scheduled at 245MW each into NYC.
 4. Total import over Line 7040 is scheduled at 1110 MW.
Total import over L33 and L34 PARs is scheduled at 0 MW.
Total import over the Sandbar PAR is scheduled at 0 MW.
Additional generation required in order to find a limit, generation is added at Patnode 230kV and Ryan 230kV buses.

Stability Transfer Limit Analysis

Methodology

The dynamic data for this analysis is developed from the 2024 ERAG MMWG series databases. The NYCA system representation is from the NYISO 2025 FERC Form 715 filing power flow models with updates according to the NYISO *2025 Load & Capacity Data Report* (“Gold Book”). Additional adjustments, as listed in “Facilities Included in this Review” section, are modelled in the case. The dynamics data includes generator, exciter, power system stabilizers, SVC, DC transmission controller, turbine governor, relays, and other miscellaneous models that provide dynamic control to the electrical system. The load model has significant impact on the stability performance of the New York State Transmission System. The primary load model for this assessment is comprised of 100% constant impedance for both active and reactive power load for the NYCA. Load models for all other planning areas are same as those from the 2024 ERAG MMWG series.

The methodology for stability analysis is described in NYISO Transmission Planning Guideline #3-1 [7]. For a stability simulation to be deemed stable, oscillations in angle and voltage must exhibit positive damping within 10 seconds after initiation of the disturbance. If a secondary mode of oscillation exists within the initial 10 seconds, then the simulation time is increased sufficiently to demonstrate that successive modes of oscillation exhibit positive damping before the simulation is deemed stable.

All simulations assume that generators with an angle separation greater than 300 degrees from the rest of the system will trip out-of-service. Further, the out-of-step scanning model (OSSCAN) and generic relay model are used to determine the tripping of transmission lines and transformers for transient swings. The generic relay model is a typical distance impedance relay on the element. The OSSCAN scans the entire network to check whether the apparent impedance is less than the line impedance.

The stability analysis evaluates about 650 NERC [17], NPCC Directory #1 [1], and NYSRC Reliability Rules [2] planning design criteria stability contingencies that are expected to produce a more severe system impact on the BPTF. These contingencies include the most severe loss of reactive capability and increased impedance on the BPTF. The contingencies are modeled to simulate the removal of all elements that the protection system or other automatic controls would disconnect without operator intervention. The stability performance contingencies include the impact of successful high speed (less than one second) reclosing and unsuccessful high speed reclosing into a fault, where high speed reclosing is utilized. A detailed description of the applied faults, elements

switched, and clearing times are provided in Appendix D.

To assess the stability transfer capability of the system (*i.e.*, stability transfer limit), stability transfer cases are created to evaluate the stability performance of the NYCA system against normal design criteria contingencies. For each transfer case, the power flow on the evaluated interfaces is tested at a value greater of 200 MW or 11% above the more restrictive of the emergency thermal transfer limit or voltage transfer limit as outlined in Figure 15. If there are no stability violations at this transfer level, this testing provides that the stability limit is higher than the emergency thermal or voltage transfer limit. The stability transfer limit analysis is performed on the 2030 summer peak load base case in accordance with the NYISO’s Process to Establish and Communicate System Operating Limits [15].

Starting with the 2030 summer peak load stability base case, the NYISO created four NYCA transfer cases which co-stress the following interfaces:

1. Central East transfer case: Dysinger East, West Central, Central East, and Total East
2. UPNY-SENY transfer case: UPNY-SENY, UPNY-ConEd, Sprainbrook/Dunwoodie-South and Long Island import
3. Volney East transfer case: Volney East
4. Moses South transfer case: Moses South

Figure 15: Stability Transfer Cases

Interface	Stability Transfer case	Emergency Thermal Transfer Limit (MW)	Voltage Transfer Limit (MW)	Target Transfer Level (MW)	Transfer Level in Stability Transfer Case (MW)
Dysinger East	Central East Transfer Case	2,075	2,925	2,303	2,340
West Central		1,175	1,925	1,375	1,388
Central East		3,900	3,650	4,052	4,165
Total East		7,925	8,475	8,797	8,836
Volney East	Volney East Transfer Case	5,700	4,975	5,522	5,551
Moses South	Moses South Transfer Case	3,700	3,175	3,524	3,553
UPNY-SENY	UPNY-SENY Transfer Case	7,750	6,425	7,132	7,457
UPNY-CONED		10,100	8,100	8,991	9,077
Sprainbrook - Dunwoodie South		5,700	6,125	6,327	7,154
Long Island Import		3,800	3,950	4,218	4,224

The Central East transfer case has the Oswego Complex generation dispatched at an output of 5,300 MW and 1,740 MW of import from Chateaugay and 2,836 MW of import from Ontario including 500 MW through St. Lawrence Phase Angle Regulators.

The UPNY-SENY transfer case has the Oswego Complex generation dispatched at an output of 5,300 MW and 1,110 MW of import from Hydro-Québec at Chateaugay. The Central East interface of the UPNY transfer case is loaded at 1,915 MW.

The Volney East transfer case stressed the Ontario - New York to 2,435 MW and the HQ - New York to 1,111 MW (not including the CHPE project).

The Moses South transfer case stressed the HQ -New York 1,936 MW (Chateaugay HVDC 1,190 MW, Beauharnois 746 MW) and the St. Lawrence L33/34 PARs scheduled at 300 MW each.

Analysis Results

For the transfer cases, there are no stability-limited interfaces in the NYCA when tested at transfer levels that are the greater of 200 MW or 10% above the more restrictive of the emergency thermal or voltage transfer limit for normal design criteria faults.

This assessment of transfer capability demonstrates that the BPTF system meets the criteria for stability performance. The BPTF system security is maintained by limiting power transfers according to the determined stability limits. The assessment of transfer capability performed dynamic stability simulations for those contingencies expected to produce the more severe system impacts based on examination of actual system events and assessment of changes to the planned system. This analysis did not determine actual stability transfer limits but shows that the stability limits are not more limiting than the emergency thermal or voltage-based transfer limits. All contingencies evaluated are stable, damped, and no generating unit lost synchronism other than by fault clearing action or special protection system response.

Assessment of Planning Transfer Capability

Figure 16 below provides a summary of the normal and emergency transfer limits for the open transmission interfaces used in this assessment. The application of planning design criteria contingencies shows no loss of a major portion of the system or unintentional separation of a major portion of the system. By limiting power transfers consistent with the transfer limits reported in this review, the security of the BPTF will be maintained and projected demand will be supplied in accordance with NERC [17], NPCC Directory #1 [1], and NYSRC Reliability Rules [2] planning design criteria contingencies.

Figure 16: Transfer Limit Comparison

Interface	2020 Comprehensive Review (Study Year 2025)				2025 Comprehensive Review (Study Year 2030)			
	Normal (MW)		Emergency (MW)		Normal (MW)		Emergency (MW)	
Dysinger East	1,800	T	2,300	T	1,800	T	2,075	T
West Central	575	T	1,075	T	900	T	1,175	T
Volney East	4,550	V	4,550	V	4,975	V	4,975	V
Moses South	2,425	T	2,425	T	3,175	T, VX	3,175	VX
Central East	3,250	T	3,325	V	3,225	T	3,650	V
Total East	6,275	T	7,100	T	7,475	T	7,925	T
UPNY-SENY	6,075	VX	6,075	VX	6,425	V, VX	6,425	V, VX
UPNY-ConEd	7,600	T	7,775	V	7,825	T	8,100	V
Sprain Brook-Dunwoodie South	5,475	T	5,750	T	5,150	T	5,700	T
Long Island Import	1,700	T	2,200	T	3,100	T	3,800	T

Notes:

Transfer limits expressed in MW and rounded down to nearest 25 MW point
 Thermal and voltage limits apply under summer peak load conditions
 Emergency limits account for more restrictive voltage collapse limit
 Limits determined in this study are not optimized

Type Codes

T – Thermal
 V – Voltage Pre/Post-contingency low limit
 VX – Voltage 95% from collapse point
 S – Stability

Steady State Transmission Security Analysis

Methodology

Transmission security is the ability of the power system to withstand disturbances, such as electric short circuits or unanticipated loss of system elements, and continue to supply and deliver electricity. Transmission security is assessed deterministically with potential disturbances being applied without concern for the likelihood of the disturbance in the assessment. These system disturbances are categorized as planning design criteria contingencies and are explicitly defined in the NERC TPL [17], NPCC Directory #1 [1], and NYSRC Reliability Rules [2] planning criteria.

Steady state transmission security analysis evaluates the thermal and voltage performance of the NYCA BPTF in response to planning design criteria contingencies (over 5,000 events within NYCA). Transmission security analysis includes an evaluation of the system response to both single (N-1) and multiple (N-1-1) contingency events. For this CATR, the local area operation NYSRC Reliability Rule G.1 R1, which requires that certain areas of the Con Edison system be designed and operated for the occurrence of a second contingency (N-1-1-0), was also evaluated. The evaluated contingencies within NYCA include those that are expected to produce a more severe system impact on the BPTF, including the most severe loss of reactive capability and increased impedance on the BPTF. The contingency events modeled to simulate the removal of all elements that the protection system or other automatic controls would disconnect without operator intervention. Neighboring systems planning design criteria contingency events are also included, as appropriate.

To evaluate the impact of a single event from the normal system condition (N-1) on the BPTF, all events impactful to the BPTF evaluated. To evaluate the impact of multiple events on the BPTF, design criteria first level contingencies, such as the loss of any critical transmission circuit, transformer, compensating device, generator, or single pole of an HVDC facility are first applied to the normal system condition (N-1-0) followed by allowable system adjustments to posture the system to be secure for all other design criteria second level contingencies (N-1-1). For N-1-1-0, allowable system adjustments occur post-second contingency to attempt to return to the normal system condition.

Transmission security analysis allows for system adjustments including generator redispatch, PAR adjustments, switched shunt adjustments, transformer tap adjustments, and HVDC adjustments between the first (N-1-0) and second (N-1-1) contingency and, for certain areas of the Con Edison system following the occurrence of a second contingency (N-1-1-0). For N-1 analysis, no system adjustments are allowed post contingency; similarly, no system adjustments are allowed following the second contingency of N-1-1 analysis. The tap settings of PARs and autotransformers regulate power flow and voltage, respectively, in the pre-contingency solution, but are fixed at their corresponding pre-contingency tap position in the post-contingency solution. Similarly, switched shunt capacitors and reactors are switched at pre-determined voltage levels in the pre-contingency solution, but are held at their corresponding pre-contingency position in the post-contingency solution. In accordance with the NYISO normal (pre-contingency) operating practice, SVC and FACTS devices are held at or near zero reactive power output in the pre-contingency power flow solution, but are allowed to regulate in the post-contingency power flow solution. The system adjustments between contingencies are made such that all monitored elements (i.e. BPS, BPTF, and ISO-secured

facilities) are secured for all possible second contingencies following the occurrence of each first contingency.

An N-0, N-1, N-1-0, N-1-1, or N-1-1-0 violation occurs when the power flowing through a transmission element exceeds its applicable rating (thermal violation) or the voltage at a bus exceeds its specified range (voltage violation). For example, an N-1-0 violation occurs when the power flow cannot be reduced to below the normal rating following the occurrence of a contingency event followed by allowable system adjustments. An N-1-1 violation occurs when the facility is reduced to (or below) its normal rating following the first level contingency and system adjustments, but the power flow following the second contingency exceeds the applicable post-contingency rating. An N-1-1-0 violation occurs when the power flow cannot be reduced to below the normal rating following the occurrence of the second level contingency event followed by allowable system adjustments.

For this assessment, the transmission security analysis is performed on the system models for study year 2030 using the baseline forecast of the statewide coincident peak load and daytime spring light load conditions. For transmission security analysis, generation is dispatched to match load plus system losses while respecting transmission security. Scheduled inter-Area transfers modeled in the base case between the NYCA and each neighboring system are held constant.

The transmission security analysis is performed using the Siemens PTI PSS®E and PowerGEM TARA programs. The list of contingencies is provided in Appendix D.

Analysis Results

In the NYISO's evaluation of the BPTF, two thermal overloads are observed. No other steady-state transmission security related needs were observed under other system conditions. Some potential N-1-1 thermal violations observed during system peak conditions were mitigated by modeling the expected operational flexibility of large load facilities, including cryptocurrency mining.

Under expected summer peak conditions, a thermal violation on the Oakdale 345/115/34.5 kV transformer and Oakdale – North Endicott 115 kV transmission line are observed. The violation occurs under N-1-1 conditions, for contingency combinations that result in the loss of the Oakdale – Westover 115 kV and Oakdale – Northside 115 kV transmission lines. The thermal violations are summarized in Figure 17 below.

Under expected summer peak conditions, a thermal violation on the Gardenville 230/115/34.5 kV transformer is observed. The violation occurs under N-1-1 conditions for any contingency combination that results in the loss of the either Gardenville 230/115/34.5 kV transformer #6 or #7

The worst thermal violations for each monitored element are summarized in Figure 17 below. A complete summary of the thermal violations is included in Appendix H.

Figure 17: Steady State Transmission Security N-1-1 Violations

Zone	Owner	Monitored Element	Normal Rating (MVA)	Contingency Rating (MVA)	1st Contingency	2nd Contingency	2030 Summer Peak Flow (%)
C	NYSEG	Oakdale 345/115/34.5 kV transformer (tertiary winding)	65	68	Loss of Oakdale – North Endicott 115 kV (938)	Loss Oakdale – Westover 115 kV (939)	111
C	NYSEG	Oakdale – North Endicott 115 kV (938)	161	177	Loss Oakdale – Westover 115 kV (939)	Loss Oakdale – North Side 115 kV (944)	107
A	NYSEG	Gardenville 230/115/34.5 kV transformer (7) (tertiary winding)	50	50	Loss of East Stolle Rd to Dysinger 345 kV (DES-1) and East Stolle Rd to Alle-Catt Wind 345 kV	Loss of Gardenville 230/115/34.5 kV transformer (6)	112

Steady State Corrective Action Plan

The Oakdale 345/115/34.5 kV transformer and Oakdale – North Endicott 115 kV transmission line steady state criteria violations discussed above were the same as reported in the 2025 Quarter 3 STAR. The Oakdale 345/115/34.5 kV and Oakdale – North Endicott 115 kV transmission line overload is addressed by the reconfiguration of the Oakdale 345 kV and 115 kV system along with a second Oakdale 345/115 kV transformer, which facilities are planned to be completed by winter 2030. Prior to completion of this project, NYSEG will utilize an interim operating procedure, including load shedding, to address this overload.

The above-mentioned Gardenville 345/115/34.5 kV overload is addressed by NYSEG’s Transformers #6, #7, and #8 and Station Reconfiguration project, which facilities are planned to be completed by winter 2030. Prior to completion of this project, NYSEG will utilize an interim operating procedure, including load shedding, to address this overload.

Dynamics Transmission Security Analysis

Methodology

Transmission security is the ability of the power system to withstand disturbances, such as electric short circuits or unanticipated loss of system elements and continue to supply and deliver electricity. Transmission security is assessed deterministically with potential disturbances being

applied without concern for the likelihood of the disturbance in the assessment. These system disturbances are categorized as planning design criteria contingencies and are explicitly defined in the NERC TPL [17], NPCC Directory #1 [1], and NYSRC Reliability Rules [2] planning criteria.

The stability analysis includes both N-1 and N-1-1 analysis. Design criteria stability N-1-1 analysis evaluates the ability of the system to meet design criteria following the occurrence of a single event and allowable system adjustments. Allowable system adjustments between the first (N-1-0) and second contingency (N-1-1) include: generator redispatch, PAR adjustments, switched shunt adjustments, transformer tap adjustments, and HVDC adjustments. Figure 18 below lists the first event outages (N-1-0) for N-1-1 analysis. For stability analysis, the loss of these elements represents the most severe impedance change to the BPTF as well as a reduced capability to transfer power among the various NYCA zones. The second contingencies (N-1-1) are the normal design criteria contingencies.

The methodology for stability analysis is described in NYISO Transmission Planning Guideline #3-1 [7]. For a stability simulation to be deemed stable, oscillations in angle and voltage must exhibit positive damping within 10 seconds after initiation of the disturbance. If a secondary mode of oscillation exists within the initial 10 seconds, then the simulation time is increased sufficiently to demonstrate that successive modes of oscillation exhibit positive damping before the simulation is deemed stable.

The transient voltage response criterion is a recovery to 0.9 per unit by 5 seconds after the fault has cleared. For PSE&G Long Island, the transient voltage response criteria is a recovery to 0.9 per unit by one second after the fault has cleared. For generators with actual low voltage ride-through capability available in the model, that actual capability is used in the simulation. For the generators whose voltage ride-through capability is not available, the assumed generator low voltage ride-through capability is 0.65 p.u. by 0.4 seconds after the fault has cleared monitored at the generator bus or at the high side of the GSU (Generator Step-up Transformer). These criteria are consistent with the system operating limit (SOL) methodology used by NYISO as the Reliability Coordinator (RC) of NYCA as described in the document, "Methodology for Creating System Operating Limits for the Operations Horizon - NERC Standard FAC-011-4 [15] and in accordance with the documented process for compliance with FAC-014-3 R6 [18].

All simulations assume that generators with an angle separation greater than 300 degrees from the rest of the system will trip out-of-service. Further, the out-of-step scanning model (OSSCAN) are used to determine the tripping of transmission lines and transformers for transient swings. The OSSCAN

scans the entire network to check whether the apparent impedance is less than the line impedance.

The stability analysis evaluates about 650 NERC [17], NPCC Directory #1 [1], and NYSRC Reliability Rules [2] planning design criteria stability contingencies that are expected to produce a more severe system impact on the BPTF. These contingencies include the most severe loss of reactive capability and increased impedance on the BPTF. The contingencies are modeled to simulate the removal of all elements that the protection system or other automatic controls would disconnect without operator intervention. The stability performance contingencies include the impact of successful high speed (less than one second) reclosing and unsuccessful high-speed reclosing into a fault, where high speed reclosing is utilized. A detailed description of the applied faults, elements switched, and clearing times are provided in Appendix D.

For this assessment, the transmission security analysis is performed on the system models for study year 2030 using the baseline forecast of the statewide coincident peak load and daytime spring light load conditions.

Figure 18: Stability Analysis First Contingency Outages (N-1-0)

First Contingency	Location
Nine Mile Point #2	Zone C
Ravenswood #3	Zone J
Northport #1	Zone K
Rochester - Pannell 345 kV Line	Zone B (West Central)
Marcy - Massena 765 kV Line	Zone D (Moses South)
Marcy - Coopers Coner 345 kV Line	Zone E (Total East)
Edic - Princetown 345 kV Line	Zone E/F (Central East)
Niagara - Dysinger 345 kV Line	Zone A/B (Dysinger East)
Leeds - Van Wagner 345 kV Line	Zone F/G (UPNY-SENY)
Champlain Hudson Power Express HVDC Line	Zone J
Ryan - Plattsburgh 230 kV Line	Zone D
Sprainbrook - East Garden City 345 kV Line*	Zone I/K

* Only for the spring light load condition

Analysis Results

Dynamic stability violations were observed for 2030 daytime spring light load case. The criteria violations include loss of generator synchronism under N-1 and N-1-1 conditions. The study indicated that the Fitzpatrick nuclear generator loses synchronism for a stuck breaker event at the

Scriba 345 kV station, which leads to the loss of the Fitzpatrick – Edic 345 kV (FS-10) and Scriba – Volney 345 kV (21). While the Fitzpatrick unit showed generator synchronism violations, the BPTF remained stable. The Fitzpatrick generator is dispatched at its full capacity (852.8 MW) and is currently modeled under the constant field current mode and thus does not have a power system stabilizer model available.

Additional analysis indicated that for the same system conditions, the Fitzpatrick generator remained stable for the contingency event when operating in automatic voltage regulation (AVR) mode with the power system stabilizer modeled, or when the generator is operating at less than its full real power capability or at a fixed reactive output near its maximum capability. Comparing the planned 2026 (year 1) and 2030 system topology, no major topology updates are present in the Zone C nor is there a significant change to the net demand in the area for the expected daytime light load conditions. However, it should be noted that a series reactor is added to the Scriba – Volney 345 kV line in the 2030 cases and the behind-the-meter DER forecast is lower in 2026 than 2030. Considering that there are no significant system changes in Zone C, it is possible that this contingency event could cause Fitzpatrick to be unstable near-term in operations.

Figure 19 provides a summary of generator synchronism and transient response criteria violations under N-1 and N-1-1. Additional information including all events run and results are found in Appendix I.

Figure 19: Dynamic Stability Criteria N-1 Violations

2030 Daytime Spring Light Load Dynamic Stability Criteria N-1 Violation			
Contingency Name	Contingency Description	Generator Synchronism	Transient Voltage Recovery
CE99	Stuck Breaker at Scriba 345 kV	X (1)	-
1. Fitzpatrick generator first-swing instability.			

Figure 20: Dynamic Stability Criteria N-1-1 Violations

2030 Daytime Spring Light Load Dynamic Stability Criteria N-1-1 Violations			
First Level Contingencies	Second Level Contingency	Generator Synchronism	Transient Voltage Response
(1)	Stuck Breaker at Scriba 345 kV (CE99)	X (2)	-
1. Various contingencies including Rochester – Pannell 345 kV line, Marcy – Massena 765 kV line, Marcy – Coopers Corner 345 kV line, Edic – Princetown 345 kV line, Niagara – Dysinger 345 kV line, Leeds – Van Wagner 345 kV line, or Ryan – Plattsburgh 230 kV line 2. Fitzpatrick generator first-swing instability.			

Dynamics Corrective Action Plan

The Fitzpatrick generator is planned return to an AVR operational mode by September 2026. A study with an updated dynamics model will be required to determine if the loss of synchronism at Fitzpatrick unit is resolved.

Prior to completion of this project, the Fitzpatrick generator may be operated below its maximum real power output, or with its reactive power output near maximum during spring light load conditions to avoid loss of synchronism.

Fault Current Assessment

Methodology

The short circuit assessment evaluates the fault duty at BPTF and other critical buses in the short-circuit representation. Fault duty is calculated using the ASPEN OneLiner® program following the NYISO guideline for Fault Current Assessments [7]. Consistent with generally accepted practices for short circuit studies, the guideline requires that the transmission lines and transformers be modeled in their normal operating condition with all generating units modeled as in-service. This configuration provides adequate design margin for safety and reliability by yielding the worst-case and most conservative fault levels. Additionally, current limiting series reactor protocols [19] are respected for this analysis.

The Lowest Circuit Breaker (LCB) rating for each of the selected substations is obtained from the breaker owner (i.e., the Transmission Owner or Generator Owner). The rating is the nameplate symmetrical rating, the de-rated symmetrical value as determined by the breaker owner, or the

approximate symmetrical value converted from a total current basis (circuit breakers rated on a total current basis are converted to an approximate symmetrical current rating by using the nominal voltage of the substation). Advanced circuit breaker rating techniques, such as asymmetrical current analysis, de-rating for reclosing, or de-rating for age, are not considered by the NYISO in this analysis. However, the equipment owner may take into account the effects of these advanced circuit breaker rating techniques in the LCB value provided to the NYISO for this assessment.

The NYISO statewide short circuit case represents 2030 and includes the modeling assumptions discussed earlier in this report.

Analysis Results

Overduty circuit breakers are identified at Northport and Pilgrim 138 kV stations. These violations are also observed in the System Impact Study for the Propel NY Alternate Solution 5 project, which has an expected in-service date in summer 2030.

The Facilities Study for the Propel NY Alternate Solution 5 project is ongoing and will identify Network Upgrade Facilities to address the adverse impacts of the project, such as overduty breakers. Therefore, the corrective action plan for these fault current violations will be determined in the Facilities Study for the Propel NY Alternate Solution 5 project.

Details of the short circuit assessment are provided in Appendix J.

Extreme Contingency Assessment

Methodology

The NYCA steady state and stability performance analysis for extreme contingencies is performed using the Siemens PTI PSS@E and PowerGEM TARA software packages. Each extreme contingency event is simulated to evaluate the BPTF transient stability, voltage, and thermal response in accordance with applicable NPCC Directory #1 [1] and NYSRC Reliability Rules [2] planning criteria.

Steady-state power flow simulations are performed via the PowerGEM TARA software package to determine voltage impacts and line overloads under extreme contingency conditions. For this assessment, the NYCA transmission system is evaluated against Short-Term Emergency (STE) ratings. This procedure requires that elements are removed from service as a direct result of the contingency as well as successive rounds of elements lost due to tripping actions caused by line overloads above STE or low voltages observed on generator or load buses. After inspecting the

elements tripped in the final analysis, a determination is made to determine the extent of any widespread system disturbance.

In order to test the ability of the system to return to a stable operating point after an extreme contingency, the NYISO performs dynamic simulations. The system model is first initialized to the pre-contingency power flow conditions and then run to 0.1 seconds before applying the contingency. For no-fault contingencies, the elements are removed from service. In the case of contingencies that include a fault, the system is changed in sequence to match breaker actions. After inspecting the simulation plots and dynamic simulation log files for each contingency, a determination is made to determine the extent of any widespread system disturbance.

The extreme contingency steady state and stability analysis examines the post-contingency steady state conditions as well as stability, overloads, cascading outages, and voltage collapse to obtain an indication of system robustness and to determine the extent of any widespread system disturbance. A widespread system disturbance is defined as outages that propagate outside of the local area.

Description of Steady State and Stability Study Cases

The extreme contingency steady state and stability base cases are derived from the system representation discussed in the introduction of the main report. However, the cases are modified by adjusting the interface flows for major NYCA intra-area interfaces at or above the transfer levels expected not to be exceeded more than 25% of the time on a load flow duration basis, but less than the Normal Transfer limit. A description of the extreme contingency case is provided in Appendix D.

Extreme Contingency Analysis Contingency Events

Steady state and stability extreme contingencies are considered very low probability events. Extreme contingencies for the NYCA are developed in conformance with NPCC Directory #1 [1] and NYSRC Reliability Rules [2] planning criteria. For this study, over 100 extreme contingencies expected to have severe system impacts are evaluated including loss of entire substations, loss of entire generation plants, loss of all circuits along a transmission right-of-way, and the sudden loss of a fuel delivery system (i.e., gas pipeline contingencies). For extreme contingency analysis, no system adjustments are allowed post event. The contingencies evaluated include the most severe loss of source, loss of reactive capability, and increased impedance on the BPTF. Details of the events tested are classified as Critical Energy Infrastructure Information and are not discussed in the body of this report. The list of extreme contingencies is provided in Appendix K.

Extreme Contingency Results Summary

In steady state analysis, most of the studied contingencies are stable and show no thermal overloads over the Short-Term Emergency (STE) rating or significant voltage violations or deviations on the BPTF. Some contingencies show voltage violations, significant voltage drops, and/or thermal overloads on the transmission system, but these conditions are local in nature. In a few cases, an extreme contingency may result in a loss of local load within an area due to low voltage or loss of additional generators.

In stability analysis, most contingencies evaluated are stable, show positive damping, and show no voltage violations. Some contingencies show first-swing instability of generators or significantly low voltages, but these conditions are local in nature. In a few cases, an extreme contingency may result in loss of multiple generators or low voltages with possible voltage collapse within an area.

The details of the analysis results are classified as Critical Energy Infrastructure Information and are not discussed in the body of this report. Details of the extreme contingency analysis are provided in Appendix K.

Extreme System Condition Assessment

NPCC Directory #1 [1], and NYSRC Reliability Rules [2] planning criteria require assessment of extreme system conditions, which have a low probability of occurrence, such as extreme weather (i.e., 90th percentile load forecast) or the loss of fuel (gas) supply.

The NYCA steady state and stability performance analysis for extreme system conditions is performed using the Siemens PTI PSS®E and PowerGEM TARA software packages. The stability and steady state methodology for the Extreme System Condition Assessment is the same as discussed in the transmission security and stability sections earlier in this report.

Extreme Weather Condition Analysis

Description of Extreme Weather Study Case

The extreme weather steady state and stability study cases are derived from the system representation discussed earlier in this report. However, load is increased to meet the forecasted statewide coincident peak load, reflecting weather conditions expected to occur no more than once in ten years.

Figure 21 below provides a comparison of the baseline and 90th percentile forecast of the 2030 coincident summer peak load [9]. Details of the study case are provided in Appendix D.

Typical transmission security cases for NYISO’s transmission security studies have at least 2,620 MW of reserve generation—an amount approximately twice the size of the largest loss of source event in the NYCA and mimics the 30-minute operating reserves maintained in real time operations. For this 90th percentile summer peak case, there are not enough resources in NYCA to model this level of reserve generation in consideration of the increased demand compared to the baseline. However, as Extreme System Condition analyses are limited N-1 only, no modeling assumptions were taken to achieve 2,620 MW of reserve.

Figure 21: 2030 Baseline and 90th Percentile Coincident Summer Peak Load Delta by Zone (MW)

Zone	A	B	C	D	E	F	G	H	I	J	K	NYCA
Baseline	2,917	1,821	3,062	1,180	1,307	2,267	2,347	627	1,351	10,880	5,151	32,910
90th Percentile	3,120	1,948	3,275	1,262	1,398	2,399	2,484	659	1,420	11,242	5,561	34,768
Delta	203	127	213	82	91	132	137	32	69	362	410	1,858

Extreme Weather Analysis Results

The 2030 90th percentile summer peak case steady state analysis indicated no voltage issues on the BPTF system for N-0 and N-1 analysis. The steady state analysis showed no N-0 thermal violations. All contingencies in the dynamic analysis evaluated are stable, damped, and no generating unit lost synchronism other than by fault clearing action or RAS response.

Under N-1 conditions, thermal violations on the Gardenville 230/115/34.5 kV transformers (6,7) are observed. The violation occurs for contingencies that result in the loss of either Gardenville 230/115/34.5 kV transformer 6 or 7 in addition to one or more additional elements. The worst N-1 thermal violations are summarized in Figure 22 below. A complete summary of the thermal violations is included in Appendix H.

It was determined through cascading analysis that the observed overloads on the Gardenville 230/115/34.5 kV transformers do not lead to cascading, voltage collapse, or widespread system disturbance.

Figure 22: Gardenville Steady State Transmission Security N-1 Violations

Zone	Owner	Monitored Element	Normal Rating (MVA)	Contingency Rating (MVA)	Contingency	2030 SUM 9010 AC Loading (%)
A	NYSEG	Gardenville 230/115/34.5 kV transformer (7) (tertiary winding)	50	50	Bus fault at Gardenville 115 kV	111
A	NYSEG	Gardenville 230/115/34.5 kV transformer (6) (tertiary winding)	67	67	Stuck Breaker at Big Tree 115 kV	107

Loss of Gas Supply Analysis

Description of Loss of Gas Supply Analysis Study Case

Natural gas-fired generation in the NYCA is supplied by various networks of major gas pipelines. From a statewide perspective, New York has a relatively diverse mix of generation resources. Details of the fuel mix in New York State are outlined in the 2025 Gold Book [9] and 2025 Power Trends Report [20].

The study case for the extreme system condition of a natural gas fuel shortage is more likely to occur during the winter peak demand period. Therefore, the study model for this assessment uses the winter peak demand level with all NYCA gas-only units modeled as unavailable (out-of-service) for this analysis. The unavailability of dual fuel units that contain limitations on the amount of oil they can burn was also considered. Further, corresponding reductions in peak output capability on dual fuel units when operating on their alternative fuel source are modeled in this analysis. The total reduction in generating capability is approximately 8,465 MW. Details of the study case are provided in Appendix D.

In performing this assessment, 685 MW of large loads are modeled as flexible during N-0 system peak demand conditions.

Loss of Gas Supply Analysis Results

The 2030-31 winter peak case with loss of gas supply steady state analysis indicated no thermal or voltage issues on the BPTF system for N-0 and N-1 analysis. All contingencies in the dynamic analysis evaluated are stable, damped, and no generating unit lost synchronism other than by fault clearing action or RAS response.

In the 2020 CATR for the extreme contingency assessment of the winter peak case with loss of gas supply, generator synchronism issues at Fitzpatrick were observed for events modeling the loss of the Scriba – Fitzpatrick 345 kV (FS-10) line with the Marcy South series compensation bypassed. Subsequent updates to the fault definitions captured in this 2025 CATR addressed these violations in the 2025 ATR.

Review of Remedial Action Schemes

The New York Independent System Operator (NYISO) in its role as Planning Coordinator conducted a review of each Remedial Action Scheme (RAS) located in its planning area. This RAS

review is completed as required by the North American Electric Reliability Corporation (NERC) PRC-012-2 standard Requirement R4 [5], and the Northeast Power Coordinating Council (NPCC) Directory #1 Requirement 12 [1] and Directory #7 Requirement 6.4 [6]. The purpose of this review is to evaluate the continued effectiveness and coordination of each RAS, its inadvertent operation performance, and the performance for a single component failure. Additionally, this review identifies if there is a need for the reclassification of a Limited Impact RAS.

RASs are classified into the following three types per NPCC Directory #7:

Type I: “A RAS, other than a limited impact RAS, which recognizes or anticipates abnormal system conditions resulting from design and operating criteria contingencies, and whose mis-operation or failure to operate would have a significant adverse impact outside of the local area. The corrective actions taken by an RAS along with the actions taken by other protection systems are intended to return power system parameters to a stable and recoverable state.”

Type II: “A RAS which recognizes or anticipates abnormal system conditions resulting from extreme contingencies or other extreme causes, and whose mis-operation or failure to operate would have a significant adverse impact outside of the local area.”

Limited Impact: “A RAS by inadvertent operation or failure to operate, cannot cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations.”

Methodology

The steady state and stability review of the NYCA RASs is performed using the PowerGEM TARA 2501 and Siemens PTI PSS®E Rev 35 software packages. Each RAS was evaluated for several actions including:

Correct operation – Evaluates whether the RAS mitigates the System condition(s) or Contingency(ies) for which it was designed [5] [6].

Failed operation - Evaluates whether a single component failure in the RAS (when the RAS is intended to operate) does not prevent the BES or BPS from meeting the same performance requirements as those required for the events and conditions for which the RAS is designed [5] [6].

Inadvertent operation – Analyzes the possible inadvertent operation of the RAS, resulting from any single RAS component malfunction. For the mis-operation of a Limited Impact RAS, the BPS and BES shall remain stable, cascading shall not occur, applicable facility ratings shall

not be exceeded, and steady-state and stability voltage performance shall be within acceptable limits and except for Limited Impact RAS, the mis-operation of RAS shall not cause cascading, applicable facility ratings shall not be exceeded, BES shall remain stable, BES voltages shall remain within post contingency voltage limits and voltage deviations and transient voltage response shall be within same limits considered in the NYISO NERC TPL-001 assessment [5] [6].

Adverse interaction – Evaluates whether the RAS avoids adverse interactions with other RAS, and protection and control systems. [5] [6]

To evaluate the correct operation of a RAS, a fault or contingency is applied, including the cross-trip or generation rejection, to determine whether the action would help the system remain stable. To evaluate the failed operation of the RAS, a fault or contingency is applied without the cross-trip or generation rejection. To evaluate the mis-operation of the RAS, the cross-trip or generation rejection occurs without an initiating fault or contingency. The outcome of these tests determines the classification (Type I, II, or Limited Impact) of the RAS.

The evaluation of each RAS is completed using the 2030 summer peak load, 2030 spring daytime light load, and 2030-31 winter peak load cases for steady state and stability situations.

RAS Evaluation Results

Detailed information about each RAS and the review findings along with the simulated steady state and stability events are also provided in Appendix L.

For the RAS review, the NYISO studied a total of nine RASs, which include two Type I RASs and seven Limited Impact RASs. The NYCA does not have any Type II RASs at the time of this evaluation. This RAS evaluation identifies the need to reclassify one Limited Impact RAS as Type I. All other RAS classifications were determined to be sufficient. Two RASs were identified as needing additional review by the RAS entities to ensure the RASs mitigate the System condition(s) or Contingency(ies) for which it was designed. Additionally, no adverse interaction between RAS and other RASs, and protection and control was observed.

Review of Exclusions from NPCC Basic Criteria

NPCC Directory #1 [1] contains a provision that allows a member to request an exclusion from criteria contingencies that are simultaneous permanent phase to ground faults on different phases of each of two adjacent transmission circuits on a multiple circuit tower, with normal fault clearing.

Given that the NYCA does not have any such exclusion at this time, none were reviewed. Furthermore, no requests for exclusions are anticipated in the near future.

Additional NYSRC Requirements

This section addresses additional requirements specific to NYSRC Reliability Rules [2] that are not addressed in other sections of this report.

System Restoration Assessment (B.2 R1.3 Assessment 5)

NYSRC Reliability Rules B.2 R1.3 Assessment 5 [2] requires the NYISO to evaluate the impact of system expansion or configuration facility plans on the NYCA System Restoration Plan. The list below outlines planned system expansion facilities that will have an impact on the NYCA System Restoration Plan:

- The NYPA Northern New York Smart Path Project includes: retiring of the existing Moses – Adirondack – Porter 230 kV path and addition of new Haverstock 345-230 kV substation, Adirondack 345 kV substation, Austin Road 345 kV substation and Willis Annex 345-230-115 kV substation, two Haverstock – Willis Annex 345 kV lines, two Haverstock – Adirondack 345 kV lines, Adirondack – Austin Road – Edic 345 kV line, Adirondack – Marcy 345 kV line, Willis Annex – Patnode #1 and #2 345 kV lines and Willis Annex – Ryan #1 and #2 345 kV lines.
- The Propel NY Alternate Solution 5 project to address the Long Island Offshore Wind Export Public Policy Transmission Need includes: 345 kV Barrett substation, 345 kV Shore Road substation, and 345 - 138 kV Ruland Road substation. The proposed Barrett 345 kV substation includes two 345/138 kV transformers and connects into the existing 138 kV system. The new 345 - 138 kV Ruland Road substation includes three 345/138 kV transformers and connects to the existing 138 kV Ruland Road substation. The proposed 345 kV Shore Road substation includes a 138 kV PAR to connect into the existing 138kV Shore Road substation. The project will also upgrade the existing 345 kV Uniondale Hub substation and add additional GIS breakers at the existing 345 kV Rainey substation. The existing Y49 line will continue to be connected to the Uniondale Hub substation. The project also proposes adding a new 138 kV PAR at the existing 138 kV Northport substation. Additional breaker upgrades at the existing 138 kV Newbridge substation and Holbrook substation have also been included as part of the project. The project proposes adding 2 new 345 kV PAR controlled tie lines between the 345 kV New Shore Road substation and the existing Sprainbrook substation. A new 345 kV PAR controlled tie line will connect the 345 kV Uniondale Hub substation and the existing 345 kV Tremont substation. The Project will add three new 345kV lines to connect the new 345 kV substations on Long Island : Barrett – Uniondale Hub, Uniondale Hub –Shore Road, and Ruland Road – Shore Road. The existing 138 kV lines from Ruland Road to New Bridge (Line 567) and from New Bridge to

Stewart Avenue (Line 467) will be converted into a new 345 kV PAR controlled line from Ruland Road to Uniondale Hub substation. The project also proposes a 138 kV line between the existing Syosset and Shore Road substation.

- The Consolidated Edison Goethals – Fox Hills project adds a new PAR feeder. This feeder will add a new 345/138 kV transformer, 138 kV PAR and a 138 kV feeder between Goethals and Fox Hills substations.
- The Consolidated Edison project at Buchanan North reconfigures the 345 kV substation by adding a circuit breaker separating the Y94 line from Ramapo to Buchanan North and 345/138 kV transformer TA5.
- The Consolidated Edison Brooklyn Clean Energy Hub (BCEH) project adds a new 345 kV substation in the New York City area and loops in the 345 kV lines #61, #62 and #63 between Rainey and Farragut through this new BCEH substation. The project also adds 345/138 kV transformers to server load at Gateway and Nevins Street substations.
- The National Grid Clay project will add two new 345 kV bays to extend service to new Micron load project.
- The NYSEG Hillside substation will add a PAR on the Hillside – East Towanda (PJM) 230 kV line.
- The NYSEG Meyer substation will add a new 230/115 kV transformer #4.
- The NYSEG Fraser reconfiguration project will add second 345/115 kV transformer and will reconfigure the substation.
- The NYSEG South Perry 230/115 kV transformer is an addition to the existing South Perry facility.
- The NYSEG Watercure project will add a new 345/115 kV transformer.
- The NYSEG Oakdale 345/115/34.5 kV transformer is an addition to the exiting Oakdale facility. The Oakdale 345 kV substation has reconfiguration plans include expansion of the existing 345 kV bus into three-bay breaker-and-half configuration and expansion of 115 kV bus into six-bay breaker-and-half configuration, adding one new 345/115 kV transformer and replacing the existing two transformers.

The potential impacts of the system expansion plans listed above have been communicated to NYISO Operations Engineering for consideration in the annual review and update of the NYCA System Restoration Plan.

Local Rules Consideration of G.1 through G.3 (B.2 R1.2)

The NYSRC has adopted Local Reliability Rules that apply to New York City and Long Island zones to protect the reliable delivery of electricity for specific electric system characteristics and demographics relative to these zones. The NYISO requests information from the Transmission

Owners on changes in local system conditions that would impact the New York State BPS at the beginning of every year. The base conditions are described earlier in this report and summaries are included in the appendices, which illustrate the application of the following local rules to the system models used for this year's assessments:

- *G.1(R1) Second Contingency Design and Operation (New York City)*
 - *The 345 kV transmission system and some specific 138 kV system in the Con Edison service territory are designed for the occurrence of two non-simultaneous contingencies and returned to normal (N-1-1-0)². Additionally, the New York City margin is based on the most limiting N-1-1-0 contingency combination.*
- *G.1(R2) Operating Reserves/Unit Commitment, G.1(R3) Locational Reserves (New York City)*
 - Local Operating Reserve rules are considered in the development of the base case used for all reliability assessments.
- *G.2 Loss of Generator Gas Supply (New York City), G.3 Loss of Generator Gas Supply (Long Island)*
 - Specific loss of generator gas supply studies are performed by Con Edison and PSEG-Long Island and are reviewed by the NYISO. The planned system is expected to be compatible with local rules regarding loss of generator gas supply.
- *G.1(R4) Thunderstorm Watch (New York City)*
 - Proposed facilities included in this assessment may impact the Thunderstorm Watch contingency list due to substation reconfiguration and facility additions. The contingencies impacted by system facility changes will be evaluated before the proposed facilities are in service.

² <https://www.coned.com/-/media/files/coned/documents/business-partners/transmission-planning/transmission-planning-criteria.pdf>

Corrective Action Plans

Status Update of Previously Identified Corrective Action Plans

Figure 23 below provides status updates for corrective action plans identified in previous reviews to achieve conformance with NPCC Directory #1 and NYSRC Reliability Rules.

Figure 23: Status Update of Previously Identified Corrective Action Plans

Identifying Study	Corrective Action Plan Description	Status
2020 CATR and 2020 RNA	Reduction in the Con Edison load forecast.	In-Service 2022
2020 CATR and 2020 RNA	Vinegar Hill Distribution Switching Substation connected to 138 kV Hudson Avenue East	In-Service 2022
2020 CATR and 2020 RNA	PAR Controlled Rainey - Corona 345/138 kV Feeder	In-Service 2023
2020 CATR and 2020 RNA	PAR Controlled Gowanus - Greenwood 345/138 kV Feeder	In-Service 2025
2020 CATR and 2020 RNA	PAR Controlled Goethals - Fox Hills 345/138 kV Feeder	In-Service 2025
2020 CATR and 2020 RNA	Series Reactors on lines 71, 72, 51 and 52 in-service and Series Reactors on lines 41, 42 and Y49 by-passes	In-Service 2023
2021 STAR and ConEd LTP	Series Reactors on lines 41 and 42 in-service	In-Service 2025
2021 STAR and ConEd LTP	Composite Load Model for Con Edison's Dynamic Database	In-Service 2025
2023 Q2 STAR	Temporary continued operation of Gowanus and Narrows for reliability as permitted by New York regulations (temporary solution)	Ongoing
	Installation of CHPE (permanent)	Planned in-service

Corrective Action Plans Identified in this Review

To address the N-1 and N-1-1 dynamics performance violations observed in this review, the corrective action plan is the planned work to return the Fitzpatrick generator to an AVR operational mode. This plan is expected to be in service by September 2026.

To address the N-1-1 thermal overload observed in this review, the corrective action plan is the planned reconfiguration of the Oakdale 345 and 115 kV system along with a second Oakdale 345/115 kV transformer, which are planned to be completed by winter 2030. Prior to completion of this project, NYSEG will utilize an interim operating procedure to address this overload.

For the Gardenville 345/115/34.5 kV overload, the corrective action plan is the planned reconfiguration of the Station and Transformers #6, #7, #8. The facilities are planned to be completed

by winter 2030. Prior to completion of this project, NYSEG will utilize an interim operating procedure to address this overload.

The overdutied circuit breakers identified at Northport and Pilgrim 138 kV stations will be identified through the Facilities Study for the Propel NY Alternate Solution 5 project.

Figure 24: Corrective Action Plans Identified in this Review

Identifying Study	Violation	Corrective Action Plan Description	Status
2025 CATR	Fitzpatrick generator first swing instability in spring light load condition for a stuck breaker event at Scriba 345 kV (CE99)	Fitzpatrick AVR operational mode	Planned in-service W2026
2025 Q3 STAR	Oakdale 345/115/34.5 kV transformer and Oakdale – N. Endicott 115 kV transmission line overload in summer peak condition	Oakdale station reconfiguration	Planned in-service W2030
2025 CATR	Gardenville 230/115/34.5 kV transformer overload in summer peak condition	New Gardenville upgrades	Planned in-service W2030
2025 CATR	Northport and Pilgrim 138 kV overdutied circuit breakers	To be determined through Q1289 facilities study	Ongoing

Overview Summary of System Performance

Five assessments and two reviews were conducted for the 2025 CATR.

In the first assessment, power flow analysis was conducted to evaluate the thermal and voltage performance of the New York State BPTF for normal (or design) contingencies considering both N-1 and N-1-1 conditions, as defined by NPCC Directory #1 [1], and NYSRC Reliability Rules [2] planning criteria. For the 2030 summer peak power flow analysis N-1-1 thermal violations were observed. Stability analysis is also conducted in this first assessment to evaluate the stability performance of the New York State BPTF for normal (or design) contingencies as defined in NPCC Directory #1, and NYSRC Reliability Rules planning criteria. The stability simulations show criteria violations on the BPTF for N-1 and N-1-1 conditions for a stuck breaker at Scriba 345 kV, which resulted in loss of synchronism at the Fitzpatrick generation in the 2030 daytime spring light load case. Corrective action plans are identified to address these criteria violations.

In the second assessment, power flow and stability analysis are conducted to evaluate the performance of the BPS for low probability extreme contingencies as defined in NPCC Directory #1 and NYSRC Reliability Rules. The power flow analysis results indicate that most of the extreme contingencies do not cause significant thermal or voltage violations over a widespread area. The

stability analysis results indicate that the system remains stable for most extreme contingencies and the impact is local.

The third assessment evaluates the fault current duty at BPTF buses in the short circuit representation. Overduty circuit breakers are identified at Northport and Pilgrim 138 kV stations. The Facilities Study for the Propel NY Alternate Solution 5 project is ongoing and Network Upgrade Facilities to address the adverse impacts of the project, such as overduty breakers, will be identified in that process.

The fourth assessment evaluates extreme system conditions, which have a low probability of occurrence (e.g., high peak load conditions resulting from extreme weather and the loss of fuel (gas) supply). For both the high peak load and loss of gas supply conditions, the power flow analysis results indicate that these system conditions do not cause thermal or voltage violations on the BPTF.

The fifth assessment and other requirements specific to the NYSRC Reliability Rules include: System Restoration Assessment and Local Operation Area criteria. The planned system meets these NYSRC Reliability Rules.

A Remedial Action Scheme (RAS) review evaluated if each RAS mitigates the system conditions or contingencies for which it was designed, avoids adverse interactions with other RAS and protection and control systems, and for inadvertent failure of a limited impact RAS, does not cause or contribute to BES cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or undamped oscillations. The RAS review indicated that one RAS may need to be reclassified as Type I RAS from Limited Impact RAS. The reviews of two RASs indicate that these schemes should remain as Limited Impact RAS, but a review of the RAS settings for potential updates will be necessary. Other RASs in the New York area are classified as limited Impact RASs, and the RAS review did not identify the need for reclassification.

A review of exclusions to Directory #1 criteria evaluates impacts due to system changes. The NYCA has no existing exclusions to NPCC Basic Criteria and no requests for new exclusions have been made.

Conclusion

As the results of this ATR indicate, the planned bulk power transmission facilities, as planned through year 2030, conform with the applicable NPCC Directory #1 and NYSRC Reliability Rules.

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