Short-Term Assessment of Reliability: 2020 Quarter 4

A Report by the
New York Independent System Operator

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Contents

Executive Summary

This report sets forth the 2020 Quarter 4 Short-Term Assessment of Reliability ("STAR") findings for the five-year study period from the STAR Start Date (October 15, 2020) through October 15, 2025. The assessment identifies short-term needs starting in 2023 and increasing in scope and scale through 2025. The issues identified are primarily driven by a combination of forecasted peak demand and the assumed unavailability of certain generation in New York City affected by the New York State Department of Environmental Conservation's "Peaker Rule."[1] The short-term transmission security needs include both thermal overloads on the bulk system as well as dynamic instability. For thermal loading, several 345 kV circuits in the Con Edison service territory are overloaded under N-1-1 conditions beginning in year 2025. The specific violations are listed in Appendix A. Dynamic instability is observed starting in 2023 and continuing through 2025. The issues include low transient voltage response, loss of generator synchronism, and undamped voltage oscillations. The transient voltage response issues arise on transmission facilities owned by Con Edison in its transmission district but extend into areas adjacent to Con Edison's service territory.

This assessment finds the planned system through 2025 is within the resource adequacy criterion.

The short-term transmission security needs observed in 2023 are Near-Term Reliability Needs, solutions to which will be solicited, evaluated, and addressed in accordance with the NYISO Short-Term Reliability Process. The needs arise within the Con Edison transmission district, therefore Con Edison is the Responsible Transmission Owner for the regulated transmission solution.

Based on the key assumptions presented to stakeholders, the needs observed in this assessment are the same as those observed in the 2020 Quarter 3 STAR. No additional short-term needs are observed in this assessment. To address the 2023 Near-Term need found in the 2020 Quarter 3 STAR, a solution solicitation was issued by the NYISO on December 3, 2020 with the proposed solutions to be submitted to the NYISO by February 1, 2021. On November 19, 2020, following the Start Date of this STAR, the NYISO presented to stakeholders an updated load forecast. The impact to the Near-Term 2023 needs due to the load forecast update were evaluated and incorporated into the solution solicitation. The needs observed in years 2024 and 2025 will be addressed in the long-term Reliability Planning Process, which will include impacts from the updated load forecast.

[1] The "Peaker Rule" is the commonly-used name for a New York State Department of Environmental Conservation ("DEC") regulation that limits nitrogen oxides (NOx) emissions from simple-cycle combustion turbines, as discussed in greater detail within this report.

Purpose

In 2019, the NYISO established a new Short-Term Reliability Process ("STRP") with its requirements prescribed in Attachments Y and FF of the NYISO's Open Access Transmission Tariff. The STRP evaluates the first five years of the planning horizon, with a focus on needs arising in the first three years of the planning horizon. With this process in place, the Reliability Planning Process may focus on solutions to longer term needs through the Reliability Needs Assessment ("RNA") and the Comprehensive Reliability Plan ("CRP").

The first step in the STRP is the Short-Term Assessment of Reliability ("STAR"). STARs are performed quarterly to proactively address reliability needs that may arise within five years ("Short-Term Reliability Needs")[2] due to various changes to the grid such as generator deactivations, revised transmission plans, and updated load forecasts. Transmission Owners also assess the impact of generator deactivations on their local system. A Short-Term Reliability Need that is observed within the first three years of the study period is deemed a "Near-Term Reliability Need."[3] Should a Near-Term Reliability Need be identified in a STAR, the NYISO would solicit and select the solution to address the need. If a need arises beyond the first three years of the study period, the NYISO may choose to address the need within the STRP or, if time permits, through the long-term Reliability Planning Process.

This STAR report sets forth the 2020 Quarter 4 findings for the study period from the STAR Start Date (October 15, 2020) through October 15, 2025 (Year 5). The NYISO, in collaboration with Con Edison, assessed the potential reliability impacts to the Bulk Power Transmission Facilities ("BPTF") considering system changes, including the availability of resources and the status of transmission plans in accordance with the NYISO Reliability Planning Process Manual[4].

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[2] OATT Section 38.1 contains the tariff definition of a Short-Term Reliability Process Need.

[3] OATT Section 38.1 contains the tariff definition of a Near-Term Reliability Need. *See also*, OATT Section 38.3.6.

[4] NYISO Reliability Planning Process Manual, December 12, 2019. *See:* https://www.nyiso.com/documents/20142/2924447/rpp_mnl.pdf

Assumptions

The NYISO evaluated the study period using the most recent Reliability Planning Process base case. The NYISO used the base load forecasts for the study years consistent with the 2020 Load and Capacity Data Report ("Gold Book").[5] In accordance with the base case inclusion rules,[6] generation and transmission projects are added to the base case if they have met significant milestones such that there is a reasonable expectation of completion of the project. A summary of key projects is provided in Appendix C.

This assessment used the major assumptions included in the 2020 RNA. Consistent with the NYISO's obligations under its tariffs, the NYISO provided stakeholders information on the modeling assumptions employed in this assessment. Details regarding the study assumptions were reviewed with stakeholders at the October 23, 2020 Electric System Planning Working Group ("ESPWG")/Transmission Planning Advisory Subcommittee ("TPAS"). The meeting materials are posted on the NYISO's public website.[7]

Generation Assumptions

Generator Deactivation Notices

There are no generator deactivations to assess in the 2020 Quarter 4 STAR.

Peaker Rule: Ozone Season Oxides of Nitrogen (NOx) Emission Limits for Simple Cycle and Regenerative Combustion Turbines

In 2019, the New York State Department of Environmental Conservation ("DEC") adopted a regulation to limit nitrogen oxides (NOx) emissions from simple-cycle combustion turbines (referred to as the "Peaker Rule").[8] Combustion turbines known as "peakers" typically operate to maintain bulk power system reliability during the most stressful operating conditions, such as periods of peak electricity demand. The Peaker Rule will impact turbines located mainly in the lower Hudson Valley, New York City and Long Island. Many of these units also maintain transmission security by supplying energy within certain areas of the grid referred to as "load pockets." Load pockets represent transmission-constrained geographic areas where electrical demand can only be served by local generators due to transmission limitations that occur during certain operational conditions.

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[5] 2020 Load and Capacity Data Report. *See:* https://www.nyiso.com/documents/20142/2226333/2020-Gold-Book-Final-Public.pdf

[6] *See* NYISO Reliability Planning Process Manual Section 3.

[7] Short-Term Assessment of Reliability: 2020 Q4 Key Study Assumptions

[8] https://www.dec.ny.gov/regulations/116131.html

The Peaker Rule provides a phased reduction in emission limits, in 2023 and 2025, during the ozone season (May 1-September 30) and allows several options for achieving compliance with the new lower limits applicable during the ozone season. The rule required peaking unit owners to submit compliance plans to the DEC in March 2020. Compliance plans submitted to the DEC were provided to the NYISO for assessment and inclusion in the Reliability Planning Process base case. The plans indicate approximately 1,500 MW of peaker capability would be unavailable during the summer by 2025 to comply with the emissions requirements. A subset of those generators would be unavailable starting in 2023. Remaining peaker units stated either that they comply with the emission limits as currently operated, or proposed equipment upgrades to achieve the emissions limits.

A summary of the list of peaker generation removals is provided in Figure 1. The list of peaker generators in Figure 1 does not include peaker generators that have already completed a Generator Deactivation Notice or entered an IIFO.

The DEC regulations include a provision to allow an affected generator to continue to operate up to two years, with a possible further two-year extension, after the compliance deadline if the generator is designated by the NYISO or the local transmission owner as needed to resolve a reliability need until a permanent solution is in place.

As compared to the 2020 RNA, all other changes to generation assumptions are specified below.

Figure 1: Status Change Due to DEC Peaker Rule

Owner/Operator	Station	Zone	Nameplate (MW)	CRIS (MW) (2)		Capability (MW) (2)		Status Change Date (1)
				Summer	Winter	Summer	Winter	
Central Hudson Gas & Elec. Corp.	Coxsackie GT	G	21.6	19.9	26.0	20.2	23.9	5/1/2023
Central Hudson Gas & Elec. Corp.	South Cairo	G	21.6	19.8	25.9	18.1	22.5	5/1/2023
Consolidated Edison Co. of NY, Inc.	74 St. GT 1 & 2	J	37.0	39.1	49.2	35.2	40.9	5/1/2023
NRG Power Marketing, LLC	Astoria GT 2-1, 2-2, 2-3, 2-4	J	186.0	165.8	204.1	141.8	185.4	5/1/2023
NRG Power Marketing, LLC	Astoria GT 3-1, 3-2, 3-3, 3-4	J	186.0	170.7	210.0	140.8	181.8	5/1/2023
NRG Power Marketing, LLC	Astoria GT 4-1, 4-2, 4-3, 4-4	J	186.0	167.9	206.7	132.8	176.2	5/1/2023
Astoria Generating Company, L.P.	Gowanus 1-1 through 1-8	J	160.0	138.7	181.1	138.2	180.6	5/1/2023
Astoria Generating Company, L.P.	Gowanus 4-1 through 4-8	J	160.0	140.1	182.9	135.3	184.8	5/1/2023
Consolidated Edison Co. of NY, Inc.	Hudson Ave 3	J	16.3	16.0	20.9	0.0	0.0	5/2/2023
Consolidated Edison Co. of NY, Inc.	Hudson Ave 5	J	16.3	15.1	19.7	14.2	20.2	5/1/2023
Helix Ravenswood, LLC	Ravenswood 01	J	18.6	8.8	11.5	8.1	10.1	5/1/2023
Helix Ravenswood, LLC	Ravenswood 10	J	25.0	21.2	27.0	16.5	24.4	5/1/2023
Helix Ravenswood, LLC	Ravenswood 11	J	25.0	20.2	25.7	16.4	22.4	5/1/2023
National Grid	Northport GT	K	16.0	13.8	18.0	11.7	15.1	5/1/2023
National Grid	Port Jefferson GT 01	K	16.0	14.1	18.4	12.9	16.6	5/1/2023
Consolidated Edison Co. of NY, Inc.	59 St. GT 1	J	17.1	15.4	20.1	15.6	20.3	5/1/2025
NRG Power Marketing, LLC	Arthur Kill GT 1	J	20.0	16.5	21.6	12.0	15.0	5/1/2025
Astoria Generating Company, L.P.	Astoria GT 01	J	16.0	15.7	20.5	14.1	19.1	5/1/2025
Astoria Generating Company, L.P.	Gowanus 2-1 through 2-8	J	160.0	152.8	199.6	142.3	190.0	5/1/2025
Astoria Generating Company, L.P.	Gowanus 3-1 through 3-8	J	160.0	146.8	191.7	135.5	182.8	5/1/2025
Astoria Generating Company, L.P.	Narrows 1-1 through 2-8	J	352.0	309.1	403.6	286.5	379.9	5/1/2025
	2023 Total		1,091.4	971.2	1,227.1	842.2	1,104.9	
	2025 Total		725.1	656.3	857.1	606.0	807.1	
	Total		1,816.5	1,627.5	2,084.2	1,448.2	1,912.0	

Notes
1. Dates identified by generators in their DEC Peaker Rule compliance plan submittals for transitioning the facility to Retired, Blackstart, or will be out-of-service in the summer ozone season.
2. MW values are from the 2020 Load and Capacity Data Report

Generator Return-to-Service

On July 10, 2020 the Hudson Ave 3 unit (Zone J, 16.3 MW (nameplate)) returned to service. However, this generator is modeled out-of-service starting May 2023 due to its plan to deactivate in order to comply with the DEC Peaker Rule.

Generator Additions

NYISO Queue #758, Sithe Independence 56.6 MW CRIS is included in the assessment as the 2020-01 Expedited Deliverability Assessment is completed.

Load Assumptions

The NYISO used the base load forecasts for the study years consistent with the 2020 Gold Book. As compared to the 2020 RNA, there are no changes in load assumptions included in this assessment.[9] Figure 2 provides a summary of the load and energy forecast used in this assessment.

Figure 2: Load and Energy Forecast: Baseline Forecast, and Baseline with BtM Solar PV Forecasts Added Back in

Baseline and Adjusted Baseline Energy Forecasts

Annual GWh	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2020 End-Use Energy Forecast	154,380	158,431	161,852	162,477	163,897	165,132	166,331	167,305	168,188	168,789	169,249
– Energy Efficiency and Codes & Standards	1,885	3,959	6,200	8,599	11,081	13,582	15,937	18,057	19,921	21,563	23,016
– BtM Solar PV	2,631	3,274	3,899	4,563	5,193	5,738	6,205	6,591	6,893	7,130	7,289
– BtM Non-Solar Distributed Generation	1,252	1,416	1,059	940	818	852	877	900	931	956	973
+ Storage Net Energy Consumption	19	43	67	99	130	160	189	221	254	281	309
+ Electric Vehicle Energy	199	345	538	781	1,085	1,456	1,889	2,407	3,031	3,765	4,506
+ Non-EV Electrification	190	457	815	1,289	1,884	2,591	3,337	4,163	5,055	5,997	6,988
2020 Gold Book Baseline Forecast	149,020	150,627	152,114	150,544	149,904	149,167	148,727	148,548	148,783	149,183	149,774
+ BtM Solar PV	2,631	3,274	3,899	4,563	5,193	5,738	6,205	6,591	6,893	7,130	7,289
2020 RNA Base Case Forecast[1]	151,651	153,901	156,013	155,107	155,097	154,905	154,932	155,139	155,676	156,313	157,063

Baseline and Adjusted Baseline Summer Peak Forecasts

Annual MW	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2020 End-Use Peak Demand Forecast	33,319	33,599	33,978	34,220	34,555	34,861	35,208	35,524	35,848	36,108	36,324
– Energy Efficiency and Codes & Standards	296	591	943	1,322	1,709	2,108	2,488	2,825	3,116	3,360	3,579
– BtM Solar PV	555	707	841	986	1,102	1,204	1,287	1,351	1,392	1,411	1,411
– BtM Non-Solar Distributed Generation	218	251	189	169	148	154	158	164	170	174	177
– BtM Storage Peak Reductions	5	14	26	44	63	91	125	159	206	250	292
+ Electric Vehicle Peak Demand	40	68	103	147	201	261	333	418	513	625	748
+ Non-EV Electrification	11	25	46	72	104	146	187	230	279	327	379
2020 Gold Book Baseline Forecast[2]	32,296	32,129	32,128	31,918	31,838	31,711	31,670	31,673	31,756	31,865	31,992
+ BtM Solar PV	555	707	841	986	1,102	1,204	1,287	1,351	1,392	1,411	1,411
2020 RNA Base Case Forecast[1]	32,851	32,836	32,969	32,904	32,940	32,915	32,957	33,024	33,148	33,276	33,403

[1] For the resource adequacy study, the Gold Book baseline load forecast was modified by removing the behind-the-meter solar PV impacts in order to model the solar PV explicitly as a generation resource to account for the intermittent nature of its availability.

[2] The transmission security power flow RNA base cases use this Gold Book baseline forecast.

Transmission Assumptions

For the study years that overlap between the RNA and the STAR (years 4 and 5), there are no changes in transmission assumptions. However, as the STAR includes an assessment for years 1 through 3, the

[9] On November 19, 2020, following the Start Date of this STAR, the NYISO presented to stakeholders an updated load forecast, as discussed further in a later section of this report.

following transmission facilities were modeled out-of-service:

- Moses – St. Lawrence 230 kV (L33P) through fall 2022
- Plattsburg 230/115 kV (AT1) transformer through winter 2021 (a spare transformer is placed in-service during the outage)
- Moses 230/115 kV (AT2) through winter 2022

The Q#543 (AC Transmission Segment B) non-material project changes, which include the Shoemaker – Sugarloaf 138 kV line and the Van Wagner 345 kV substation are also included in this assessment.[10]

Findings

This assessment finds that reliability criteria would not be met throughout the five-year study period under the assumed and forecasted base case system conditions.

Resource Adequacy Assessments

The NYISO assessed the resource adequacy of the NYCA system, per the one-day-in-ten-years (0.1 days per year) loss of load expectation ("LOLE") criterion, which measures the probability of disconnecting firm load due to a resource deficiency. This assessment finds the planned system through 2025 is within the resource adequacy criterion.

Transmission Security Assessments

The NYISO performed a transmission security assessment for the BPTF and identified Short-Term Reliability Needs. The transmission security issues include thermal overloads and dynamic instability. The Short-Term Reliability Needs identified in this assessment are not Generator Deactivation Reliability Needs.[11]

Steady State Assessment

Thermal overloads on the BPTF are observed starting in 2025 on several Con Edison transmission facilities. Figure 3 summarizes the worst overload on each BPTF element with a under N-1-1 conditions and Figure 4 provides a summary for N-1-1-0 conditions. No steady state voltage violations are observed on the BPTF for this assessment. Appendix A provides the details of additional contingency combinations

[10] The NYISO presented the Shoemaker – Sugarloaf 138 kV non-material determination to stakeholders at an August 7, 2020 stakeholder meeting. The NYISO presented the Van Wagner 345 kV substation non-material determination to stakeholders at an October 5, 2020 stakeholder meeting. *See* TPAS meeting materials at https://www.nyiso.com/tpas

[11] OATT Section 38.1 contains the tariff definition of a Generator Deactivation Reliability Need.

that also result in thermal criteria violations for these BPTFs.

Figure 3: Steady State Transmission Security N-1-1 Violations

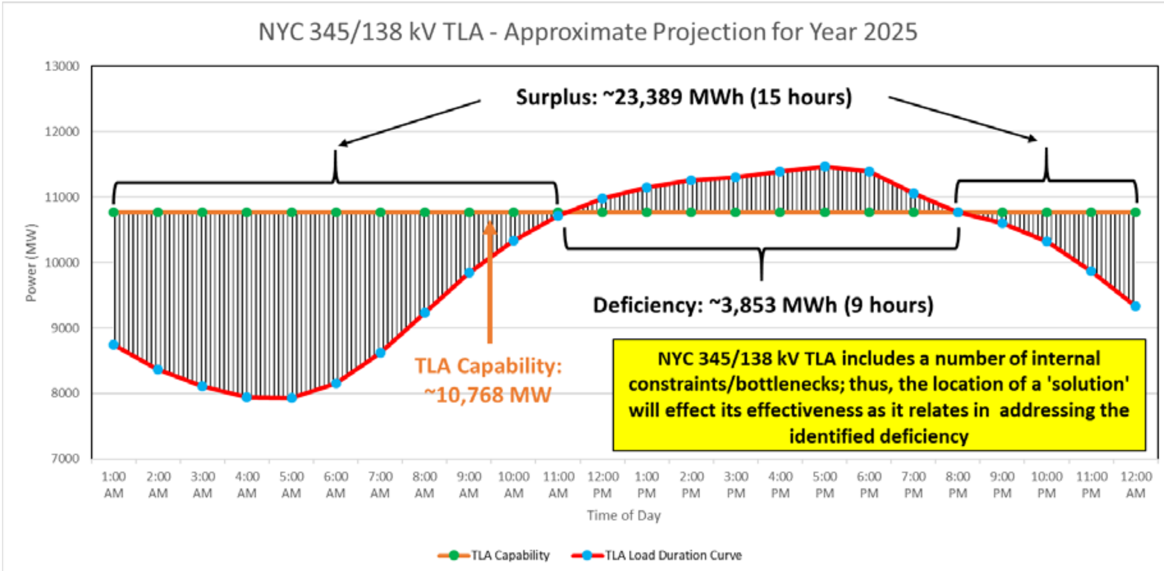
Zone	Owner	Monitored Element	Normal Rating (MVA)	Contingency Rating (MVA)	1st Contingency	2nd Contingency	2025 Summer Peak Flow (%)
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Loss of Ravenswood 3	Dunwoodie-Mott Haven 345 kV (72)	110
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (72)	785	925	Loss of Ravenswood 3	Dunwoodie-Mott Haven 345 kV (71)	108
J	ConEd	Goethals-Gowanus 345 kV (26)	518	738	Loss of Ravenswood 3	Stuck Breaker at Goethals 5	102
J	ConEd	Goethals-Gowanus 345kV (25)	518	738	Loss of Ravenswood 3	Gowanus - Goethals 345 kV (26)	103
I	ConEd	Sprainbrook/Dunwoodie 345/138 kV (N7)	366	423	Loss of Ravenswood 3	Tower W89 & W90	106
I	ConEd	Sprainbrook/Dunwoodie 345/138 kV (S6)	309	438	Loss of Ravenswood 3	Tower W89 & W90	103

Figure 4: Steady State Transmission Security N-1-1-0 Violations

Zone	Owner	Monitored Element	Normal Rating (MVA)	Contingency Rating (MVA)	1st Contingency	2nd Contingency	2025 Summer Peak Flow (%)
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Loss of Ravenswood 3	Dunwoodie-Mott Haven 345 kV (72)	132

Considering the utilization of all available PAR controls, the observed maximum deficiency (*i.e.,* compensatory MW) for the New York City 345/138 kV Transmission Load Area ("TLA") in 2025 is 700 MW. Based on the load duration curve shown in Figure 7 the deficiency in 2025 may be observed for approximately nine hours (3,853 MWh).

Figure 5: NYC 2025 345/138 kV TLA Load Duration Curve



Steady State Compensatory MW

The compensatory MW needed in 2025 to address the BPTF steady state transmission security issues is 700 MW.

Transmission security compensatory MW amounts are determined by adding generic resources to locations of need (or combinations of locations). The compensatory MW additions are not intended to represent specific solutions, as the impact of specific solutions can depend on the type of the solution and its location on the grid. Rather, the compensatory MW provide a generic order-of-magnitude measure to guide the formulation of solutions. Transmission security needs could potentially be met by combinations of solutions including generation, transmission, energy efficiency, and demand response measures.

System Stability Assessments

Dynamic instability is observed starting in 2023 and continues for the entire study period. The issues include low transient voltage response, loss of generator synchronism, and undamped voltage oscillations. The transient voltage response issues arise on transmission facilities owned by Con Edison in its transmission district, but extend into areas adjacent to Con Edison's service territory. The loss of generator synchronism is observed in generators within or near the Astoria and Greenwood load pockets, and is primarily driven by the transient voltage response in the local area. The undamped voltage oscillations also arise primarily in the Con Edison transmission district and are primarily driven by the reduction in dynamic reactive capability and MW to serve the load. The reduction in system inertia may also play a role in the undamped voltage oscillations. Figure 6 provides a summary of Short-Term Reliability Needs related to the generator synchronism and transient voltage response dynamic stability criteria under N-1 conditions, and Figure 7 provides a summary of the needs for N-1-1 conditions.

Figure 6: N-1 Dynamic Stability Criteria Violations

Dynamic Stability Criteria N-1 Violations (1), (2)								
Contingency Name	Contingency Description	2023		2024		2025		
		Generator Synchronism	Transient Voltage Response	Generator Synchronism	Transient Voltage Response	Generator Synchronism	Transient Voltage Response	
ConEd08	Fault at E. 13th St. 138 kV with stuck breaker 4E		non-BPTF		non-BPTF		non-BPTF	
ConEd15	Fault at Greenwood 138 kV with stuck breaker 7S		non-BPTF		non-BPTF	x	non-BPTF	
ConEd16	Fault at Hell Gate 138 kV with stuck breaker 5						non-BPTF	
ConEd25-Q461-Q462	Fault at E. 13th St. 138 kV with stuck breaker		non-BPTF		non-BPTF		non-BPTF	
UC11	Fault at Sprainbrook 345 kV and L/O Sprainbrook - Tremont (X28) 345 kV and Buchanan - Sprainbrook (W93/W79) 345 kV		non-BPTF		non-BPTF		BPTF & non-BPTF	
UC25A	Fault at Ravenswood 3 345 kV and L/O Ravenswood 3		BPTF & non-BPTF		BPTF & non-BPTF	x	BPTF & non-BPTF	
UC25B	Fault at Rainey 345 kV and L/O 60L 345 kV circuit					x	BPTF & non-BPTF	
UC048A_Q510	Fault at Gowanus 345 kV and L/O Gowanus 345/138 kV 14TR					x	non-BPTF	
UC049_Q510	Fault at Gowanus 345 kV with stuck breaker 14						non-BPTF	

Notes
(1) non-BPTF issues are reported for information only
(2) BPTF dynamic issues increase in scope and scale through 2030 as observed in the 2020 Reliability Needs Assessment

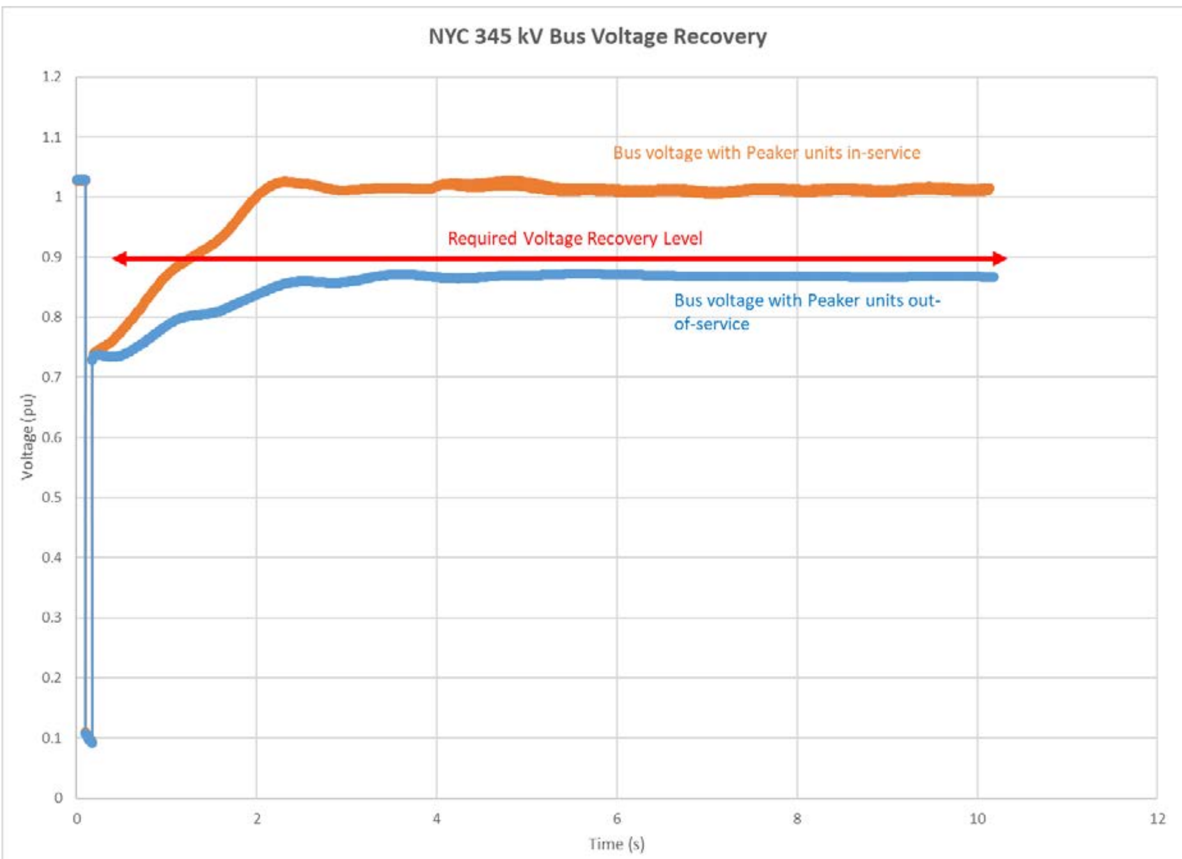
Figure 7: N-1-1 Dynamic Stability Criteria Violations

Dynamic Stability Criteria N-1-1 Violations (L/O Ravenswood 3 as First Level Event) (1), (2)							
Contingency Name	Contingency Description	2023		2024		2025	
		Generator Synchronism	Transient Voltage Response	Generator Synchronism	Transient Voltage Response	Generator Synchronism	Transient Voltage Response
ConEd08	Fault at E. 13th St. 138 kV with stuck breaker 4E		non-BPTF		non-BPTF		non-BPTF
ConEd12	Fault at Fresh Kills 138 kV with L/O Arthur Kill 2						non-BPTF
ConEd14	Fault at Greenwood 138 kV with L/O Gowanus 345/138 (T2) 345 kV and PAR						non-BPTF
ConEd15	Fault at Greenwood 138 kV with stuck breaker 7S		non-BPTF		non-BPTF	x	non-BPTF
ConEd16	Fault at Hell Gate 138 kV with stuck breaker 5						non-BPTF
ConEd25-Q461-Q462	Fault at E. 13th St. 138 kV with stuck breaker		non-BPTF		non-BPTF		non-BPTF
TE03-UC03	Fault at Sprainbrook 345 kV and L/O Sprainbrook - Millwood (W64/W99, W79/W93) 345 kV						BPTF & non-BPTF
TE20-UC20	Fault at Dunwoodie 345 kV and L/O Dunwoodie - Pleasantville (W89 and W90) 345 kV						BPTF & non-BPTF
UC11	Fault at Sprainbrook 345 kV and L/O Sprainbrook - Tremont (X28) 345 kV and Buchanan - Sprainbrook (W93/W79) 345 kV		BPTF & non-BPTF		BPTF & non-BPTF	x	BPTF & non-BPTF
UC19	Fault at Millwood 345 kV and L/O Millwood - Sprainbrook (W82/W65 and W85/W78) 345 kV						non-BPTF
UC25A	Fault at Ravenswood 3 345 kV and L/O Ravenswood 3					x	BPTF & non-BPTF
UC25B	Fault at Rainey 345 kV and L/O 60L 345 kV circuit		non-BPTF		non-BPTF	x	BPTF & non-BPTF
UC048A_Q510	Fault at Gowanus 345 kV and L/O Gowanus 345/138 kV 14TR		non-BPTF		non-BPTF	x	non-BPTF
UC049_Q510	Fault at Gowanus 345 kV with stuck breaker 14					x	non-BPTF
UC5_Q510	Fault at Farragut 345 kV (near B44 line) with stuck breaker 11W		non-BPTF		non-BPTF	x	BPTF & non-BPTF

Notes
(1) non-BPTF issues are reported for information only
(2) BPTF dynamic issues increase in scope and scale through 2030 as observed in the 2020 Reliability Needs Assessment

Figure 8 shows the transient voltage response for a 345 kV bus in the Con Edison transmission district that passes the stated criteria as observed in assessments that have the peaker units in-service, as compared to the response observed with the peaker units out-of-service. To pass the transient voltage response criteria, the post-fault value must settle to at least 0.9 p.u. voltage five seconds after the fault has cleared for most Transmission Owners. The PSEG Long Island criteria is to settle to at least 0.9 p.u. voltage one second after the fault has cleared. When the transient voltage response fails the stated criteria (as shown in Figure 8), this is referred to as fault-induced delayed voltage recovery ("FIDVR"). FIDVR events are driven by end-use load behavior and load composition; primarily by induction motor loads. One of the causes of FIDVR is the stalling of induction motors due to low voltages. When an induction motor stalls, the motors draws excessive reactive power from the grid and require five to six times their typical steady-state running current in this locked-rotor condition,[12] which can eventually lead to a significant loss of generation and load.

Figure 8: New York City (NYC) 345 kV Bus Voltage Recovery



During a fault, the observed voltage drop at a bus depends on the location of the fault on the system relative to the bus and the amount of time the fault remains on the system before it is cleared by protective relaying actions. Following the clearing of a fault on the system by protection system actions, the bus voltage and generator rotor usually enter an oscillatory period. The generator excitation system controls the generator terminal voltage to improve and stabilize the voltages. Depending on the severity

[12] https://www.nerc.com/docs/pc/tis/FIDVR_Tech_Ref%20V1-2_PC_Approved.pdf

of voltages and generator size, the voltages may or may not stabilize. Generator rotor swings after a fault are caused by the accumulation of energy, *i.e.* an imbalance between electrical power and mechanical power, during the fault. After the clearing of the fault, the generator rotor swings (or oscillations) dissipate that accumulated energy over time. For a stable system response, these oscillations dampen over time to an acceptable post-fault value. For an unstable system response, the system may experience unacceptable damping, system separation, cascading, and generators losing synchronism with the system.

As shown in Figure 6 and Figure 7, several contingencies result in loss of generator synchronism with the transmission system. A primary driver to the loss of synchronism for these machines is the sustained low voltages following the clearing of the fault. Examples of low voltages as observed from the high-side of the generator step-up ("GSU") transformer are shown in Figure 9 in response to a contingency. As can be seen in Figure 9, the sustained low voltages are also observed at the high side of the GSU and remain in the NERC standard PRC-024 "may trip" zone. In this example, due to the sustained low voltages an equilibrium point for the generators is not reached and the generators lose synchronism with the system. As shown in Figure 10, Generator 1 loses synchronism and trips off line at about 3.5 seconds and Generator 2 becomes asynchronous and trips off line at about 10 seconds. The rotor angles plotted in Figure 10 are relative to the system average rotor angle.

Figure 9: High Side of GSU Voltage

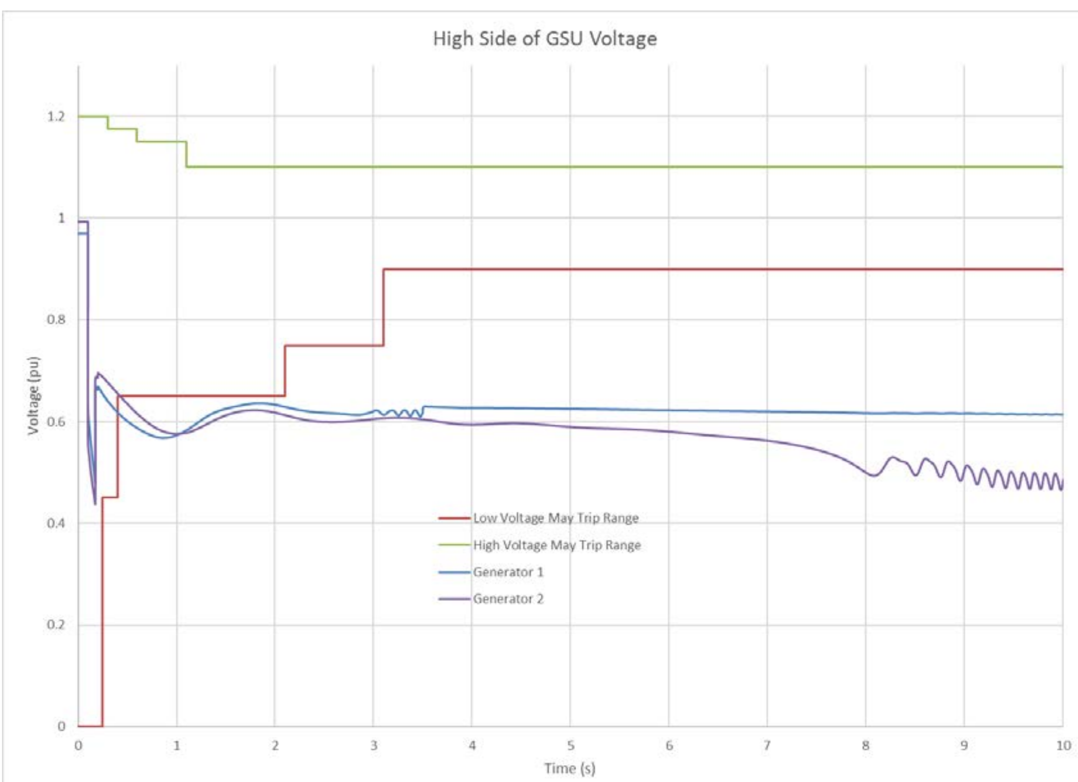
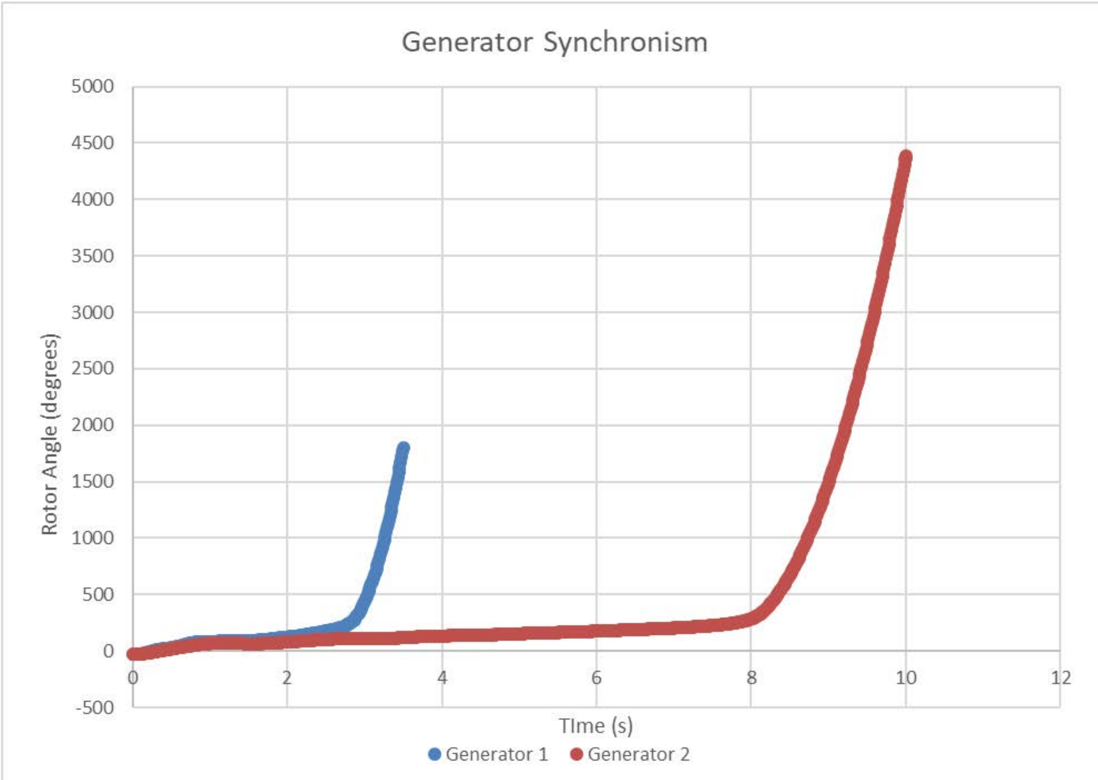


Figure 10: Generator Synchronism



Stability Compensation

In the pre-fault (N-0) system condition, voltages are maintained with various static (*e.g.* fixed and switched shunt devices, transmission circuits) and dynamic (*e.g.* generators, flexible AC transmission systems ("FACTS") devices, static synchronous compensators ("STATCOMS"), static VAr compensators ("SVCs"), wind and solar plant voltage controls, and other fast-acting devices[13]) reactive resources maintaining voltages within prescribed ranges. Manual adjustments to these devices occur as load and other system conditions change in order to maintain the required voltage level.

During the dynamic simulation timeframe, sufficient dynamic reactive resources to sustain transient voltage support during the natural swings of the system are crucial. Generally, the system response to these swings to maintain voltage comes from dynamic reactive resources. While pre-contingency voltages can be maintained using static reactive resources, the dynamic system response timeframe focuses primarily on dynamic reactive capability due to the transient nature of large power and voltage swings and the brief response time required.

[13] https://www.nerc.com/comm/PC_Reliability_Guidelines_DL/Reliability%20Guideline%20-%20Reactive%20Power%20Planning.pdf

The dynamic stability compensatory values are measured by adding fictitious generators at the Farragut 345 kV, Astoria East 138 kV, and Greenwood North 138 kV buses with a MW size determined by the compensatory MW needed to resolve the identified steady state thermal overloads. Focusing on the event combination of the loss of Ravenswood 3 followed by event UC11, which is one of the more severe events, reactive capability is added to the fictitious generators to the point where the transient voltage violations, sustained oscillations, and generator synchronism criteria violations are no longer observed. Figure 11 provides a description of dynamic compensation needed to address the event combination of the loss of Ravenswood 3 followed by event UC11. The impact of the added dynamic reactive capability is highly non-linear, and other event combinations and locations of the fictitious generators may cause significant differences in the amount of dynamic compensatory resources needed, and those amounts may vary from the values stated in Figure 11.

The compensatory MVA additions are not intended to represent specific solutions, as the impact of specific solutions can depend on the type of the solution and its location on the grid. Rather, the compensatory MVA provide a generic order-of-magnitude measure to guide the formulation of solutions. Transmission security needs could potentially be met by combinations of solutions including generation, transmission, energy efficiency, and demand response measures.

Figure 11: Description of Dynamic Compensatory MVA

Dynamics Compensatory Resource Values						
	Machine MVA			Pgen (MW)		
Location	2023	2024	2025	2023	2024	2025
Farragut 345 kV	350	350	400	0	0	230
Astoria East 138 kV	140	140	170	110	110	110
Greenwood North 138 kV	0	0	450	0	0	360
Total	490	490	1,020	110	110	700

Additional Transmission Owner Local Criteria Assessments (Information Only)

As described in the following sections, Con Edison and Central Hudson each identified transmission security issues in their service territories on their non-BPTF systems. The local non-BPTF criteria violations identified below are provided for information only.[14]

[14] The NYISO identifies and addresses any Generator Deactivation Reliability Needs on non-BPTF facilities that arise with three years after the 365 days prior notice period upon receiving a complete Generator Deactivation Notice. *See* OATT §§ 38.1 (definition of Generator Deactivation Reliability Need), 38.2 (scope of Short-Term Reliability Process).

Central Hudson Assessment

Central Hudson currently owns and operates two 25 MVA (nameplate) combustion turbines that are subject to the DEC Peaker Rule, namely the Coxsackie and South Cairo generators. Both of these generators provide local substation reserve capacity for transformer outages and post-contingency voltage support for the Westerlo transmission loop. Without these generators, there is no reserve capability for local transformer outages and the Westerlo loop is voltage constrained. These transmission security issues would begin in 2023 and continue through 2025.

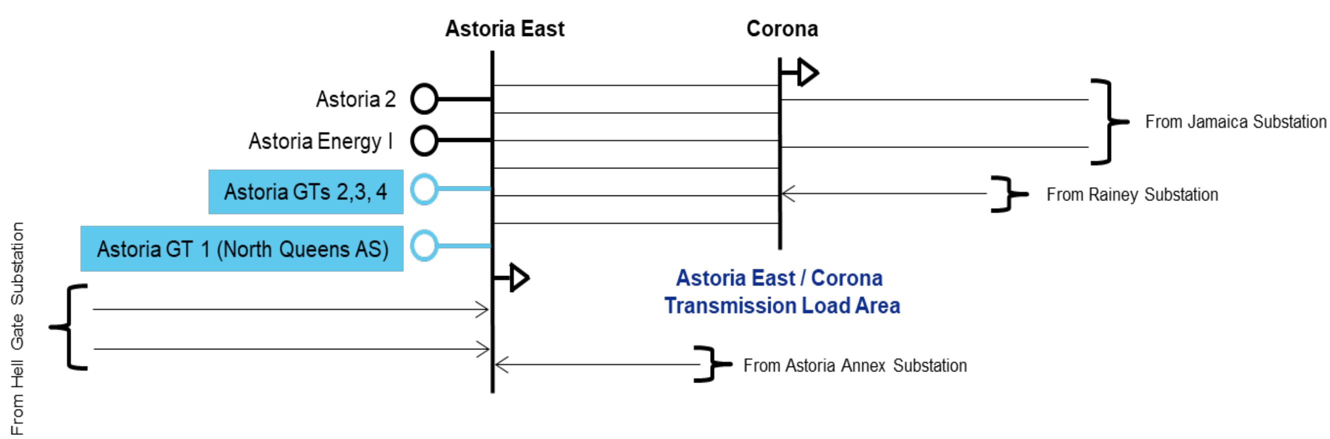
Con Edison Assessment

The transmission security criteria violations observed in the Con Edison transmission district are primarily due to deficiencies that are observed in the Astoria East/Corona 138 kV Transmission Load Area ("TLA") and the Greenwood/Fox Hills 138 kV TLA.

Astoria East/Corona 138 kV TLA

Figure 12 shows the high-level topology of the Astoria East/Corona 138 kV TLA. The boundary feeders for this TLA include the feeders from the Hell Gate, Astoria Annex, Rainey, and Jamaica substations.

Figure 12: Astoria East/ Corona 138 kV TLA



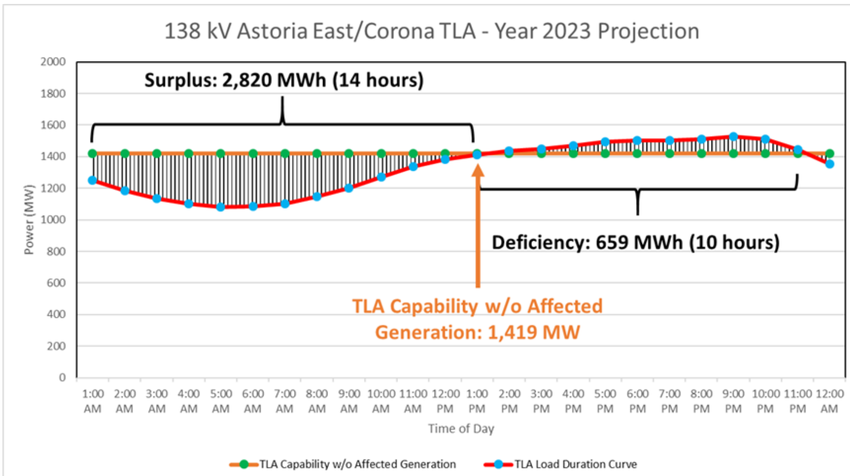
In 2023, thermal overloads are observed on the Astoria East/Corona 138 kV TLA boundary feeders, which are designed to a second contingency (N-1-1-0) based on the applicable Con Edison local design criteria.

Considering the utilization of all available phase angle regulator ("PAR") controls, the maximum observed deficiency (*i.e.*, compensatory MW) within this TLA ranges from 110 MW to 115 MW between 2023 and 2025 as shown in Figure 13. As shown in Figure 14, the Astoria East/Corona 138 kV TLA does not peak with the coincident system peak. Based on the load duration curve shown in Figure 14, the TLA may be deficient over 10 hours (659 MWh) on a peak day in 2023, with little variance through 2025.

Figure 13: Astoria East/ Corona 138 kV TLA Deficiency

Year	2023	2024	2025
Deficiency (MW)	110	115	110

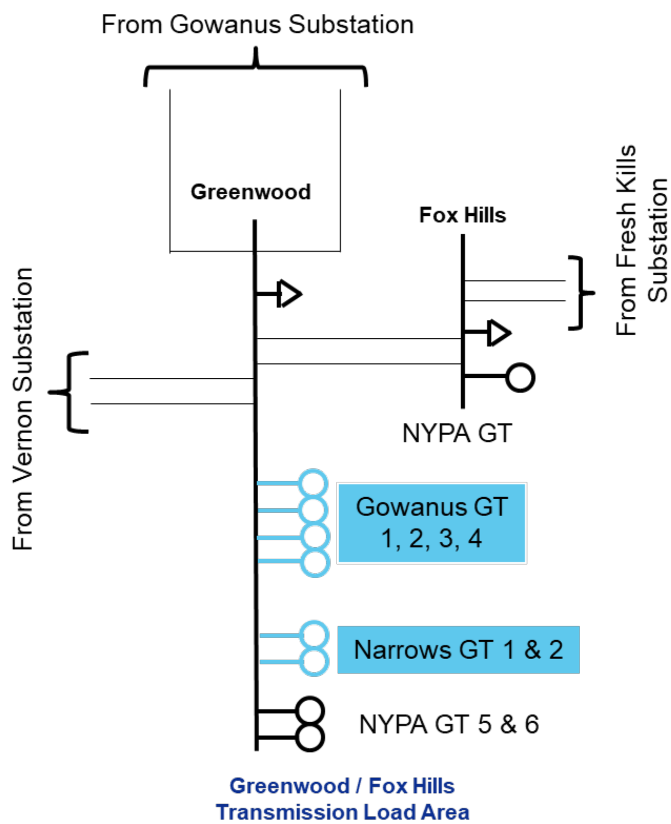
Figure 14: Astoria East/Corona 138 kV Load Duration Curve for 2023



Greenwood/Fox Hills 138 kV TLA

Figure 15 shows the high-level topology of the Greenwood/Fox Hills 138 kV TLA. The boundary feeders for this TLA include the feeders from the Vernon, Gowanus, and Fresh Kills substations.

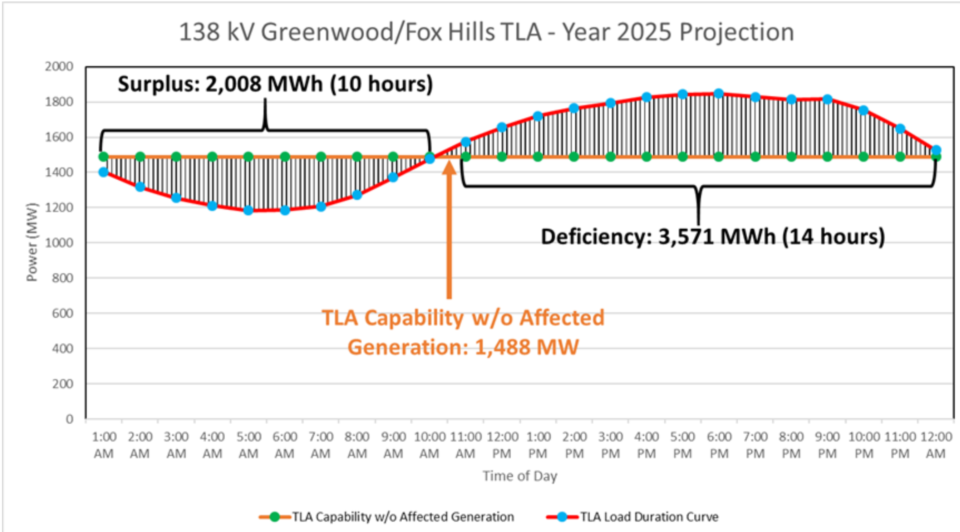
Figure 15: Greenwood/Fox Hills 138 kV TLA



In 2025, thermal overloads and voltage violations are observed on the Greenwood/Fox Hills 138 kV TLA boundary feeders in the steady state (N-0) condition, which are exacerbated under N-1 and N-1-1 conditions.

Considering the utilization of all available PAR controls, the maximum observed deficiency (*i.e.,* compensatory MW) within this TLA is 360 MW in 2025. Based on the load duration curve shown in Figure 16, the TLA may be deficient over 14 hours (3,571 MWh) over a 14-hour period on a peak day in 2025.

Figure 16: Greenwood/Fox Hills 138 kV TLA Load Duration Curve for 2025



Short-Term Reliability Needs

Short-Term Reliability Needs are observed on the BPTF starting in 2023 and increasing in scope through 2025. The primary driver of the deficiencies observed in 2023 is the compound effect of load forecast increases and the assumed unavailability of peaking generation in New York City (Zone J), as affected by the DEC's Peaker Rule.

"Near-Term Reliability Needs" are reliability needs that are observed within the first three years of the relevant STAR study period[15]. The Short-Term Reliability Needs observed in 2023 arise within the first three years of the study period. Solutions to these Near-Term Reliability Needs will be solicited and addressed in accordance with the STRP. The needs observed in years 2024 and 2025 are identical to those identified in the 2020 RNA, and therefore will be addressed in the long-term Reliability Planning Process. None of the Short-Term Reliability Needs identified in this STAR are Generator Deactivation Reliability Needs.

The NYISO, in consultation with Con Edison, reviewed whether the adoption of alternative operating procedures could address the identified Near-Term Reliability Needs identified in this STAR, and whether updates to Con Edison's Local Transmission Owner Plan could address the Near-Term Reliability Needs.[16] The review did not identify operating procedures or updates to Con Edison's Local Transmission Owner Plan at this time.

[15] OATT Section 38.1 contains the tariff definition of a Near-Term Reliability Need. *See also*, OATT Section 38.3.6.

[16] *See* OATT Section 38.3.5.2.

Updated Findings since the STAR Start Date

After the STAR start date, an update has been provided to stakeholders regarding the load forecast used in the Q4 STAR. Updates that come after the STAR start date would normally be handled in the next STAR, which in this case would be the 2021 Q1 STAR. However, since a solution solicitation was being developed for the 2023 reliability needs found in the 2020 Q3 STAR and to ensure it was using the latest information, the reliability needs were updated with this load forecast change.

The updated load forecast was presented by the NYISO at a November 19, 2020 stakeholder meeting which addressed an updated peak load forecast to account for the expected impact of COVID-19 and the associated economic and societal effects.[17] Figure 17 and Figure 18 provide a comparisons of the 2020 Load and Capacity Data Report baseline summer coincident peak demand and annual energy forecasts with the updated long term forecast.

Figure 17: Comparison of Summer Coincident Peak Forecast

	Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2020 Load and Capacity Data Report	2021	2,641	1,943	2,719	613	1,329	2,329	2,153	646	1,427	11,300	5,029	32,129
	2022	2,626	1,941	2,715	640	1,313	2,313	2,144	646	1,435	11,397	4,958	32,128
	2023	2,610	1,938	2,711	663	1,297	2,297	2,134	646	1,428	11,362	4,832	31,918
	2024	2,597	1,936	2,708	682	1,283	2,285	2,127	647	1,429	11,395	4,749	31,838
	2025	2,585	1,935	2,705	693	1,271	2,276	2,118	647	1,425	11,390	4,666	31,711
Long Term Forecast Update	2021	2,627	1,955	2,818	618	1,396	2,366	2,193	631	1,369	11,010	5,162	32,145
	2022	2,603	1,933	2,804	643	1,375	2,342	2,161	632	1,388	11,174	5,057	32,112
	2023	2,582	1,912	2,793	665	1,357	2,322	2,131	632	1,383	11,138	4,952	31,867
	2024	2,565	1,899	2,785	682	1,341	2,307	2,108	633	1,376	11,089	4,844	31,629
	2025	2,553	1,892	2,782	694	1,329	2,298	2,095	633	1,373	11,067	4,755	31,471
Delta	2021	-14	12	99	5	67	37	40	-15	-58	-290	133	16
	2022	-23	-8	89	3	62	29	17	-14	-47	-223	99	-16
	2023	-28	-26	82	2	60	25	-3	-14	-45	-224	120	-51
	2024	-32	-37	77	0	58	22	-19	-14	-53	-306	95	-209
	2025	-32	-43	77	1	58	22	-23	-14	-52	-323	89	-240

Figure 18: Comparison of Baseline Annual Energy Forecast

	Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2020 Load and Capacity Data Report	2021	14,441	9,602	15,400	5,154	7,584	11,542	9,259	2,774	5,590	49,242	20,039	150,627
	2022	14,540	9,697	15,578	5,431	7,610	11,612	9,275	2,847	5,603	49,715	20,206	152,114
	2023	14,446	9,665	15,557	5,622	7,531	11,531	9,163	2,876	5,500	48,835	19,818	150,544
	2024	14,367	9,643	15,558	5,777	7,463	11,475	9,057	2,899	5,473	48,628	19,564	149,904
	2025	14,280	9,616	15,538	5,875	7,396	11,420	8,951	2,919	5,452	48,433	19,287	149,167
Long Term Forecast Update	2021	14,415	9,575	15,337	5,193	7,580	11,701	9,196	2,876	5,807	48,235	19,945	149,860
	2022	14,356	9,567	15,349	5,410	7,547	11,649	9,151	2,895	5,806	48,016	19,844	149,590
	2023	14,302	9,561	15,374	5,592	7,520	11,606	9,109	2,911	5,786	47,485	19,654	148,900
	2024	14,243	9,552	15,385	5,742	7,491	11,566	9,063	2,925	5,762	47,080	19,351	148,160
	2025	14,173	9,531	15,383	5,845	7,462	11,525	9,015	2,934	5,752	46,877	19,083	147,580
Delta	2021	-26	-27	-63	39	-4	159	-63	102	217	-1,007	-94	-767
	2022	-184	-130	-229	-21	-63	37	-124	48	203	-1,699	-362	-2,524
	2023	-144	-104	-183	-30	-11	75	-54	35	286	-1,350	-164	-1,644
	2024	-124	-91	-173	-35	28	91	6	26	289	-1,548	-213	-1,744
	2025	-107	-85	-155	-30	66	105	64	15	300	-1,556	-204	-1,587

[17] Meeting material for November 19, 2020 ESPWG/TPAS: https://www.nyiso.com/espwg

The NYISO assessed the impacts on the 2023 needs based on the forecast update. The NYISO found that the dynamic instability on the BPTF is no longer observed in 2023 under N-1 conditions, however dynamic instability is still observed on the BPTF in 2023 under N-1-1 conditions. The dynamic stability compensatory MVA as measured by adding fictitious generators at the Farragut 345 kV and Astoria East 138 kB buses is 340 MVA in 2023. The needs observed in year 2024 and 2025 will be addressed in the long-term Reliability Planning Process which will include impacts from the updated load forecast.

Conclusions and Next Steps

The NYISO observes Short-Term Reliability Needs on the BPTF starting in 2023 and increasing in scope and scale through 2025. These transmission security needs are driven primarily by forecasted increases in load and the unavailability of generation affected by the DEC Peaker Rule. The transmission security issues include thermal overloads and dynamic instability. For thermal loading, several 345 kV circuits in the Con Edison service territory are overloaded under N-1-1 and N-1-1-0 conditions beginning in year 2025. The specific violations are listed in Appendix A. Regarding resource adequacy, this assessment finds the planned system through 2025 is within the resource adequacy criterion.

The transmission security related Short-Term Reliability Needs observed in 2023 are Near-Term Reliability Needs. To address the 2023 Near-Term need found in the 2020 Quarter 3 STAR, a solution solicitation was issued by the NYISO on December 3, 2020 with the proposed solutions to be submitted to the NYISO by February 1, 2021[18]. These solutions will be evaluated in accordance with the STRP.

The needs observed in years 2024 and 2025 will be addressed in the long-term Reliability Planning Process rather than in the STRP.

Because the NYISO has solicited solutions to the identified Needs and is awaiting responses to its solicitation, this concludes the 2020 Quarter 4 Short-Term Reliability Process.

[18] https://www.nyiso.com/documents/20142/15930765/STRP-Q3-2020-Solicitation-Letter-Final.pdf/

Appendix A: List of Short-Term Reliability Needs

The NYISO identified Short-Term Reliability Needs resulting from transmission security violations. The transmission security issues include thermal overloads and dynamic instability. For thermal loading, several 345 kV circuits in the Con Edison service territory are overloaded under N-1-1 and N-1-1-0 conditions beginning in year 2025. For steady state N-1-1, Figure A. 1 shows the transmission security violations for the top 10 contingency combinations. For steady state N-1-1-0, Figure A. 2 shows the worst contingency combination for the loss of Ravenswood 3 followed by Dunwoodie – Mott Haven (72) 345 kV. Figure A. 3 shows the BPTF buses with dynamics N-1 transient voltage response criteria violations. Figure A. 4 shows the BPTF buses with dynamics N-1-1 transient voltage response criteria violations.

Figure A. 1 Steady State Transmission Security N-1-1 Violations

Zone	Owner	Monitored Element	Normal Rating (MVA)	Contingency Rating (MVA)	1st Contingency	2nd Contingency	2025 Summer Peak Flow (%)
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Loss of Ravenswood 3	Dunwoodie-Mott Haven 345 kV (72)	110
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Loss of Ravenswood 3	Stuck breaker at Mott Haven 7	110
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Loss of Ravenswood 3	Stuck breaker at Mott Haven 3	110
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Loss of Ravenswood 3	Stuck breaker at Dunwoodie 8	107
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Dunwoodie-Mott Haven 345 kV (72)	Loss of Ravenswood 3	109
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Sprainbrook-W 49th St 345 kV (51)	Stuck breaker at Sprainbrook RS4	101
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Sprainbrook-W 49th St 345 kV (52)	Stuck breaker at Sprainbrook RS5	101
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (72)	785	925	Loss of Ravenswood 3	Dunwoodie-Mott Haven 345 kV (71)	108
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (72)	785	925	Loss of Ravenswood 3	Stuck breaker at Mott Haven BTE	108
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (72)	785	925	Loss of Ravenswood 3	Stuck breaker at Mott Haven 2	108
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (72)	785	925	Dunwoodie-Mott Haven 345 kV (71)	Loss of Ravenswood 3	108
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (72)	785	925	Loss of Ravenswood 3	Stuck breaker at Dunwoodie 3	105
J	ConEd	Goethals-Gowanus 345 kV (26)	518	738	Loss of Ravenswood 3	Stuck Breaker at Goethals 5	102
J	ConEd	Goethals-Gowanus 345kV (25)	518	738	Loss of Ravenswood 3	Gowanus - Goethals 345 kV (26)	103
J	ConEd	Goethals-Gowanus 345kV (25)	518	738	Loss of Ravenswood 3	Stuck Breaker at Goethals 8	102
J	ConEd	Goethals-Gowanus 345kV (25)	518	738	Sprainbrook-W 49th St 345 kV (51)	Gowanus - Goethals 345 kV (26)	101
J	ConEd	Goethals-Gowanus 345kV (25)	518	738	Sprainbrook-W 49th St 345 kV (52)	Gowanus - Goethals 345 kV (26)	101
I	ConEd	Sprainbrook/Dunwoodie 345/138 kV (N7)	366	423	Loss of Ravenswood 3	Tower W89 & W90	106
I	ConEd	Sprainbrook/Dunwoodie 345/138 kV (S6)	309	438	Loss of Ravenswood 3	Tower W89 & W90	103

Figure A. 2: Steady State Transmission Security N-1-1-0 Violations

Zone	Owner	Monitored Element	Normal Rating (MVA)	Contingency Rating (MVA)	1st Contingency	2nd Contingency	2025 Summer Peak Flow (%)
I/J	ConEd	Dunwoodie-Mott Haven 345 kV (71)	785	925	Loss of Ravenswood 3	Dunwoodie-Mott Haven 345 kV (72)	132

Figure A. 3 BPTF Buses with Transient Voltage Response Criteria Violations (N-1)

Bus Number	Bus Name	Base kV	Area Num	Area Name	Owner Name	Earliest Year of observed transient voltage response violations	Contingency Events which result in transient voltage response violations for this bus (See Notes Below)
126262	BUCHANAN N	345	8	MILLWOOD	CONED	2025	(2), (3)
126263	BUCHANAN S	345	8	MILLWOOD	CONED	2025	(1), (2), (3)
126266	DUNWOODIE	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126267	E VIEW 2N	345	9	DUNWOODIE	CONED	2025	(2), (3)
126268	E VIEW 1N	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126269	E VIEW 2S	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126270	E VIEW 1S	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126272	E13ST 45	345	10	NYC	CONED	2023	(1), (2), (3)
126273	E13ST 46	345	10	NYC	CONED	2023	(1), (2), (3)
126274	E13ST 47	345	10	NYC	CONED	2023	(1), (2), (3)
126275	E13ST 48	345	10	NYC	CONED	2023	(1), (2), (3)
126277	FARRAGUT	345	10	NYC	CONED	2023	(1), (2), (3)
126280	FARRAGUT TX9	345	10	NYC	CONED	2023	(1), (2), (3)
126291	MILLWOOD	345	8	MILLWOOD	CONED	2025	(1), (2), (3)
126292	PL VILLE	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126293	PL VILLW	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126295	RAINEY	345	10	NYC	CONED	2023	(1), (2), (3)
126298	SPRAINBROOK	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126299	REACBUS	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126301	TREMONT	345	10	NYC	CONED	2025	(2), (3)
126304	W 49 ST	345	10	NYC	CONED	2023	(1), (2), (3)
126306	WOOD B	345	8	MILLWOOD	NYSEG	2025	(1), (2), (3)
126319	WOOD C	345	8	MILLWOOD	NYSEG	2025	(1), (2), (3)
126342	W74 TAP	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126343	W73 TAP	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126517	REACM51	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126518	REACM52	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)

Bus Number	Bus Name	Base kV	Area Num	Area Name	Owner Name	Earliest Year of observed transient voltage response violations	Contingency Events which result in transient voltage response violations for this bus (See Notes Below)
126590	GOWANUS 41SR	345	10	NYC	CONED	2023	(1), (2), (3)
126591	GOWANUS 42SR	345	10	NYC	CONED	2023	(1), (2), (3)
126600	REAC71	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126601	REAC72	345	9	DUNWOODIE	CONED	2025	(1), (2), (3)
126641	MOTT HAVEN	345	10	NYC	CONED	2023	(1), (2), (3)
126642	RAINEY WEST	345	10	NYC	CONED	2023	(1), (2), (3)
126643	RAINEY EAST	345	10	NYC	CONED	2023	(1), (2), (3)
126644	FARRAGUT WES	345	10	NYC	CONED	2023	(1), (2), (3)
126645	FARRAGUT EAS	345	10	NYC	CONED	2023	(1), (2), (3)
126847	ACADEMY	345	10	NYC	CONED	2025	(1), (2), (3)
126865	RAV3 60M	345	10	NYC	CONED	2023	(1), (2), (3)
126866	RAV3 60L	345	10	NYC	CONED	2023	(1), (2)
127100	B44	345	10	NYC	CONED	2023	(1), (2), (3)
128248	ANNTRHIGH	345	10	NYC	CONED	2023	(1), (2), (3)
128699	MILLW345_C1	345	8	MILLWOOD	CONED	2025	(1), (2), (3)
128700	MILLW345_C2	345	8	MILLWOOD	CONED	2025	(1), (2), (3)
128701	ASTOR REAC	345	10	NYC	NYPA	2023	(1), (2), (3)
128822	E.G.C.-1	345	11	L ISLAND	LIPA	2025	(1), (2), (3)
128823	E.G.C.-2	345	11	L ISLAND	LIPA	2025	(1), (2), (3)
128824	EGC DUM	345	11	L ISLAND	LIPA	2025	(1), (2), (3)
128825	EGC PAR	345	11	L ISLAND	LIPA	2025	(1), (2), (3)
128830	HMP HRBR	345	11	L ISLAND	LIPA	2025	(1), (2), (3)
128835	SHORE RD	345	11	L ISLAND	LIPA	2023	(1), (2), (3)
128842	NEPTCONV	345	11	L ISLAND	LIPA	2025	(2), (3)
128847	NWBRG	345	11	L ISLAND	LIPA	2025	(2), (3)
129233	VLY STRM	138	11	L ISLAND	LIPA	2025	(2), (3)
129234	VLY STRM2	138	11	L ISLAND	LIPA	2025	(2), (3)
129235	V STRM P	138	11	L ISLAND	LIPA	2023	(1), (2), (3)
129247	L SUCS	138	11	L ISLAND	LIPA	2025	(1), (2), (3)
129248	L SUCS2	138	11	L ISLAND	LIPA	2025	(1), (2), (3)
129249	L SUCSPH	138	11	L ISLAND	LIPA	2023	(1), (2), (3)
129265	CARLE PL	138	11	L ISLAND	LIPA	2025	(2), (3)
129281	GLNWD GT	138	11	L ISLAND	LIPA	2025	(1), (2), (3)
129282	GLNWD NO	138	11	L ISLAND	LIPA	2025	(1), (2), (3)
129283	GLNWD SO	138	11	L ISLAND	LIPA	2025	(1), (2), (3)
129288	ROSLYN	138	11	L ISLAND	LIPA	2025	(1), (2), (3)

Bus Number	Bus Name	Base kV	Area Num	Area Name	Owner Name	Earliest Year of observed transient voltage response violations	Contingency Events which result in transient voltage response violations for this bus (See Notes Below)
129293	SHORE RD	138	11	L ISLAND	LIPA	2025	(1), (2), (3)
129294	SHORE RD2	138	11	L ISLAND	LIPA	2025	(1), (2), (3)
130759	WOODB345	345	8	MILLWOOD	NYSEG	2025	(1), (2), (3)
130877	WOODC345	345	8	MILLWOOD	NYSEG	2025	(1), (2), (3)
147829	ASTOR345	345	10	NYC	NYPA	2023	(1), (2), (3)
147857	DVNPT NK	345	9	DUNWOODIE	NYPA	2025	(1), (2), (3)
148707	AST_E_2	345	10	NYC	NYPA	2025	(1), (2), (3)

Notes

Event (1) UC11

Event (2) UC25A

Event (3) UC25B

Figure A. 4 BPTF Buses with Transient Voltage Response Criteria Violations (N-1-1)

Bus Number	Bus Name	Base kV	Area Num	Area Name	Owner Name	Earliest Year of observed transient voltage response violations	Contingency Events which result in transient voltage response violations for this bus (See Notes Below)
126249	26T	345	10	NYC	CONED	2025	(4), (5), (6), (9), (10), (11), (12), (13), (14), (15), (19)
126262	BUCHANAN N	345	8	MILLWOOD	CONED	2025	(5), (8), (9), (10), (11), (12), (13), (14), (15), (19)
126263	BUCHANAN S	345	8	MILLWOOD	CONED	2025	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
126265	COGNTECH	345	10	NYC	CONED	2025	(4), (5), (6), (9), (10), (11), (12), (13), (14), (15), (19)
126266	DUNWOODIE	345	9	DUNWOODIE	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126267	E VIEW 2N	345	9	DUNWOODIE	CONED	2025	(2), (5), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126268	E VIEW 1N	345	9	DUNWOODIE	CONED	2023	(2), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126269	E VIEW 2S	345	9	DUNWOODIE	CONED	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126270	E VIEW 1S	345	9	DUNWOODIE	CONED	2023	(1), (2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126272	E13ST 45	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (14), (15), (16), (18), (19)
126273	E13ST 46	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (15), (16), (18), (19)
126274	E13ST 47	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126275	E13ST 48	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (16), (18), (19)
126277	FARRAGUT	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (13), (14), (15), (16)
126280	FARRAGUT TX9	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)

Bus Number	Bus Name	Base kV	Area Num	Area Name	Owner Name	Earliest Year of observed transient voltage response violations	Contingency Events which result in transient voltage response violations for this bus (See Notes Below)
126282	FRESH KILLS	345	10	NYC	CONED	2025	(4), (5), (6), (9), (10), (11), (12), (13), (14), (15), (19)
126283	GOTHLS	345	10	NYC	CONED	2025	(4), (5), (6), (9), (10), (11), (12), (13), (14), (15), (19)
126285	GOW R4	345	10	NYC	CONED	2025	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
126286	GOW R16	345	10	NYC	CONED	2025	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
126287	GOWANUS	345	10	NYC	CONED	2025	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
126291	MILLWOOD	345	8	MILLWO OD	CONED	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
126292	PL VILLE	345	9	DUNWO ODIE	CONED	2023	(2), (4), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
126293	PL VILLW	345	9	DUNWO ODIE	CONED	2023	(2), (4), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
126295	RAINEY	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126298	SPRAINBRO OK	345	9	DUNWO ODIE	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126299	REACBUS	345	9	DUNWO ODIE	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
126301	TREMONT	345	10	NYC	CONED	2025	(1), (2), (4), (5), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126304	W 49 ST	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126305	WOOD A	345	8	MILLWO OD	NYSEG	2025	(4), (6), (8), (9), (10), (11), (12), (13), (14), (15), (19)
126306	WOOD B	345	8	MILLWO OD	NYSEG	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
126319	WOOD C	345	8	MILLWO OD	NYSEG	2025	(4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (19)
126342	W74 TAP	345	9	DUNWO ODIE	CONED	2023	(1), (2), (4), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126343	W73 TAP	345	9	DUNWO ODIE	CONED	2023	(1), (2), (4), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126517	REACM51	345	9	DUNWO ODIE	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126518	REACM52	345	9	DUNWO ODIE	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126590	GOWANUS 41SR	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126591	GOWANUS 42SR	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126600	REAC71	345	9	DUNWO ODIE	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126601	REAC72	345	9	DUNWO ODIE	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126641	MOTT HAVEN	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126642	RAINEY WEST	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126643	RAINEY EAST	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126644	FARRAGUT WES	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)

Bus Number	Bus Name	Base kV	Area Num	Area Name	Owner Name	Earliest Year of observed transient voltage response violations	Contingency Events which result in transient voltage response violations for this bus (See Notes Below)
126645	FARRAGUT EAS	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126847	ACADEMY	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126865	RAV3 60M	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
126866	RAV3 60L	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
127100	B44	345	10	NYC	CONED	2023	(1), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16)
128248	ANNTRHIG H	345	10	NYC	CONED	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
128252	BAYONNE	345	10	NYC	CONED	2025	(4), (5), (6), (9), (10), (11), (12), (13), (14), (15), (19)
128315	Q516GSU_ HV	345	10	NYC	CONED	2025	(4), (5), (6), (9), (10), (11), (12), (13), (14), (15), (19)
128699	MILLW345 _C1	345	8	MILLWO OD	CONED	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
128700	MILLW345 _C2	345	8	MILLWO OD	CONED	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
128701	ASTOR REAC	345	10	NYC	NYPA	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
128702	BAYO_XFM R_HV	345	10	NYC	CONED	2025	(4), (5), (6), (9), (10), (11), (12), (13), (14), (15), (19)
128822	E.G.C.-1	345	11	L ISLAND	LIPA	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17), (18), (19)
128823	E.G.C.-2	345	11	L ISLAND	LIPA	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17), (18), (19)
128824	EGC DUM	345	11	L ISLAND	LIPA	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17), (18), (19)
128825	EGC PAR	345	11	L ISLAND	LIPA	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17), (18), (19)
128830	HMP HRBR	345	11	L ISLAND	LIPA	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17), (18), (19)
128835	SHORE RD	345	11	L ISLAND	LIPA	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17), (18), (19)
128842	NEPTCONV	345	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (10), (11), (12), (13), (15), (19)
128847	NWBRG	345	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (10), (11), (12), (13), (15), (19)
129202	BARRETT1	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (11), (15), (19)
129203	BARRETT2	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (11), (15), (19)
129204	BRRT PH	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (9), (19)
129205	BRTGT1-8	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (11), (15), (19)
129206	BRTGT9-12	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (11), (15), (19)
129233	VLY STRM	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (19)
129234	VLY STRM2	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (19)
129235	V STRM P	138	11	L ISLAND	LIPA	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
129247	L SUCS	138	11	L ISLAND	LIPA	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)

Bus Number	Bus Name	Base kV	Area Num	Area Name	Owner Name	Earliest Year of observed transient voltage response violations	Contingency Events which result in transient voltage response violations for this bus (See Notes Below)
129248	L SUCS2	138	11	L ISLAND	LIPA	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
129249	L SUCSPH	138	11	L ISLAND	LIPA	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
129265	CARLE PL	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (10), (11), (12), (15), (19)
129270	E.G.C.	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (9), (15), (19)
129271	E.G.C.-2	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (9), (15), (19)
129276	FREEPORT	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (9), (19)
129281	GLNWD GT	138	11	L ISLAND	LIPA	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
129282	GLNWD NO	138	11	L ISLAND	LIPA	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
129283	GLNWD SO	138	11	L ISLAND	LIPA	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
129288	ROSLYN	138	11	L ISLAND	LIPA	2025	(4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (19)
129293	SHORE RD	138	11	L ISLAND	LIPA	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
129294	SHORE RD2	138	11	L ISLAND	LIPA	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
129310	NEWBRGE	138	11	L ISLAND	LIPA	2025	(5), (6), (9), (19)
130758	WOODA345	345	8	MILLWOOD	NYSEG	2025	(3), (4), (6), (8), (9), (10), (11), (12), (13), (14), (15), (19)
130759	WOODB345	345	8	MILLWOOD	NYSEG	2023	(2), (4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
130877	WOODC345	345	8	MILLWOOD	NYSEG	2025	(4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (19)
135222	WOOD D	345	8	MILLWOOD	NYSEG	2025	(4), (6), (8), (9), (10), (11), (12), (13), (14), (15), (19)
146874	LOVETT345ST	345	7	HUDSON	O&R	2025	(4), (5), (6), (8), (9), (10), (11), (12), (13), (14), (15), (19)
147829	ASTOR345	345	10	NYC	NYPA	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)
147857	DVNPT NK	345	9	DUNWOODIE	NYPA	2023	(2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (19)
148707	AST_E_2	345	10	NYC	NYPA	2023	(1), (2), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (18), (19)

Notes:
Event (1) ConEd16
Event (2) ConEd23_Q510
Event (3) TE02-UC02
Event (4) TE03-UC03
Event (5) TE20-UC20
Event (6) UC11
Event (7) UC19
Event (8) UC25A
Event (9) UC25B
Event (10) UC32_Q510
Event (11) UC33_Q510
Event (12) UC34_Q510
Event (13) UC35_Q510
Event (14) UC36_Q510
Event (15) UC38_Q510
Event (16) UC39_Q510
Event (17) UC048A_Q510
Event (18) UC57_Q510
Event (19) UC5_Q510

Appendix B: Short-Term Reliability Process Solution Monitoring

There are no STRP solutions at this time to monitor.

Appendix C: Summary of Transmission and Generation Assumptions

The figures below summarize the generator deactivations, generator additions, major topology changes, additional proposed transmission projects, and firm transmission plans included in this STAR. There are no changes as compared to the 2020 RNA report, with the exception of the additional generator deactivations noted in this report.

Figure C. 1 Generator Deactivations

Owner/ Operator	Plant Name	Zone	CRIS (MW)		Capability (MW)		Status	Deactivation date
			Summer	Winter	Summer	Winter		
International Paper Company	Ticonderoga (1)	F	7.6		9.5	9.8	I	05/01/2017
Helix Ravenswood, LLC	Ravenswood 09	J	21.7	27.6	16.3	22.8	R	11/01/2017
Binghamton BOP, LLC	Binghamton	C	43.8	57.2	43.7	47.1	I	01/09/2018
Helix Ravenswood, LLC	Ravenswood 2-1	J	40.4	51.4	31.4	41.7	I	04/01/2018
	Ravenswood 2-2	J	37.6	47.8	29.9	41.9	I	04/01/2018
	Ravenswood 2-3	J	39.2	49.9	28.9	37.3	I	04/01/2018
	Ravenswood 2-4	J	39.8	50.6	30.7	41.6	I	04/01/2018
	Ravenswood 3-1	J	40.5	51.5	31.9	40.8	I	04/01/2018
	Ravenswood 3-2	J	38.1	48.5	29.4	40.3	I	04/01/2018
	Ravenswood 3-4	J	35.8	45.5	31.2	40.8	I	04/01/2018
Lyonsdale Biomass, LLC	Lyonsdale	E	20.2	20.2	19.3	19.7	R	07/18/2019
Exelon Generation Company LLC	Monroe Livingston	B	2.4	2.4	2.4	2.4	R	09/01/2019
Innovative Energy Systems, Inc.	Steuben County LF	C	3.2	3.2	3.2	3.2	R	09/01/2019
Consolidated Edison Co. of NY, Inc	Hudson Ave 4	J	13.9	18.2	14.0	16.3	R	09/10/2019
New York State Elec. & Gas Corp.	Auburn - State St	C	5.8	6.2	4.1	7.3	R	10/01/2019
Somerset Operating Company, LLC	Somerset	A	686.5	686.5	676.4	684.4	R	02/15/2020
Entergy Nuclear Power Marketing, LLC	Indian Point 2	H	1,026.5	1,026.5	1,011.5	1,029.4	R	04/30/2020
Cayuga Operating Company, LLC	Cayuga 1	C	154.1	154.1	151.0	152.0	R	05/15/2020
Cayuga Operating Company, LLC	Cayuga 2	C	154.7	154.7	139.6	158.0	R	05/15/2020
Albany Energy, LLC	Albany LFGE (2)	F	4.5	4.5	5.6	5.6	I	07/01/2020
National Grid	West Babylon 4	K	49.0	64.0	50.2	65.4	R	12/11/2020
National Grid	Glenwood GT 01 (2)	K	14.6	19.1	11.4	14.5	R	02/28/2021
Entergy Nuclear Power Marketing, LLC	Indian Point 3	H	1040.4	1040.4	1036.3	1038.3	R	04/30/2021
		Total	3,520.3	3,630.0	3,407.9	3,560.6		

Notes
(1) Part of SCR program
(2) The Generator Deactivation Assessment for this facility is included in the 2020 Quarter 3 STAR

Figure C. 2 Generation Additions

Queue	Owner/ Operator	Proposed Generator Project	Zone	Proposed Date in 2020 Gold Book (1)	Requested CRIS (MW)	Summer (MW)
387	Cassadaga Wind, LLC	Cassadaga Wind	A	Dec-20	126.0	126.5
396	Baron Winds, LLC	Baron Winds	C	Dec-20	300.0	238.4
422	NextEra Energy Resources, LLC	Eight Point Wind Enery Center	B	Dec-20	101.2	101.8
505	RES America Development Inc.	Ball Hill Wind	A	Dec-22	100.0	100.0
430	HQUS	Cedar Rapids Transmission Upgrade	D	Oct-21	80.0	N/A
546	Atlantic Wind, LLC	Roaring Brook Wind	E	Dec-20	79.7	79.7
678	LI Solar Generation, LLC	Calverton Solar Energy Center	K	Dec-20	22.9	22.9
758	Sithe/Independence Power Partners, LP	Sithe Independence (2)	C	In-Service	56.6	N/A

Notes

(1) Generation projects that met the Reliabilty Planning Process base case inclusion rules are assumed to be in-service one year later than the 2020 Gold Book Proposed Date to reflect the potential impact of COVID-19 on construction and completion
(2) Update for the 2020 Quarter 4 STAR

Figure C. 3 Major Topology Changes

Terminals		ID	kV	Notes
Marion	Farragut	B3402	345	Long-term unavailability
Marion	Farragut	C3403	345	Long-term unavailability
Dunwoodie	Mott Haven	71	345	Series Reactor By-Passed
Dunwoodie	Mott Haven	72	345	Series Reactor By-Passed
Sprainbrook	W. 49th Street	M51	345	Series Reactor By-Passed
Sprainbrook	W. 49th Street	M52	345	Series Reactor By-Passed
Farragut	Gowanus	41	345	Series Reactor In-Service
Farragut	Gowanus	42	345	Series Reactor In-Service
Sprainbrook	East Garden City	Y49	345	Series Reactor In-Service

Figure C. 4 Additional Proposed Transmission Projects

Queue #	Transmission Owner	Terminals		Expected In-Service		Nominal Voltage in kV	
				Season	Year	Operating	Design
430	Empire State Connector Corp.	Dennison	Alcoa	W	2020	115	115
545A	NextEra Energy Transmission NY	Dysinger (New Station)	East Stolle (New Station)	S	2022	345	345
545A	NextEra Energy Transmission NY	Dysinger (New Station)	Dysinger (New Station)	S	2022	345	345
556	NGRID	Porter	Rotterdam	W	2023	230	230
556	NGRID	Porter	Rotterdam	W	2023	230	230
556	NGRID	Edic	New Scotland	W	2023	345	345
556	NAT/NYPA/NGRID	Edic	Rotterdam	W	2023	345	345
556	NAT/NYPA	Rotterdam	Princetown	W	2023	345	345
556	NAT/NYPA	Edic	Princetown	W	2023	345	345
556	NAT/NYPA	Princetown	New Scotland	W	2023	345	345
556	NGRID	Princetown	New Scotland	W	2023	345	345
543	NGRID	Greenbush	Hudson	W	2023	115	115
543	NGRID	Hudson	Pleasant Valley	W	2023	115	115
543	NGRID	Schodack	Churchtown	W	2023	115	115
543	NGRID	Churchtown	Pleasant Valley	W	2023	115	115
543	NGRID	Milan	Pleasant Valley	W	2023	115	115
543	NGRID	Lafarge	Pleasant Valley	W	2023	115	115
543	NGRID	North Catskill	Milan	W	2023	115	115
543	O&R	Shoemaker, Middle	Sugarloaf, Chester	W	2023	138	138
543	NGRID	New Scotland	Alps	W	2023	345	765
543	New York Transco	Schodack	Churchtown	W	2023	115	115
543	New York Transco	Churchtown	Pleasant Valley	W	2023	115	115
543	NGRID	Lafarge	Churchtown	W	2023	115	115
543	NGRID	North Catskill	Churchtown	W	2023	115	115
543	New York Transco	Knickerbocker	Pleasant Valley	W	2023	345	345
543	New York Transco	Knickerbocker	Knickerbocker	W	2023	345	345
543	NGRID	Knickerbocker	New Scotland	W	2023	345	345
543	NGRID	Knickerbocker	Alps	W	2023	345	345
543	New York Transco	Shoemaker	Sugarloaf	W	2023	138	138
543	New York Transco	Shoemaker, Middle	Sugarloaf, Chester	W	2023	138	138

Figure C. 5 Firm Transmission Plans

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
ConEd	Jamaica	Jamaica	Reconfiguration	In-Service	2019	138	138		N/A	N/A	Reconfiguration
ConEd	East 13th Street	East 13th Street	xfmr	In-Service	2019	345	345		N/A	N/A	Replacing xfmr 10 and xfmr 11
ConEd	Gowanus	Gowanus	xfmr	In-Service	2019	345	345		N/A	N/A	Replacing xfmr T2
ConEd	East 13th Street	East 13th Street	Reconfiguration	In-Service	2019	345	345		N/A	N/A	Reconfiguration (xfmr 10 - xfmr 11)
ConEd	Rainey	Corona	xfmr/Phase shifter	In-Service	2019	345/138	345/138	1	268 MVA	320 MVA	xfmr/Phase shifter
LIPA	Far Rockaway	Far Rockaway	Reconfiguration	In-Service	2019	34.5	34.5		N/A	N/A	Reconfigure 34.5 kV switchgear
LIPA	Elwood	Elwood	Breaker	In-Service	2019	138	138		N/A	N/A	Install double bus tie - Operate Normally Open
LIPA	Canal	Southampton	5.20	In-Service	2019	69	69	1	1107	1169	2500 kcmil XLPE CU
LIPA	Deer Park	Deer Park	-	W	2019	69	69	1	N/A	N/A	Install 27 MVAR Cap Bank
LIPA	MacArthur	MacArthur	-	W	2019	69	69	1	N/A	N/A	Install 27 MVAR Cap Bank
LIPA	West Hempstead	East Garden City	-2.92	In-Service	2019	69	69	1	1158	1245	477 ACSS
LIPA	West Hempstead	Hempstead	0.97	In-Service	2019	69	69	1	1158	1245	477 ACSS
LIPA	Hempstead	East Garden City	1.95	In-Service	2019	69	69	1	1158	1245	477 ACSS

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
LIPA	Pilgrim	West Bus	-11.86	In-Service	2019	138	138	1	2087	2565	2493 ACAR
LIPA	West Bus	Kings	8.25	In-Service	2019	138	138	1	2087	2565	2493 ACAR
LIPA	Pilgrim	Kings	4.81	In-Service	2019	138	138	1	2087	2565	2493 ACAR
NGRID	Golah	Golah	Cap Bank	In-Service	2019	115	115	1	18MVAR	18MVAR	Capacitor Bank
NGRID	Falls Park	Schodack(NG)	17.33	In-Service	2019	115	115	1	186 MVA	227 MVA	Loop for NYSEG Sub Will Reconfigure NG Line #14 Into Two New Lines
NGRID	Falls Park	Churchtown	9.41	In-Service	2019	115	115	1	175 MVA	206 MVA	Loop for NYSEG Sub Will Reconfigure NG Line #14 Into Two New Lines
NGRID	Batavia	Batavia	Cap Bank	In-Service	2019	115	115	1	30MVAR	30MVAR	Second Capacitor Bank
NGRID	Battenkill	Eastover Road	-22.72	In-Service	2019	115	115	1	937	1141	New Schaghticoke Switching Station
NGRID	Battenkill	Schaghticoke (New Station)	14.31	In-Service	2019	115	115	1	937	1141	New Schaghticoke Switching Station
NGRID	Schaghticoke (New Station)	Eastover Road	8.41	In-Service	2019	115	115	1	937	1141	New Schaghticoke Switching Station
NGRID	Mohican	Luther Forest	-34.47	In-Service	2019	115	115	1	937	1141	New Schaghticoke Switching Station
NGRID	Mohican	Schaghticoke (New Station)	28.13	In-Service	2019	115	115	1	937	1141	New Schaghticoke Switching Station
NGRID	Ohio St	Ohio St		In-Service	2019	115	115		N/A	N/A	New Distribution Station at Ohio Street
NGRID	Albany Steam	Greenbush	6.14	In-Service	2019	115	115	2	1190	1527	Reconductor Albany - Greenbush 115kV lines 1 & 2
NGRID	Schodack	Churchtown	-26.74	In-Service	2019	115	115	1	937	1141	Line removal tapped by Falls Park Project
NGRID	Sodeman Rd	Sodeman Rd		In-Service	2019	115	115		N/A	N/A	New Distribution Station at Sodeman Road

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
NGRID	Dewitt	Dewitt		In-Service	2019	115	115		N/A	N/A	New Distribution Station at Dewitt
NGRID	Luther Forest	Schaghticoke (New Station)	6.34	In-Service	2019	115	115	1	1280	1563	New Schaghticoke Switching Station
NGRID	Seneca	Seneca	-	In-Service	2019	115/22	115/22	-	50MVA	50MVA	Damage/Failure on TR2
NGRID	Mortimer	Mortimer	Reconfiguration	In-Service	2019	115	115	1	N/A	N/A	Reconfiguration of Station
NGRID	Mohican	Butler	3.50	S	2019	115	115	1	TBD	TBD	Replace 3.5 miles of conductor w/min 336.4 ACSR
NYSEG	Wood Street	Carmel	1.34	In-Service	2019	115	115	1	261 MVA	261 MVA	477 ACSR
NYSEG	Flat Street	Flat Street	xfmr	In-Service	2019	115/34.5	115/34.5	2	40MVA	45.2MVA	Transformer #2
NYSEG	Falls Park 115/34.5kV Substation			In-Service	2019	115/34.5	115/34.5				Tap to interconnect NG Line #14
NYSEG	Falls Park	Falls Park	xfmr	In-Service	2019	115/34.5	115/34.5	1	62 MVA	70 MVA	Transformer #1
RGE	Station 42	Station 23	Phase Shifter	In-Service	2019	115	115	1	253 MVA	253 MVA	Phase Shifter
RGE	Station 23	Station 23	xfmr	In-Service	2019	115/11.5/11.5	115/11.5/11.5	2	75 MVA	84 MVA	Transformer
RGE	Station 23	Station 23	xfmr	W	2019	115/34.5	115/34.5	2	75 MVA	84 MVA	Transformer
CHGE	North Chelsea	North Chelsea	xfmr	S	2020	115/69	115/69	1	564	728	Replace Transformer 1
CHGE	Fishkill Plains	East Fishkill	2.05	S	2020	115	115	1	995	1218	1-1033.5 ACSR
CHGE	North Catskill	North Catskill	xfmr	W	2020	115/69	115/69	2	560	726	Replace Transformer 4 & 5
ConEd	Buchanan North	Buchanan North	Reconfiguration	S	2020	345	345		N/A	N/A	Reconfiguration (bus work related to decommissioning of Indain Point 2)

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
LIPA	Meadowbrook	East Garden City	-3.11	S	2020	69	69	1	458	601	4/0 CU
LIPA	East Garden City	Lindbergh	2.50	S	2020	69	69	1	575	601	750 kcmil CU
LIPA	Lindbergh	Meadowbrook	2.11	S	2020	69	69	1	458	601	4/0 CU
LIPA	Elmont	Floral Park	-1.59	S	2020	34.5	34.5	1	644	816	477 AL
LIPA	Elmont	Belmont	1.82	S	2020	34.5	34.5	1	342	457	2/0 CU
LIPA	Belmont	Floral Park	2.04	S	2020	34.5	34.5	1	644	816	477 AL
LIPA	MacArthur	-	Cap Bank	S	2020	69	69	1	27MVAR	27 MVAR	Capacitor bank
NGRID	Rosa Rd	Rosa Rd	-	S	2020	115	115		N/A	N/A	Install 35.2MVAR Cap Bank at Rosa Rd
NGRID	Rotterdam	Curry Rd	7	S	2020	115	115	1	808	856	Replace 7.0 miles of mainly 4/0 Cu conductor with 795kcmil ACSR 26/7
NGRID	Elm St	Elm St	xfmr	S	2020	230/23	230/23	1	118MVA	133MVA	Add a fourth 230/23kV transformer
NGRID	West Ashville	West Ashville		S	2020	115	115		N/A	N/A	New Distribution Station at West Ashville
NGRID	Spier	Rotterdam (#2)	-32.74	S	2020	115	115	1	1168	1416	New Lasher Rd Switching Station
NGRID	Spier	Lasher Rd (New Station) (#2)	21.69	S	2020	115	115	1	1168	1416	New Lasher Rd Switching Station
NGRID	Lasher Rd (New Station)	Rotterdam	11.05	S	2020	115	115	1	2080	2392	New Lasher Rd Switching Station
NGRID	Spier	Luther Forest (#302)	-34.21	S	2020	115	115	1	916	1070	New Lasher Rd Switching Station
NGRID	Spier	Lasher Rd (New Station) (#302)	21.72	S	2020	115	115	1	916	1118	New Lasher Rd Switching Station

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
NGRID	Lasher Rd (New Station)	Luther Forest	12.49	S	2020	115	115	1	990	1070	New Lasher Rd Switching Station
NGRID	Rotterdam	Rotterdam	-	S	2020	115	115	2	N/A	N/A	Install Series Reactors at Rotterdam Station on lines 17 & 19
NGRID	Huntley	Lockport	6.9	S	2020	115	115	2	1303	1380	Replace 6.9 miles of 36 and 37 lines
NGRID	Two Mile Creek	Two Mile Creek		S	2020	115	115		N/A	N/A	New Distribution Station at Two Mile Creek
NGRID	Maple Ave	Maple Ave		S	2020	115	115		N/A	N/A	New Distribution Station at Maple Ave
NGRID	Randall Rd	Randall Rd		S	2020	115	115		N/A	N/A	New Distribution Station at Randall Road
NGRID	GE	Geres Lock	7.14	S	2020	115	115	1	785	955	Reconductoring 4/0CU & 336 ACSR to 477 ACCR (Line #8)
NGRID	Gardenville 115kV	Gardenville 115kV	-	S	2020	-	-	-	-	-	Rebuild of Gardenville 115kV Station to full breaker and a half
NGRID	Rotterdam	Woodlawn	7	S	2020	115	115	1			Replace 7.0 miles of mainly 4/0 Cu conductor with 795kcmil ACSR 26/7
NGRID	Gardenville 230kV	Gardenville 115kV	xfmr	S	2020	230/115	230/115	-	347 MVA	422 MVA	Replacement of 230/115kV TB#4 stepdown with larger unit
NGRID	Oswego	Oswego	-	W	2020	115	115		N/A	N/A	Rebuild of Oswego 115kV Station
NYPA	Fraser Annex	Fraser Annex	SSR Detection	S	2020	345	345	1	1793 MVA	1793 MVA	MSSC SSR Detection Project
NYPA	Niagara	Rochester	-70.20	W	2020	345	345	1	2177	2662	2-795 ACSR
NYPA	Somerset	Rochester	-44.00	W	2020	345	345	1	2177	2662	2-795 ACSR
NYPA	Niagara	Station 255 (New Station)	66.40	W	2020	345	345	1	2177	2662	2-795 ACSR

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
				Firm Plans (included in FERC 715 Base Case)							
NYPA	Somerset	Station 255 (New Station)	40.20	W	2020	345	345	1	2177	2662	2-795 ACSR
NYPA	Station 255 (New Station)	Rochester	3.80	W	2020	345	345	2	2177	2662	2-795 ACSR
NYPA	Niagara 230 kV	Niagara 230 kV	Breaker	W	2020	230	230	1	N/A	N/A	Add a new breaker
NYPA	Niagara 230 kV	Niagara 115 kV	Autotransformer	S	2020	230	115	1	240 MVA	240 MVA	Replace Niagara AT #1
NYPA	Astoria 138 kV	Astoria 13.8 kV	Astoria CC GSU Refurbishment	W	2020	138	18	1	234	234	Astoria CC GSU Refurbishment
NYSEG	Watercure Road	Watercure Road	xfmr	W	2020	345/230	345/230	1	426 MVA	494 MVA	Transformer #2 and Station Reconfiguration
NYSEG	Willet	Willet	xfmr	W	2020	115/34.5	115/34.5	1	39 MVA	44 MVA	Transformer #2
NYSEG	Coddington	E. Ithaca (to Coddington)	8.07	W	2020	115	115	1	307 MVA	307 MVA	665 ACCR
O & R	West Nyack	West Nyack	Cap Bank	S	2020	138	138	1	-	-	Capacitor Bank
O & R	Harings Corner (RECO)	Closter (RECO)	3.20	S	2020	69	69	1	1098	1312	UG Cable
O & R	Ramapo	Ramapo	xfmr	S	2020	345/138	345/138	1	731	731	-
RGE	Station 122-Pannell-PC1	Station 122-Pannell-PC1 and PC2		S	2020	345	345	1	1314 MVA-LTE	1314 MVA-LTE	Relay Replacement
RGE	Station 262	Station 23	1.46	W	2020	115	115	1	2008	2008	Underground Cable
RGE	Station 33	Station 262	2.97	W	2020	115	115	1	2008	2008	Underground Cable
RGE	Station 262	Station 262	xfmr	W	2020	115/34.5	115/34.5	1	58.8MVA	58.8MVA	Transformer
RGE	Station 255 (New Station)	Rochester	3.80	W	2020	345	345	1	2177	2662	2-795 ACSR

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
					Firm Plans (included in FERC 715 Base Case)						
RGE	Station 255 (New Station)	Station 255 (New Station)	xfmr	W	2020	345/115	345/115	1	400 MVA	450 MVA	Transformer
RGE	Station 255 (New Station)	Station 255 (New Station)	xfmr	W	2020	345/115	345/115	2	400 MVA	450 MVA	Transformer
RGE	Station 255 (New Station)	Station 418	9.60	W	2020	115	115	1	1506	1807	New 115kV Line
RGE	Station 255 (New Station)	Station 23	11.10	W	2020	115	115	1	1506	1807	New 115kV Line
CHGE	Hurley Avenue	Leeds	Static synchronous series compensator	S	2021	345	345	1	2336	2866	21% Compensation
LIPA	Valley Stream	East Garden City	7.36	S	2021	138	138	1	1171	1171	2000 SQMM XLPE
LIPA	Amagansett	Montauk	-13.00	S	2021	23	23	1	577	657	750 kcmil CU
LIPA	Amagansett	Navy Road	12.74	S	2021	23	23	1	577	657	750 kcmil CU
LIPA	Navy Road	Montauk	0.26	S	2021	23	23	1	577	657	750 kcmil CU
LIPA	Riverhead	Wildwood	10.63	S	2021	138	138	1	1399	1709	1192ACSR
LIPA	Riverhead	Canal	16.49	S	2021	138	138	1	1000	1110	2368 KCMIL (1200 mm^2) Copper XLPE
LIPA	Deer Park	-	Cap Bank	S	2021	69	69	1	27MVAR	27 MVAR	Capacitor bank
NGRID	Clay	Dewitt	10.24	S	2021	115	115	1	220MVA	268MVA	Reconductor 4/0 CU to 795ACSR
NGRID	Clay	Teall	12.75	S	2021	115	115	1	220 MVA	268MVA	Reconductor 4/0 CU to 795ACSR
NGRID	Gardenville 230kV	Gardenville 115kV	xfmr	S	2021	230/115	230/115	-	347 MVA	422 MVA	Replacement of 230/115kV TB#3 stepdown with larger unit
NGRID	Huntley 115kV	Huntley 115kV	-	S	2021	230	230	-	N/A	N/A	Rebuild of Huntley 115kV Station

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
NGRID	Mortimer	Mortimer	xfmr	S	2021	115	115		50MVA	50MVA	Replace Mortimer 115/69kV Transformer
NGRID	Mortimer	Mortimer	-	S	2021	115	115		N/A	N/A	Second 115kV Bus Tie Breaker at Mortimer Station
NGRID	New Bethlehem	New Bethlehem	-	S	2021	115	115		N/A	N/A	New Bethlehem 115/13.2kV station
NGRID	New Cicero	New Cicero		S	2021	115	115		N/A	N/A	New Distribution Station at New Cicero
NGRID	Mountain	Lockport	0.08	S	2021	115	115	2	174MVA	199MVA	Mountain-Lockport 103/104 Bypass
NGRID	Royal Ave	Royal Ave	-	S	2021	115/13.2	115/13.2	-	-	-	Install new 115-13.2 kV distribution substation in Niagara Falls (Royal Ave)
NGRID	Niagara	Packard	3.4	W	2021	115	115	1	344MVA	449MVA	Replace 3.4 miles of 192 line
NYPA	Moses 230 kV	Adirondack 230 kV	Series Compensation	S	2021	230	230	-	±13.2kV	±13.2kV	Voltage Source Series Compensation
NYPA	St. Lawrence 230kV	St. Lawrence 115kV	xfmr	S	2021	230/115	230/115	1	TBD	TBD	Replacement of St. Lawrence AutoTransformer #2
NYPA	Plattsburg 230 kV	Plattsburg 115 kV	xfmr	W	2021	230/115	230/115	1	249	288	Refurbishment of Plattsburgh Auto Transformer #1
NYPA	Astoria Annex	Astoria Annex	Shunt Reactor	W	2021	345	345	2	TBD	TBD	
O & R	Lovett 345 kV Station (New Station)	Lovett	xfmr	S	2021	345/138	345/138	1	562 MVA	562 MVA	Transformer
O & R	Little Tor	-	Cap Bank	S	2021	138	138	1	32 MVAR	32 MVAR	Capacitor bank
O & R	Deerpak	Port Jervis	2	S	2021	69	69	1		1604	
O & R	Westtown	Port Jervis	7	S	2021	69	69	1		1604	
O & R/ConEd	Ladentown	Buchanan	-9.5	S	2021	345	345	1	3000	3211	2-2493 ACAR

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
O & R/ConEd	Ladentown	Lovett 345 kV Station (New Station)	5.5	S	2021	345	345	1	3000	3211	2-2493 ACAR
O & R/ConEd	Lovett 345 kV Station (New Station)	Buchanan	4	S	2021	345	345	1	3000	3211	2-2493 ACAR
CHGE	St. Pool	High Falls	5.61	W	2022	115	115	1	1010	1245	1-795 ACSR
CHGE	High Falls	Kerhonkson	10.03	W	2022	115	115	1	1010	1245	1-795 ACSR
CHGE	Modena	Galeville	4.62	W	2022	115	115	1	1010	1245	1-795 ACSR
CHGE	Galeville	Kerhonkson	8.96	W	2022	115	115	1	1010	1245	1-795 ACSR
CHGE	Hurley Ave	Saugerties	11.40	W	2022	69	115	1	1114	1359	1-795 ACSR
CHGE	Kerhonkson	Kerhonkson	xfmr	W	2022	115/69	115/69	1	564	728	Add Transformer 3
CHGE	Kerhonkson	Kerhonkson	xfmr	W	2022	115/69	115/69	1	564	728	Add Transformer 4
CHGE	Rock Tavern	Sugarloaf	12.10	W	2022	115	115	1	N/A	N/A	Retire SL Line
CHGE	Sugarloaf	NY/NJ State Line	10.30	W	2022	115	115	2	N/A	N/A	Retire SD/SJ Lines
NGRID	South Oswego	Indeck (#6)	-	S	2022	115	115	1	-	-	Install High Speed Clearing on Line #6
NGRID	Porter	Porter	-	S	2022	230	230		N/A	N/A	Porter 230kV upgrades
NGRID	Watertown	Watertown		S	2022	115	115		N/A	N/A	New Distribution Station at Watertown
NGRID	Golah	Golah	xfmr	S	2022	69	69		50MVA	50MVA	Replace Golah 69/34.5kV Transformer
NGRID	Niagara	Packard	3.7	S	2022	115	115	1	344MVA	449MVA	Replace 3.7 miles of 191 line

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
NGRID	Lockport	Mortimer	56.5	S	2022	115	115	3	-	-	Replace Cables Lockport-Mortimer #111, 113, 114
NGRID	Niagara	Packard	3.7	W	2022	115	115	2	344MVA	449MVA	Replace 3.7 miles of 193 and 194 lines
NGRID	Gardenville	Big Tree	6.3	W	2022	115	115	1	221MVA	221MVA	Gardenville-Arcade #151 Loop-in-and-out of NYSEG Big Tree
NGRID	Big Tree	Arcade	28.6	W	2022	115	115	1	129MVA	156MVA	Gardenville-Arcade #151 Loop-in-and-out of NYSEG Big Tree
NGRID	Coffeen	Coffeen	-	S	2022	115	115	-	TBD	TBD	Terminal equipment replacements
NGRID	Browns Falls	Browns Falls	-	S	2022	115	115	-	TBD	TBD	Terminal equipment replacements
NGRID	Taylorville	Taylorville	-	S	2022	115	115	-	TBD	TBD	Terminal equipment replacements
NYPA	Niagara 345 kV	Niagara 230 kV	xfmr	W	2022	345/230	345/230	1	TBD	TBD	Replacement of Niagara AutoTransformer #3
NYSEG	South Perry	South Perry	xfmr	W	2022	115/34.5	115/34.5	1	59 MVA	67 MVA	Transformer #3
NYSEG	South Perry	South Perry	xfmr	W	2022	230/115	230/115	1	246 MVA	291 MVA	Transformer
NYSEG	Fraser	Fraser	xfmr	W	2022	345/115	345/115	1	305 MVA	364 MVA	Transformer #2 and Station Reconfiguration
NYSEG	Fraser 115	Fraser 115	Rebuild	W	2022	115	115		N/A	N/A	Station Rebuild to 4 bay BAAH
NYSEG	Delhi	Delhi	Removal	W	2022	115	115		N/A	N/A	Remove 115 substation and terminate existing lines to Fraser 115 (short distance)
NYSEG	Erie Street Rebuild	Erie Street Rebuild	Rebuild	W	2022	115	115				Station Rebuild
NYSEG	Big Tree Road	Big Tree Road	Rebuild	W	2022	115	115				Station Rebuild

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
NYSEG	Meyer	Meyer	xfmr	W	2022	115/34.5	115/34.5	2	59.2MVA	66.9MVA	Transformer #2
O & R	Ramapo (NY)	South Mahwah (RECO)	5.50	W	2022	138	138	2	1980	2120	1272 ACSS
RGE	Station 168	Mortimer (NG Trunk #2)	26.4	W	2022	115	115	1	145 MVA	176 MVA	Station 168 Reinforcement Project
RGE	Station 168	Elbridge (NG Trunk # 6)	45.5	W	2022	115	115	1	145 MVA	176 MVA	Station 168 Reinforcement Project
RGE	Station 127	Station 127	xfmr	W	2022	115/34.5	115/34.5	1	75MVA	75MVA	Transformer #2
CHGE	Saugerties	North Catskill	12.46	W	2023	69	115	1	1114	1359	1-795 ACSR
NGRID	Cortland	Clarks Corners	0.2	S	2023	115	115	1	147MVA	170MVA	Replace 0.2 miles of 1(716) line and series equipment
NGRID	Maplewood	Menands	3	S	2023	115	115	1	220 MVA	239 MVA	Reconductor approx. 3 miles of 115kV Maplewood – Menands #19
NGRID	Maplewood	Reynolds	3	S	2023	115	115	1	217 MVA	265 MVA	Reconductor approx 3 miles of 115kV Maplewood – Reynolds Road #31
NGRID	Elm St	Elm St	-	S	2023	230/23	230/23	-	118MVA	133MVA	Replace TR2 as failure
NGRID	Packard	Huntley	9.1	W	2023	115	115	1	262MVA	275MVA	Walck-Huntley #133, Packard-Huntley #130 Reconductor
NGRID	Walck	Huntley	9.1	W	2023	115	115	1	262MVA	275MVA	Walck-Huntley #133, Packard-Huntley #130 Reconductor
NGRID	Kensington Terminal	Kensington Terminal	-	W	2023	115/23	115/23	-	50MVA	50MVA	Replace TR4 and TR5
NGRID	Malone	Malone	-	S	2023	115	115	-	TBD	TBD	Station Rebuild
NGRID	Taylorville	Boonville	-	S	2023	115	115	-	TBD	TBD	Install series reactors on the 5 and 6 lines. Size TBD
NYPA	Moses	Adirondack	78	S	2023	230	345	2	1088	1329	Replace 78 miles of both Moses-Adirondack 1&2

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
						Firm Plans (included in FERC 715 Base Case)					
NYPA	Niagara 345 kV	Niagara 230 kV	xfmr	W	2023	345/230	345/230	1	TBD	TBD	Replacement of Niagara AutoTransformer #5
NYSEG	Gardenville	Gardenville	xfmr	W	2023	230/115	230/115	1	316 MVA	370 MVA	NYSEG Transformer #3 and Station Reconfiguration
NYSEG	Wood Street	Wood Street	xfmr	W	2023	345/115	345/115	1	327 MVA	378 MVA	Transformer #3
O & R	Burns	West Nyack	5.00	S	2023	138	138	1	940	940	UG Cable
O & R	Shoemaker	Pocatello	2.00	W	2023	69	69	1	1604	1723	795 ACSS
O & R	Sugarloaf	Shoemaker	12.00	W	2023	69	138	2	1062	1141	397 ACSS
ConEd	Hudson Ave East	New Vinegar Hill Distribution Switching Station	xfmrs/PARs/Feeders	S	2024	138/27	138/27		N/A	N/A	New Hudson Ave Distribution Switching Station
ConEd	Farragut	Farragut	Reconfiguration	S	2024	138	138		N/A	N/A	Install PASS Breaker
NGRID	Dunkirk	Laona	-	S	2024	115	115	2	N/A	N/A	Remove series reactors from New Road Switch Station and install new to Moons Switch Station
NGRID	Laona	Moons	-	S	2024	115	115	2	N/A	N/A	Remove series reactors from New Road Switch Station and install new to Moons Switch Station
NGRID	Golah	Golah	Reconfiguration	S	2024	115	115		-	-	Add a Golah 115kV bus tie breaker
NGRID	Dunkirk	Dunkirk	-	S	2024	115	115		N/A	N/A	Rebuild of Dunkirk 115kV Station
NGRID	Gardenville	Dunkirk	20.5	S	2024	115	115	2	1105	1346	Replace 20.5 miles of 141 and 142 lines
NGRID	Homer Hill	Homer Hill	-	S	2024	115	115	-	116MVA	141MVA	Homer Hill Replace five OCB

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
NGRID	Inghams	Saint Johnsville	2.94	W	2024	115	115	1	1114	1359	Reconductor 2.94mi of 2/0 + 4/0 Cu (of 7.11mi total) to 795 ACSR
NGRID	Inghams 115kV	Inghams 115kV	Breaker	W	2024	115	115	-	2000	2000	Add series breaker to Inghams R15 (Inghams - Meco #15 115kV)
NGRID	Schenectady International	Rotterdam	0.93	W	2024	69	115	1	1114	1359	Reconductor 0.93mi of 4/0 Cu + 336.4 ACSR (of 21.08mi total) to 795 ACSR
NGRID	Rotterdam	Schoharie	0.93	W	2024	69	115	1	1114	1359	Reconductor 0.93mi of 4/0 Cu (of 21.08mi total) to 795 ACSR
NYSEG	Westover 115	Westover	Removal	W	2024	115	115		N/A	N/A	Remove 115 substation and terminate existing lines to Oakdale 115 (short distance)
O & R	Montvale (RECO)	-	Cap Bank	S	2024	69	69	1	32 MVAR	32 MVAR	Capacitor bank
O & R	Ramapo	Sugarloaf	17.00	W	2024	138	138	1	1980	2120	1272 ACSS
O & R	Burns	Corporate Drive	5.00	W	2024	138	138	1	1980	2120	1272 ACSS
RGE	Station 418	Station 48	7.6	W	2024	115	115	1	175 MVA	225 MVA	New 115kV Line
RGE	Station 82	Station 251 (Upgrade Line #902)		W	2024	115	115	1	400MVA	400MVA	Line Upgrade
RGE	Mortimer	Station 251 (Upgrade Line #901)	1.00	W	2024	115	115	1	400MVA	400MVA	Line Upgrade
LIPA	Southampton	Deerfield	4.00	S	2025	69	138	1	1171	1171	2000 SQMM XLPE
NGRID	Stoner	Rotterdam	9.81	W	2025	115	115	1	1398	1708	Reconductor 9.81mi of 4/0 Cu + 336.4 ACSR (of 23.12mi total) to 1192.5 ACSR
NGRID	Meco	Rotterdam	9.81	W	2025	115	115	1	1398	1708	Reconductor 9.96mi of 4/0 Cu + 336.4 ACSR (of 30.79mi total) to 1192.5 ACSR
LIPA	Syosset	Shore Rd	11.00	S	2026	138	138	1	1171	1171	2000 SQMM XLPE

Transmission Owner	Terminals		Line Length in Miles	In-Service Date/Yr		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size
				Prior to (2)	Year	Operating	Design		Summer	Winter	
Firm Plans (included in FERC 715 Base Case)											
LIPA	Syosset	Shore Rd	Phase Shifter	S	2026	138	138	1	TBD	TBD	Phase Shifter
NGRID	Niagara	Gardenville	26.3	S	2026	115	115	1	275MVA	350MVA	Packard-Erie / Niagara-Garenville Reconfiguration
NGRID	Packard	Gardenville	28.2	S	2026	115	115	2	168MVA	211 MVA	Packard-Gardenville Reactors, Packard-Erie / Niagara-Garenville Reconfiguration
NGRID	Mortimer	Pannell	15.7	S	2026	115	115	2	221MVA	270MVA	
NGRID/NYSEG	Erie St	Gardenville	5.5	S	2026	115	115	1	139MVA	179MVA	Packard-Erie / Niagara-Garenville Reconfiguration, Gardenville add breakers
O & R	West Nyack	West Nyack	-	S	2026	138	138	1			Station Reconfiguration
O & R	West Nyack (NY)	Harings Corner (RECO)	7.00	W	2026	69	138	1	1604	1723	795 ACSS

Appendix D: Resource Adequacy Assumptions

Resource Adequacy Assumptions Matrix

#	Parameter	2020 RNA (2020 GB) Study Period: 2024(y4) -2030 (y10)	2020 Q4 STAR (2020 GB) Study Period: 2021(y1) -2030 (y5)
Load Parameters			
1	Peak Load Forecast	Adjusted 2020 Gold Book NYCA baseline peak load forecast. The GB 2020 baseline peak load forecast includes the impact (reduction) of behind-the-meter (BtM) solar at the time of NYCA peak. For the Resource Adequacy load model, the deducted BtM solar MW was added back to the NYCA zonal loads, which then allows for a discrete modeling of the BtM solar resources.	Same
2	Load Shapes (Multiple Load Shapes)	Used Multiple Load Shape MARS Feature 8,760 hour historical load shapes were used as base shapes for LFU bins: Bin 1: 2006 Bin 2: 2002 Bins 3-7: 2007 Peak adjustments on a seasonal basis. For the BtM Solar adjustment, the BtM shape is added back to account for the impact of the BtM generation on both on-peak and off-peak hours.	Same

#	Parameter	2020 RNA (2020 GB) Study Period: 2024(y4) -2030 (y10)	2020 Q4 STAR (2020 GB) Study Period: 2021(y1) -2030 (y5)
3	Load Forecast Uncertainty (**LFU**)	Updated via Load Forecast Task Force (LFTF) process Reference: April 13 2020 LFTF presentation: https://www.nyiso.com/documents/20142/11883362/LFU_Summary.pdf	Same
Generation Parameters			
1	**Existing** Generating Unit Capacities	2020 Gold Book values. Use summer min (DMNC vs. CRIS). Use winter min (DMNC vs. CRIS). Adjusted for RNA inclusion rules.	Same
2	**Proposed New Units Inclusion** Determination	GB2020 with Inclusion Rules Applied	Same
3	Retirement, Mothballed Units, IIFO	GB2020 with Inclusion Rules Applied	Same
4	Forced and Partial Outage Rates	Five-year (2015-2019) GADS data for each unit represented. Those units with less than five years – use representative data. Transition Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods over the most recent five-year period For new units or units that are in service for less than three years, NERC 5-year class average EFORd data are used.	Same
5	Planned Outages	Based on schedules received by the NYISO and adjusted for history	Same

#	Parameter	2020 RNA (2020 GB) Study Period: 2024(y4) -2030 (y10)	2020 Q4 STAR (2020 GB) Study Period: 2021(y1) -2030 (y5)
6	Summer Maintenance	None	Same
7	Combustion Turbine Derates	Derate based on temperature correction curves For new units: used data for a unit of same type in same zone, or neighboring zone data.	Same
8	Existing Landfill Gas Plants	Actual hourly plant output over the period 2013-2017. Program randomly selects a LFG shape of hourly production over the 2013-2017 for each model replication. Probabilistic model is incorporated based on five years of input shapes, with one shape per replication randomly selected in the Monte Carlo process.	Same
9	Existing **Wind** Units (>5 years of data)	Actual hourly plant output over the period 2015-2019. Probabilistic model is incorporated based on five years of input shapes with one shape per replication being randomly selected in Monte Carlo process	Same
10	Existing **Wind** Units (<5 years of data)	For existing data, the actual hourly plant output over the period 2013-2017 is used. For missing data, the nameplate normalized average of units in the same load zone is scaled by the unit's nameplate rating.	Same
11a	Proposed **Land based Wind** Units	Inclusion Rules Applied to determine the generator status. The nameplate normalized average of units in the same load zone is scaled by the unit's nameplate rating.	Same

#	Parameter	2020 RNA (2020 GB) Study Period: 2024(y4) -2030 (y10)	2020 Q4 STAR (2020 GB) Study Period: 2021(y1) -2030 (y5)
11b	Proposed **Offshore Wind** Units	N/A	N/A
12a	Existing **Utility-scale Solar Resources**	The 31.5 MW Upton metered solar capacity: probabilistic model chooses from 5 years of production data output shapes covering the period 2013-2017 (one shape per replication is randomly selected in Monte Carlo process.)	Same
12b	Proposed **Utility-scale Solar Resources**	Inclusion Rules Applied to determine the generator status. The nameplate normalized average of units in the same load zone is scaled by the unit's nameplate rating.	Same
13	Projected **BtM Solar Resources**	Will use 5-year of inverter production data. Probabilistic model is incorporated based on five years of input shapes with one shape per replication being randomly selected in Monte Carlo process **Reference**: April 6, 2020 TPAS/ESPWG meeting materials	Same

#	Parameter	2020 RNA (2020 GB) Study Period: 2024(y4) -2030 (y10)	2020 Q4 STAR (2020 GB) Study Period: 2021(y1) -2030 (y5)
14	Existing **BTM-NG Program**	These are former load modifiers to sell capacity into the ICAP market. Modeled as cogen type 2 unit in MARS. Unit capacity set to CRIS value, load modeled with weekly pattern that can change monthly.	Same
15	Existing **Small Hydro** Resources	Actual hourly plant output over the period 2013-2017. Program randomly selects a hydro shape of hourly production over the 5-year window for each model replication. The randomly selected shape is multiplied by their current nameplate rating.	Same
16	Existing **Large Hydro**	Probabilistic Model based on 5 years of GADS data. Transition Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods over the most recent five-year period (2013-2017). Methodology consistent with thermal unit transition rates.	Same
17	Proposed **Energy Storage**	N/A	Same
18	Existing Energy Limited Resources	N/A	Existing elections were made by August 1, 2020 and are incorporated into the model as hourly shapes consistent with operational capabilities. Resource output is aligned with the NYISO's peak load window, when most loss-of load events are expected to occur.
Transaction – Imports/ Exports			

#	Parameter	2020 RNA (2020 GB) Study Period: 2024(y4) -2030 (y10)	2020 Q4 STAR (2020 GB) Study Period: 2021(y1) -2030 (y5)
1	Capacity Purchases	Grandfathered Rights and other awarded long-term rights Modeled using MARS explicit contracts feature.	Same
2	Capacity Sales	These are long-term contracts filed with FERC. Modeled using MARS explicit contracts feature. Contracts sold from ROS (Zones: A-F). ROS ties to external pool are derated by sales MW amount	Same
3	FCM Sales	Model sales for known years Modeled using MARS explicit contracts feature. Contracts sold from ROS (Zones: A-F). ROS ties to external pool are derated by sales MW amount	Same
4	UDRs	Updated with most recent elections/awards information (VFT, HTP, Neptune, CSC)	Same
5	EDRs	Cedars Uprate 80 MW. Increased the HQ to D by 80 MW. Note: the Cedar bubble has been removed and its corresponding MW was reflected in HQ to D limit. References: 1. March 16, 2020 ESPWG/TPAS 2. April 6, 2020 TPAS/ESPWG	Same

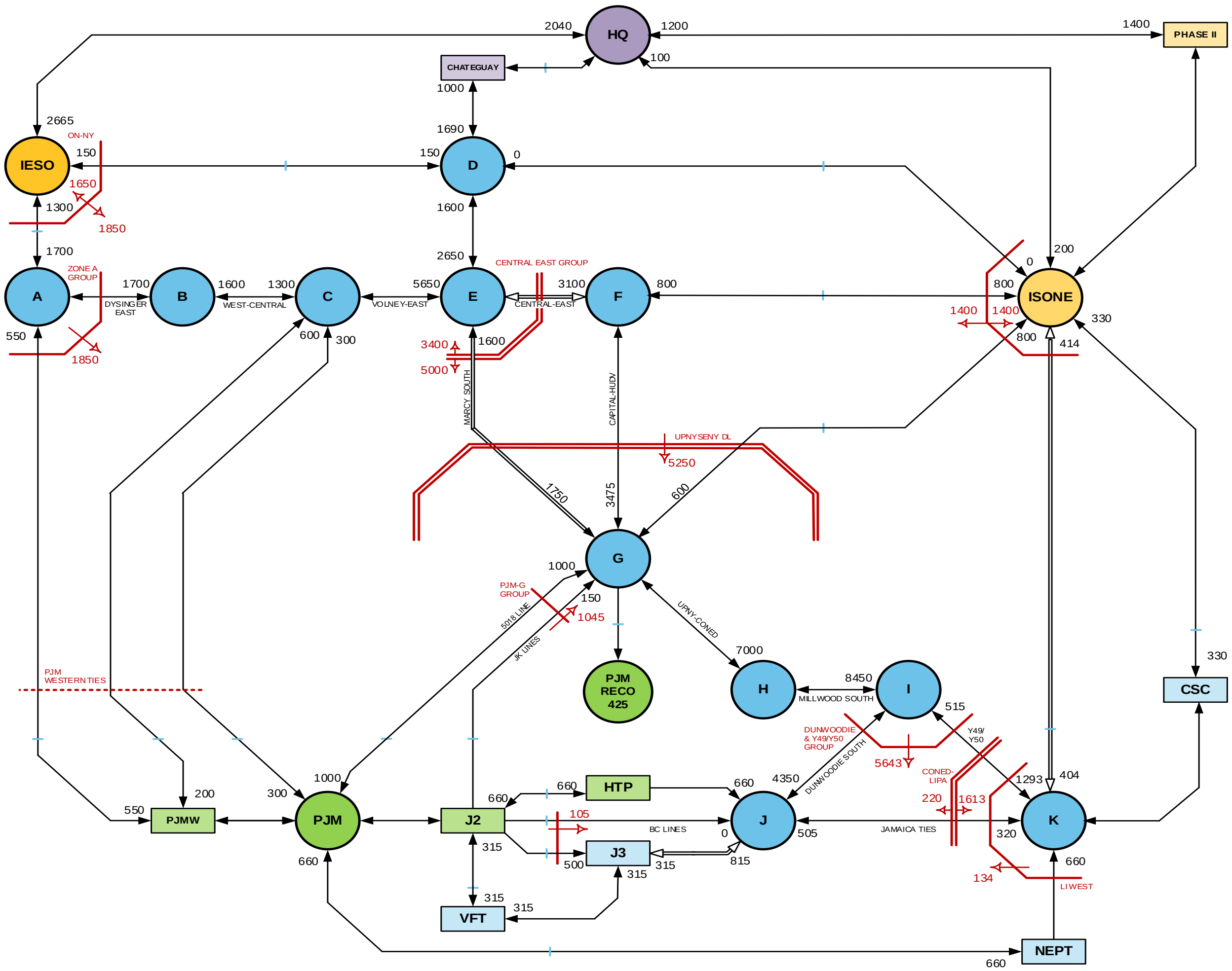
#	Parameter	2020 RNA (2020 GB) Study Period: 2024(y4) -2030 (y10)	2020 Q4 STAR (2020 GB) Study Period: 2021(y1) -2030 (y5)
6	Wheel-Through Contract	300 MW HQ through NYISO to ISO-NE. Modeled as firm contract. Reduced the transfer limit from HQ to NYISO by 300 MW and increased the transfer limit from NYISO to ISO-NE by 300 MW.	Same
MARS Topology: a simplified bubble-and-pipe representation of the transmission system			
1	Interface Limits	Developed by review of previous studies and specific analysis during the RNA study process	Same
2	New Transmission	Based on TO- provided firm plans (via Gold Book 2020 process) and proposed merchant transmission; inclusion rules applied	Same
3	AC Cable Forced Outage Rates	All existing cable transition rates updated with data received from ConEd and PSEG-LIPA to reflect most recent five-year history	Same
4	UDR unavailability	Five-year history of forced outages	Same

#	Parameter	2020 RNA (2020 GB) Study Period: 2024(y4) -2030 (y10)	2020 Q4 STAR (2020 GB) Study Period: 2021(y1) -2030 (y5)
Emergency Operating Procedures			
1	Special Case Resources	SCRs sold for the program discounted to historic availability ("effective capacity"). Summer values calculated from the latest available July registrations, held constant for all years of study. 15 calls/month	Same. Used 2020 SCR elections
2	EDRP Resources	Not modeled: the values are less than 2 MW.	Same
3	Other EOPs	Based on TO information, measured data, and NYISO forecasts	Same. Used updated elections, as applicable
External Control Areas			
1	PJM	Simplified model: The 5 PJM MARS areas (bubbles) were consolidated into one	Same
2	ISONE	Simplified model: The 8 ISO-NE MARS areas (bubbles) were consolidated into one	Same

#	Parameter	2020 RNA (2020 GB) Study Period: 2024(y4) -2030 (y10)	2020 Q4 STAR (2020 GB) Study Period: 2021(y1) -2030 (y5)
3	HQ	As per RNA Procedure External model (load, capacity, topology) provided by PJM/NPCC CP-8 WG. LOLE of pool adjusted to be between 0.10 and 0.15 days per year by adjusting capacity pro-rata in all areas.	Same
4	IESO	As per RNA Procedure External model (load, capacity, topology) provided by PJM/NPCC CP-8 WG. LOLE of pool adjusted to be between 0.10 and 0.15 days per year by adjusting capacity pro-rata in all areas.	Same
5	Reserve Sharing	All NPCC Control Areas indicate that they will share reserves **equally** among all members before sharing with PJM.	Same
6	NYCA Emergency Assistance Limit	Implemented a statewide limit of 3,500 MW	Same
Miscellaneous			
1	MARS Model Version	3.29.1499	3.30.1531

Resource Adequacy Topology from the 2020 RNA

Topology Year 1 (2021)



Notes

1. PJM to NY emergency assistance (EA) assumption for calculating the PJM-NY Western ties, PJM-G Group, and ABC Line Group flow distribution limit: 1500MW

2. NYCA EA simultaneous import limit: 3,500 MW

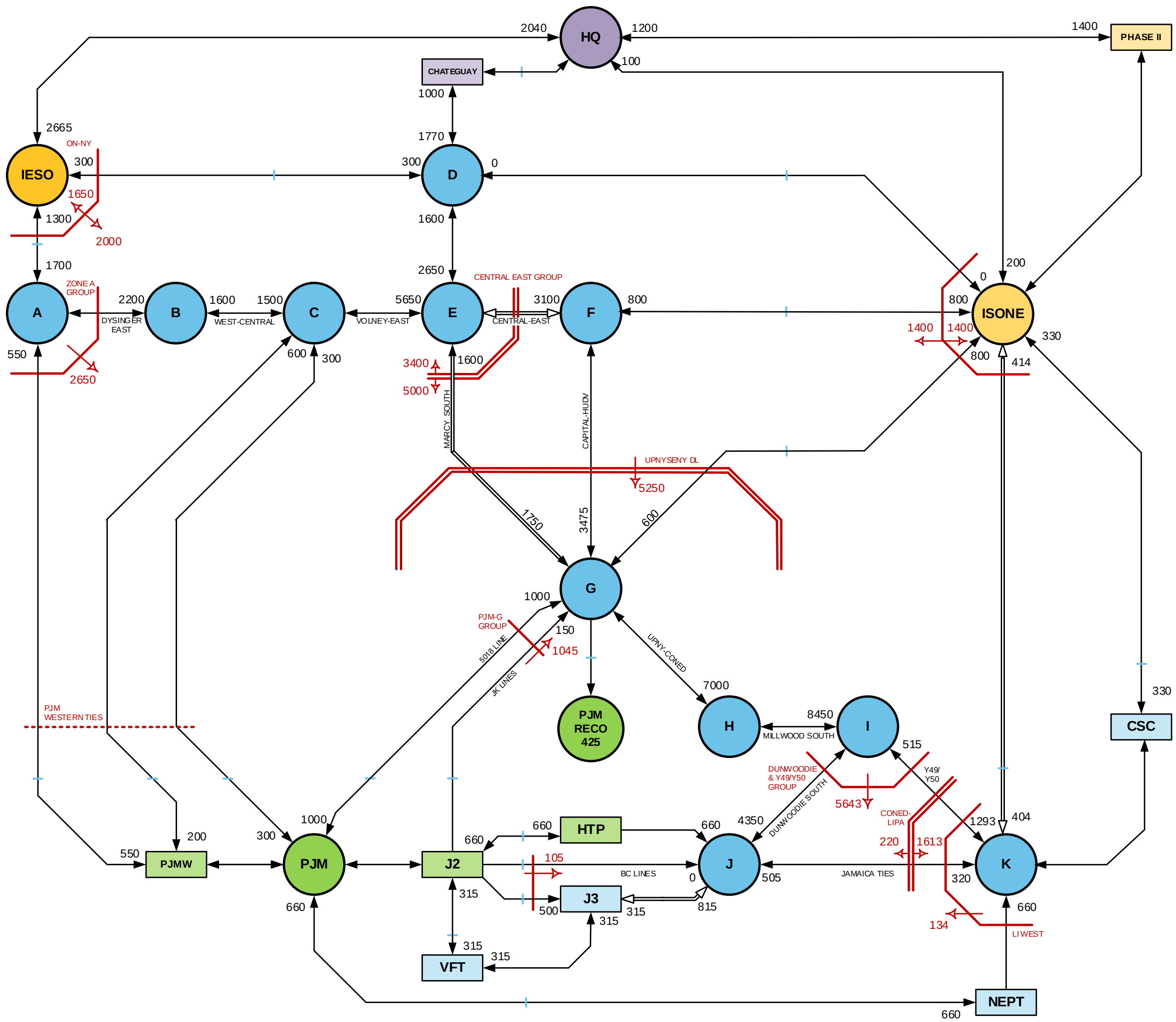
3. External areas representation based upon information received from the NPCC CP-8 WG

Legend

- Interface
- Unidirectional Interface
- Interface w/ Dynamic Ratings
- Interface Group
- Interface Group w/ Dynamic Ratings
- Monitoring Interface Group
- NYCA EA Interface Group Marker
- XX "Dummy Bubble" i.e. no load

NOTE: An interface is considered to not have a MW limitation if no number is specified

Topology Year 2- 3 (2022- 2023)



Notes

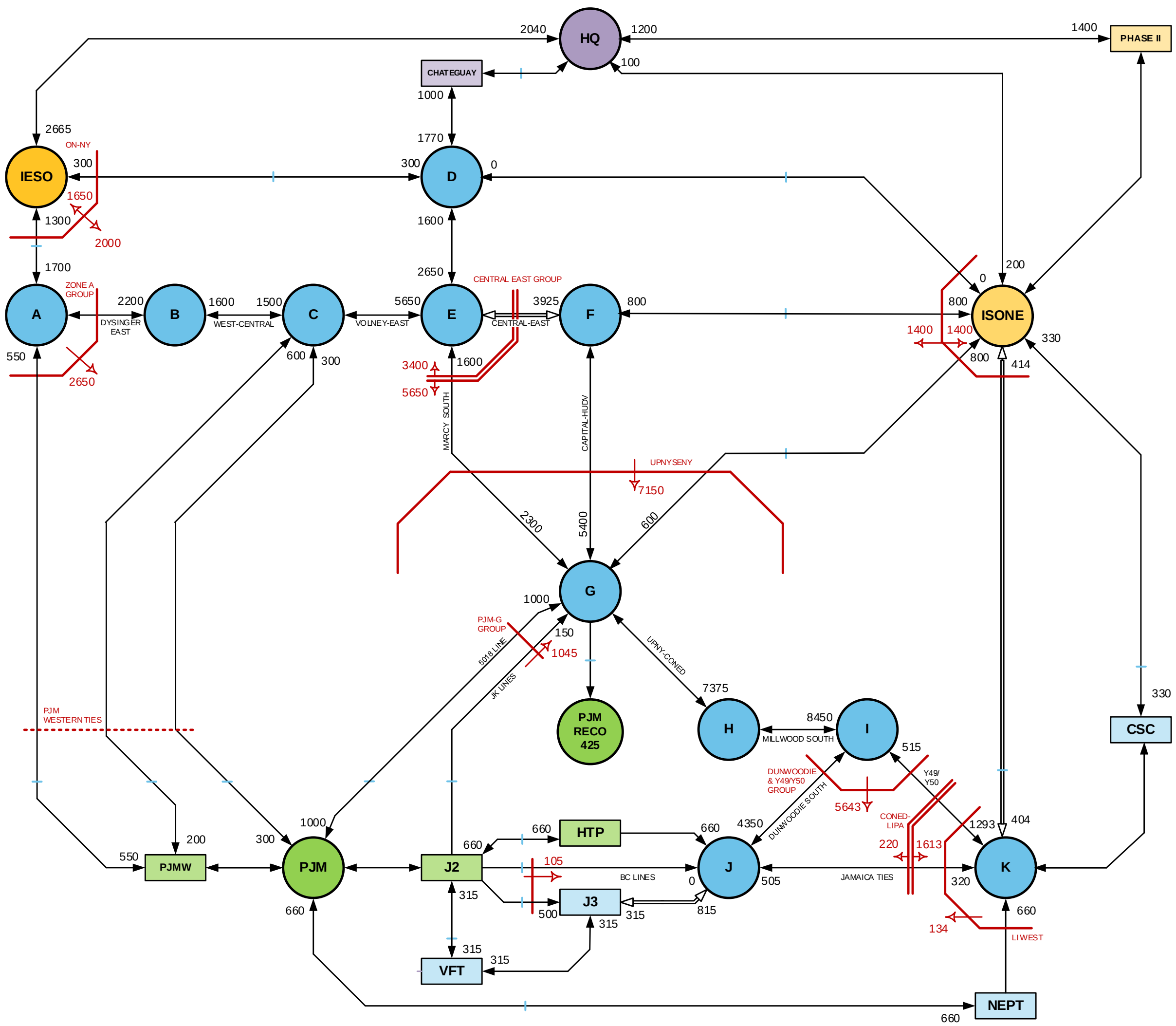
1. PJM to NY emergency assistance (EA) assumption for calculating the PJM-NY Western ties, PJM-G Group, and ABC Line Group flow distribution limit: 1500MW
2. NYCA EA simultaneous import limit: 3,500 MW
3. External areas representation based upon information received from the NPCC CP-8 WG

Legend

- Interface
- Unidirectional Interface
- Interface w/ Dynamic Ratings
- Interface Group
- Interface Group w/ Dynamic Ratings
- Monitoring Interface Group
- NYCA EA Interface Group Marker
- XX "Dummy Bubble" i.e. no load

NOTE: An interface is considered to not have a MW limitation if no number is specified

2020 RNA Topology Years 4-5 (2024 -2025)



Notes

1. PJM to NY emergency assistance (EA) assumption for calculating the PJM-NY Western ties, PJM-G Group, and ABC Line Group flow distribution limit: 1500MW

2. NYCA EA simultaneous import limit: 3,500 MW

3. External areas representation based upon information received from the NPCC CP-8 WG

Legend

- Interface
- Unidirectional Interface
- Interface w/ Dynamic Ratings
- Interface Group
- Interface Group w/ Dynamic Ratings
- Monitoring Interface Group
- NYCA EA Interface Group Marker
- XX "Dummy Bubble" i.e. no load

NOTE: An interface is considered to not have a MW limitation if no number is specified