Short-Term Assessment of Reliability: 2023 Quarter 3

A Report by the
New York Independent System Operator

October 13, 2023

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Executive Summary

This report sets forth the 2023 Quarter 3 Short-Term Assessment of Reliability ("STAR") findings for the five-year study period of July 15, 2023, through July 15, 2028, considering forecasts of peak power demand, planned upgrades to the transmission system, and changes to the generation mix over the next five years. This assessment does not identify any Generator Deactivation Reliability Need following the retirement of Western NY Wind, Ravenswood 01, and Ravenswood 11. No new reliability needs are identified in this STAR.

New York City Reliability Need

In the 2023 Quarter 2 STAR, the NYISO found a short-term reliability need beginning in summer 2025 within New York City primarily driven by a combination of forecasted increases in peak demand and the assumed unavailability of certain generation in New York City affected by the "Peaker Rule."[1] 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. As of May 1, 2023, 1,027 MW of affected peakers have deactivated or limited their operation. An additional 590 MW of peakers are expected to become unavailable beginning May 1, 2025, all of which are in New York City. With the additional peakers unavailable, the bulk power transmission system will not be able to securely and reliably serve the forecasted demand in New York City (Zone J). Specifically, the Quarter 2 STAR identified that the New York City zone is deficient by as much as 446 MW for a duration of nine hours on the peak day during expected weather conditions when accounting for forecasted economic growth and policy-driven increases in demand.

On August 4th the NYISO issued a solution solicitation to address the New York City need. Based on the study assumptions for this Quarter 3 STAR, the NYISO observes no changes to the need observed in the Quarter 2 STAR. In consideration of the advisory forecast, the NYISO presented to stakeholders at the September 28th Load Forecasting Task Force meeting that there is a potential reduction of only 20 MW to the higher bound of the range of forecasted conditions during expected weather for New York City. This potential reduction does not eliminate the need and has a negligible impact of the findings in the 2023 Quarter 2 STAR.

On October 3, 2023, the NYISO received proposed solutions to the Quarter 2 STAR need within New York City and is in the process of assessing the proposals. If proposed solutions, either individually or in

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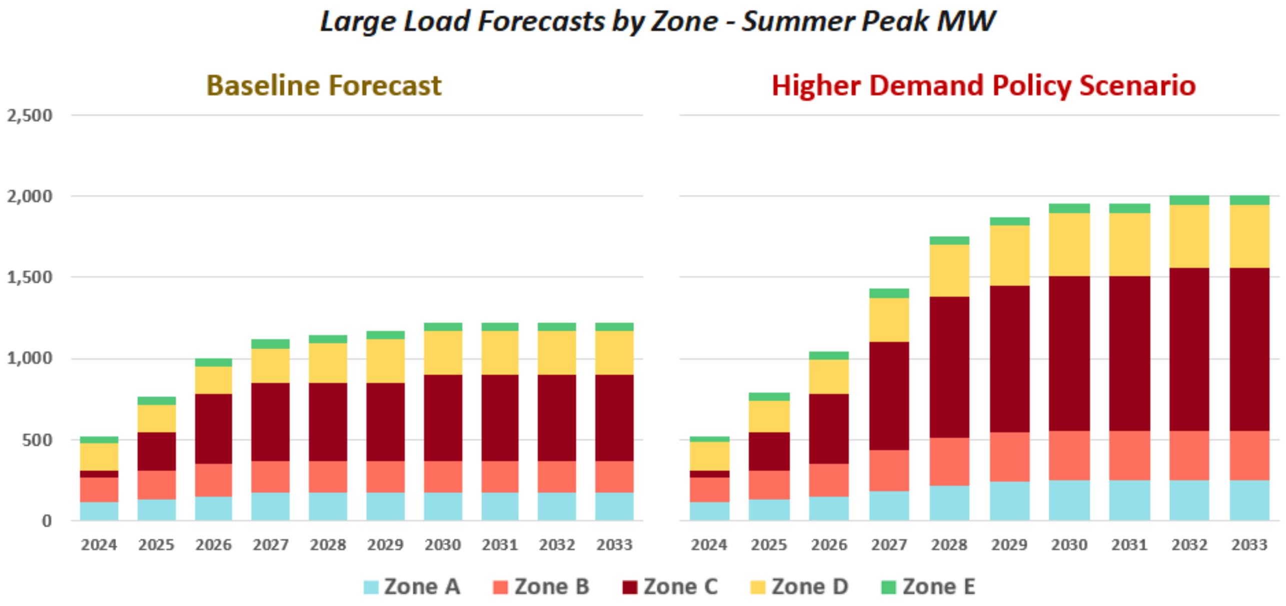
[1] In 2019, the New York State Department of Environmental Conservation adopted a regulation to limit nitrogen oxides (NOx) emissions from simple-cycle combustion turbines, referred to as the "Peaker Rule" (here)

combination, are not viable or sufficient to meet the identified Short-Term Reliability Need, interim solutions must be in place to keep the grid reliable. One potential outcome could include relying on generators that are subject to the DEC's Peaker Rule to remain in operation until a permanent solution is in place. The Peaker Rule anticipated this scenario when it authorized the NYISO to designate certain units to remain in operation beyond 2025 on an as-needed basis for reliability. Based on findings from its Short-Term Reliability Process, the NYISO may designate certain units, in sufficient quantity, to remain in operation for an additional two years (until May 1, 2027) with the potential of an additional two-year extension (to May 1, 2029) if a permanent solution that is needed to maintain reliability has been identified but is not yet online. The NYISO would only temporarily retain peakers as a last resort approach if it does not expect solutions to be in place by the time the identified reliability need is expected in 2025.

Reliability Assessment

The margin to maintain reliability over the short term will narrow or could be eliminated based upon a variety of potential changes in forecasted system conditions. A key driver to the narrowing of the statewide reliability margin is the impact from large load projects. A significant assumption update in this Quarter 3 STAR is the inclusion of additional large load projects primarily in western and central New York, many of which are currently undergoing a load interconnection study. The figure below shows the zonal forecasts of the included large loads in this assessment. Currently, there is approximately 260 MW of large loads installed within New York. In 2025, this amount is projected to increase to 764 MW. This significant load increase reduces the statewide margin to less than 100 MW in 2025 during normal operations for expected weather. The rapid growth of large load projects poses a risk to the future reliability of the New York grid if it is not matched with the equivalent addition of new resources.

While there is potential for a deficient statewide system margin in 2025, the primary driver is the New York City deficiency already identified in the Quarter 2 STAR. Depending on the solution to the New York City reliability need, the potential statewide deficiency may be mitigated. For this reason and the uncertainty of the large load projects, the NYISO is not identifying a new reliability need in this Quarter 3 STAR. The NYISO will continue to track the status of these large loads and assess the impact of the solutions to the need identified to the 2023 Quarter 2 STAR through the quarterly process.



Large Load Forecasts by Zone - Summer Peak MW

Baseline Forecast

Higher Demand Policy Scenario

In addition to New York City and the statewide system margin, this assessment also evaluated the transmission security margins for the Lower Hudson Valley and Long Island localities. For these localities, the planned Bulk Power Transmission Facilities ("BPTF") through the study period are within applicable reliability criteria based on the baseline summer coincident peak demand forecast with expected weather and with the planned projects meeting their proposed in-service dates. The NYISO assessed the resource adequacy of the overall system and found no resource adequacy reliability needs.

Central Hudson identified transmission security issues in its transmission district on its non-BPTF system. These are primarily driven by the assumed unavailability of certain generation in its district affected by the Peaker Rule. Given that those generators did not provide complete Generator Deactivation Notices to the NYISO prior to the start of this STAR, the local non-BPTF criteria violations identified by Central Hudson are being provided for information but were not assessed to identify possible Generator Deactivation Reliability Needs at this time.

The wholesale electricity markets administered by the NYISO are an important tool to help mitigate these risks. The markets are designed, and continue to evolve and adapt, to send appropriate price signals for new market entry and the retention of resources that assist in maintaining reliability. The potential risks and resource needs identified in the NYISO's analyses may be resolved by new capacity resources coming into service, construction of additional transmission facilities, and/or increased energy efficiency and integration of demand-side resources. The NYISO is tracking the progression of many projects that may contribute to grid reliability, including numerous offshore wind facilities that have not yet met the inclusion rules for reliability assessments. The NYISO will continue to monitor these resources and other developments to determine whether changing system resources and conditions could impact the reliability of the New York bulk electric grid.

As generators that are subject to the DEC's Peaker Rule submit their Generator Deactivation Notices, the NYISO and the responsible Transmission Owners will continue to evaluate in future STARs whether Generator Deactivation Reliability Needs arise from the deactivation of Initiating Generators.[2]

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[2] Per OATT 38.1, an "Initiating Generator" is "a Generator with a nameplate rating that exceeds 1 MW that submits a Generator Deactivation Notice for purposes of becoming Retired or entering into a Mothball Outage or that has entered into an ICAP Ineligible Forced Outage pursuant to Section 5.18.2.1 of the ISO Services Tariff, which action is being evaluated by the ISO in accordance with its Short-Term Reliability Process requirements in this Section 38 of the ISO OATT."

Purpose

In 2019, the NYISO established a quarterly Short-Term Reliability Process ("STRP") with its requirements prescribed in Attachments Y and FF of the NYISO's Open Access Transmission Tariff ("OATT"). The STRP evaluates the first five years of the planning horizon, with a focus on needs arising in the first three years of the study period. With this process in place, the biennial Reliability Planning Process focuses on identifying and resolving 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")[3] due to various changes to the grid such as generator deactivations, revised transmission plans, and updated demand forecasts. Transmission Owners also assess the impact of generator deactivations on their local systems. A Short-Term Reliability Need that is observed within the first three years of the study period constitutes a "Near-Term Reliability Need."[4] Should a Near-Term Reliability Need be identified in a STAR, the NYISO solicits and selects 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 2023 Quarter 3 findings for the study period from the STAR Start Date (July 15, 2023) through July 15, 2028. The NYISO 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.[5]

Assumptions

The NYISO evaluated the study period using the most recent Reliability Planning Process base case and data available as of July 14, 2023 (*i.e.,* the day before the July 15, 2023 Q3 STAR start date). 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 timely completion of the project. A summary of key projects is provided in Appendix C. The NYISO is tracking the

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

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

[5] NYISO Reliability Planning Process Manual, July 11, 2022. *See:* https://www.nyiso.com/documents/20142/2924447/rpp_mnl.pdf

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

progress of many projects that may contribute to grid reliability, including numerous offshore wind facilities that have not yet met the inclusion rules for reliability assessments. These additional tracked projects are listed in the *2023 Gold Book* and in Appendix D of the 2022 RNA.

This assessment used the major assumptions included in the 2022 RNA, along with several updates to key study assumptions which are provided below. Consistent with the obligations under its tariffs, the NYISO provided information to stakeholders on the modeling assumptions employed in this assessment. Details regarding the study assumptions were reviewed with stakeholders at the joint Electric System Planning Working Group ("ESPWG")/Transmission Planning Advisory Subcommittee ("TPAS") meeting on July 25, 2023. The meeting materials are posted on the NYISO's website.[7]

Generation Assumptions

Generator Deactivation Notices

For this STAR, the deactivating generators included in this assessment are listed in Figure 1. A list of all generator deactivations, including those evaluated in prior STARs, is provided in Appendix C. The posting of generator deactivation notices for retirement, mothball outage, or ICAP ineligible forced outage are available on the NYISO's website under the Short-Term Reliability Process.[8]

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[7] Short-Term Assessment of Reliability: 2023 Q3 Key Study Assumptions, ESPWG/TPAS/LFTF, July 25, 2023 (here)

[8] See https://www.nyiso.com/short-term-reliability-process then Generator Deactivation Notices/Planned Retirement Notices or Generator Deactivation Notices/IIFO Notifications

Figure 1: 2023 Quarter 3 STAR Generator Deactivations

Generating Unit	Submitting Entity	PTID	Responsible Transmission Owner	Zone	Nameplate MW	Unit Type	Date of Completed Deactivation Notice	Retire/Mothball Outage/ICAP Ineligible Forced Outage (IIFO)	Proposed Deactivation/IIFO Date
Western NY Wind	Western New York Wind Corp. (Wethersfield)	24143	National Grid	B	6.6	Wind	06/09/2023	Retire	5/1/2023
Ravenswood GT 01	Helix Ravenswood, LLC.	23729	Con Edison	J	18.6	Gas Turbine	07/13/2023	Retire	5/1/2023[9]
Ravenswood GT 11	Helix Ravenswood, LLC.	24259	Con Edison	J	25	Jet Engine	07/13/2023	Retire	5/1/2023

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[9] Both Ravenswood GT 01 and 11 units are currently in an IIFO. The IIFO assessment was included in the 2022 Quarter 1 STAR (here).

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").[10] 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 impacts 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 a portion of electrical demand can only be served by local generators due to transmission limitations that occur during certain operating conditions.

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. Considering all peaker unit compliance plans, approximately 1,600 MW of peaker generation capability would be unavailable during the summer by 2025 to comply with the emissions requirements. A subset of those generators are unavailable starting in 2023. As of May 1, 2023, 1,014 MW of affected peakers have deactivated or limited their operations. An additional 604 MW of peakers are expected to become unavailable beginning May 1, 2025, all of which are in New York City, except to the extent that some of them need to be temporarily retained for reliability until permanent, Climate Leadership and Community Protection Act[11] compliant solutions are developed or completed. Remaining peaker units have stated either that they comply with the emission limits as currently operated, or proposed equipment upgrades to achieve the emissions limits.

A list of peaker generation removals is provided in Figure 2. Peaker generators that have already completed a Generator Deactivation Notice or entered an IIFO are indicated in the table. Additionally, the table notes the STAR study or other assessments where these generators have been evaluated once a generator completed its generator deactivation notice or entered into an IIFO.

The DEC regulations include a provision to allow an affected generator to continue to operate for up to

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[10] DEC Peaker Rule

[11] New York's Climate Leadership and Community Protection Act ("CLCPA"), Chapter 106 of the Laws of 2019. The CLCPA become effective on January 1, 2020.

two years, with a possible further two-year extension, after the compliance deadline if the generator is designated by the NYISO or by the local transmission owner as needed to resolve a reliability need until a permanent solution is in place.

Study assumptions of generators for this STAR are derived from the 2022 RNA, except for the changes to generation assumptions specified below.

Figure 2: Status Changes Due to DEC Peaker Rule

Owner/Operator	Station	Zone	Nameplate (MW)	CRIS (MW) (1)		Capability (MW) (1)		Status Change Date (2)	STAR Evaluation or Other Assessment
				Summer	Winter	Summer	Winter		
National Grid	West Babylon 4 (6) (7)	K	52.4	49.0	64.0	41.2	63.4	12/12/2020 (R)	Other
National Grid	Glenwood GT 01 (4) (7)	K	16.0	14.6	19.1	13.0	15.3	2/28/2021 (R)	2020 Q3
Helix Ravenswood, LLC	Ravenswood 11	J	25.0	20.2	25.7	16.1	22.4	12/1/2021 (IIFO)	2022 Q1
Helix Ravenswood, LLC	Ravenswood 01	J	18.6	8.8	11.5	7.7	11.1	1/1/2022 (IIFO)	2022 Q1
Astoria Generating Company, L.P.	Gowanus 1-1 through 1-8	J	160.0	138.7	181.1	133.1	182.2	11/1/2022 (R)	2022 Q2
Astoria Generating Company, L.P.	Gowanus 4-1 through 4-8	J	160.0	140.1	182.9	138.8	183.4	11/1/2022 (R)	2022 Q2
Consolidated Edison Co. of NY, Inc.	Hudson Ave 3	J	16.3	16.0	20.9	12.3	15.6	11/1/2022 (R)	2022 Q2
Consolidated Edison Co. of NY, Inc.	Hudson Ave 5	J	16.3	15.1	19.7	15.3	18.6	11/1/2022 (R)	2022 Q2
Central Hudson Gas & Elec. Corp.	Coxsackie GT (8)	G	21.6	21.6	26.0	19.0	23.6	5/1/2023	
Central Hudson Gas & Elec. Corp.	South Cairo (8)	G	21.6	19.8	25.9	18.7	23.1	5/1/2023	
Consolidated Edison Co. of NY, Inc.	74 St. GT 1 & 2 (10)	J	37.0	39.1	49.2	37.8	43.6	5/1/2023	2022 Q2
NRG Power Marketing, LLC	Astoria GT 2-1, 2-2, 2-3, 2-4	J	186.0	165.8	204.1	138.0	184.2	5/1/2023 (R)	2022 Q2
NRG Power Marketing, LLC	Astoria GT 3-1, 3-2, 3-3, 3-4	J	186.0	170.7	210.0	139.1	180.4	5/1/2023 (R)	2022 Q2
NRG Power Marketing, LLC	Astoria GT 4-1, 4-2, 4-3, 4-4	J	186.0	167.9	206.7	138.5	178.6	5/1/2023 (R)	2022 Q2
Helix Ravenswood, LLC	Ravenswood 10	J	25.0	21.2	27.0	16.1	20.3	5/1/2023 (R)	2022 Q3
National Grid	Glenwood GT 03 (3) (4)	K	55.0	54.7	71.5	49.9	67.2	5/1/2023	
National Grid	Northport GT (9)	K	16.0	13.8	18.0	8.3	12.7	5/1/2023	
National Grid	Port Jefferson GT 01 (9)	K	16.0	14.1	18.4	13.0	15.3	5/1/2023	
National Grid	Shoreham 1 (3) (4)	K	52.9	48.9	63.9	41.3	61.4	5/1/2023	
National Grid	Shoreham 2 (3) (4)	K	18.6	18.5	23.5	16.5	20.3	5/1/2023	
Astoria Generating Company, L.P.	Astoria GT 01 (11)	J	16.0	15.7	20.5	13.4	19.1	5/1/2025	2022 Q4
Consolidated Edison Co. of NY, Inc.	59 St. GT 1	J	17.1	15.4	20.1	13.1	18.8	5/1/2025	
NRG Power Marketing, LLC	Arthur Kill GT 1	J	20.0	16.5	21.6	12.3	15.8	5/1/2025	
Astoria Generating Company, L.P.	Gowanus 2-1 through 2-8 (5)	J	160.0	152.8	199.6	142.1	182.0	5/1/2025	
Astoria Generating Company, L.P.	Gowanus 3-1 through 3-8 (5)	J	160.0	146.8	191.7	136.9	179.9	5/1/2025	
Astoria Generating Company, L.P.	Narrows 1-1 through 2-8 (5)	J	352.0	309.1	403.6	285.9	369.2	5/1/2025	
	Prior to Summer 2022		112.0	92.6	120.3	78.0	112.2		
	Prior to Summer 2023		1,174.3	1,066.0	1,348.8	935.7	1,230.5		
	Prior to Summer 2025		725.1	656.3	857.1	603.7	784.8		
	Total		2,011.4	1,814.9	2,326.2	1,617.4	2,127.5		

Notes

1. MW values are from the 2023 Load and Capacity Data Report.

2. 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 or the date in which the generator entered (or proposed to enter) Retired (R) or Mothball Outage (MO) or the date on which the generator entered ICAP Ineligible Forced Outage (IIFO).

3. Generator changed DEC peaker rule compliance plan as compared to the 2020 RNA and all STARs prior to 2021 Q3.

4. Long Island Power Authority (LIPA) has submitted notifications to the DEC per part 227-3 of the peaker rule stating that these units are needed for reliability allowing these units to operate until at least May 1, 2025. Due to the future nature of these units being operated only as designated by the operator as an emergency operating procedure the NYISO will continue to plan for these units be unavailable starting May 2023.

5. These units have indicated they will be out-of-service during the ozone season (May through September) in their compliance plans in response to the DEC peaker rule.

6. This unit was evaluated in a stand-alone generator deactivation assessment prior to the creation of the Short-Term Reliability Process.

7. Unit operating as a load modifier.

8. Central Hudson submitted notification to the DEC per part 227-3 of the peaker rule stating these units are needed for reliability. The most recent LTP update from Central Hudson notes the planned retirement of South Cairo and Coxsakie generators in December 2024. https://www.nyiso.com/documents/20142/26630522/Local-Transmission-Plan-2021.pdf/

9. On May 24, 2023 National Grid notified the New York State Public Service Commission that these units have been classified as black-start only units and are no longer subject to NYISO dispatch.

10. Unit no longer subject to NYISO dispatch and is used for local reliability only.

11. The unit did not deactivate as it performed testing to comply with the DEC peaker rule through 2025.

Generator Return-to-Service

There are no generators that have returned to service beyond those included in prior STARs. A list of generators that have returned to service included in prior STARs is provided in Appendix C.

Generator Additions

There are generation additions beyond those included in the 2022 RNA. Additionally, several planned generators have come into service in 2023. A list of generator additions, including updates to planned commercial operation dates as included in the 2022 RNA, is provided in Appendix C.

Demand Assumptions

The NYISO used the demand forecasts for this assessment consistent with the 2023 Gold Book incorporating the following load projects in the NYISO interconnection queue: Q#0580 – WNY STAMP, Q#0776 – Greenidge Load, Q#0849 – Somerset Load, Q#0850 – Cayuga Load, and Q#0979 – North Country Data Center (load increase), Q1536 – White Pine Phase I (Micron), and Q1446 – Massena Green Hydrogen (Air Products and Chemicals). The combined zonal totals for the large loads included in this assessment is shown in Figure 3 with additional details provided in Appendix C.

This assessment recognizes that there is uncertainty in the demand forecast driven by uncertainties in key assumptions such as population and economic growth, energy efficiency, the installation of behind-the-meter renewable energy resources, and electric vehicle adoption and charging patterns. These risks are considered in the transmission security margin calculations by incorporating the lower and higher bounds as a range of forecasted conditions during expected weather, specified in the Gold Book as the policy scenario forecasts. The lower and higher demand policy scenarios reflect achievement of policy targets through alternative pathways and assume the same weather factors as the baseline demand forecast. Figure 4 shows the range of baseline forecast along with the demand for heatwave and extreme heatwave conditions within the New York City locality. Figure 5 provides the same forecast information but for the entire New York area. The dominant policy driver in the early forecast years is energy efficiency, with significant state energy savings targets set through 2025 and 2030. Full achievement of these efficiency targets is significant enough to push the higher demand policy scenario below the baseline peak forecast for the NYCA over the first few study years.

The higher demand policy forecasts higher demand from the large loads in addition to higher demand from the current customer base (*i.e.,* core demand[12]). Currently, there is approximately 260 MW of the planned large loads installed within New York. In 2025, this amount is projected to increase to 764 MW

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[12] "Core" demand represents existing load and load growth associated with the current customer base.

with additional increases over time.

Figure 3: Status Changes Due to DEC Peaker Rule

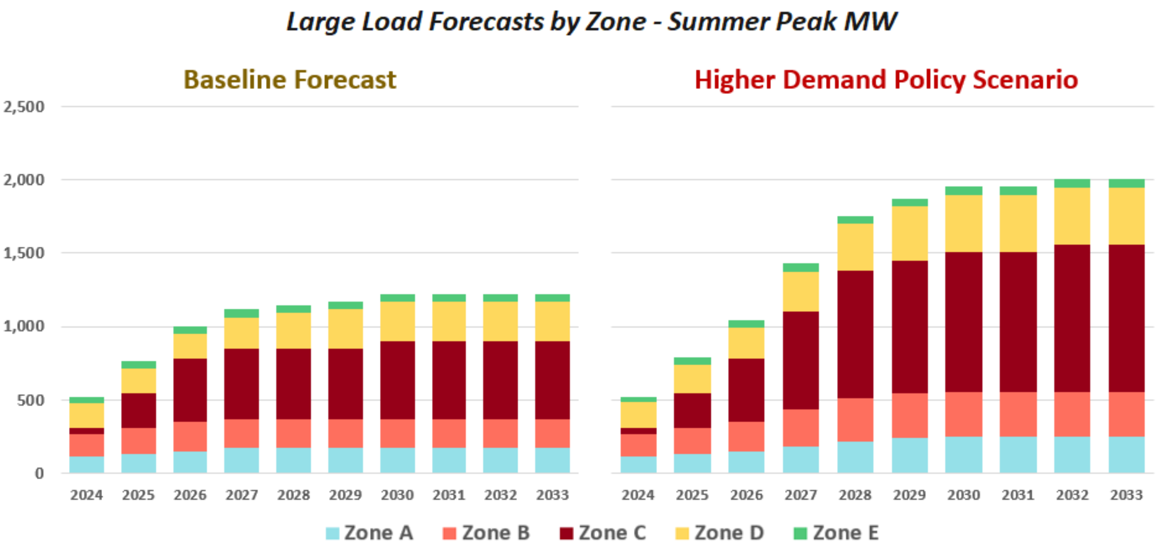


Figure 4: New York City Demand Forecasts

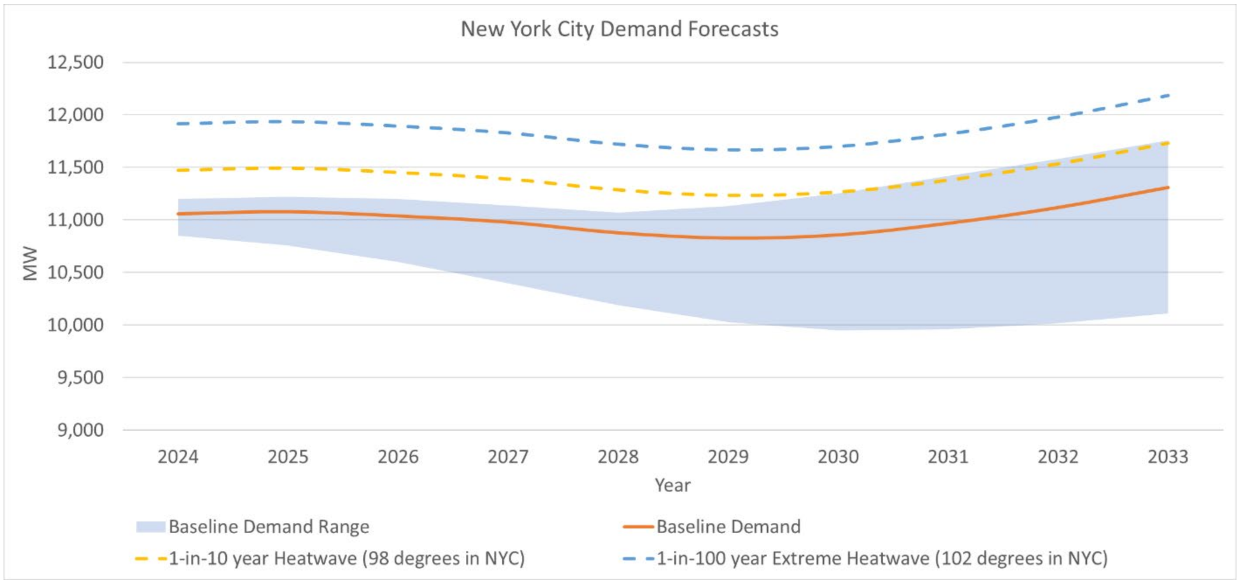
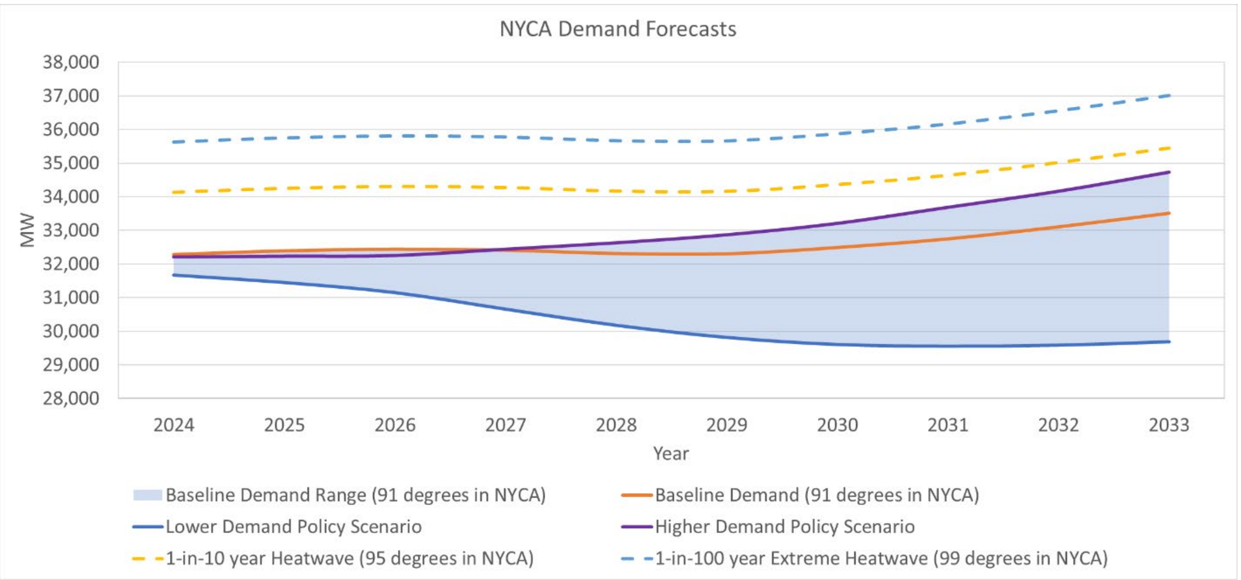


Figure 5: NYCA Demand Forecasts

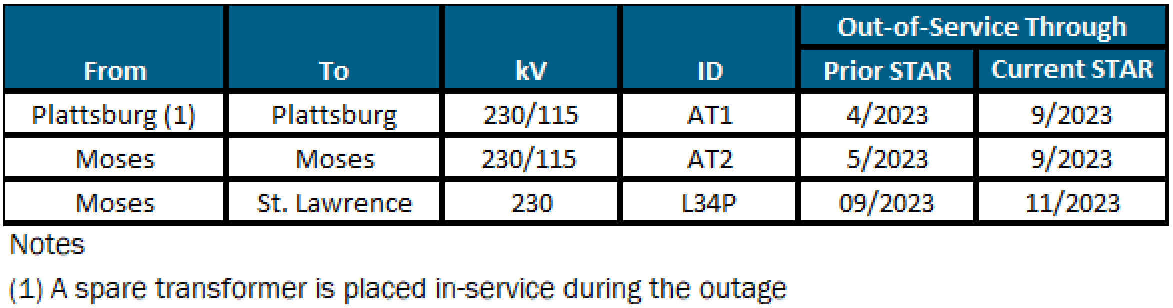


Transmission Assumptions

Existing Transmission

The transmission assumptions utilized in this assessment are similar to those used for the 2022 RNA. Compared to the prior STAR there are three outages with delayed return-to-service dates. Figure 6 shows the changes in existing transmission outage assumptions compared to the prior STAR.

Figure 6: Changes to Existing Transmission Facilities Modeled Out-of-Service



From	To	kV	ID	Out-of-Service Through	
				Prior STAR	Current STAR
Plattsburg (1)	Plattsburg	230/115	AT1	4/2023	9/2023
Moses	Moses	230/115	AT2	5/2023	9/2023
Moses	St. Lawrence	230	L34P	09/2023	11/2023

Notes
(1) A spare transformer is placed in-service during the outage

A complete list of existing transmission facilities that are modeled as out-of-service for this assessment is also provided in Appendix C.

Proposed Transmission

Compared to the 2022 RNA there are changes to assumed firm transmission facilities, as captured in Section 7 of the 2023 Gold Book. Details of the proposed transmission assumptions included in the RNA are provided in Appendix C.

Findings

Grid reliability is determined by assessing transmission security and resource adequacy. Transmission security is the ability of the electric system to withstand disturbances such as electric short circuits or unanticipated loss of system elements without involuntarily disconnecting firm load. Resource adequacy is the ability of electric systems to supply the aggregate electrical demand and energy requirements of customers, accounting for scheduled and reasonably expected unscheduled outages of system elements.

Starting with the 2022 RNA and included in subsequent STARs (including this STAR), enhancements to the application of reliability rules were employed for both transmission security and resource adequacy:

- For transmission security, to represent that not all generation will be available at any given time, a derating factor is applied to thermal units. Additionally, intermittent, weather dependent generation is dispatched according to its expected availability coincident with the represented system condition. The enhancements also include the ability to identify BPTF reliability needs in instances where the transmission security margin for a constrained area of the system is less than zero MW.
- For resource adequacy, to ensure that some level of operating reserves is maintained, the Emergency Operating Procedure (EOP) step will retain 350 MW of operating reserves at the time of a load shedding event.

As explained below, this assessment finds that reliability criteria would not be met for the BPTF throughout the five-year study period under the assumed and forecasted base case system conditions; however, the observed need in New York City is consistent with the 2023 Quarter 2 STAR.

Resource Adequacy Assessments

Resource adequacy is the ability of the electric system to supply the aggregate electrical demand and energy requirements of the firm load at all times, considering scheduled and reasonably expected unscheduled outages of system elements. The NYISO performs resource adequacy assessments on a probabilistic basis to capture the random nature of system element outages. If a system has sufficient transmission and generation, the probability of an unplanned disconnection of firm load is equal to or less than the system's standard, which is expressed as a loss of load expectation (LOLE). Consistent with the NPCC and NYSRC criterion, the New York State bulk power system is planned to meet an LOLE that, at any given point in time, is less than or equal to an involuntary firm load disconnection that is not more frequent than once in every 10 years, or 0.1 event days per year.

This assessment finds that the planned system through the study period meets the resource adequacy criterion. Details about the resource adequacy study assumptions are provided in Appendix D.

Transmission Security Assessments

Transmission security is the ability of the power system to withstand disturbances, such as electric short circuits or unanticipated loss of system elements, and continue to supply and deliver electricity. The analysis for the transmission security assessment is conducted in accordance with NERC Reliability Standards, NPCC Transmission Design Criteria, and the NYSRC Reliability Rules. Transmission security is assessed deterministically with potential disturbances being applied without concern for the likelihood of the disturbance in the assessment. These disturbances (single-element and multiple-element contingencies) are categorized as the design criteria contingencies, which are explicitly defined in the reliability criteria. The impacts resulting from applying these design criteria contingencies are assessed to determine whether thermal loading, voltage or stability violations will occur. In addition, the NYISO performs a short circuit analysis to determine if the system can clear faulted facilities reliably under short circuit conditions. The NYISO's "Guideline for Fault Current Assessment"[13] describes the methodology for that analysis.

Transmission security analysis includes the assessment of various combinations of credible system conditions intended to stress the system. As transmission security analysis is deterministic, these various credible combinations of system conditions are evaluated throughout the study period to identify reliability needs. Intermittent generation is represented based on expected output during the modeled system conditions.[14]

Transmission security margins are included in this assessment to identify plausible changes in conditions or assumptions that might adversely impact the reliability of the system. The transmission security margin is the ability to meet load plus losses and system reserve (*i.e.*, total capacity requirement) using NYCA generation, interchange, and including temperature-based generation derates (total resources). This assessment is performed using a deterministic approach through powerflow simulations combined with post-processing spreadsheet-based calculations. [15] For this evaluation, a BPTF reliability need is identified when the margin is less than zero under expected weather, normal transfer criteria. For the purposes of identifying reliability needs on the BPTF using transmission security margin calculations, thermal generation MW capability is considered available based on NERC five-year class averages for the

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[13] Attachment I of Transmission, Expansion, and Interconnection Manual.

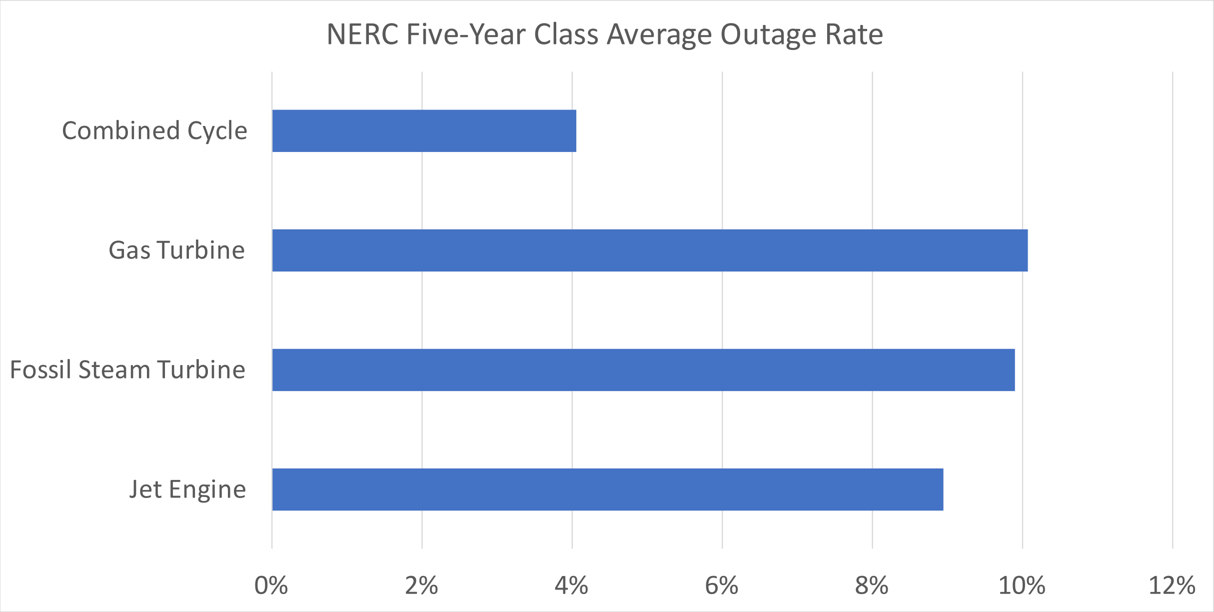
[14] The RNA assumptions matrix is posted under the July 1, 2022 TPAS/ESPWG meeting materials, which is available at here, and also in Appendix D.

[15] At its June 23, 2022, meeting, the NYISO Operating Committee approved revisions to the Reliability Planning Process Manual that reflect the use of transmission security margins and other enhancements.

relevant type of unit.[16] Derates for thermal generation are included due to the aging fleet without expected replacement, while the share of intermittent, weather dependent, generation is growing.

Figure 7 shows the NERC five-year class-average outage rate for combined cycle, gas turbine, fossil steam turbine, and jet engine generators. Figure 8 shows the impact of the thermal derates on the total resources available statewide, as well as the Lower Hudson Valley, New York City, and Long Island localities. Reductions in thermal derates over time are driven by the assumed generator deactivations in this assessment.

Figure 7: NERC Five-Year Class Average Outage Rate



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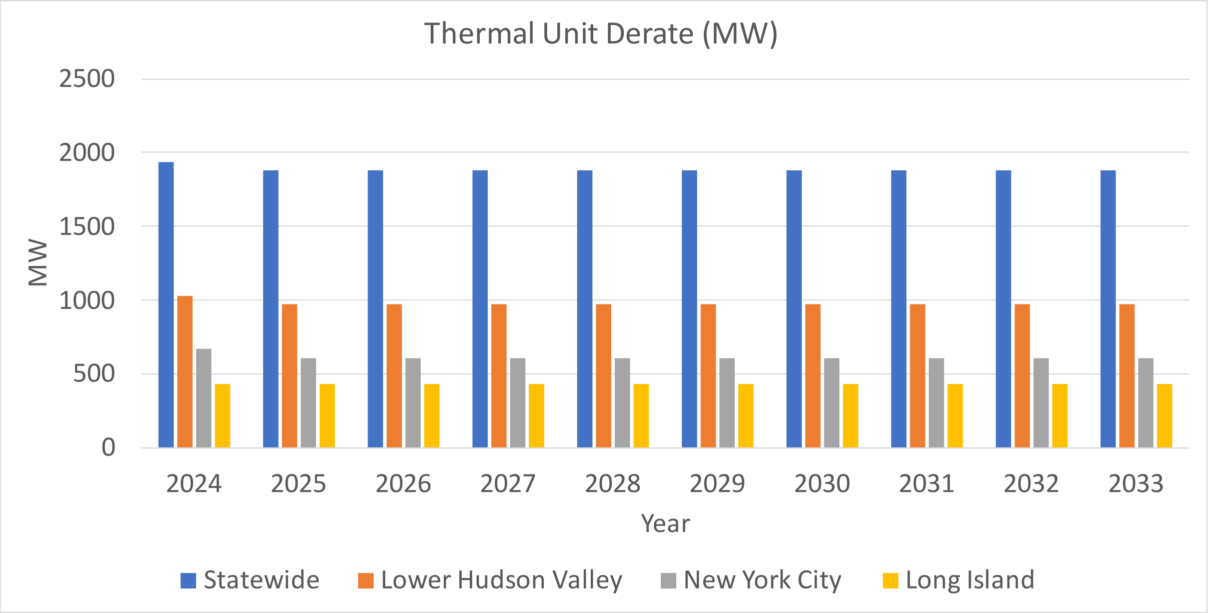
[16] The NERC five-year class average EFORd data is available here.

Figure 8: Thermal Unit Derate (MW) for New York



For the transmission security margin assessment, margins are evaluated for the statewide system margin, as well as Lower Hudson Valley, New York City, and Long Island localities. In this evaluation, a BPTF reliability need is identified when the margin is less than zero under expected weather, normal transfer criteria conditions. Additional details regarding the impact of heatwaves, cold snaps, and other system conditions are provided in Appendix E for informational purposes.

The NYISO performed a transmission security assessment of the BPTF and identified no new reliability need. Con Edison evaluated the impact of the Ravenswood 01 and Ravenswood 11 generators deactivation on its non-BPTF and found no reliability need.[17] National Grid evaluated the impact of the Western NY Wind generator deactivation and identified no reliability need. The NYISO reviewed and verified the analysis performed by both Con Edison and National Grid.

Steady State Assessment

In the NYISO's evaluation of the BPTF, thermal overloads are observed on the National Grid Clay-Woodard (#17) 115 kV transmission line (specifically the Clay-Euclid segment of the line). This issue was first observed in the 2021 Quarter 3 STAR.[18] At the October 1, 2021 joint ESPWG/TPAS meeting, National Grid presented an LTP update to install a 3% series reactor at the Woodard 115 kV substation on the Clay-

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[17] The 2022 Quarter 1 STAR evaluated the IIFO of these units. The 2022 Quarter 1 STAR did not identify a Generator Deactivation Reliability Need following the IIFO of these units.

[18] https://www.nyiso.com/documents/20142/16004172/2021-Q3-STAR-Report-vFinal2.pdf/

Woodard 115 kV line.[19] This series reactor is planned to be in service by December 31, 2023. As discussed in the 2021 Quarter 3 STAR, National Grid will utilize an interim operating procedure to address this overload until the permanent series reactor is placed in service. After incorporating National Grid's LTP update and described interim operating procedure, the NYISO did not observe any thermal criteria violations.

A potential steady-state transmission security violation was identified for the study period under expected winter peak conditions. No other steady-state transmission security related needs were observed under other system conditions, including daytime light load conditions, which captured a high penetration of behind-the-meter solar resources.

The identified transmission security issue is a low-voltage violation at the Porter 115 kV bus following various contingency combinations resulting in the loss of both Edic-to-Porter 345/115 kV transformers under expected winter peak conditions. The low-voltage violation at the Porter 115 kV bus is observed starting in winter 2025-26 due to (1) the retirement of the two Porter 230/115 kV buses, which is planned to occur that winter with the Smart Path Connect Project (interconnection queue #Q1125), and (2) the increasing demand in Zone E observed in winter. The evaluation did not observe the low-voltage violation at the Porter 115 kV bus under summer peak demand conditions because the demand forecast for Zone E is higher in winter than in summer. Since the low-voltage violation that is observed at the Porter 115 kV bus occur due to the planned changes with the interconnection of the Smart Path Connect Project (Q#1125), this issue will be addressed through the NYISO's interconnection process.[20]

Dynamics Assessment

No BPTF dynamic criteria violations were observed for this assessment. Additionally, no dynamic stability related non-BPTF generator deactivation reliability needs were observed for this assessment.

Short Circuit Assessment

No BPTF short-circuit criteria violations were observed in this assessment. Additionally, no short-circuit non-BPTF generator deactivation reliability needs were observed in this assessment.

Transmission Security Margin Assessment

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[19] https://www.nyiso.com/documents/20142/25058472/03_National%20Grid%20NY%20Local%20Transmission%20Plan%20Update%2010-2021.pdf/

[20] On March 2, 2023, the NYISO reported to TPAS that a developer-initiated modification request for the Q#1125 project is not material and, therefore, permitted under the Transmission Interconnection Procedures (here). The requested modifications are intended to address low-voltage violations due to the proposed interconnection of the project, which include: (1) a hybrid break (*e.g.*, two breakers in-series in a single breaker position) at the new bay in the Edic 345 kV of the project substation to accommodate the project and (2) only partially retiring the Porter 230 kV substation instead of retiring the entire substation (*e.g.*, keeping the existing Edic 345/230 kV transformer, Edic-Porter 230 kV transmission line (#17), and two Porter 230/115 kV transformers).

For the transmission security margin assessment, "tipping points" are evaluated for the statewide system margin and for the Lower Hudson Valley, New York City, and Long Island localities. In the Lower Hudson Valley and Long Island localities, the BPTF system is designed to remain reliable in the event of two non-simultaneous outages (N-1-1). In the Con Edison service territory, the 345 kV transmission system and specific portions of the 138 kV transmission system are designed to remain reliable and return to normal ratings after the occurrence of two non-simultaneous outages (N-1-1-0). Figure 6 provides a summary of the margins for normal transfer criteria at the higher bound of the range of forecasted conditions during expected weather. While the margins are sufficient statewide (as well as in the Lower Hudson Valley and Long Island localities), the margin within New York City, as observed in the 2023 Quarter 2 STAR, remains deficient by as much as 446 MW for a duration of nine hours on the peak day during expected weather conditions when accounting for forecasted economic growth and policy-driven increases in demand. With the planned addition of CHPE, there is an increase in the observed margin beginning summer 2026. The margin changes in each year between 2026 and 2033 are due to changes in the demand forecast. By 2033, the margin within New York City reduces to just under 200 MW.

In consideration of the advisory forecast that the NYISO presented to stakeholders at the September 28th Load Forecasting Task Force meeting, there is a potential reduction of only 20 MW to the higher bound of the range of forecasted conditions during expected weather for New York City.[21] This potential reduction does not eliminate the need and has a negligible impact of the findings in the 2023 Quarter 2 STAR.

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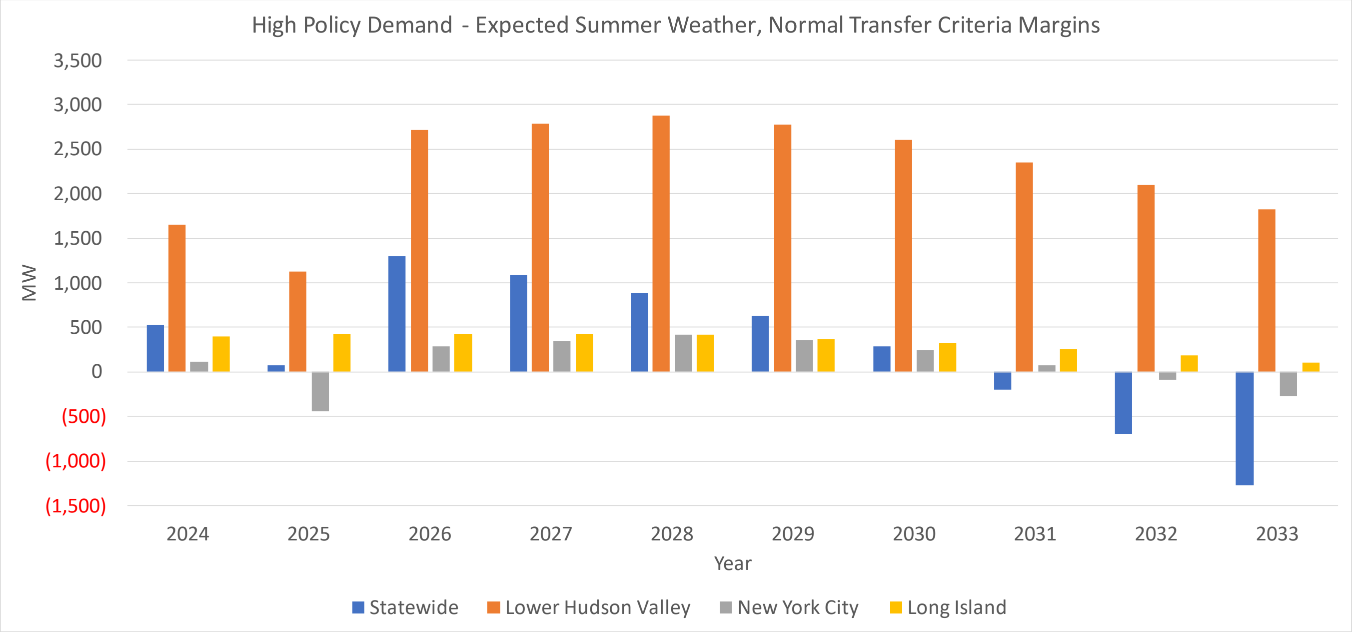
[21] NYSRC Fall Forecast Update: Updated 2023 Weather Normalization & Proposed 2024 IRM Forecast, LFTF, September 28, 2023 (here)

Figure 9: Summary of Expected Summer Weather, Normal Transfer Criteria Margins

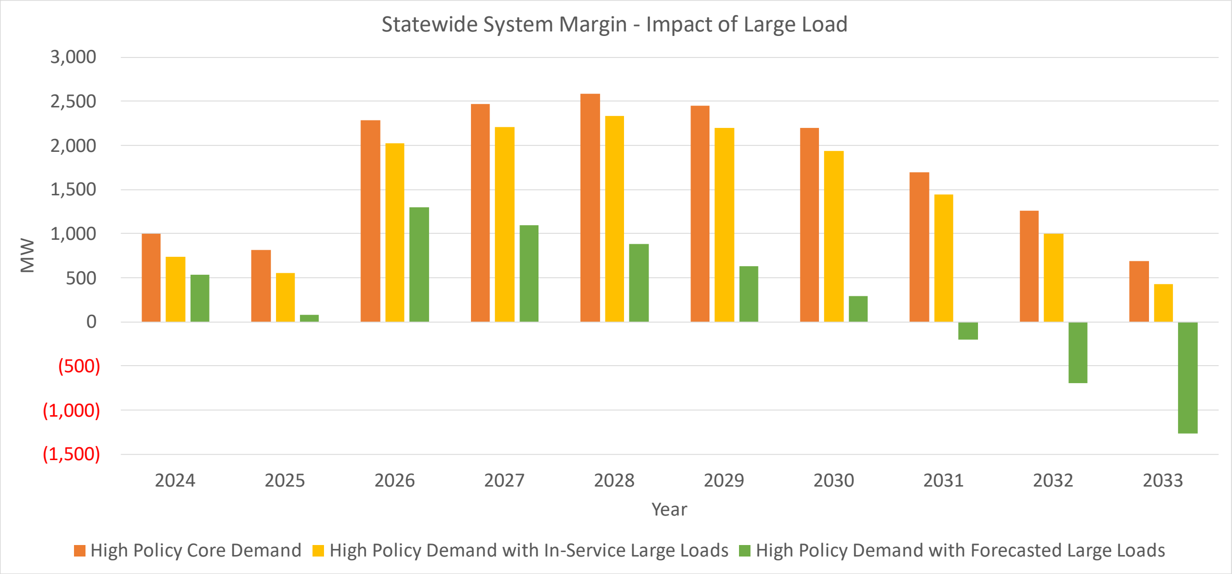


Accounting for uncertainties in key demand forecast assumptions, the higher bound of expected demand under baseline weather conditions (95 degrees Fahrenheit) in 2025 results in a deficiency of 446 MW over 9 hours. The deficiency would be significantly greater if New York City experiences a heatwave (98 degrees Fahrenheit) or an extreme heatwave (102 degrees Fahrenheit). The deficient margin is primarily due to the increased demand forecasts within New York City combined with the planned unavailability of simple-cycle combustion turbines to comply with the DEC's Peaker Rule in 2025. Prior reliability assessments, including the 2022 RNA and subsequent STARs, identified that the reliability margins within New York City would not be sufficient if, among other reasons, the forecasted demand increased by as little as 60 MW in 2025. When comparing the baseline summer coincident peak demand forecast found for New York City (Zone J) in the 2022 Gold Book to that included in the 2023 Gold Book, the forecast increased by 294 MW. Additionally, decreased summer capabilities of generators within the area and increased generator forced outage rates also contribute to the deficiency.

A key driver to the narrowing of the statewide reliability margin is the impact from large load projects. A significant assumption update in this Quarter 3 STAR is the inclusion of additional large load projects primarily in western and central New York, many of which are currently undergoing a load interconnection study. Figure 3 shows the zonal forecasts of the included large loads in this assessment. Currently, there is approximately 260 MW of large loads installed within New York. In 2025, this amount is projected to increase to 764 MW. This significant load increase reduces the statewide margin to less than 100 MW in 2025 during normal operations for expected weather. The rapid growth of large load projects poses a risk to the future reliability of the New York grid if it is not matched with the equivalent addition of new resources.

While there is potential for a deficient statewide system margin in 2025, the primary driver is the New York City deficiency already identified in the 2023 Quarter 2 STAR. Depending on the solution to the New York City reliability need, the potential statewide deficiency may be mitigated. For this reason and the uncertainty of the large load projects, the NYISO is not identifying a new reliability need in this Quarter 3 STAR. The NYISO will continue to track the status of these large loads and assess the impact of the solutions to the need identified to the 2023 Quarter 2 STAR through the quarterly process.

Figure 10: Impact of Large Loads on Statewide System Margin



Both the New York City transmission security margin and statewide system margin improve in 2026 with the anticipated addition of the Champlain Hudson Power Express (CHPE) connection from Hydro Quebec to New York City. However, the margin gradually erodes following CHPE's addition as the baseline demand grows throughout New York (see Figure 11 and Figure 12).

Beyond 2025, the reliability margins within New York City may also not be sufficient if (1) the CHPE project experiences a significant delay, or (2) additional power plants become unavailable, or (3) demand significantly exceeds current forecasts. The reliability margins continue to be deficient for the ten-year planning horizon without the CHPE project in service or other offsetting changes or solutions. In addition, while CHPE will contribute to reliability in the summer, the facility is not expected to provide any capacity in the winter. Depending on the solutions received in response to the NYISO's solicitation for solutions to address this reliability need, some generation affected by DEC's Peaker Rule may need to remain in service until CHPE or other permanent solutions are completed to maintain a reliable grid.

Figure 11: New York City Transmission Security Margins for Expected Weather (With and Without CHPE)

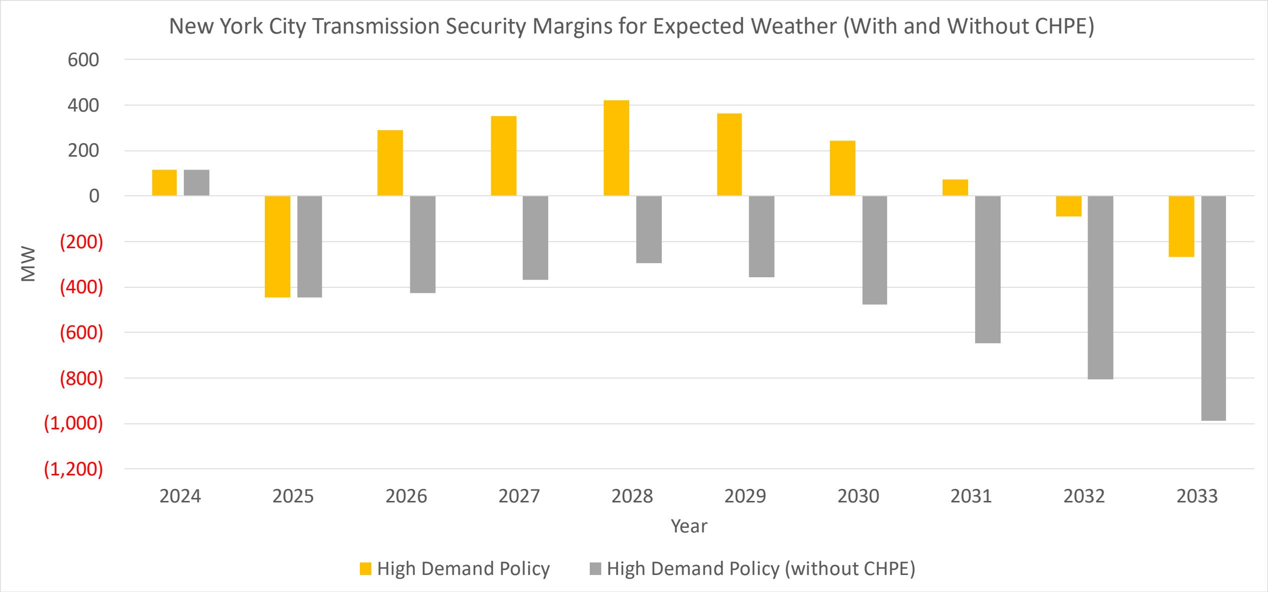
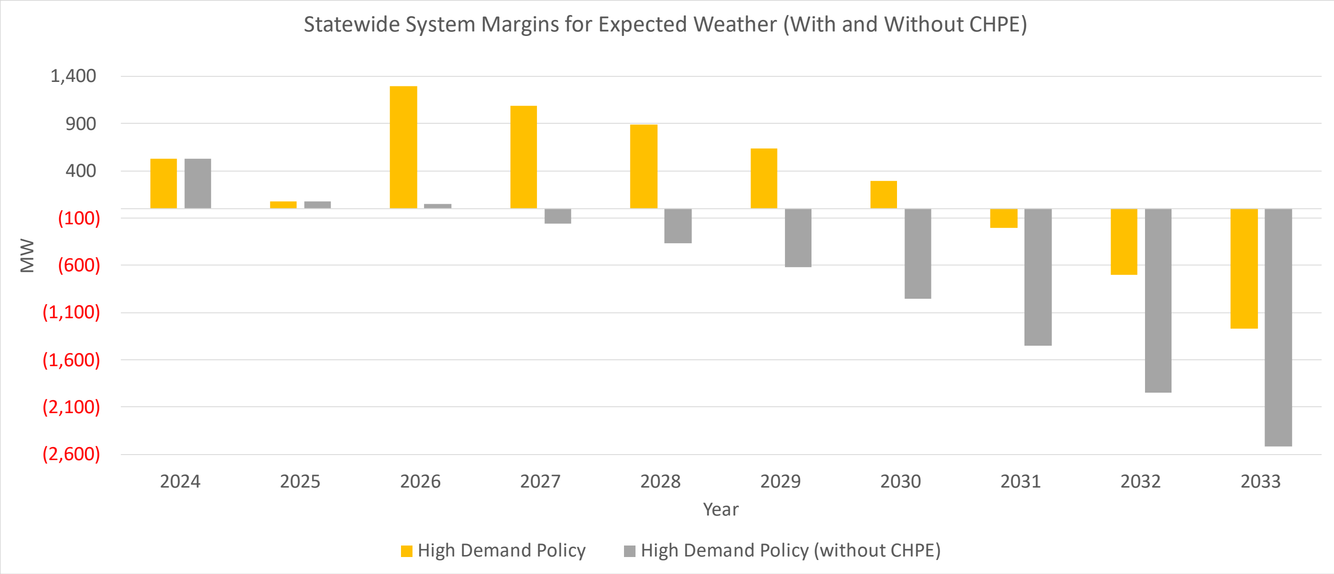


Figure 12: Statewide System Margins for Expected Weather (With and Without CHPE)



Potential heatwaves of various degrees also pose risks throughout the next ten years, especially in 2025, with a deficiency of 555 MW during a heatwave. As shown in Figure 13, with the CHPE project in service by 2026 the transmission security margin within New York City under a heatwave is sufficient through 2032. By 2033, under a heatwave the margin is again deficient by 75 MW. Under an extreme heatwave the margin is deficient for all years with the largest deficiency observed in 2025 at 1,060 MW.

For the statewide system margin under a heatwave, the margins are deficient in all years except 2028 and 2029 with the extreme system margin deficient for all years. In addition, while CHPE will contribute to reliability in the summer, the facility is not expected to provide any capacity in the winter.

Figure 13: New York City Transmission Security Margin for Heatwaves and Extreme Heatwaves

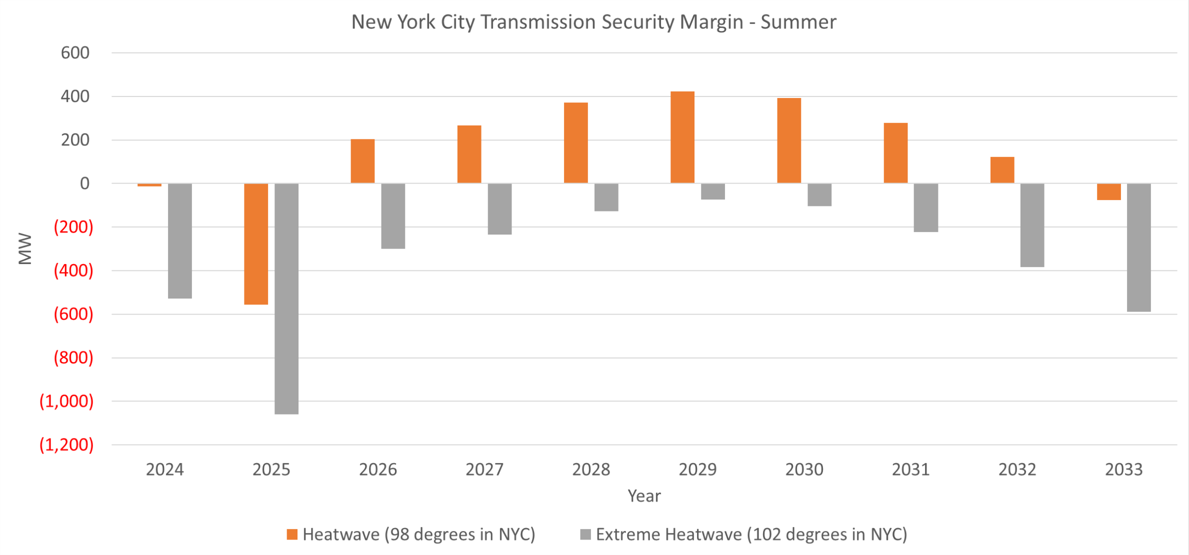
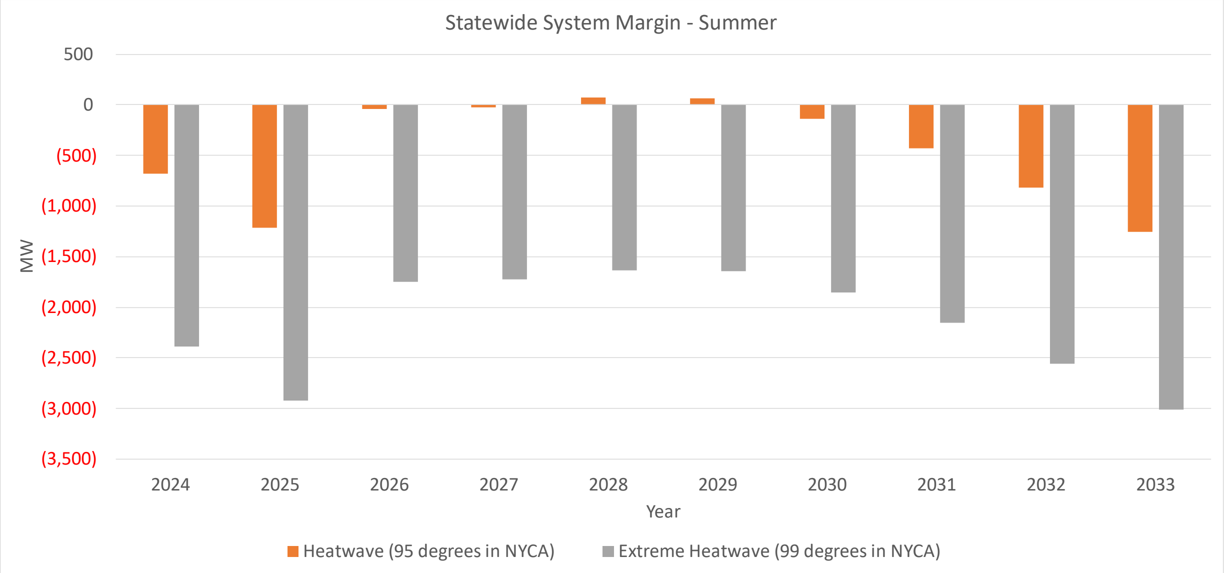


Figure 14: Statewide System Margin for Heatwaves and Extreme Heatwaves



Additional details regarding the margin calculations are provided in Appendix E. Appendix E also shows impact on the margin of heatwaves, cold snaps, plant outages, and other system conditions for informational purposes.

Additional Transmission Owner Local Criteria Assessments (For Information Only)

As described in the following sections, Central Hudson identified transmission security issues in their service territories on their non-BPTF systems, as recorded in prior STAR reports. The local non-BPTF criteria violations identified below are not Generator Deactivation Reliability Needs and are provided for information only.[22]

Central Hudson Assessment

Central Hudson currently owns and operates two 25 MVA (nameplate) combustion turbines that are subject to DEC's Peaker Rule, namely the Coxsackie and South Cairo generators. Both 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, first identified in the 2020 Quarter 3 STAR, arise on non-BPTF facilities beginning in 2023 and continuing through 2025. At the October 25, 2021, joint ESPWG/TPAS meeting, Central Hudson updated its LTP to resolve the Westerlo transmission loop voltage issue.[23] The LTP includes the installation of a STATCOM and capacitor bank at the South Cairo and Freehold substations with the facilities to be in service by December 2024. On June 21, 2023, a notice of intent to retire the South Cairo and Coxsakie generators was submitted to the New York State Public Service Commission (PSC).[24] On October 11, 2023, the completed generator deactivation notice for the South Cairo generator was posted on the NYISO website.[25] The retirement of this generator will be evaluated in the 2023 Quarter 4 STAR.

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[22] *See* OATT §§ 38.1 (definition of Generator Deactivation Reliability Need) 38.2 (scope of Short-Term Reliability Process), 38.10.1.2 (other reliability needs that arise on non-BPTFs may be reported in a STAR for informational purposes).

[23] https://www.nyiso.com/documents/20142/25620932/02 Central Hudson Local Transmission Plan.pdf/

[24] The notice of intent to retire the South Cairo and Coxsackie generators is provided on the PSC website (here).

[25] Posting of completed generator deactivation notice South Cairo (here).

Conclusions and Determination

Consistent with the analysis and explanations above, this assessment finds the planned BPTF system through the study period meets applicable reliability criteria, other than the reliability need previously identified in the 2023 Quarter 2 STAR. This assessment does not identify any Generator Deactivation Reliability Need following the retirement of Western NY Wind, Ravenswood 01, and Ravenswood 11. As such, Western New York Wind Corp. and Helix Ravenswood, LLC have satisfied the applicable requirements under the NYISO's Short-Term Reliability Process to retire its unit on or after the date indicated in tis generator deactivation notice.[26]

On October 3, 2023, the NYISO received proposed solutions to the New York City need identified in the 2023 Quarter 2 STAR and is in the process of assessing the proposals. If proposed solutions, either individually or in combination, are not viable or sufficient to meet the identified Short-Term Reliability Need, interim solutions must be in place to keep the grid reliable. One potential outcome could include relying on generators that are subject to the DEC's Peaker Rule to remain in operation until a permanent solution is in place. The Peaker Rule anticipated this scenario when it authorized the NYISO to designate certain units to remain in operation beyond 2025 on an as-needed basis for reliability. Based on findings from its Short-Term Reliability Process, the NYISO may designate certain units, in sufficient quantity, to remain in operation for an additional two years (until May 1, 2027) with the potential of an additional two-year extension (to May 1, 2029) if a permanent solution that is needed to maintain reliability has been identified but is not yet online. The NYISO would only temporarily retain peakers as a last resort approach if it does not expect solutions to be in place by the time the identified reliability need is expected in 2025.

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[26] Western New York Wind Corp. and Helix Ravenswood, LLC must complete all required NYISO administrative processes and procedures prior to the retirement of their respective facilities. See Technical Bulletin 185 Generator Deactivation Process and Technical Bulletin 250 Short-Term Reliability Process. The NYISO's determination in this Short-Term Reliability Process does not relieve either Western NY Wind Corp. or Helix Ravenswood, LLC of any obligations it has with respect to its participation in the NYISO markets. If Western NY Wind Corp. or Helix Ravenswood LLC rescind their respective Generator Deactivation Notice or do not retire within 730 days of July 15, 2023, then it will be required to submit a new Generator Deactivation Notice in order to deactivate the Generator(s) and will be required to repay study costs in accordance with Section 38.14 of the OATT.

Appendix A: List of Short-Term Reliability Needs

The 2023 Quarter 2 STAR found a reliability need beginning in summer 2025 within New York City primarily driven by a combination of forecasted increases in peak demand and the assumed unavailability of certain generation in New York City affected by the "Peaker Rule."[27] Specifically, the 2023 Q2 STAR found that the New York City zone is deficient by as much as 446 MW for a duration of nine hours on the peak day during expected weather conditions when accounting for forecasted economic growth and policy-driven increases in demand. The reliability need is based on a deficient transmission security margin in the New York City locality that accounts for expected generator availability, transmission limitations, and updated demand forecasts using data published in the 2023 Load & Capacity Data Report ("Gold Book").

Appendix B: Short-Term Reliability Process Solution List

The Short-Term Reliability Process solution list and the status of these solutions is posted on the NYISO website at the following location:

https://www.nyiso.com/documents/20142/19556596/SolutionStatus-03092021.pdf/

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[27] In 2019, the New York State Department of Environmental Conservation adopted a regulation to limit nitrogen oxides (NOx) emissions from simple-cycle combustion turbines, referred to as the "Peaker Rule" (https://www.dec.ny.gov/regulations/116131.html)

Appendix C: Summary of Study Assumptions

This assessment used the major assumptions included in the 2022 RNA, with the key updates as noted below. Consistent with the NYISO's obligations under its tariffs, the NYISO provided information to stakeholders on the modeling assumptions employed in this assessment. Details regarding the study assumptions were reviewed with stakeholders at the July 25, 2023, joint Electric System Planning Working Group ("ESPWG")/Transmission Planning Advisory Subcommittee ("TPAS") meeting. The meeting materials are posted on the NYISO's website.[28] The figures below summarize the changes to generation, load, and transmission.

Generation Assumptions

In the 2022 RNA assumptions matrix for transmission security, the modeling assumption for run-of-river hydro generation is fixed at their 5-year average based on GADS data (roughly 50% of the capability stated in the Gold Book). The NYISO reviewed this assumption and found that this assumption remains valid as an annual value. However, the derating factor for these hydro resources based on production during the top 20 peak load hours provides more granular derating factors of 55.44% for summer peak and 40.57% for winter peak. The more granular information was used in this STAR.

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[28] Short-Term Assessment of Reliability: 2023 Q3 Key Study Assumptions, ESPWG/TPAS/LFTF, July 25, 2023 (here)

Figure 15: Completed Generator Deactivations

Owner/ Operator	Plant Name	Zone	Nameplate (MW)	CRIS (MW)		Capability (MW)		Status	Deactivation Date (2)	STAR Evaluation (3)
				Summer	Winter	Summer	Winter			
International Paper Company	Ticonderoga (1)	F	9.0	7.6	7.5	9.5	9.8	I	5/1/2017	-
Helix Ravenswood, LLC	Ravenswood 2-4	J	42.9	39.8	50.6	30.7	41.6	I	4/1/2018	-
	Ravenswood 3-1	J	42.9	40.5	51.5	31.9	40.8	I	4/1/2018	-
	Ravenswood 3-2	J	42.9	38.1	48.5	29.4	40.3	I	4/1/2018	-
	Ravenswood 3-4	J	42.9	35.8	45.5	31.2	40.8	I	4/1/2018	-
Exelon Generation Company LLC	Monroe Livingston	B	2.4	2.4	2.4	2.4	2.4	R	9/1/2019	-
Innovative Energy Systems, Inc.	Steuben County LF	C	3.2	3.2	3.2	3.2	3.2	R	9/1/2019	-
Consolidated Edison Co. of NY, Inc	Hudson Ave 4	J	16.3	13.9	18.2	14.0	16.3	R	9/10/2019	-
New York State Elec. & Gas Corp.	Auburn - State St	C	7.4	5.8	6.2	4.1	7.3	R	10/1/2019	-
Somerset Operating Company, LLC	Somerset	A	655.1	686.5	686.5	676.4	684.4	R	3/12/2020	-
Entergy Nuclear Power Marketing, LLC	Indian Point 2	H	1,299.0	1,026.5	1,026.5	1,011.5	1,029.4	R	4/30/2020	-
Cayuga Operating Company, LLC	Cayuga 1	C	155.3	154.1	154.1	151.0	152.0	R	6/4/2020	-
Entergy Nuclear Power Marketing, LLC	Indian Point 3	H	1,012.0	1,040.4	1,040.4	1,036.3	1,038.3	R	4/30/2021	-
Helix Ravenswood, LLC	Ravenswood GT 11	J	25.0	20.2	25.7	16.1	22.4	I	12/1/2021	2022 Q1
Helix Ravenswood, LLC	Ravenswood GT 1	J	18.6	8.8	11.5	7.7	11.1	I	1/1/2022	2022 Q1
Exelon Generation Company LLC	Madison County LF	E	1.6	1.6	1.6	1.6	1.6	I	4/1/2022	2022 Q2
Nassau Energy, LLC	Trigen CC	K	55.0	51.6	60.1	38.5	51.0	R	7/15/2022	2022 Q2
Consolidated Edison Co. of NY, Inc.	Hudson Ave 3	J	16.3	16.0	20.9	12.3	15.6	R	11/1/2022	2022 Q2
Consolidated Edison Co. of NY, Inc.	Hudson Ave 5	J	16.3	15.1	19.7	15.3	18.6	R	11/1/2022	2022 Q2
Astoria Generating Company, L.P.	Gowanus 1-1 through 1-8	J	160.0	138.7	181.1	133.1	182.2	R	11/1/2022	2022 Q2
Astoria Generating Company, L.P.	Gowanus 4-1 through 4-8	J	160.0	140.1	182.9	138.8	183.4	R	11/1/2022	2022 Q2
NRG Power Marketing LLC	Astoria GT 2-1	J	46.5	41.2	50.7	34.9	46.5	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 2-2	J	46.5	42.4	52.2	34.3	45.6	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 2-3	J	46.5	41.2	50.7	36.3	46.7	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 2-4	J	46.5	41.0	50.5	32.5	45.4	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 3-1	J	46.5	41.2	50.7	34.6	45.0	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 3-2	J	46.5	43.5	53.5	35.7	45.3	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 3-3	J	46.5	43.0	52.9	33.9	44.6	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 3-4	J	46.5	43.0	52.9	34.9	45.5	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 4-1	J	46.5	42.6	52.4	33.6	43.8	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 4-2	J	46.5	41.4	51.0	34.3	44.3	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 4-3	J	46.5	41.1	50.6	35.4	46.4	R	5/1/2023	2022 Q2
NRG Power Marketing LLC	Astoria GT 4-4	J	46.5	42.8	52.7	35.2	44.1	R	5/1/2023	2022 Q2
Helix Ravenswood, LLC	Ravenswood 10	J	25.0	21.2	27.0	16.1	20.3	R	5/1/2023	2022 Q3
		Total	4,367.1	4,012.3	4,292.4	3,826.7	4,156.0			

Notes

(1) Part of SCR program

(2) This table only includes units that have entered into IIFO or have completed the generator deactivation process.

(3) "-" denotes that the generator deactivation was assessed prior to the creation of the Short-Term Reliability Process

Figure 16: Proposed Generator Deactivations

Owner/ Operator	Plant Name (1)	Zone	Nameplate (MW)	CRIS (MW)		Capability (MW)		Status	Deactivation date (2)	STAR Evaluation
				Summer	Winter	Summer	Winter			
Consolidated Edison Co. of NY, Inc.	74 St. GT 1 & 2	J	37	39.1	49.2	39.3	45.2	R	5/1/2023	2022 Q2
Eastern Generation, LLC	Astoria GT 01	J	16	15.7	20.5	13.6	19.0	R	5/1/2023	2022 Q4
		Total	53	54.8	69.7	52.9	64.2			

Notes

(1) This table includes units that have proposed to Retire or enter Mothball Outage and have a completed generator deactivation notice but have yet to complete

(2) Date in which the generator proposed Retire (R) or enter Mothball Outage (MO)

Figure 17: Generator Additions

NYISO Interconnection Queue #	Project Name/(Owner)	Zone	Point of Interconnection	Type	COD or I/S Date	Summer Peak MW	Notes
758	Independence GS1 to GS4 {Dynegy Marketing and Trade, LLC)	C	Scriba 345 kV	Gas	I/S	9.0	3
396	Baron Winds (Baron Winds, LLC)	C	Hillside - Meyer 230kV	W	I/S	238.4	2, 4
422	Eight Point Wind Energy Center (NextEra Energy Resources, LLC)	C	Bennett 115kV	W	I/S	101.8	2
775	Puckett Solar (Puckett Solar, LLC)	C	Chenango Forks Substation 34.5kV	S	I/S	20	1
731	Branscomb Solar (Branscomb Solar, LLC)	F	Battenkill - Eastover 115kV	S	I/S	20	1
748	Regan Solar (Regan Solar, LLC)	F	Market Hill - Johnstown 69kV	S	I/S	20	1
678	Calverton Solar Energy Center (LI Solar Generation, LLC)	K	Edwards Substation 138kV	S	I/S	22.9	2
769	North Country Energy Storage (New York Power Authority)	D	Willis 115kV	ES	I/S	20	
768	Janis Solar (Janis Solar LLC)	C	Willet 34.5kV	S	I/S	20	1
682	Grissom Solar (Grissom Solar, LLC)	F	Ephratah - Florida 115kV	S	I/S	20	1
531	Number 3 Wind Energy (Invenergy Wind Development LLC)	E	Taylorville - Boonville 115kV	W	I/S	103.9	2
759	KCE NY6	A	Gardenville - Bethlehem Steel Wind 115kV	ES	I/S	20	1
730	Darby Solar (Darby Solar, LLC)	F	Mohican - Schaghticoke 115kV	S	I/S	20	1
670	Skyline Solar (SunEast Skyline Solar LLC)	E	Campus Rd - Clinton 46kV	S	04/2022	20	1
807	Hilltop Solar (SunEast Hilltop Solar LLC)	F	Eastover - Schaghticoke 115kV	S	07/2022	20	
734	Ticonderoga Solar (ELP Ticonderoga Solar LLC)	F	ELP Ticonderoga Solar LLC	S	08/2022	20	1
735	ELP Stillwater Solar (ELP Stillwater Solar LLC)	F	Luther Forest - Mohican 115kV	S	09/2022	20	
666	Martin Solar (Martin Solar LLC)	A	Arcade - Five Mile 115kV	S	10/2022	20	1

NYISO Interconnection Queue #	Project Name/(Owner)	Zone	Point of Interconnection	Type	COD or I/S Date	Summer Peak MW	Notes
667	Bakerstand Solar (Bakerstand Solar LLC)	A	Machias - Maplehurst 34.5kV	S	10/2022	20	1
579	Bluestone Wind (Bluestone Wind, LLC)	E	Afton - Stilesville 115kV	W	10/2022	111.8	2
565	Tayandenega Solar (Tayandenega Solar, LLC)	F	St. Johnsville - Inghams 115kV	S	10/2022	20	1
505	Ball Hill Wind (Ball Hill Wind Energy, LLC)	A	Dunkirk - Gardenville 230kV	W	11/2022	100.0	2
721	Excelsior Energy Center (Excelsior Energy Center, LLC)	B	N. Rochester - Niagara 345 kV	S	11/2022	280.0	2
618	High River Solar (High River Energy Center, LLC)	F	Inghams - Rotterdam 115kV	S	11/2022	90.0	2
619	East Point Solar (East Point Energy Center, LLC)	F	Cobleskill - Marshville 69kV	S	11/2022	50.0	2
564	Rock District Solar (Rock District Solar, LLC)	F	Sharon - Cobleskill 69kV	S	12/2022	20	1
570	Albany County 1 (Hecate Energy Albany 1 LLC)	F	Long Lane - Lafarge 115kV	S	12/2022	20	1
598	Albany County 2 (Hecate Energy Albany 2 LLC)	F	Long Lane - Lafarge 115kV	S	12/2022	20	1
638	Pattersonville (Pattersonville Solar Facility, LLC)	F	Rotterdam - Meco 115kV	S	12/2022	20	1
572	Greene County 1 (Hecate Energy Greene 1 LLC)	G	Coxsackie - North Catskill 69kV	S	01/2023	20	1
573	Greene County 2 (Hecate Energy Greene 2 LLC)	G	Coxsackie Substation 13.8kV	S	03/2023	10	1
592	Niagara Solar (Duke Energy Renewables Solar, LLC)	B	Bennington 34.5kV Substation	S	05/2023	20	
584	Dog Corners Solar (SED NY Holdings LLC)	C	Aurora Substation 34.5kV	S	05/2023	20	1
590	Scipio Solar (Duke Energy Renewables Solar, LLC)	C	Scipio 34.5kV Substation	S	05/2023	18	
545	Sky High Solar (Sky High Solar, LLC)	C	Tilden -Tully Center 115kV	S	06/2023	20	1
586	Watkins Road Solar (SED NY Holdings LLC)	E	Watkins Rd - Ilion 115kV	S	06/2023	20	1
581	Hills Solar (SunEast Hills Solar LLC)	E	Fairfield - Inghams 115kV	S	08/2023	20	

NYISO Interconnection Queue #	Project Name/(Owner)	Zone	Point of Interconnection	Type	COD or I/S Date	Summer Peak MW	Notes
612	South Fork Wind Farm (South Fork Wind, LLC)	K	East Hampton 69kV	OSW	08/2023	96.0	2
695	South Fork Wind Farm II (South Fork Wind, LLC)	K	East Hampton 69kV	OSW	08/2023	40.0	2
637	Flint Mine Solar (Flint Mine Solar LLC)	G	LaFarge - Pleasant Valley 115kV, Feura Bush - North Catskill 115kV	S	09/2023	100.0	2
848	Fairway Solar (SunEast Fairway Solar LLC.)	E	McIntyre - Colton 115kV	S	10/2023	20	
617	Watkins Glen Solar Watkins Glen Energy Center, LLC	C	Bath - Montour Falls 115kV	S	11/2023	50.0	2
720	Trelina Solar Energy Center (Trelina Solar Energy Center, LLC)	C	Border City - Station 168 115 KV	S	11/2023	80.0	2
855	NY13 Solar (Bald Mountain Solar LLC)	F	Mohican - Schaghticoke 115kV	S	11/2023	20	
495	Mohawk Solar (Mohawk Solar LLC)	F	St. Johnsville - Marshville 115kV	W	11/2024	90.5	2
706	High Bridge Wind (High Brigde Wind, LLC)	E	E. Norwich - Jennison 115kV	W	11/2023	100.8	2
591	Highview Solar (SunEast Highview Solar LLC)	C	South Perry 34.5kV	S	12/2024	20.0	2
828	Valley Solar (SunEast Valley Solar LLC)	C	Owego 34.5kV Substation	S	11/2024	20.0	2
832	CS Hawthorn Solar (Granada Solar, LLC)	F	North Troy - Hoosick 115kV	S	02/2024	20.0	2
833	Dolan Solar (Dolan Solar, LLC)	F	Battenkill - Mohican 115kV	S	09/2023	20.0	2
629	Silver Lake Solar (Silver Lake Solar, LLC)	C	South Perry 34.5kV	S	11/2024	24.9	2

Notes

(1) Only these proposed small generators obtained Capacity Resource Interconnection Service (CRIS) and therefore are modeled for the resource adequacy Base Cases.

(2) All proposed large generators obtained or are assumed to obtain both Energy Resource Interconnection Service (ERIS) and CRIS and are modeled both in transmission security and resource adequacy Base Cases, unless otherwise noted as "ERIS only," in which case they are modeled only for the transmission security assessments.

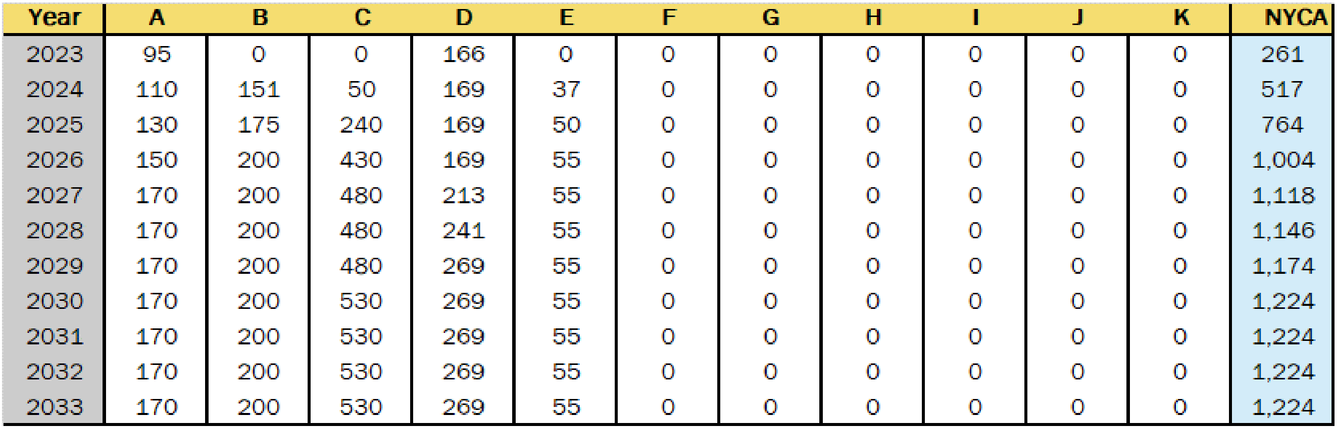
(3) Large generator, ERIS only

(4) Only Part 1 of this generator is in-service (119.2 MW). The remaining MW is planned to be in-service by December 2023.

Demand Assumptions

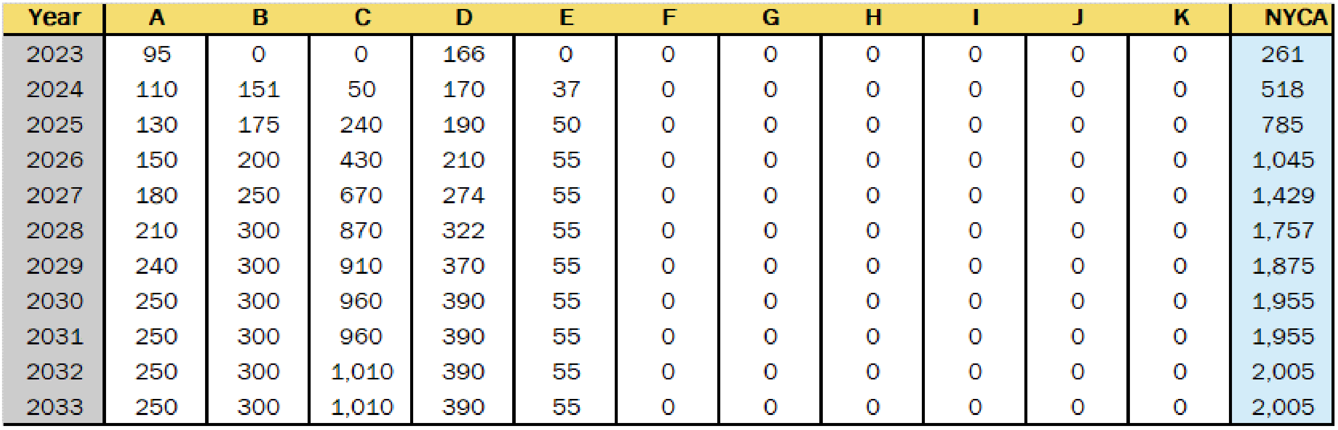
The 2023 Quarter 3 STAR uses the baseline summer coincident peak demand forecasts for the study years consistent with the 2023 Gold Book with the following load projects in the NYISO interconnection queue: Q#0580 – WNY STAMP, Q#0776 – Greenidge Load, Q#0849 – Somerset Load, Q#0850 – Cayuga Load, and Q#0979 – North Country Data Center (load increase), Q1536 – White Pine Phase I (Micron), and Q1446 – Massena Green Hydrogen (Air Products and Chemicals).

Figure 18: Interconnecting Large Loads Forecast – Baseline



Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023	95	0	0	166	0	0	0	0	0	0	0	261
2024	110	151	50	169	37	0	0	0	0	0	0	517
2025	130	175	240	169	50	0	0	0	0	0	0	764
2026	150	200	430	169	55	0	0	0	0	0	0	1,004
2027	170	200	480	213	55	0	0	0	0	0	0	1,118
2028	170	200	480	241	55	0	0	0	0	0	0	1,146
2029	170	200	480	269	55	0	0	0	0	0	0	1,174
2030	170	200	530	269	55	0	0	0	0	0	0	1,224
2031	170	200	530	269	55	0	0	0	0	0	0	1,224
2032	170	200	530	269	55	0	0	0	0	0	0	1,224
2033	170	200	530	269	55	0	0	0	0	0	0	1,224

Figure 19: Interconnecting Large Loads Forecast – High Policy

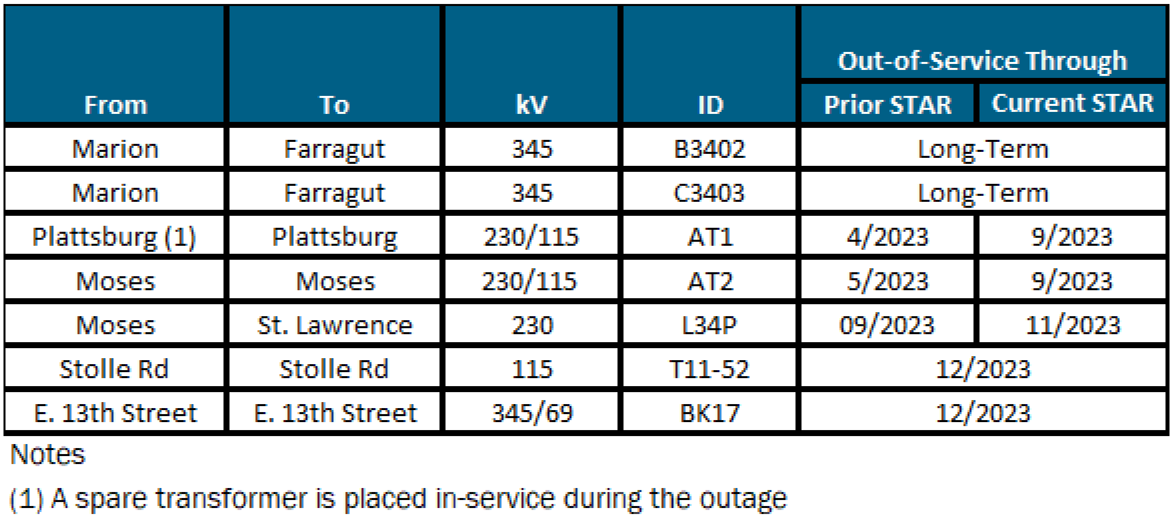


Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023	95	0	0	166	0	0	0	0	0	0	0	261
2024	110	151	50	170	37	0	0	0	0	0	0	518
2025	130	175	240	190	50	0	0	0	0	0	0	785
2026	150	200	430	210	55	0	0	0	0	0	0	1,045
2027	180	250	670	274	55	0	0	0	0	0	0	1,429
2028	210	300	870	322	55	0	0	0	0	0	0	1,757
2029	240	300	910	370	55	0	0	0	0	0	0	1,875
2030	250	300	960	390	55	0	0	0	0	0	0	1,955
2031	250	300	960	390	55	0	0	0	0	0	0	1,955
2032	250	300	1,010	390	55	0	0	0	0	0	0	2,005
2033	250	300	1,010	390	55	0	0	0	0	0	0	2,005

Transmission Assumptions

The study assumptions for existing transmission facilities that are modeled as out-of-service are listed in Figure 20. Figure 21 shows the Con Edison series reactor status utilized in the 2022 RNA as well as for this STAR. There are no changes to the Con Edison series reactor assumptions in this STAR compared to the 2022 RNA. Figure 22 provides a summary of the Transmission Interconnection Procedures (TIP) projects and the Transmission Owner Local Transmission Plans (LTPs) as listed in the 2022 Gold Book that are included in the 2022 RNA, as well as this STAR.[29]

Figure 20: Existing Transmission Facilities Modeled Out-of-Service

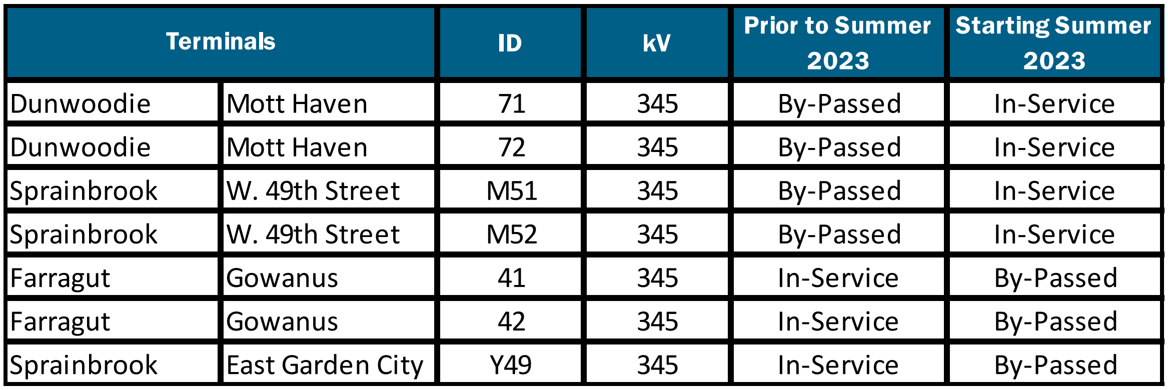


From	To	kV	ID	Out-of-Service Through	
				Prior STAR	Current STAR
Marion	Farragut	345	B3402	Long-Term	
Marion	Farragut	345	C3403	Long-Term	
Plattsburg (1)	Plattsburg	230/115	AT1	4/2023	9/2023
Moses	Moses	230/115	AT2	5/2023	9/2023
Moses	St. Lawrence	230	L34P	09/2023	11/2023
Stolle Rd	Stolle Rd	115	T11-52	12/2023	
E. 13th Street	E. 13th Street	345/69	BK17	12/2023	

Notes

(1) A spare transformer is placed in-service during the outage

Figure 21: Con Edison Proposed Series Reactor Status



Terminals		ID	kV	Prior to Summer 2023	Starting Summer 2023
Dunwoodie	Mott Haven	71	345	By-Passed	In-Service
Dunwoodie	Mott Haven	72	345	By-Passed	In-Service
Sprainbrook	W. 49th Street	M51	345	By-Passed	In-Service
Sprainbrook	W. 49th Street	M52	345	By-Passed	In-Service
Farragut	Gowanus	41	345	In-Service	By-Passed
Farragut	Gowanus	42	345	In-Service	By-Passed
Sprainbrook	East Garden City	Y49	345	In-Service	By-Passed

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[29] While the 2023 Gold Book forecasts were able to be included in this assessment, updates to transmission plans documented in Section 7 of the 2023 Gold Book were not included. These are planned to be included beginning in the 2023 Quarter 3 STAR, consistent with the general timeframe for conducting STARs and publication of the annual Gold Book.

Figure 22: Firm Transmission Plans (from the 2023 Load and Capacity Data Report Section VII)

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
Class Year Transmission Projects (18)													
[631],15,21	CHPE LLC	Hertel 735kV (Quebec)	Astoria Annex 345kV	363	S	2026	400	400	1	1000 MW	1000 MW	-/+ 320kV Bipolar HVDC cable	2021
[887],15,21	CHPE LLC	Hertel 735kV (Quebec)	Astoria Annex 345kV	363	S	2026	400	400	1	250 MW	250 MW	-/+ 320kV Bipolar HVDC cable	2021
TIP Projects (19) (included in FERC 715 Base Case)													
545A/3	NextEra Energy Transmission NY	Dysinger (New Station)	East Stolle (New Station)	20	In-Service	2022	345	345	1	1356 MVA	1612 MVA	Western NY - Empire State Line Project	OH
545A/3	NextEra Energy Transmission NY	Dysinger (New Station)	Dysinger (New Station)	PAR	In-Service	2022	345	345	1	700 MVA	700 MVA	Western NY - Empire State Line Project	
556	LSP/NGRID	Porter	Rotterdam	-71.8	Removed	2022	230	230	1	1066	1284	AC Transmission Project Segment A/1-795 ACSR/1-1431 ACSR/2-954 ACSS	
556	LSP/NGRID	Porter	Rotterdam	-72.1	Removed	2022	230	230	1	1066	1284	AC Transmission Project Segment A/1-795 ACSR/1-1431 ACSR/2-954 ACSS	
556	LSP/NGRID	Edic	New Scotland	-83.5	Removed	2022	345	345	1	2190	2718	AC Transmission Project Segment A/2-795 ACSR	
556	NGRID	Rotterdam	New Scotland	-18.1	Removed	2022	115	230	1	1212	1284	AC Transmission Project Segment A/1-1033.5 ACSR/1-1192.5 ACSR	
556/3	LSP/NGRID	Edic	Gordon Rd (New Station)	68.7	In-Service	2022	345	345	1	3410	3709	AC Transmission Project Segment A/2-795 ACSR/2-954 ACSS	
556/3	LSP/NGRID	Gordon Rd (New Station)	New Scotland	24.9	In-Service	2022	345	345	1	2190	2718	AC Transmission Project	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												Segment A/2-795 ACSR/2-954 ACSS	
556/3	LSP	Gordon Rd (New Station)	Rotterdam	transformer	In-Service	2022	345/230	345/230	1	637 MVA	760 MVA	AC Transmission Project Segment A	
556/3	LSP	Gordon Rd (New Station)	Rotterdam	transformer	In-Service	2022	345/230	345/230	1	637 MVA	783 MVA	AC Transmission Project Segment A	
556	LSP/NGRID	Gordon Rd (New Station)	New Scotland	-24.9	S	2023	345	345	1	2190	2718	AC Transmission Project Segment A/2-795 ACSR/2-954 ACSS	
556	LSP	Gordon Rd (New Station)	Princetown (New Station)	5.3	S	2023	345	345	1	3410	3709	AC Transmission Project Segment A/2-954 ACSS	
556	LSP	Princetown (New Station)	New Scotland	20.1	S	2023	345	345	2	3410	3709	AC Transmission Project Segment A/2-954 ACSS	
556	LSP/NGRID	Princetown (New Station)	New Scotland	19.8	S	2023	345	345	1	2190	2718	AC Transmission Project Segment A/2-795 ACSR	
556	LSP/NYPA/NGRID	Edic	Princetown (New Station)	67.0	W	2023	345	345	2	3410	3709	AC Transmission Project Segment A/2-954 ACSS	
556	NYPA	Edic	Marcy	1.4	W	2023	345	345	1	3150	3750	AC Transmission Project Segment A; Terminal Equipment Upgrades to existing line	
556	NGRID	Rotterdam	Rotterdam	remove substation	S	2029	230	230	N/A	N/A	N/A	Rotterdam 230kV Substation Retirement	
556	NGRID	Rotterdam	Eastover Rd	-23.8	S	2029	230	230	1	1114	1284	Rotterdam 230kV Substation Retirement, reconnect existing line	
556	LSP	Gordon Rd (New Station)	Rotterdam	remove transformer	S	2029	345/230	345/230	1	637 MVA	783 MVA	Rotterdam 230kV	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												Substation Retirement	
556	LSP	Gordon Rd (New Station)	Rotterdam	remove transformer	S	2029	345/230	345/230	1	637 MVA	760 MVA	Rotterdam 230kV Substation Retirement	
556	LSP/NGRID	Gordon Rd (New Station)	Rotterdam	-0.1	S	2029	230	230	1	1260	1500	Rotterdam 230kV Substation Retirement	
556	LSP/NGRID	Gordon Rd (New Station)	Rotterdam	-0.04	S	2029	230	230	1	1260	1500	Rotterdam 230kV Substation Retirement	
556	NGRID	Gordon Rd (New Station)	Eastover Rd	23.8	S	2029	230	230	1	1114	1284	Rotterdam 230kV Substation Retirement; reconnect existing line	
556	LSP	Gordon Rd (New Station)	Gordon Rd (New Station)	transformer	S	2029	345/230	345/230	1	637 MVA	783 MVA	Rotterdam 230kV Substation Retirement, reconnect transformer to existing line	
556	LSP	Gordon Rd (New Station)	Rotterdam	transformer	S	2029	345/115	345/115	2	882 MVA	996 MVA	Rotterdam 230kV Substation Retirement	
543	NGRID	Greenbush	Hudson	-26.4	W	2023	115	115	1	648	800	AC Transmission Project Segment B	
543	NGRID	Hudson	Pleasant Valley	-39.2	W	2023	115	115	1	648	800	AC Transmission Project Segment B	
543	NGRID	Schodack	Churchtown	-26.7	W	2023	115	115	1	937	1141	AC Transmission Project Segment B	
543	NGRID	Churchtown	Pleasant Valley	-32.2	W	2023	115	115	1	806	978	AC Transmission Project Segment B	
543	NGRID	Milan	Pleasant Valley	-16.8	W	2023	115	115	1	806	978	AC Transmission Project Segment B	
543	NGRID	Lafarge	Pleasant Valley	-60.4	W	2023	115	115	1	584	708	AC Transmission Project Segment B	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
543	NGRID	North Catskill	Milan	-23.9	W	2023	115	115	1	937	1141	AC Transmission Project Segment B	
543	NGRID	New Scotland	Alps	-30.6	W	2023	345	765	1	2015	2140	AC Transmission Project Segment B	
543/3	New York Transco	Hudson	Churchtown	7.2	In-Service	2022	115	115	1	648	798	AC Transmission Project Segment B	
543/3	New York Transco	Churchtown	Blue Stores	9.0	In-Service	2022	115	115	1	1114	1360	AC Transmission Project Segment B	
3	New York Transco	Blue Stores	Milan	10.8	In-Service	2023	115	115	1	879	1099	AC Transmission Project Segment B	
	New York Transco	Milan	Pleasant Valley	16.9	W	2023	115	115	1	648	848	AC Transmission Project Segment B	
543	NGRID	Lafarge	Churchtown	28.2	W	2023	115	115	1	582	708	AC Transmission Project Segment B	
543	NGRID	North Catskill	Churchtown	8.4	W	2023	115	115	1	648	848	AC Transmission Project Segment B	
543	New York Transco	Knickerbocker (New Station)	Pleasant Valley	54.5	W	2023	345	345	1	3844	4106	AC Transmission Project Segment B	
543	New York Transco	Knickerbocker (New Station)	Knickerbocker (New Station)	series capacitor	W	2023	345	345	1	3862	4103	AC Transmission Project Segment B	
543	NGRID	Knickerbocker (New Station)	New Scotland	12.4	W	2023	345	345	1	2381	3099	AC Transmission Project Segment B	
543	NGRID	Knickerbocker (New Station)	Alps	18.1	W	2023	345	345	1	2552	3134	AC Transmission Project Segment B	
543	New York Transco	Rock Tavern	Sugarloaf	12.0	W	2023	115	115	1	1657	2026	AC Transmission Project Segment B; 1-1590 ACSR	OH
543	New York Transco	Sugarloaf	Sugarloaf	Transformer	W	2023	138/115	138/115	---	1652	1652	AC Transmission Project Segment B	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
	New York Transco	Sugarloaf (Transco)	Sugarloaf (O&R)	0.14	W	2023	138	138	1	1657	2026	AC Transmission Project Segment B; 1-1590 ACSR	OH
543	New York Transco	Van Wagner (New Station)	---	Cap Bank	W	2023	345	345	---	N/A	N/A	AC Transmission Project Segment B	
543	NGRID	Athens	Pleasant Valley	-39.39	W	2023	345	345	1	2228	2718	Loop Line into new Van Wagner Substation/2-795 ACSR	OH
543	NGRID	Leeds	Pleasant Valley	-39.34	W	2023	345	345	1	2228	2718	Loop Line into new Van Wagner Substation/2-795 ACSR	OH
543	NGRID	Athens	Van Wagner (New Station)	38.65	W	2023	345	345	1	2228	2718	Loop Line into new Van Wagner Substation/2-795 ACSR	OH
543	NGRID	Leeds	Van Wagner (New Station)	38.63	W	2023	345	345	1	2228	2718	Loop Line into new Van Wagner Substation/2-795 ACSR	OH
543	New York Transco	Van Wagner (New Station)	Pleasant Valley	0.71	W	2023	345	345	1	3864	4096	Loop Line into new Van Wagner Substation/Reconductor w/2-795 ACSS	OH
543	New York Transco	Van Wagner (New Station)	Pleasant Valley	0.71	W	2023	345	345	1	3864	4096	Loop Line into new Van Wagner Substation/Reconductor w/2-795 ACSS	OH
543	New York Transco	Dover (New Station)	Dover (New Station)	Phase Shifter	W	2023	345	345	---	2510	2510	Loop Line 398 into new substation and install 2 x 750 MVAr PARs	---
543	ConEd	Cricket Valley	CT State Line	-3.46	W	2023	345	345	1	2220	2700	Loop Line into new Dover Substation/2-795 ACSS	OH
543	ConEd	Cricket Valley	Dover (New Station)	0.30	W	2023	345	345	1	2220	2700	Loop Line into new Dover Substation/2-795 ACSS	OH

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
543	ConEd	Dover (New Station)	CT State Line	3.13	W	2023	345	345	1	2220	2700	Loop Line into new Dover Substation/2-795 ACSS	OH
1125	NYPA	Edic	Marcy	1.4	W	2025	345	345	1	4030	4880	SPCP Terminal Equipment Upgrades to existing line	
1125	NYPA	Moses	Haverstock	2	W	2025	230	230	3	1089	1330	SPCP: Existing Moses - Adirondack (MA1), Moses - Adirondack (MA2), and Moses - Willis (MW2) 230 kV Lines to Haverstock Substation. 1 – 795 kcmil ACSR 26/7 “Drake”	
1125	NYPA	Moses	Moses	SUB	W	2025	230	230	N/A	N/A	N/A	SPCP: Terminal Upgrades at Moses 230 kV Substation and Transformer T3 and MW-2 breaker positions interchanged	
1125	NYPA	Haverstock 230 kV	Haverstock 345 kV	xfmr	W	2025	230/345	230/345	3	753	753	SPCP: Haverstock 230/345 kV xfmr-1, xfmr-2 and xfmr-3. Given Amp Ratings are for High Voltage side of xfmr.	
1125	NYPA	Haverstock	Haverstock	SUB	W	2025	345	345	N/A	N/A	N/A	SPCP: Haverstock 345 kV Substation. New Shunt Capacitor Banks.	
1125	NYPA	Haverstock	Adirondack	83.7	W	2025	345	345	2	2177	2663	SPCP: Existing Moses - Adirondack (MA1), Moses -	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												Adirondack (MA2) 230kV lines to Haverstock Substation.Creating new Haverstock to Adirondack (HA1) and Haverstock to Adirondack (HA2) 345kV lines. 2 – 795 kcmil ACSR 26/7 “Drake”	
1125	NYPA	Adirondack 115 kV	Adirondack 345 kV	xfmr	W	2025	115/345	115/345	1	192	221	SPCP: Adirondack 115/345 kV xfmr. Given Amp Ratings are for High Voltage side of xfmr.	
1125	NYPA	Adirondack	Adirondack	SUB	W	2025	345	345	N/A	N/A	N/A	SPCP: Adirondack 345 kV Substation. New Shunt Capacitor Banks. New Shunt Reactor Banks.	
1125	NYPA	Haverstock	Willis	34.99	W	2025	345	345	2	3119	3660	SPCP: Existing Moses - Willis (MW1) and Moses - Willis (MW2) 230 kV Lines diverted to to Haverstock Substation. Creating Haverstock - Willis (HW1) and Haverstock - Willis (HW1) 345 kV Lines. 2 – 795 kcmil ACSS 26/7 “Drake”	
1125	NYPA	Willis 345 kV	Willis 230 kV	xfmr	W	2025	345/230	345/230	2	2259	2259	SPCP: Willis 345/230 kV xfmr-1 and xfmr-2. Given Amp Ratings	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												are for High Voltage side.	
1125	NYPA	Willis	Willis	SUB	W	2025	230	230	N/A	N/A	N/A	SPCP: New Willis 345 kV Substation. New Shunt Capacitor Bank.	
1125	NYPA	Willis	Patnode	8.65	W	2025	230	230	2	2078	2440	SPCP: Two Willis - Patnode 230 kV Lines. 1 – 1272 kcmil ACSS 45/7 “Bittern”	
1125	NYPA	Willis	Ryan	6.59	W	2025	230	230	2	2078	2440	SPCP: Two Willis - Ryan 230 kV Lines. 1 – 1272 kcmil ACSS 45/7 “Bittern”	
1125	NYPA	Ryan	Ryan	SUB	W	2025	230	230	N/A	N/A	N/A	SPCP: Terminal Upgrades at Ryan 230 kV Substation.	
1125	NYPA	Patnode	Patnode	SUB	W	2025	230	230	N/A	N/A	N/A	SPCP: Terminal Upgrades at Patnode 230 kV Substation.	
1125	NYPA	Willis (Existing)	Willis (New)	0.4	W	2025	230	230	2	2078	2440	SPCP: Two Willis (existing) - Willis (New) 230 kV Lines. 1 – 1272 kcmil ACSS 45/7 “Bittern”	
1125	NYPA/NGRID	Adirondack	Austin Road	11.6	W	2025	345	345	1	3119	3660	SPCP: Adirondack - Austin Road Circuit-1 345 kV Line. 2 – 795 kcmil ACSS 26/7 “Drake”	
1125	NYPA/NGRID	Adirondack	Marcy	52.6	W	2025	345	345	1	3119	3660	SPCP: Adirondack - Marcy Circuit-1 345 kV Line. 2 – 795 kcmil	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												ACSS 26/7 “Drake”	
1125	NGRID	Austin Road	Edic	42.5	W	2025	345	345	1	3119	3660	SPCP: Austin Road -Edic Circuit-1 345 kV Line. 2 – 795 kcmil ACSS 26/7 “Drake”	
1125	NGRID	Rector Road	Austin Road	1	W	2025	230	230	1	1089	1330	SPCP: Rector Road - Austin Road Circuit-1 230 kV Line. 1 – 795 kcmil ACSR 26/7 “Drake”	
1125	NGRID	Austin Road 230 kV	Austin Road 345 kV	Transformer	W	2025	230/345	230/345	1	753	753	SPCP: Austin Road 230/345 kV xfmr. Given Amp Ratings are for High Voltage side of xfmr.	
1125	NGRID	Austin Road	Austin Road	Substation	W	2025	345	345	N/A	N/A	N/A	SPCP: Austin Road 345 kV Substation.	
1125	NGRID	Edic	Edic	Substation	W	2025	345	345	N/A	N/A	N/A	SPCP: Terminal Upgrades at Edic 345 kV Substation. New Shunt Capacitor Bank.	
1125	NGRID	Edic 345kV	Edic 230kV	Transformer	W	2025	345/230	345/230	1	N/A	N/A	SCSP: Remove Existing Transformer #2 345/230kV	
1125	NYPA	Marcy	Marcy	SUB	W	2025	345	345	N/A	N/A	N/A	SPCP: Terminal Upgrades at Marcy 345 kV Substation.	
1125	NGRID	Chases Lake	Chases Lake	Substation	W	2025	230	230	N/A	N/A	N/A	SPCP: Retire 230kV Substation.	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
1125	NYPA	Moses	Massena	Series Reactor	W	2025	230	230	2	3840	4560	SPCP: Install Series Reactors on Moses - Massena 230 kV Lines	
1125	NYPA	Moses	Adirondack	-85.7	W	2025	230	230	2	N/A	N/A	SPCP: Retire Existing Moses - Adirondack MA1 and MA2 230 kV Lines	
1125	NYPA	Moses	Willis	-36.99	W	2025	230	230	2	N/A	N/A	SPCP: Retire Existing Moses - Willis MW1 and MW2 230 kV Line	
631/887	NYPA	Astoria Annex	Rainey	3.4	W	2026	345	345	1	2326	2326	Q#631 and Q# 887 are part of Class Year 2021. It includes an elective System Upgrade Facility, Astoria Annex - Rainey 345kV XLPE cable. Conductor Type : XLPE Cable	CY 2021 / Under Ground Cable (UG)
1125	NGRID	Adirondack	Porter	-54.41	W	2025	230	230	1	N/A	N/A	SPCP: Retire Existing Adirondack - Porter 230 kV Line	
1125	NGRID	Adirondack	Chases Lake	-11.05	W	2025	230	230	1	N/A	N/A	SPCP: Retire Existing Adirondack - Chases Lake 230 kV Line	
1125	NGRID	Chases Lake	Porter	-43.46	W	2025	230	230	1	N/A	N/A	SPCP: Retire Existing Chases Lake - Porter 230 kV Line	
1125	NYPA	Willis	Patnode	-8.65	W	2025	230	230	1	N/A	N/A	SPCP: Retire Existing Willis - Patnode WPN1 230 kV Line.	
1125	NYPA	Willis	Ryan	-6.59	W	2025	230	230	1	N/A	N/A	SPCP: Retire Existing Willis	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												- Ryan WRY2 230 kV Line.	
1125	NGRID	Edic	Porter	-0.39	W	2025	230	230	1	N/A	N/A	SPCP: Retire Existing Edic-Porter #17 230kV Line	
1125	NGRID	Porter	Porter	Transformers	W	2025	230/115	230/115	2	N/A	N/A	SCSP: Remove Existing Transformers #1&2 230kV/115kV	
1125	NGRID	Porter	Porter	Substation	W	2025	230	230	N/A	N/A	N/A	SPCP: Retire Porter 230kV substation	
Firm Plans (5) (included in FERC 715 Base Case)													
14	CHGE	Hurley Avenue	Leeds	Static synchronous series compensator	S	2023	345	345	1	2336	2866	21% Compensation	-
	CHGE	Rock Tavern	Sugarloaf	-12.1	W	2022	115	115	1	N/A	N/A	Retire SL Line	OH
	CHGE	Knapps Corners 115	Knapps Corners 69	xfmr	S	2023	115/69	115/69	1	100 MVA	123 MVA	Substation Rebuild - New 115/69 kV Transformer	
	CHGE	Kerhonkson	Kerhonkson	xfmr	W	2023	115/69	115/69	1	827	1006	Add Transformer 3	-
	CHGE	Kerhonkson	Kerhonkson	xfmr	W	2023	115/69	115/69	1	827	1006	Add Transformer 4	-
11	CHGE	High Falls	Kerhonkson	10.03	W	2023	115	115	1	1010	1245	1-795 ACSR: Convert to 115 kV Operation	OH
11	CHGE	Galeville	Kerhonkson	9.16	W	2023	115	115	1	1010	1245	1-795 ACSR: Convert to 115 kV Operation	OH
	CHGE	Sugarloaf	NY/NJ State Line	-10.3	W	2024	115	115	2	N/A	N/A	Retire SD/SJ Lines	OH
11	CHGE	St. Pool	High Falls	5.69	W	2024	115	115	1	1010	1245	1-795 ACSR: Convert to 115 kV Operation	OH
11	CHGE	Modena	Galeville	4.62	W	2024	115	115	1	1010	1245	1-795 ACSR: Convert to 115 kV Operation	OH

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
6	CHGE	Knapps Corners	Spackenkill	2.36	W	2024	115	115	1	1280	1563	1-1033 ACSR	OH
11	CHGE	Hurley Ave	Saugerties	11.50	W	2025	69	115	1	1114	1359	1-795 ACSR	OH
11	CHGE	Saugerties	North Catskill	12.46	W	2025	69	115	1	1114	1359	1-795 ACSR	OH
3	ConEd	Hudson Ave East	New Vinegar Hill Distribution Switching Station	xfmrs/PARs/Feeders	In-Service	2022	138/27	138/27		N/A	N/A	New Vinegar Hill Distribution Switching Station	UG
	ConEd	Rainey	Corona	xfmr/PAR/Feeder	S	2023	345/138	345/138		N/A	N/A	New second PAR regulated feeder	UG
	ConEd	Millwood West	Millwood West	xfmr	S	2024	345/138	345/138		N/A	N/A	Replacing xfmr TA1	-
	ConEd	Gowanus	Greenwood	xfmr/PAR/Feeder	S	2025	345/138	345/138		N/A	N/A	New PAR regulated feeder	UG
	ConEd	Goethals	Fox Hills	xfmr/PAR/Feeder	S	2025	345/138	345/138		N/A	N/A	New PAR regulated feeder	UG
	ConEd	Astoria East	Astoria Annex	Feeder	S	2026	138	138		2086	2599	Elective System Upgrade Facility for Q631 NS Power Express (reconducting feeder 34091)	OH
	ConEd	Rainey	Rainey	xfmr	S	2026	345/138	345		N/A	N/A	Replacing xfmr 3W	-
	ConEd	Buchanan North	Buchanan North	Reconfiguration	S	2026	345	345		N/A	N/A	Reconfiguration (separating feeder Y94 and xmrf TA5 by adding breaker 12)	-
	ConEd	Fresh Kills	Fresh Kills	xfmr	S	2026	345/138	345		N/A	N/A	Replacing xfmr TA1	
3	LIPA	Round Swamp	Round Swamp	-	In-Service	2022	69	69		N/A	N/A	New Round Swamp Road substation	
3	LIPA	Round Swamp	Plainview	1.93	In-Service	2022	69	69	1	1217	1217	2500kcmil XLPE	UG
3	LIPA	Round Swamp	Ruland Rd	3.81	In-Service	2022	69	69	1	1217	1217	2500kcmil XLPE	UG

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
3	LIPA	Arverne	Far Rockaway	2.48	In-Service	2022	34.5	34.5	1	986	1035	2500kcmil	UG
	LIPA	Pilgrim	Pilgrim	-	S	2023	69	69		N/A	N/A	Station Reconfiguration	
	LIPA	Terryville	Flowerfield	4.74	W	2023	69	69	1	996	1054	2500kcmil	UG
3	NGRID	Volney	Clay	-	In-Service	2022	345	345	1	1200 MVA	1474 MVA	Replace Terminal Equipment Line #6	OH
3	NGRID	Mountain	Lockport	0.08	In-Service	2022	115	115	2	174MVA	199MVA	Mountain-Lockport 103/104 Bypass	OH
3	NGRID	Golah	Golah	xfmr	In-Service	2022	69	69		50MVA	50MVA	Replace Golah 69/34.5kV Transformer	
3	NGRID	Niagara	Packard	3.7	In-Service	2022	115	115	1	344MVA	449MVA	Replace 3.7 miles of 191 line	OH
3	NGRID	Wolf Rd	Menands	1.34	In-Service	2022	115	115	1	182 MVA	222 MVA	Reconductor 1.34 miles between Wolf Rd-Everett tap (per EHI)	OH
	NGRID	Dunkirk	Dunkirk	-	W	2022	115	115	-	-	-	Rebuild Dunkirk Station/ Asset Separation.	
	NGRID	Lockport	Mortimer	56.5	W	2022	115	115	3	-	-	Replace Cables Lockport-Mortimer #111, 113, 114	
6	NGRID	Niagara	Packard	3.7	In-Service	2022	115	115	2	344MVA	449MVA	Replace 3.7 miles of 193 and 194 lines	OH
	NGRID	Gardenville	Big Tree	6.3	W	2022	115	115	1	221MVA	221MVA	Gardenville-Arcade #151 Loop-in-and-out of NYSEG Big Tree	OH
	NGRID	Big Tree	Arcade	28.6	W	2022	115	115	1	129MVA	156MVA	Gardenville-Arcade #151 Loop-in-and-out of NYSEG Big Tree	OH

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
	NGRID	Kensington Terminal	Kensington Terminal	-	W	2022	115/23	115/23	-	50MVA	50MVA	Replace TR4 and TR5	
	NGRID	Taylorville	Boonville	-	W	2022	115	115	1	584	708	Replace Station connections	
	NGRID	Taylorville	Browns Falls	-	W	2022	115	115	1	584	702	Replace Station connections	
	NGRID	Batavia	Batavia		W	2022	115	115				Batavia replace five OCB's.	
	NGRID	Albany Steam	Albany Steam	-	W	2022	115	115				Replace NG's 115kV Breakers.	
	NGRID	Lockport	Lockport	-	W	2022	115	115	-	N/A	N/A	Install R264 at Lockport for line 108 and operate as alternate breaker for line 108 at Lockport	
	NGRID	South Oswego	Indeck (#6)	-	S	2023	115	115	1	-	-	Install High Speed Clearing on Line #6	
	NGRID	Porter	Porter	-	S	2023	230	230		N/A	N/A	Porter 230kV upgrades	
	NGRID	Mountain	Lockport		S	2023	115	115	2	847	1000	Reinsulating Mountain-Lockport 103/104	
	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 Maple wood – Reynolds Road #31	
	NGRID	Ridge	Ridge		S	2023				N/A	N/A	Ridge substation 34.5kV rebuild	
	NGRID	Colton	Browns Falls	-	S	2023	115	115	1	629	764	Flat Rock station (mid-line) upgrades	
22	NGRID/NYSEG	Mortimer	Station 56		W	2023	115	115	1	649	788	Mortimer-Pannell #24 Loop in-and-	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												out of NYSEG's Station 56	
	NGRID	Clay	Woodard		W	2023	115	115	1			Add 10.5mH reactor on line #17.	OH
	NGRID	Gardenville	Dunkirk	0.20	W	2023	115	115	2	N/A	N/A	Add 115kV taps on 141/142 to new customer station (Erie)	OH
	NGRID	Cortland	Clarks Corners	0.2	S	2024	115	115	1	176MVA	224MVA	Replace 0.2 miles of 1(716) line and series equipment	OH
	NGRID	Homer Hill	Homer Hill	-	S	2024	115	115	-			Homer Hill Replace five OCB	
22	NGRID	Marshville	Marshville	-	S	2024	115/69	115/69		N/A	N/A	Replace transformers at Marshville and upgrade associate equipment	
	NGRID	Packard	Huntley	9.1	W	2024	115	115	1	262MVA	275MVA	Walck-Huntley #133, Packard-Huntley #130 Reconductor	OH
	NGRID	Walck	Huntley	9.1	W	2024	115	115	1	262MVA	275MVA	Walck-Huntley #133, Packard-Huntley #130 Reconductor	OH
22	NGRID	Station 56	Pannell		W	2024	115	115	1	649	788	Mortimer-Pannell #24 Loop in-and-out of NYSEG's Station 56	
	NGRID	Clay	Wetzel	3.7	W	2024	115	115	1	220 MVA	220 MVA	Add a breaker at Clay and build approximately 2000 feet of 115kV to create radial line	
	NGRID	Watertown	Watertown		S	2025	115	115		N/A	N/A	New Distribution Station at Watertown	
	NGRID	Golah	Golah		S	2025				N/A	N/A	Golah substation rebuild	

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							Operating	Design		Summer	Winter		
	NGRID	Malone	Malone	-	S	2025	115	115	-	753	753	Install PAR on Malone - Willis line 1-910	
	NGRID	Malone	Malone	-	S	2025	115	115	-	N/A	N/A	Expand 115-13.2kV substation with a second transformer and feeders	
	NGRID	Terminal	Terminal	-	S	2025	115	115	-	N/A	N/A	Rebuild 115/13.2kV Terminal substation	
22	NGRID	Mohican	Mohican	-	W	2025	115	115		N/A	N/A	Replace 115kV and 34.5kV assets, add 13.2kV substation	
6	NGRID	Gardenville	Dunkirk	20.5	S	2026	115	115	2	1105	1346	Replace 20.5 miles of 141 and 142 lines	OH
	NGRID	Niagara	Gardenville	26.3	S	2026	115	115	1	275MVA	350MVA	Packard-Erie / Niagara-Gardenville Reconfiguration	OH
	NGRID	Packard	Gardenville	28.2	S	2026	115	115	2	168MVA	211 MVA	Packard-Gardenville Reactors, Packard-Erie / Niagara-Gardenville Reconfiguration	OH
	NGRID/NYSEG	Erie St	Gardenville	5.5	S	2026	115	115	1	139MVA	179MVA	Packard-Erie / Niagara-Gardenville Reconfiguration, Gardenville add breakers	OH
	NGRID	Lockport	Batavia	20	S	2026	115	115	1	646	784	Rebuild 20 miles of Lockport-Batavia 112	
	NGRID	Packard	Packard		S	2026	115	115				Packard replace three OCB's	
	NGRID	Oswego	Oswego	-	S	2026	345	345		N/A	N/A	Rebuild of Oswego 345kV Station (asset separation).	

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							Operating	Design		Summer	Winter		
	NGRID	Rotterdam	Rotterdam	-	S	2026	115/69	115/69	-	67	76	Rebuild Rotterdam 69kV substation and add a 2nd 115/69kV Transformer	-
	NGRID	Rotterdam	Schoharie	0.93	S	2026	69	115	1	77	93	Rebuild 0.93mi double circuit Rotterdam-Schoharie / Schenectady International-Rotterdam	OH
	NGRID	Schenectady International	Rotterdam	0.93	S	2026	69	115	1	69	84	Rebuild 0.93mi double circuit Rotterdam-Schoharie / Schenectady International-Rotterdam	OH
	NGRID	Tar Hill	Tar Hill		S	2026	115	115				New station to replace Lighthouse Hill.	
	NGRID	Inghams	Inghams	-	S	2026	115	115				Rebuild Inghams station, including rebuilding the PAR	
	NGRID	Browns Falls	Browns Falls	-	S	2026	115	115	-	N/A	N/A	Build new SubT facilities to separate assets from the hydroplant	
	NGRID	Huntley	Lockport	1.2	W	2026	115	115	2	747	934	Rebuild 1.2 miles of (2) single circuit taps on Huntley-Lockport 36/37 at Ayer Rd	
	NGRID	Oneida	Oneida	-	W	2026	115	115				115kV Oneida Station Rebuild & add Cap bank.	
22	NGRID	Amsterdam	Rotterdam	1	S	2027	69	69	2	584	708	Rebuild approximately 1 mile of 69kV. The Amsterdam -	

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							Operating	Design		Summer	Winter		
												Rotterdam project changes the impedances of two 69kV line sections, no ratings impacts.	
	NGRID	Brockport	Brockport	3.5	S	2027	115	115	2	648	650	Refurbish 111/113 3.5 mile single circuit taps to Brockport Station.	
	NGRID	Colton	Dennison	-	S	2027	115	115	1	916	1118	Replace Station connections. Line #4	
	NGRID	Colton	Dennison	-	S	2027	115	115	1	916	1118	Replace Station connections. Line #5	
	NGRID	Elm St	Elm St	-	S	2027	230/23	230/23	-	118MVA	133MVA	Replace TR2 as failure	
	NGRID	Pannell	Geneva		W	2027	115	115	2			Critical Road crossings replace on Pannell-Geneva 4/4A	
	NGRID	Lockport	Lockport		W	2027				N/A	N/A	Rebuild of Lockport Substation and control house	
	NGRID	Mortimer	Golah	9.7	W	2027	115	115	1	657	797	Refurbish 9.7 miles Single Circuit Wood H-Frames on Mortimer-Golah 110.	
	NGRID	Mortimer	Mortimer	-	W	2027	115	115		N/A	N/A	Second 115kV Bus Tie Breaker at Mortimer Station	
	NGRID	Boonville	Boonville	-	W	2027	115	115	-	N/A	N/A	New 115kV station adjacent to existing Boonville sub	
	NGRID	Mortimer	Pannell	15.7	S	2028	115	115	2	221MVA	270MVA	Reconductor existing Mortimer – Pannell 24 and 25 lines	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												with 795 ACSR	
22	NGRID	SE Batavia	Golah	27.8	W	2028	115	115	1	648	846	Refurbish 27.8 miles Single Circuit Wood H-Frames on SE Batavia-Golah 119	
	NGRID	Stoner	Stoner	-	S	2030	115	115	-	N/A	N/A	Upgrade limiting equipment at Stoner	
	NGRID	Clinton	Clinton	-	S	2030	115	115	-	N/A	N/A	Upgrade limiting equipment at Clinton	
	NGRID	Rotterdam	Rotterdam	-	S	2030	115	115	-	N/A	N/A	Upgrade terminal equipment on Lines 10 & 12 at Rotterdam	
22	NGRID	Meco	Meco	-	S	2030	115/69	115/69		N/A	N/A	Rebuild Meco substation and add a 2nd 115/69kV transformer	
	NGRID	Gardenville	Homer Hill	37.5	S	2031	115	115	2	649	788	Refurbish 37.5 miles double circuit Gardenville-Homer Hill 151/152l	
	NGRID	Huntley	Gardenville	23.4	W	2031	115	115	2	731	887	Refurbish 23.4 miles double circuit on Huntley-Gardenville 38/39.	
566/6	NYPA	Moses	Adirondack	78	S	2023	230	345	2	1088	1329	Replace 78 miles of both Moses-Adirondack 1&2	
	NYPA	St. Lawrence 230kV	St. Lawrence 115kV	xfmr	S	2023	230/115	230/115	1	TBD	TBD	Replacement of St. Lawrence AutoTransformer #2	
	NYPA	Plattsburg 230 kV	Plattsburg 115 kV	xfmr	S	2023	230/115	230/115	1	249	288	Replace in kind of Plattsburgh Auto	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												Transformer #1	
	NYPA	Fraser	Fraser	SVC Control	S	2023	345	345	1	NA	NA	Fraser SVC Control Upgrade	
6, 22	NYPA	Y49 345kV	Y49 345kV	Y49 Reconductoring	S	2023	345	345	1	TBD	TBD	Improvements to Y-49 345 kV circuit	
580	NYPA/NGRID	STAMP	STAMP	Substation	S	2024	345/115	345/115		300 MVA	300 MVA	Load Interconnection.	
	NYPA	Moses	Moses	Circuit Breakers Replacements	W	2025	115/230	115/230		N/A	N/A	St. Lawrence Breaker Replacement 115 and 230 kV	
	NYSEG	Big Tree Road	Big Tree Road	Rebuild	W	2022	115	115				Station Rebuild	
	NYSEG	Wood Street	Wood Street	xfmr	W	2023	345/115	345/115	1	327 MVA	378 MVA	Transformer #3	-
	NYSEG/ConEd	Pleasant Valley	Wood St	28	W	2023	345	345	2	3030	3480	Tapping 345 kV Line between Pleasant Valley and Millwood West at Wood Street	
	NYSEG/ConEd	Wood St	Millwood West	12.4	W	2023	345	345	2	3030	3480	Tapping 345 kV Line between Pleasant Valley and Millwood West at Wood Street	
	NYSEG/ConEd	Millwood West	Pleasant Valley	-40.4	W	2023	345	345	2	3030	3480	Tapping 345 kV Line between Pleasant Valley and Millwood West at Wood Street	
	NYSEG	Coddington	E. Ithaca (to Coddington)	8.07	S	2024	115	115	1	307 MVA	307 MVA	665 ACCR	OH
	NYSEG	Fraser	Fraser	xfmr	S	2024	345/115	345/115	1	305 MVA	364 MVA	Transformer #2 and Station Reconfiguration	-

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
	NYSEG	Fraser 115	Fraser 115	Rebuild	S	2024	115	115		N/A	N/A	Station Rebuild to 4 bay BAAH	-
	NYSEG	Delhi	Delhi	Removal	S	2024	115	115		N/A	N/A	Remove 115 substation and terminate existing lines to Fraser 115 (short distance)	
	NYSEG	New Gardenville	New Gardenville	xfmr	S	2026	230/115	230/115	1	316 MVA	370 MVA	NYSEG Transformer #6 and Station Reconfiguration	-
	NYSEG	New Gardenville	New Gardenville	xfmr	S	2026	115/34.5	115/34.5	1	50	60	NYSEG Transformer #7 and Station Reconfiguration	
	NYSEG	New Gardenville	New Gardenville	xfmr	S	2026	115/34.5	115/34.5	2	50	60	NYSEG Transformer #8 and Station Reconfiguration	
	NYSEG	Wright Avenue	Wright Avenue	Rebuild	S	2026	115	115		N/A	N/A	Station Rebuild with 115 kV GIS Ring Bus, 34.5 kV & 12.5 kV GIS & New Control Building	
	NYSEG	Wright Avenue	Wright Avenue	xfmr	S	2026	115/34.5	115/34.5	1	65	72.5	Two New 50 MVA Transformers	
	NYSEG	Wright Avenue	Wright Avenue	xfmr	S	2026	34.5/12.5	34.5/12.5	1	48.1	53.65	Two New 37 MVA Transformers	
	NYSEG	North Waverly	East Sayre	2.99	W	2025	115	115	1	218	261	Reconductor existing line with ACSR 795 26/7 "Drake"	
	NYSEG	Meyer	Meyer	xfmr	W	2026	115/34.5	115/34.5	2	59.2MVA	66.9MVA	Transformer #2	-
	NYSEG	Erie Street Rebuild	Erie Street Rebuild	Rebuild	S	2027	115	115				Station Rebuild	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
	NYSEG	South Perry	South Perry	xfmr	S	2027	230/115	230/115	1	246 MVA	291 MVA	Transformer	-
	NYSEG	Oakdale 115	Oakdale 115	Rebuild	S	2027	115	115		N/A	N/A	Complete rebuild of 115 kV to 6 bay BAAH	
	NYSEG	Westover 115	Westover	Removal	S	2027	115	115		N/A	N/A	Remove 115 substation and terminate existing lines to Oakdale 115 (short distance)	
	NYSEG	Oakdale 345	Oakdale 115	xfmr	S	2027	345/115	345/115/34.5	1	494MVA	527 MVA	Transformer #3 and Station Reconfiguration	-
7	O & R/ConEd	Ladentown	Buchanan	-9.5	S	2024	345	345	1	3000	3211	2-2493 ACAR	
7	O & R/ConEd	Ladentown	Lovett 345 kV Station (New Station)	5.5	S	2024	345	345	1	3000	3211	2-2493 ACAR	
7	O & R/ConEd	Lovett 345 kV Station (New Station)	Buchanan	4	S	2024	345	345	1	3000	3211	2-2493 ACAR	
	O & R	Lovett 345 kV Station (New Station)	Lovett	xfmr	S	2024	345/138	345/138	1	562 MVA	562 MVA	Transformer	
	RGE	Station 127	Station 127	xfmr	W	2023	115/34.5	115/34.5	1	75MVA	75MVA	Transformer #2	-
7	RGE	Station 168	Mortimer (NG Trunk #2)	26.4	W	2025	115	115	1	145 MVA	176 MVA	Station 168 Reinforcement Project	OH
7	RGE	Station 168	Elbridge (NG Trunk # 6)	45.5	W	2025	115	115	1	145 MVA	176 MVA	Station 168 Reinforcement Project	OH
	RGE	Station 418	Station 48	7.6	S	2026	115	115	1	175 MVA	225 MVA	New 115kV Line	OH
	RGE	Station 33	Station 251 (Upgrade Line #942)		S	2026	115	115	1	400MVA	400MVA	Line Upgrade	
22	RGE	Station 33	Station 251 (Upgrade Line #943)		S	2026	115	115	1	400MVA	400MVA	Line Upgrade	
	RGE	Station 418	Station 113 (Rebuild Line #947)	3.3	S	2027	115	115	1	267 MVA	326 MVA	Monroe County Reliability Project Line	

[Project Queue Position] / Project Notes	Transmission Owner	Terminals		Line Length in Miles (1)	Proposed In-Service Date/Yr Prior to		Nominal Voltage in kV		# of ckts	Thermal Ratings (4)		Project Description / Conductor Size	Class Year / Type of Construction
							Operating	Design		Summer	Winter		
												Rebuild and Reconductor	
	RGE	Station 113	Spencerport (Rebuild Line #947)	4.3	S	2027	115	115	1	267 MVA	326 MVA	Monroe County Reliability Project Line Rebuild and Reconductor	
	RGE	Spencerport	Station 70 (Rebuild Line #947)	4.5	S	2027	115	115	1	267 MVA	326 MVA	Monroe County Reliability Project Line Rebuild and Reconductor	
	RGE	Station 70	Station 71 (Rebuild Line #9467)	4.2	S	2027	115	115	1	267 MVA	326 MVA	Monroe County Reliability Project Line Rebuild and Reconductor	
	RGE	Station 71	Station 69 (Rebuild Line #945)	2.9	S	2027	115	115	1	267 MVA	326 MVA	Monroe County Reliability Project Line Rebuild and Reconductor	
	RGE	Station 69	Station 93 (Rebuild Line #917)	2	S	2027	115	115	1	267 MVA	326 MVA	Monroe County Reliability Project Line Rebuild and Reconductor	
	RGE	Station 93	Station 7 (Rebuild Line #917)	1.6	S	2027	115	115	1	218 MVA	272 MVA	Monroe County Reliability Project Line Rebuild and Reconductor	
	RGE	Station 82	Station 251 (Upgrade Line #902)		S	2028	115	115	1	400MVA	400MVA	Line Upgrade	
	RGE	Mortimer	Station 251 (Upgrade Line #901)	1.00	S	2028	115	115	1	400MVA	400MVA	Line Upgrade	

Notes

Number	Note
1	Line Length Miles: Negative values indicate removal of Existing Circuit being tapped
2	S = Summer Peak Period W = Winter Peak Period
3	Equipment (Transformers & Capacitor Banks) is retained on this list for one year after it goes in In-Service, and then it is deleted. A Transmission Line is reflected in Table VI, when it goes In-Service
4	Thermal Ratings in Amperes, except where labeled otherwise
5	Firm projects are those which have been reported by TOs as being sufficiently firm, and either (i) have an Operating Committee approved System Impact Study (if applicable) and, for projects subject to Article VII, have a determination from New York Public Service Commission that the Article VII application is in compliance with Public Service Law § 122, or (ii) is under construction and is scheduled to be in-service prior to June 1 of the current year.
6	Reconductoring of Existing Line
7	Segmentation of Existing Circuit
8	Deleted
9	Upgrade of existing 69 kV to 138 kV operation
10	Deleted
11	Upgrade of existing 69 kV to 115 kV operation
12	Deleted
13	Contingent on future generation resources
14	This transmission upgrade was identified as a System Deliverability Upgrade (SDU) in the Class Year 2011 Study process required to make certain interconnection projects fully deliverable in the Rest of State Capacity Region. Upon the completion of Class Year 2011, the security posted for the SDU constituted greater than 60% of the total estimated costs for the SDUs and thereby "triggered" the SDU for construction.
15	The Class Year Transmission Project, Q#631, includes an elective System Upgrade Facility, an Astoria-Rainey 345kV cable. The Class Year Transmission Project, Q#887, is a 250 MW uprate of Q#631 project.
16	Deleted
17	Deleted
18	This project has a System Reliability Impact Study that has been approved by the NYISO Operating Committee, and therefore is a potential candidate to enter the next Open Class Year study
19	These transmission projects are included in the FERC 715 Report models. Please see FERC 715 report for an explanation of the inclusion criteria.
20	Deleted

Appendix D: Resource Adequacy Assumptions

2023 Q3 STAR MARS Assumptions Matrix

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
Key Assumptions and Reports				
1	**Links to Key Assumptions Presentations and Final Reports**	**Nov 15, 2022**: NYISO Board approval and final 2022 RNA posting. 2022 RNA Report link 2022 RNA Appendix link	April 25, 2023 ESPWG: 2023 Q2 STAR Key Assumptions January 24 2023 ESPWG: 2023 Q1 STAR Key Assumptions January 24 2023 ESPWG: 2023 Q1 STAR Key Assumptions July 26, 2022 ESPWG: Q3 STAR Key Assumptions October 25, 2022 ESPWG: Q4 STAR Key Assumptions STAR Reports, Notices: https://www.nyiso.com/short-term-reliability-process	July 25, 2023 ESPWG/TPAS: 2023 Q3 STAR Key Assumptions

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
Load Parameters				
1	**Peak** Load Forecast	Adjusted 2022 Gold Book NYCA baseline peak load forecast. It includes five large loads from the NYISO interconnection queue, with forecasted impacts. Baseline load represents coincident summer peak demand and includes the reductions due to projected energy efficiency programs, building codes and standards, BtM storage impacts at peak, distributed energy resources and BtM solar photovoltaic resources; it also reflects expected impacts (increases) from projected electric vehicle usage and electrification. The GB 2022 baseline peak load forecast includes the impact (reduction) of behind-the-meter (BtM) solar at the time of NYCA peak. For the BtM Solar adjustment, gross load forecasts that include the impact of the BtM generation will be used for the 2022 RNA, as provided by the Demand Forecasting Team which then allows for a discrete modeling of the BtM solar resources using 5 years of inverter data.	Same method, updated to the 2023 Gold Book [link]	Same method, updated to the 2023 Gold Book [link]
2	Load **Shapes** (Multiple Load Shapes)	**New Load Shapes** *(see March 24 LFTF/ESPWG):* Used Multiple Load Shape MARS Feature 8,760-hour historical gross load shapes were used as base shapes for LFU bins: Load Bins 1 and 2: 2013 Load Bins 3 and 4: 2018 Load Bins 5 to 7: 2017 Historical load shapes are adjusted to meet zonal (as well as G-J) coincident and non-coincident peak forecasts (summer and winter), while maintaining the energy targets. For the BtM Solar discrete modeling, gross load forecasts that include the impact of the BtM generation are used (additional details under the BtM Solar category below).	Same	Same

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
3	Load Forecast Uncertainty (LFU) The LFU model captures the impacts of weather conditions on future loads.	2022 LFU Updated via Load Forecast Task Force (LFTF) process. Updated LFU values, *(as presented at the April 21, 2022 LFTF [link])*	Same method	2023 LFU Updated via Load Forecast Task Force (LFTF) process. Updated LFU values, (as presented at the May 26, 2023 LFTF [link])
Generation Parameters				
1	**Existing** Generating Unit Capacities (*e.g., thermal units, large hydro)*	2022 Gold Book values: Summer is min of (DMNC, CRIS). Winter is min of (DMNC, CRIS). Adjusted for RNA inclusion rules application.	Same method	2023 Gold Book values: Summer is min of (DMNC, CRIS). Winter is min of (DMNC, CRIS). Adjusted for RNA inclusion rules application.
2	**Proposed New Units Inclusion** Determination	2022 Gold Book with Inclusion Rules applied *See April 26, 2022 TPAS/ESPWG*	Same method, see applicable STAR Key Assumptions presentation	2023 Gold Book with Inclusion Rules applied *See July 25, 2023 TPAS/ESPWG/LFTF [link]*
3	Retirement, Mothballed Units, IIFO	2022 Gold Book with Inclusion Rules applied *See April 26, 2022 TPAS/ESPWG*	Same method, see applicable STAR Key Assumptions presentation	2023 Gold Book with Inclusion Rules applied *See July 25, 2023 TPAS/ESPWG/LFTF [link]*
4	Forced and Partial Outage Rates (*e.g., thermal units, large hydro)*	Five-year (2017-2021) 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 method	Same method Five-year (2018-2022) GADS data for each unit represented. 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.
5	Planned Outages	Based on schedules received by the NYISO and adjusted for history	Same method	Same method

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
6	Fixed and Unplanned Maintenance	Scheduled maintenance from Operations. Unplanned maintenance based on GADS data average maintenance time – average time in weeks is modeled.	Same method	Same method
7	Summer Maintenance	None	Same method	Same method
8	Combustion Turbine Derates	Derate based on temperature correction curves Thermal derates are based on a ratio of peak load before LFU is applied and LFU applied load. For new units: used data for a unit of same type in same zone, or neighboring zone data.	Same method	Same method
8	Existing Landfill Gas (LFG) Plants	Actual hourly plant output over the last 5 years. Program randomly selects an LFG shape of hourly production over the last 5 years 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 method	Same method
9	Existing **Wind** Units (>5 years of data)	Actual hourly plant output over the last 5 years (2017-2021). Probabilistic model is incorporated based on five years of input shapes with one shape per replication being randomly selected in Monte Carlo process.	Same method	Actual hourly plant output over the last 5 years (2018-2022). Probabilistic model is incorporated based on five years of input shapes with one shape per replication being randomly selected in Monte Carlo process.
10	Existing **Wind** Units (<5 years of data)	For existing data, the available actual hourly plant output 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 method	Same method
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 method	Same method

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
11b	Proposed **Offshore Wind** Units	Inclusion Rules Applied to determine the generator status. Power curves based on 2008-2012 NREL from 3 different sites: NY Harbor, LI Shore, LI East, and GE updates of the NREL curves reflecting derates.	Same method	Same method
12a	Existing **Utility-scale Solar Resources**	Inclusion Rules Applied to determine the generator status. Probabilistic model chooses from the production data output shapes covering the last 5 years. One shape per replication is randomly selected in Monte Carlo process.	Same method	Same method
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 method	Same method
13	Projected **BtM Solar Resources**	**Supply side:** Five years of 8,760 hourly MW profiles based on sampled inverter data The MARS random shape mechanism is used: one 8,760 hourly shape (of five) is randomly picked for each replication year. Similar with the past planning modeling and aligns with the method used for wind, utility solar, landfill gas, and run-of-river facilities. **Load side:** Gross load forecasts will be used for the 2022 RNA, as provided by the forecasting group.	Same method	Same method

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
14	Existing **BTM-NG Program**	These are former load modifiers to sell capacity into the ICAP market. Modeled as cogen type 1 (or type 2 as applicable) unit in MARS. Unit capacity set to CRIS value, load modeled with weekly pattern that can change monthly.	Same method	Same method
15	Existing **Small Hydro** Resources (e.g., run-of-river)	Actual hourly plant output over the past 5 years period. 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 method	Same method
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. Methodology consistent with thermal unit transition rates.	Same method	Same method
17	Proposed front-of-meter **Battery Storage**	GE MARS ES model is used. Units are given a maximum capacity, maximum stored energy, and a dispatch window.	Same method	Same method
18	Existing Energy Limited Resources (**ELRs**)	**New method:** GE developed MARS functionality to be used for ELRs. Resource output is aligned with the NYISO's peak load window when most loss-of-load events are expected to occur.	Same method	Same method

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
Transaction – Imports/ Exports				
1	Capacity Purchases	Grandfathered Rights and other awarded long-term rights Modeled using MARS explicit contracts feature.	Same method	Same method
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 method	Same method
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 method	Same method
4	UDRs	Updated with most recent elections/awards information (VFT, HTP, Neptune, CSC) Added CHPE HTP (from Hydro Quebec into Zone J) at 1250 MW (summer) starting 2026	Same method	Same method
5	External Deliverability Rights (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.	Same method	Same method

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
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 method	Same method
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 method	Same method
2	New Transmission	Based on TO- provided firm plans (via Gold Book 2020 process) and proposed merchant transmission; inclusion rules applied.	Same method	Same method *Note*: the Dover PAR related with the ACPPTPP is delayed from 2024 to 2025. This delay has an impact on the status of the Knickerbocker to Pleasant Valley series compensation. The NYISO tested a conservative reduction of 750 MW on the UPNY-SENY interface due to bypassing the series compensation, and the conclusion that the NYCA LOLE is below 0.1 event-days/year for the 2023 Q3 STAR stands.
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 method	Same method
4	UDR unavailability	Five-year history of forced outages	Same method	Same method
5	Other	Topology changes summary, as compared with the 2021 -2030 CRP MARS topology: 1. Dysinger East and Group A limits decreased to reflect Large Loads in western NY (as forecasted in the 2022 Gold Book Table I-14 [link] 2. West Central reverse emergency thermal limits increased mainly due to a rating increase on a limiting element – also as identified in the 2022 Operating Study	Same method	Same method

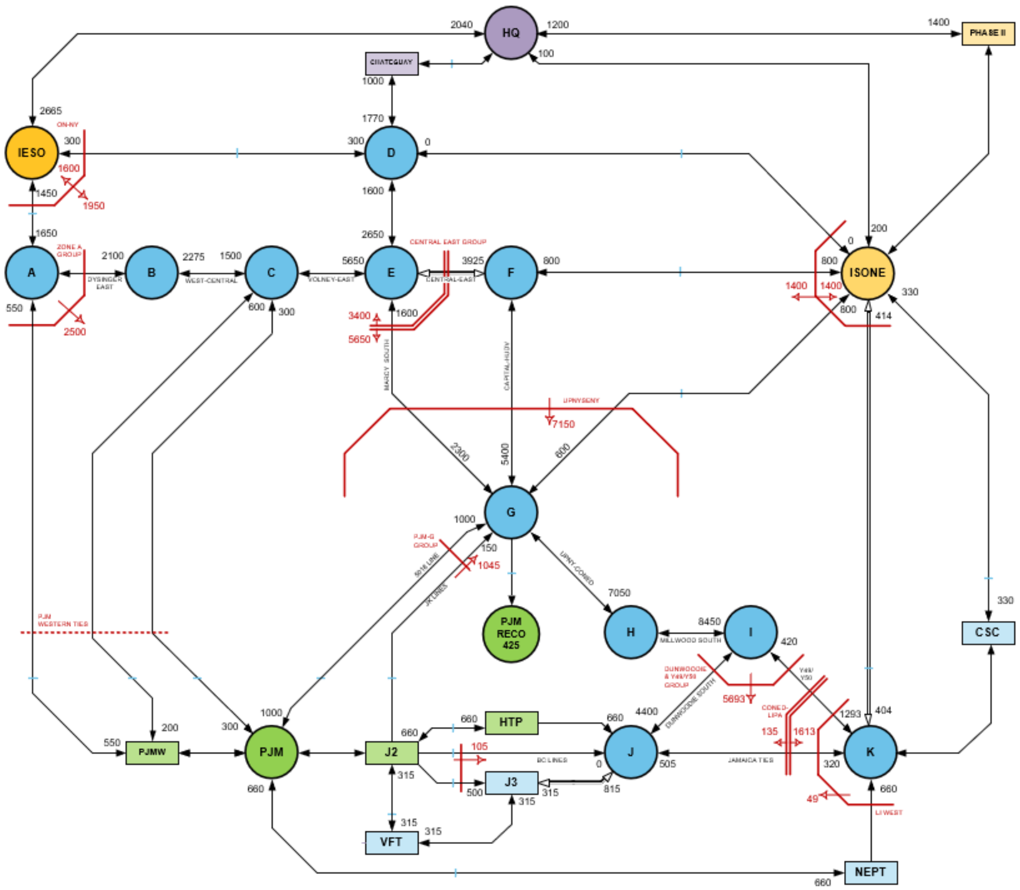
#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
		3. Ontario – NY updated per input from Ontario ISO 4. Added 1,250 MW (May through October) related with the HVDC from Quebec to New York City (Champlain Hudson project) starting 2026 5. Updated Long Island limits per PSEG-Long Island's input 6. Updated UPNY-ConEd to align with around 300 MW smaller delta associated in the 2021 Operations UPNY-ConEd Voltage Study with the status of the M51, M52, 71, 72 Series Rectors (assumed in service for this RNA)		
Emergency Operating Procedures (EOPs)				
0	EOP Steps Order	1. Removing Operating Reserve 2. Special Case Resources (SCRs) (Load and Generator) 3. 5% Manual Voltage Reduction 4. 30-Minute Operating Reserve to Zero 5. 5% Remote Controlled Voltage Reduction 6. Voluntary Load Curtailment 7. Public Appeals 8. Emergency Assistance from External Areas 9. Part of the 10-Minute Operating Reserve to Zero	Same method	Implementing NYSRC ICS' recommendation: Moved step 5 to step 4. Moved step 6 to step 5. Moved step 4 to step 6.
1	Special Case Resources (SCR)	SCRs sold for the program discounted to historic availability ("effective capacity"). Monthly variation based on historical experience. Summer values calculated from the latest available July registrations (July 2022 SCR enrollment) held constant for all years of study. Modeling 15 calls/year. Generation and load zonal MW are combined into one step.	Same method	SCRs sold for the program discounted to historic availability ("effective capacity"). Monthly variation based on historical experience. Summer values calculated from the latest available July registrations (July 2023 SCR enrollment) held constant for all years of study. Modeling 15 calls/year. Generation and load zonal MW are combined into one step.
2	EDRP Resources	Not modeled: the values are less than 2 MW.	Same method	Same method

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
3	Operating Reserves	655 MW 30-min reserve to zero 960 MW 10-min reserve to zero Note: the 10-min reserve modeling method is updated per NYISO's recommendation (approved at the May 4, 2022 NYSRC ICS [link]) to maintain (or no longer deplete/use) 350 MW of the 1,310 MW 10-min operating reserve at the applicable EOP step. Therefore, the 10-min operating reserve MARS EOP step will use, as needed each MARS replication: 960 MW (=1,310 MW–350 MW)	Same method	655 MW 30-min reserve to zero 910 MW 10-min reserve to zero Note: the 10-min reserve modeling method is updated per NYISO's recommendation (approved at the May 30, 2023 NYSRC ICS [link]) to maintain (or no longer deplete/use) 400 MW of the 1,310 MW 10-min operating reserve at the applicable EOP step. Therefore, the 10-min operating reserve MARS EOP step will use, as needed each MARS replication: 910 MW (=1,310 MW–400 MW)
4	Other EOPs *e.g., manual voltage reduction, voltage curtailments, public appeals, external assistance, as listed above*	Based on TO information, measured data, and NYISO forecasts. Used 2022 elections, as available	Same method	Based on TO information, measured data, and NYISO forecasts. Used 2023 elections, as available
External Control Areas Modeling Assumptions • External models (NE, HQ, Ontario, PJM) received via the NPCC CP-8 WG process. • The top three summer peak load days of an external Control Area is modeled as coincident with the NYCA top three peak load days. • Load and capacity fixed through the study years. • The renewable and energy limited shapes are removed. • EOPs are not represented for the external Control Area capacity models. • External Areas adjusted to be between 0.1 and 0.15 event-days/year LOLE by adjusting capacity pro-rata in all areas. • Implemented a statewide emergency assistance (from the neighboring systems) limit of 3500 MW. • LFU is applied to neighboring systems. • Same load historical years are used as NY.				
1	PJM	Simplified model: The 5 PJM MARS areas (bubbles) were consolidated into one starting 2020 RNA As per RNA procedure	Same method	Same method
2	ISONE	Simplified model: The 8 ISO-NE MARS areas (bubbles) were consolidated into one starting 2020 RNA	Same method	Same method

#	Parameter	2022 RNA (2022 Gold Book) Study Period: y4 (2026)-y10 (2032)	2022 Q3, Q4 STAR and 2023 Q1, Q2 STAR (2022 Gold Book, 2022 RNA Base Cases + key updates) Study Period: y1 (2023)-y5 (2027)	2023 Reliability Planning Models (2023 Gold Book) Study Period: y1 (2024)-y5 (2028)
3	HQ	As per RNA Procedure	Same method	Same method
4	IESO	As per RNA procedure.	Same method	Same method
5	Reserve Sharing	All NPCC Control Areas indicate that they will share reserves **equally** among all members before sharing with PJM.	Same method	Same method
6	NYCA Emergency Assistance Limit	Implemented a statewide limit of 3,500 MW, additional to the "pipe" limits	Same method	Same method
Miscellaneous				
1	MARS Model Version	4.10.2035	Same	4.14.2163

Resource Adequacy Topology from the 2022 Reliability Needs Assessment[30]

MARS Topology Study Year 2024



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

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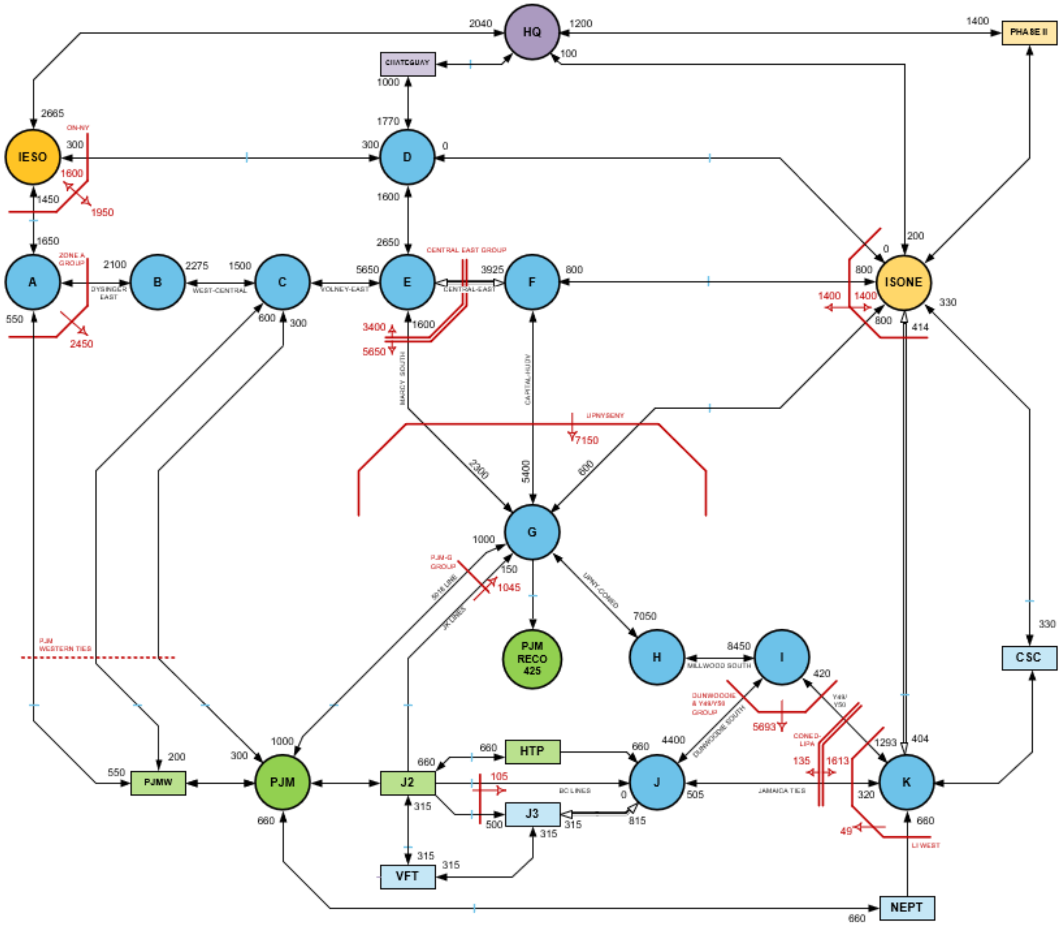
[30] This is the MARS topology used for 2022 Reliability Needs Assessment studies and is not fully re-evaluated for each quarterly STAR.

MARS Topology Study Year 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

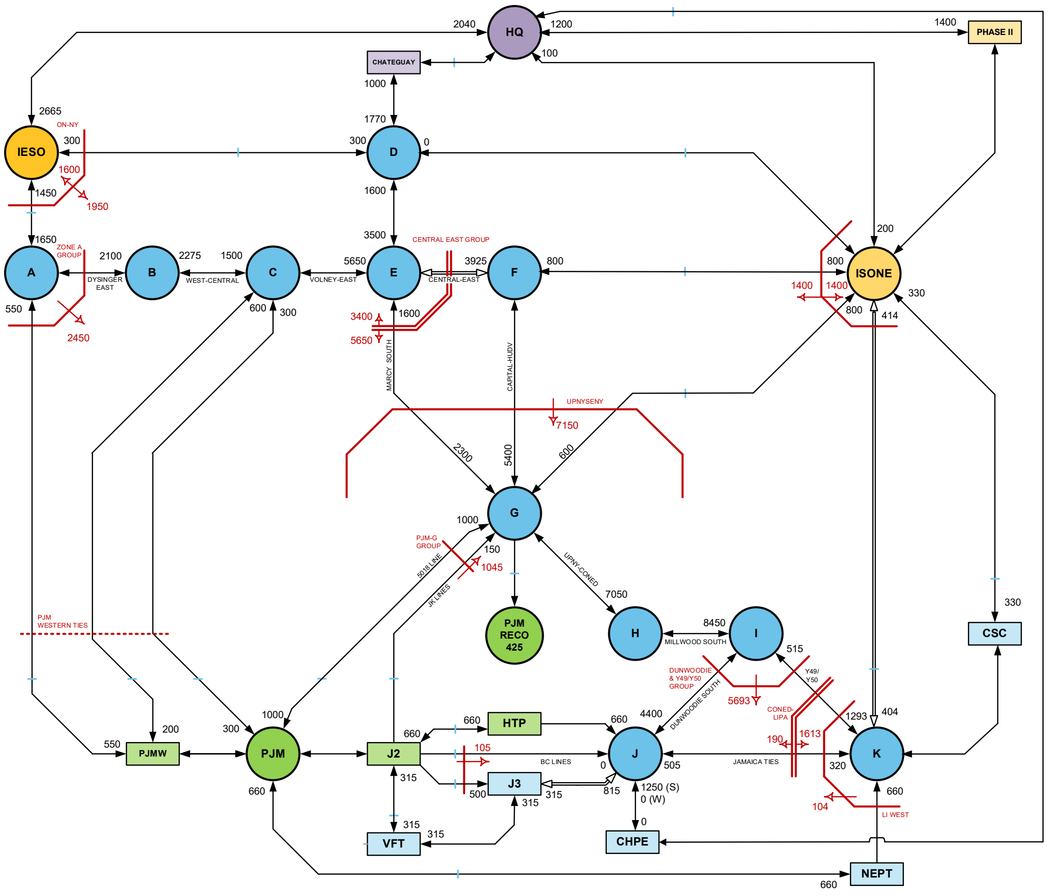
— Interface Group
═ Interface Group w/ Dynamic Ratings
- - - Monitoring Interface Group

— / | 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

MARS Topology Study Year 2026-2028



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

Appendix E: Transmission Security Margins (Tipping Points)

Introduction

The purpose of this assessment is to identify plausible changes in conditions or assumptions that might adversely impact the reliability of the system. This assessment is performed using input from the 2023 Load and Capacity Data Report (Gold Book) and the projects that meet the 2022 RNA base case inclusion rules with consideration of updates for the quarterly Short-Term Reliability Process.

This assessment is derived from discussions with stakeholders at the May 5, 2022[31] and May 23, 2022[32] joint meetings of the Transmission Planning Advisory Subcommittee and the Electric System Planning Working Group, seeking several enhancements to the reliability planning practices. The proposed changes to reliability planning practices included: (1) modeling intermittent resources according to their expected availability coincident with the represented system condition, (2) accounting for the availability of thermal generation based on NERC class average five-year outage rate data in transmission security assessments, and (3) the ability to identify reliability needs through powerflow simulations combined with post-processing spreadsheet-based calculations of transmission security margins (a.k.a. "tipping points") within the Lower Hudson Valley (Zones G-J), New York City (Zone J), and Long Island (Zone K) localities, as well as other enhancements to reliability planning practices.[33] At its June 23, 2022, meeting, the Operating Committee approved revisions to the Reliability Planning Process Manual that reflect these enhancements. For this assessment, the margins are evaluated statewide as well as Lower Hudson Valley, New York City, and Long Island localities.

A BPTF reliability need is identified when the transmission security margin under expected weather conditions in the Lower Hudson Valley, New York City, and Long Island localities is less than zero or when the statewide system margin is less than zero. Additional details regarding the impact of heatwave, extreme heatwave, or other scenario conditions are provided for informational purposes.

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[31] Reliability Planning Practices: Opportunities for Enhancement, May 5, 2022 TPAS/ESPWG (here)

[32] Response to Stakeholder Questions and Feedback on 2022 RNA, 2022 Quarter 2 STAR and Reliability Planning Enhancements, May 23, 2022 ESPWG (here)

[33] At its June 23, 2022 meeting, the NYISO Operating Committee approved revisions to the Reliability Planning Process Manual that reflect the use of transmission security margins and other enhancements (here)

New York Control Area (NYCA) Statewide System Margins

The statewide system margin for the New York Control Area is evaluated under baseline expected summer peak demand forecasts, which includes expected weather for summer and winter conditions with normal transfer criteria. Under current applicable reliability rules and procedures, a Reliability Need would be identified when the statewide margin is negative for the base case assumptions (*i.e.*, baseline summer peak coincident peak ("summer peak") demand, expected weather, normal transfer criteria). The statewide system margin is the ability to meet the forecasted demand and largest loss-of-source contingency (*i.e.,* total capacity requirement) against the NYCA generation (including derates) and external area interchange. The NYCA generation (from line-item A) is comprised of the existing generation plus additions of future generation resources that meet the reliability planning process base case inclusion rules less the removal of deactivating generation and peaker units. Consistent with current transmission planning practices for transmission security, the NYISO assumed the following for the summer capability period: (1) land-based wind generation is assumed at a 5% of nameplate output and off-shore wind is assumed at 10% of nameplate output, (2) run-of-river hydro is reduced consistent with its average capacity factor, and (3) wholesale solar generation is dispatched based on the ratio of behind-the-meter solar generation ("BtM-PV") BtM solar nameplate capacity and BtM-PV peak reductions stated in the 2023 Gold Book. For the winter capability period: (1) land-based wind generation is assumed at 10% of nameplate output and off-shore wind is 15% of nameplate output, (2) run-of-river hydro is reduced consistent with its average capacity factor, and (3) wholesale solar generation is dispatched at 0 MW for winter peak. Derates for thermal resources based on their NERC five-year class average EFORd are also included.[34] Additionally, the NYCA generation includes the Oswego export limit with all lines in service.

Transmission security analysis represents discrete snapshots in time of various credible combinations of system conditions. When reliability needs are identified, only the magnitude of the need is identified (*e.g.*, a thermal overload expressed in terms of percentage of the applicable rating) under the studied system conditions. Additional details are required to fully describe the nature of the need, such as evaluating the hourly demand shape and its impact on the need. For example, in the 2020 Reliability Needs Assessment,[35] there is information detailing various contingency combinations resulting in thermal overloads within New York City (*see, e.g.*, 2020 RNA Figure 26). To fully describe the nature of these needs, demand-duration shapes were developed for the areas in which needs were observed (*see, e.g.*, 2020 RNA Figure 27).

To describe the nature of the statewide system margins under expected summer peak, heatwave, and

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[34] NERC five-year class average EFORd data

[35] 2020 Reliability Needs Assessment

extreme heatwave conditions more fully, demand shapes are developed to reflect the expected behavior of the demand over 24 hours on the summer peak day for the 10-year study horizon. Details of the demand shapes are provided later in this appendix. For this assessment, demand shapes were not developed past 2033 and have only been developed for the summer condition.

Baseline peak forecasts and demand shapes assume expected (approximately average) peak day weather. The heatwave and extreme heatwave conditions are defined by the 90th and 99th percentile summer peak forecasts documented in the Gold Book, respectively. The baseline and percentile summer peak forecasts utilize a cumulative temperature and humidity index, which reflects a weighted average of weather conditions on the peak day and the two preceding days and is based on the historical distribution of peak-day weather. The peak demand forecasts incorporate the projected impacts of increasing temperature trends throughout the forecast horizon. In general, a heatwave (1-in-10-year or 90/10) has a statewide average maximum temperature of 95 degrees Fahrenheit. An extreme heatwave (1-in-100-year or 99/1) has a statewide average maximum temperature of 98 degrees Fahrenheit. Figure 23 shows the forecasts summer peak load for the NYCA under baseline normal weather conditions (maximum temperature of 91 degrees Fahrenheit), as well as a 95-degree Fahrenheit heatwave expected once every ten years (90/10) and an extreme 1-in-100 year (99/1) heatwave with a maximum temperature of 98 degrees Fahrenheit.

As shown in Figure 24, under summer peak demand with expected weather with normal transfer criteria, the statewide system margin (line-item J) ranges between 457 MW in 2024 to a deficiency of 46 MW in 2033. The annual fluctuations are driven by the decreases in NYCA generation (line-items A and B) and in the demand forecast (line-items F and G). In 2025, under the baseline demand forecast the system is observed to be deficient by 81 MW. However, the higher policy demand forecast has an extremely narrow, but positive margin at 79 MW. Overall, a key contributor to the narrowing of the transmission security margin is the large load forecast (line-item G) which is 764 MW in 2025. Of the planned large loads, approximately 260 MW is currently in-service leaving 504 MW of growth forecasted for year 2025 (260+504=764 MW). Without any additional large load growth from the existing 260 MW, the system margin in 2025 under baseline demand conditions would be 423 MW (as opposed to a deficiency of -81 MW currently shown in line-item J).

The NYISO performed an additional sensitivity evaluation for informational purposes shown in Figure 24, representing the impact of maintaining the full operating reserve within the NYCA (line-item N) on the statewide system margin. The statewide system margin with full operating reserve is deficient in the 2025. In this scenario the margins are sufficient once Champlain Hudson Power Express (CHPE) project enters service by summer 2026.[36] However, due to load growth, the margins are again observed to be deficient starting in 2030.

Utilizing the demand shapes for the baseline summer peak demand day with expected weather (Figure 118), the statewide system margin for each hour utilizing normal transfer criteria is shown in Figure 25. The statewide system margin for each hour is created by using the demand forecast for each hour in the margin calculation (*e.g.*, Figure 24 line-items F and G) with additional adjustments in NYCA generation to account for the appropriate derate for solar generation and energy limited resources in each hour (*e.g.*, Figure 24 line-item B). All other values in the margin calculations are held constant. A graphical representation of the hourly margin for years 2024, 2025, 2028, and 2033 is shown in Figure 26. These years are selected due to the DEC Peaker Rule impacts in 2025 along with the year 5 representation (2028) and the last year of the ten-year study horizon for the reliability planning process. Figure 27 shows the impact of additional generator and plant outages on the statewide system margin.

It is possible for other combinations of events, such as a 1-in-10-year heatwave[37] ("heatwave") or 1-in-100-year extreme heatwave[38] ("extreme heatwave") to result in a deficient statewide system margin. Figure 28 shows the statewide system margin for heatwave condition under the assumption that the system is using emergency transfer criteria. Although system transmission security is not currently designed under these conditions, Figure 28 shows that insufficient margin exists in most of the years in the ten-year horizon (line-item K). Additionally, Figure 28 also shows the statewide system margin with full operating reserve under heatwave conditions (line-item M). Under this sensitivity, there is insufficient margin for all study years.

Utilizing the demand shape for the 1-in-10-year heatwave (Figure 124), the statewide system margin for each hour utilizing emergency transfer criteria is shown in Figure 29. Under the 1-in-10-year heatwave conditions, the deficiency for the 1-in-10-year heatwave peak day in 2024, shown in Figure 28 at the statewide coincident peak hour, is 682 MW. Figure 29 shows that the system is deficient in ten hours with a total deficiency in the 24-hour period of 6,183 MWh. In 2025, the system is observed to be deficiency for only 9 hours; however, the total deficiency is 9,520 MWh. Deficiencies in other years can be similarly calculated. Figure 30 provides a graphical representation of the statewide system margin curve for heatwave conditions for the heatwave peak day in summers 2024, 2025, 2028, and 2033.

For the statewide system margin in a 1-in-100-year extreme heatwave, Figure 31 shows that there is insufficient statewide system margin as early as 2024 by 2,392 MW (line-item K). The margin improves in

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[36] The CHPE project is currently planned to enter service in May 2026.

[37] The load forecast utilized for the heatwave condition is the 90th percentile (or 90/10) expected load forecast.

[38] The load forecast utilized for the extreme heatwave condition is the 99th percentile (or 99/1) expected load forecast.

summer 2026 with CHPE in service; however, the margin remains deficient for the entire study period. In 2026, the deficiency is 1,745 MW. By 2033, the deficiency worsens to 3,011 MW. These issues are exacerbated with consideration of full operating reserve (line-item M).

Utilizing the demand shape for the 1-in-100-year extreme heatwave (Figure 129), the statewide system margin for each hour utilizing emergency transfer criteria is shown in Figure 32. Under the 1-in-100-year extreme heatwave conditions, the deficiency for the extreme heatwave day in summer 2025 shown in Figure 31 as 2,923 MW is seen over 12 hours (25.966 MWh). With the in-service status of CHPE by summer 2026, the deficiency observed for the extreme heatwave day in summer 2026 improves to ten hours (12,514 MWh). By 2033, the extreme heatwave days deficiency is nine hours (18,942 MWh). Figure 33 provides a graphical representation of the statewide system margin curve for heatwave conditions for the peak day in years 2024, 2025, 2028, and 2033.

Figure 34 shows the statewide system margin under winter peak demand and expected weather, using normal transfer criteria. For winter peak, the statewide system margin ranges from 9.440 MW in winter 2024-25 to 942 MW in winter 2033-34 (line-item J). Under the additional sensitivity evaluation of maintaining the full operating reserve in the NYCA shown in Figure 34, all years are also shown to be sufficient.

Cold snap and extreme cold snap conditions are defined by the 90th and 99th percentile winter peak forecasts, respectively, which are documented in the 2023 Gold Book. The baseline and percentile winter peak forecasts utilize the historical distribution of winter peak day temperature. In general, a cold snap (1-in-10-year or 90/10) reflects a statewide daily average temperature of 5 degrees Fahrenheit. An extreme cold snap (1-in-100-year or 99/1) reflects a statewide daily average temperature of -2 degrees Fahrenheit.

Figure 35 shows the statewide system margin in a 1-in-10-year cold snap ("cold snap") utilizing emergency transfer criteria.[39] Under this condition, the margin is sufficient for all study years (line-item K) and ranges from 8.994 MW in winter 2024-25 to 140 MW in winter 2033-34. Additionally, Figure 35 shows the statewide system margin with full operating reserve, which is also sufficient for all study years until 2033-34 which is deficient by 1,170 MW.

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[39] The load forecast utilized for the cold snap condition is the winter 90th percentile (or 90/10) expected load forecast.

Figure 36 shows the statewide system margin in a 1-in-100-year extreme cold snap ("extreme cold snap") utilizing emergency transfer criteria.[40] Under this condition, the margin is sufficient for all study years (line-item K) until winter 2032-33, which is deficient by 669 MW and worsens to 2,284 MW in winter 2033-34. Additionally, Figure 36 shows that the statewide system margin with full operating reserve s also sufficient for all study years (line-item M) through winter 2030-31. In winter 2031-32, the margin is deficient by 452 MW and worsens to 3,594 MW by following winter 2033-34.

Figure 37 provides a summary of the summer peak statewide system margins under expected weather, heatwave, and extreme heatwave conditions. Figure 38 provides a summary of the winter peak statewide system margins under expected weather, cold snap, and extreme cold snap conditions. Figure 39 provides a summary of the statewide system margin with the summer peak baseline demand range from the lower and higher policy demand forecast scenarios.

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[40] The load forecast utilized for the extreme cold snap condition is the winter 99th percentile (or 99/1) expected load forecast.

Figure 23: Statewide Summer Peak Demand Forecasts

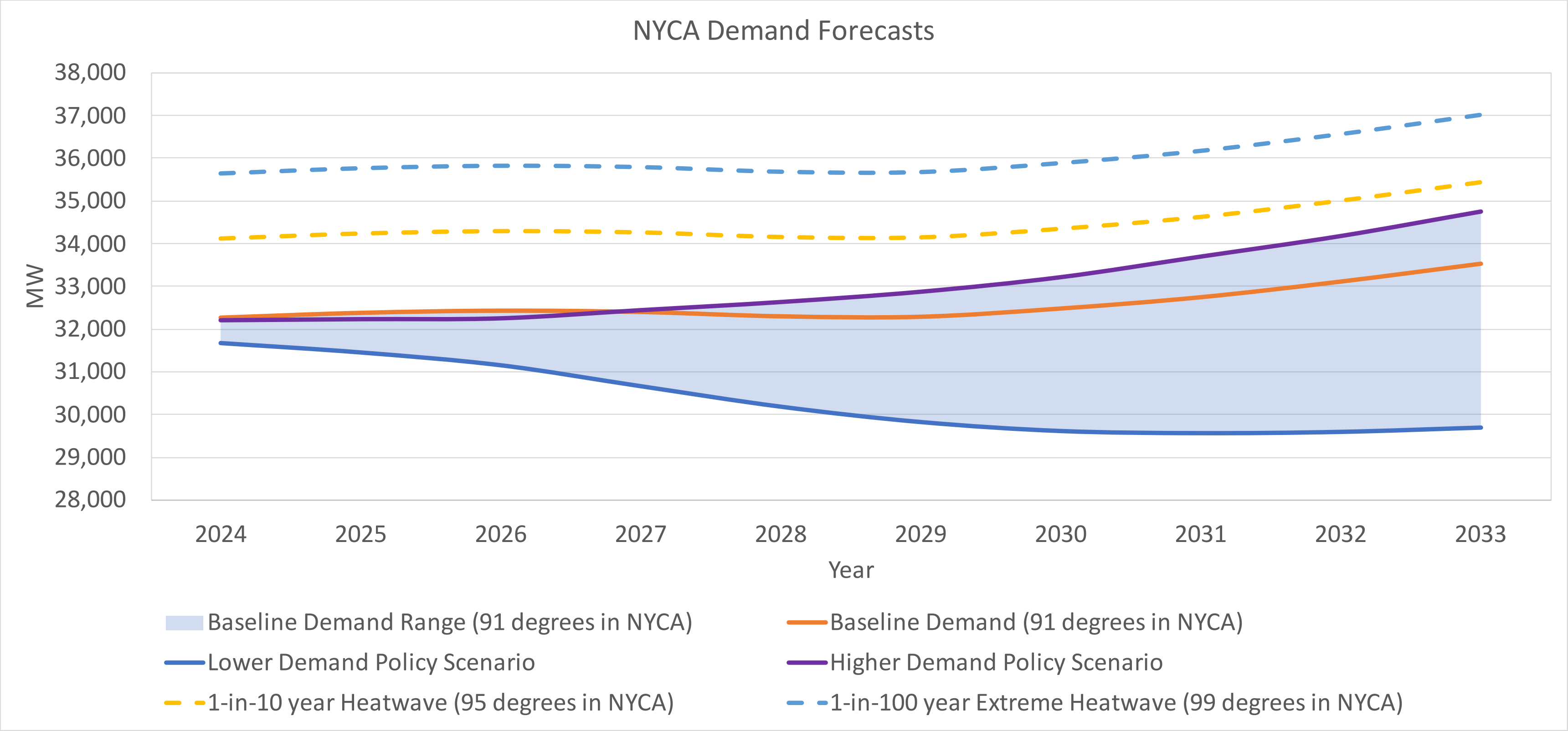


Figure 24: Statewide System Margin (Summer Peak - Expected Weather, Normal Transfer Criteria)

Line	Item	Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)									
		2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	NYCA Generation (1)	38,066	38,343	38,343	38,343	38,343	38,343	38,343	38,343	38,343	38,343
B	NYCA Generation Derates (2)	(5,863)	(6,567)	(6,582)	(6,596)	(6,610)	(6,624)	(6,624)	(6,639)	(6,653)	(6,653)
C	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
D	External Area Interchanges (3)	1,844	1,844	3,094	3,094	3,094	3,094	3,094	3,094	3,094	3,094
E	**Total Resources (A+B+C+D)**	34,047	33,619	34,855	34,841	34,827	34,812	34,812	34,798	34,784	34,784
F	Demand Forecast (5)	(31,763)	(31,626)	(31,436)	(31,292)	(31,164)	(31,126)	(31,266)	(31,526)	(31,886)	(32,296)
G	Large Load Forecast (6)	(517)	(764)	(1,004)	(1,118)	(1,146)	(1,174)	(1,224)	(1,224)	(1,224)	(1,224)
H	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
I	**Total Capability Requirement (F+G+H)**	(33,590)	(33,700)	(33,750)	(33,720)	(33,620)	(33,610)	(33,800)	(34,060)	(34,420)	(34,830)
J	**Statewide System Margin (E+I)**	457	(81)	1,105	1,121	1,207	1,202	1,012	738	364	(46)
K	Higher Policy Demand Impact	75	160	190	(30)	(320)	(570)	(720)	(940)	(1,060)	(1,220)
L	**Higher Policy Statewide System Margin (J+K)**	532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
M	SCRs (7), (8)	897	897	897	897	897	897	897	897	897	897
N	**Statewide System Margin with SCR (L+M)**	1,429	976	2,192	1,987	1,783	1,529	1,189	695	200	(370)
O	Operating Reserve	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
P	**Statewide System Margin with Full Operating Reserve (N+O) (4)**	119	(334)	882	677	473	219	(121)	(615)	(1,110)	(1,680)

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Interchanges are based on ERAG MMWG values.
4. For informational purposes.
5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included.
6. Forecast of large load queue projects included in this assessment (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center, Q1536 - White Pines Phase 1 (Micron), and Q1446 - Massena Green Hydrogen (Air Products and Chemicals)).
7. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
8. Includes a derate of 384 MW for SCRs

Figure 25: Statewide System Margin (Hourly) (Summer Peak - Expected Weather, Normal Transfer Criteria)

Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)										
Statewide System Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	6,317	5,543	6,691	6,666	6,707	6,695	6,552	6,364	6,115	5,851
HB1	6,322	5,564	6,727	6,716	6,767	6,771	6,650	6,490	6,274	6,045
HB2	7,140	6,396	7,568	7,565	7,624	7,642	7,537	7,398	7,207	7,007
HB3	7,583	6,848	8,026	8,028	8,094	8,118	8,027	7,900	7,726	7,542
HB4	7,547	6,811	7,991	7,996	8,065	8,095	8,009	7,889	7,721	7,545
HB5	6,881	6,139	7,315	7,320	7,389	7,417	7,326	7,199	7,020	6,835
HB6	5,698	4,990	6,182	6,204	6,290	6,330	6,240	6,110	5,925	5,728
HB7	5,418	4,851	6,122	6,218	6,371	6,460	6,403	6,298	6,131	5,949
HB8	4,587	4,257	5,652	5,860	6,108	6,275	6,272	6,209	6,082	5,933
HB9	3,904	3,821	5,350	5,683	6,037	6,290	6,356	6,351	6,277	6,176
HB10	2,964	3,072	4,706	5,137	5,578	5,904	6,026	6,071	6,039	5,984
HB11	2,150	2,372	4,072	4,564	5,063	5,436	5,597	5,675	5,676	5,651
HB12	1,539	1,800	3,523	4,036	4,559	4,947	5,117	5,203	5,210	5,194
HB13	724	952	2,662	3,167	3,681	4,063	4,224	4,300	4,295	4,272
HB14	1,043	1,208	2,889	3,129	3,622	3,985	3,327	3,385	3,367	3,326
HB15	639	667	2,273	2,680	3,114	3,424	3,038	3,046	2,975	2,885
HB16	1,021	(48)	1,144	1,438	1,772	1,993	2,001	1,929	1,773	1,604
HB17	457	(65)	1,261	1,406	1,611	1,712	1,622	1,457	1,208	941
HB18	584	(81)	1,105	1,121	1,207	1,202	1,012	738	377	11
HB19	387	136	1,257	1,211	1,242	1,193	954	650	364	(46)
HB20	842	264	1,656	1,829	1,847	1,790	1,549	1,250	863	457
HB21	1,137	281	1,384	1,325	1,345	1,293	1,541	1,255	887	498
HB22	2,260	1,425	2,539	2,486	2,508	2,461	3,053	2,789	2,449	2,089
HB23	3,981	3,174	4,302	4,262	4,294	4,264	4,085	3,856	3,557	3,241

Figure 26: Statewide System Margin Hourly Curve (Summer Peak - Expected Weather, Normal Transfer Criteria)

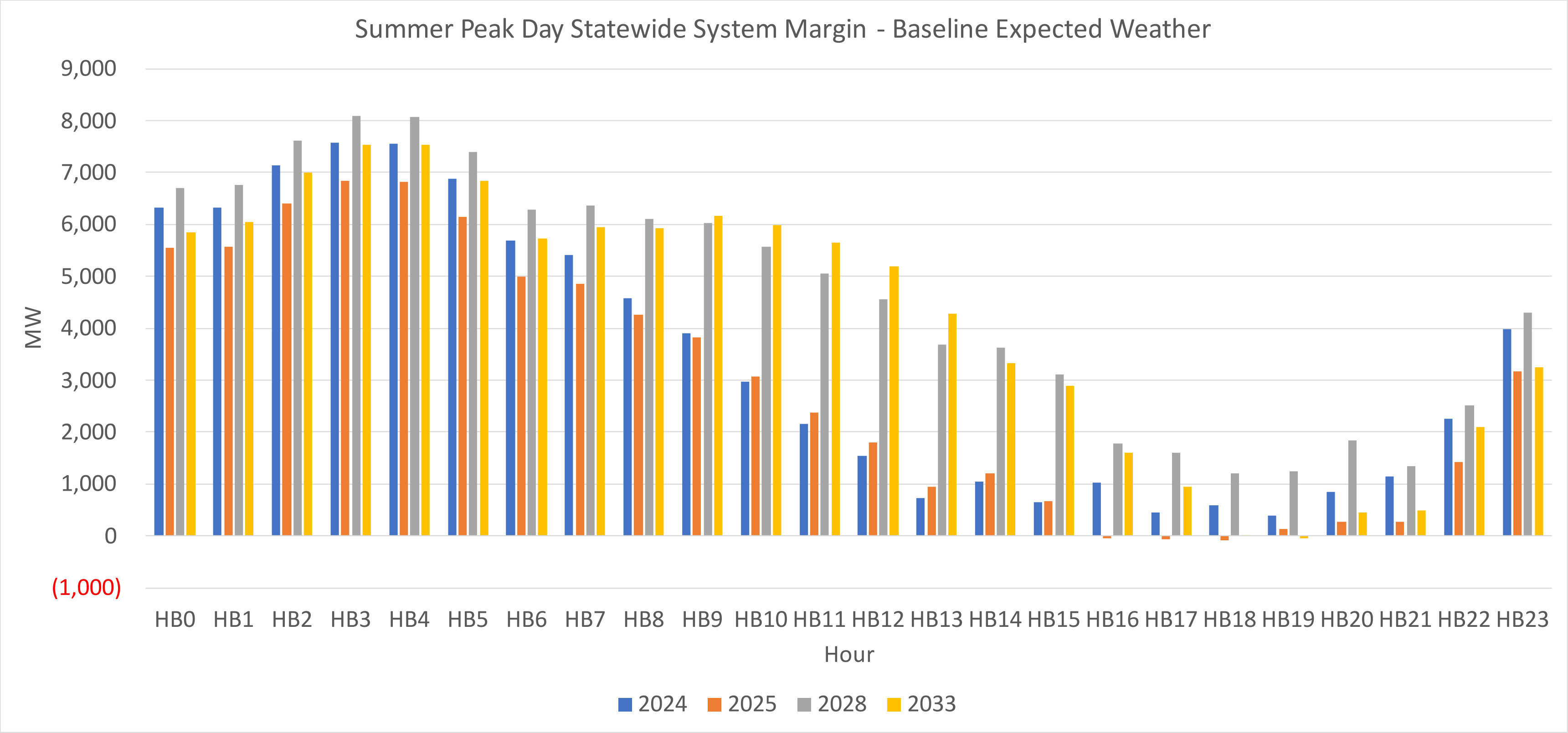


Figure 27: Impact of Generator Outages on Statewide System Margin

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	Summer DMNC (MW)	NERC 5-Year Class Average De-Rate (MW)	Transmission Security Margin Following Generator/Plant Outage									
Lockport CC1, CC2, and CC3	207.3	(8.42)	334	(119)	1,096	892	688	433	93	(401)	(895)	(1,465)
Lockport CC1	69.1	(2.81)	466	13	1,229	1,025	820	566	226	(268)	(762)	(1,332)
Lockport CC2	69.1	(2.81)	466	13	1,229	1,025	820	566	226	(268)	(762)	(1,332)
Lockport CC3	69.1	(2.81)	466	13	1,229	1,025	820	566	226	(268)	(762)	(1,332)
American Ref-Fuel 1 & 2	35.8	(3.54)	500	47	1,263	1,059	854	600	260	(234)	(728)	(1,298)
American Ref-Fuel 1	17.9	(1.77)	516	63	1,279	1,075	871	616	276	(218)	(712)	(1,282)
American Ref-Fuel 2	17.9	(1.77)	516	63	1,279	1,075	871	616	276	(218)	(712)	(1,282)
Fortistar - N.Tonawanda	57.3	(2.33)	477	24	1,240	1,036	832	577	237	(257)	(751)	(1,321)
Chaffee	6.4	(0.62)	527	74	1,289	1,085	881	627	287	(208)	(702)	(1,272)
Indeck-Olean	77.2	(3.13)	458	5	1,221	1,017	813	558	218	(276)	(770)	(1,340)
Indeck-Yerkes	45.8	(1.86)	489	36	1,251	1,047	843	588	248	(246)	(740)	(1,310)
Chautauqua LFGE	0.0	0.00	532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Jamestown 5, 6 & 7	82.3	(8.22)	458	5	1,221	1,017	813	558	218	(276)	(770)	(1,340)
Jamestown 7	40.4	(4.07)	496	43	1,259	1,055	850	596	256	(238)	(733)	(1,303)
Jamestown 5	22.4	(2.22)	512	59	1,275	1,071	866	612	272	(222)	(716)	(1,286)
Jamestown 6	19.5	(1.93)	515	62	1,278	1,073	869	615	275	(219)	(714)	(1,284)
Model City Energy	5.6	(0.54)	527	74	1,290	1,086	882	627	287	(207)	(701)	(1,271)
Modern LF	6.4	(0.62)	527	74	1,289	1,085	881	627	287	(208)	(702)	(1,272)
Mill Seat	6.4	(0.62)	527	74	1,289	1,085	881	627	287	(208)	(702)	(1,272)
Synergy Biogas	0.0	0.00	532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Hyland LFGE	4.8	(0.46)	528	75	1,291	1,087	882	628	288	(206)	(701)	(1,271)
R. E. Ginna	580.3	(11.08)	(37)	(490)	726	522	317	63	(277)	(771)	(1,265)	(1,835)
Red Rochester (BTM:NG)	12.5	(1.24)	521	68	1,284	1,080	875	621	281	(213)	(707)	(1,277)
Allegany	62.2	(2.53)	473	20	1,236	1,031	827	573	233	(262)	(756)	(1,326)
Batavia	47.8	(1.94)	487	34	1,249	1,045	841	586	246	(248)	(742)	(1,312)

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Carr St.-E. Syr	86.5	(3.51)	449	(4)	1,212	1,008	804	549	209	(285)	(779)	(1,349)
Syracuse	87.1	(3.54)	449	(4)	1,212	1,007	803	549	209	(285)	(780)	(1,350)
Broome LFGE	2.4	(0.23)	530	77	1,293	1,089	884	630	290	(204)	(698)	(1,268)
Broome 2 LFGE	2.1	(0.20)	531	78	1,293	1,089	885	630	290	(204)	(698)	(1,268)
Independence GS1, GS2, GS3, & GS4	958.8	(38.93)	(387)	(840)	375	171	(33)	(288)	(628)	(1,122)	(1,616)	(2,186)
Independence GS1	239.7	(9.73)	302	(150)	1,065	861	657	402	62	(432)	(926)	(1,496)
Independence GS2	239.7	(9.73)	302	(150)	1,065	861	657	402	62	(432)	(926)	(1,496)
Independence GS3	239.7	(9.73)	302	(150)	1,065	861	657	402	62	(432)	(926)	(1,496)
Independence GS4	239.7	(9.73)	302	(150)	1,065	861	657	402	62	(432)	(926)	(1,496)
Greenidge 4 (BTM:NG)	24.0	(2.38)	511	58	1,274	1,069	865	611	271	(224)	(718)	(1,288)
James A. FitzPatrick	831.3	(18.04)	(281)	(734)	482	278	73	(181)	(521)	(1,015)	(1,509)	(2,079)
High Acres	9.6	(0.93)	524	71	1,287	1,082	878	624	284	(211)	(705)	(1,275)
Indeck-Silver Springs	52.6	(2.14)	482	29	1,245	1,040	836	582	242	(252)	(747)	(1,317)
Indeck-Oswego	52.7	(2.14)	482	29	1,245	1,040	836	582	242	(252)	(747)	(1,317)
Nine Mile Point 2 (2)	1,272.1	(27.60)	(594)	(1,047)	169	(36)	(240)	(494)	(834)	(1,328)	(1,823)	(2,393)
Nine Mile Point 1	620.9	(13.47)	(75)	(528)	688	483	279	25	(315)	(809)	(1,304)	(1,874)
Oswego 6	823.4	(81.52)	(209)	(662)	553	349	145	(110)	(450)	(944)	(1,438)	(2,008)
Oswego 5	798.1	(79.01)	(187)	(640)	576	372	168	(87)	(427)	(921)	(1,415)	(1,985)
Seneca Energy 1 & 2	17.6	(1.70)	517	64	1,279	1,075	871	616	276	(218)	(712)	(1,282)
Ontario LFGE	11.2	(1.08)	522	69	1,285	1,081	877	622	282	(212)	(706)	(1,276)
Seneca Energy 1	8.8	(0.85)	525	72	1,287	1,083	879	624	284	(210)	(704)	(1,274)
Seneca Energy 2	8.8	(0.85)	525	72	1,287	1,083	879	624	284	(210)	(704)	(1,274)
Clinton LFGE	6.4	(0.62)	527	74	1,289	1,085	881	627	287	(208)	(702)	(1,272)
Massena	79.9	(3.24)	456	3	1,219	1,014	810	556	216	(279)	(773)	(1,343)
Saranac Energy CC1 & CC2	235.5	(9.56)	307	(146)	1,069	865	661	406	66	(428)	(922)	(1,492)
Saranac Energy CC2	124.9	(5.07)	413	(40)	1,175	971	767	513	173	(322)	(816)	(1,386)

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Saranac Energy CC1	110.6	(4.49)	426	(27)	1,189	985	781	526	186	(308)	(802)	(1,372)
Beaver Falls	80.3	(3.26)	455	2	1,218	1,014	810	555	215	(279)	(773)	(1,343)
Oneida-Herkimer LFGE	3.2	(0.31)	530	77	1,292	1,088	884	629	289	(205)	(699)	(1,269)
DANC LFGE	6.4	(0.62)	527	74	1,289	1,085	881	627	287	(208)	(702)	(1,272)
Carthage Energy	55.6	(2.26)	479	26	1,242	1,038	833	579	239	(255)	(750)	(1,320)
Sterling	48.3	(1.96)	486	33	1,249	1,045	840	586	246	(248)	(743)	(1,313)
Albany LFGE	5.6	(0.54)	527	74	1,290	1,086	882	627	287	(207)	(701)	(1,271)
Castleton Energy Center	66.1	(2.68)	469	16	1,232	1,027	823	569	229	(265)	(760)	(1,330)
Selkirk I & II	350.6	(14.23)	196	(257)	959	755	550	296	(44)	(538)	(1,033)	(1,603)
Selkirk-II	275.9	(11.20)	268	(185)	1,030	826	622	368	28	(467)	(961)	(1,531)
Rensselaer	77.0	(3.13)	459	6	1,221	1,017	813	558	218	(276)	(770)	(1,340)
Selkirk-I	74.7	(3.03)	461	8	1,224	1,019	815	561	221	(274)	(768)	(1,338)
Empire CC1 & CC2	586.6	(23.82)	(30)	(483)	732	528	324	70	(270)	(765)	(1,259)	(1,829)
Empire CC1	293.3	(11.91)	251	(202)	1,014	810	605	351	11	(483)	(978)	(1,548)
Empire CC2	293.3	(11.91)	251	(202)	1,014	810	605	351	11	(483)	(978)	(1,548)
Indeck-Corinth	128.4	(5.21)	409	(44)	1,172	968	763	509	169	(325)	(819)	(1,389)
Colonie LFGTE	6.4	(0.62)	527	74	1,289	1,085	881	627	287	(208)	(702)	(1,272)
Fulton LFGE	3.2	(0.31)	530	77	1,292	1,088	884	629	289	(205)	(699)	(1,269)
Athens 1, 2, and 3	990.5	(40.21)	(418)	(871)	345	141	(64)	(318)	(658)	(1,152)	(1,646)	(2,216)
Athens 3	331.3	(13.45)	215	(238)	977	773	569	315	(25)	(520)	(1,014)	(1,584)
Athens 1	329.6	(13.38)	216	(237)	979	775	570	316	(24)	(518)	(1,012)	(1,582)
Athens 2	329.6	(13.38)	216	(237)	979	775	570	316	(24)	(518)	(1,012)	(1,582)
Bethlehem GS1, GS2, GS3	818.7	(33.24)	(253)	(706)	510	305	101	(153)	(493)	(987)	(1,482)	(2,052)
Bethlehem GS1	272.9	(11.08)	271	(182)	1,033	829	625	371	31	(464)	(958)	(1,528)
Bethlehem GS2	272.9	(11.08)	271	(182)	1,033	829	625	371	31	(464)	(958)	(1,528)
Bethlehem GS3	272.9	(11.08)	271	(182)	1,033	829	625	371	31	(464)	(958)	(1,528)

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Wheelabrator Hudson Falls	10.4	(1.03)	523	70	1,286	1,082	877	623	283	(211)	(706)	(1,276)
DCRRA	6.2	(0.61)	527	74	1,290	1,085	881	627	287	(208)	(702)	(1,272)
Roseton 1 & 2	1,188.7	(117.68)	(539)	(992)	224	20	(184)	(439)	(779)	(1,273)	(1,767)	(2,337)
Roseton 2	612.5	(60.64)	(19)	(472)	743	539	335	80	(260)	(754)	(1,248)	(1,818)
Roseton 1	576.2	(57.04)	13	(440)	776	572	367	113	(227)	(721)	(1,215)	(1,785)
Danskammer 1, 2, 3, & 4	496.2	(49.12)	85	(368)	848	644	440	185	(155)	(649)	(1,143)	(1,713)
Danskammer 4	222.1	(21.99)	332	(121)	1,095	891	687	432	92	(402)	(896)	(1,466)
Danskammer 3	139.7	(13.83)	407	(46)	1,169	965	761	506	166	(328)	(822)	(1,392)
Danskammer 1	70.2	(6.95)	469	16	1,232	1,028	823	569	229	(265)	(759)	(1,329)
Danskammer 2	64.2	(6.36)	475	22	1,237	1,033	829	575	235	(260)	(754)	(1,324)
CPV Valley CC1 & CC2	651.8	(26.46)	(93)	(546)	670	466	261	7	(333)	(827)	(1,322)	(1,892)
CPV Valley CC1	325.9	(13.23)	220	(233)	983	778	574	320	(20)	(515)	(1,009)	(1,579)
CPV Valley CC2	325.9	(13.23)	220	(233)	983	778	574	320	(20)	(515)	(1,009)	(1,579)
Cricket Valley CC1, CC2, & CC3	1,029.3	(41.79)	(455)	(908)	308	103	(101)	(355)	(695)	(1,189)	(1,684)	(2,254)
Cricket Valley CC2	343.6	(13.95)	203	(250)	966	761	557	303	(37)	(532)	(1,026)	(1,596)
Cricket Valley CC3	343.3	(13.94)	203	(250)	966	762	557	303	(37)	(531)	(1,026)	(1,596)
Cricket Valley CC1	342.4	(13.90)	204	(249)	967	762	558	304	(36)	(530)	(1,025)	(1,595)
Bowline 1 & 2	1,139.0	(112.76)	(494)	(947)	269	65	(140)	(394)	(734)	(1,228)	(1,722)	(2,292)
Bowline 1	582.0	(57.62)	8	(445)	771	567	362	108	(232)	(726)	(1,221)	(1,791)
Bowline 2	557.0	(55.14)	31	(422)	793	589	385	131	(209)	(704)	(1,198)	(1,768)
Hillburn GT	35.7	(3.20)	500	47	1,263	1,058	854	600	260	(234)	(729)	(1,299)
Shoemaker GT	32.7	(2.93)	503	50	1,265	1,061	857	603	263	(232)	(726)	(1,296)
Wheelabrator Westchester	52.1	(5.16)	486	33	1,248	1,044	840	585	245	(249)	(743)	(1,313)
Astoria Energy 2 - CC3 & CC4	570.2	(23.15)	(15)	(468)	748	544	340	85	(255)	(749)	(1,243)	(1,813)
Astoria Energy 2 - CC3	285.1	(11.58)	259	(194)	1,022	817	613	359	19	(475)	(970)	(1,540)
Astoria Energy 2 - CC4	285.1	(11.58)	259	(194)	1,022	817	613	359	19	(475)	(970)	(1,540)

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	Summer DMNC (MW)	NERC 5-Year Class Average De-Rate (MW)	Transmission Security Margin Following Generator/Plant Outage									
Astoria East Energy CC1 & CC2	583.8	(23.70)	(28)	(481)	735	531	327	72	(268)	(762)	(1,256)	(1,826)
Astoria East Energy - CC1	291.9	(11.85)	252	(201)	1,015	811	607	352	12	(482)	(976)	(1,546)
Astoria East Energy - CC2	291.9	(11.85)	252	(201)	1,015	811	607	352	12	(482)	(976)	(1,546)
Astoria 2, 3, & 5	917.4	(90.82)	(294)	(747)	469	264	60	(194)	(534)	(1,028)	(1,523)	(2,093)
Astoria 5	374.7	(37.10)	195	(258)	958	753	549	295	(45)	(540)	(1,034)	(1,604)
Astoria 3	372.2	(36.85)	197	(256)	960	756	551	297	(43)	(537)	(1,032)	(1,602)
Astoria 2	170.5	(16.88)	379	(74)	1,142	937	733	479	139	(356)	(850)	(1,420)
Bayonne EC CT G1 through G10	601.6	(53.90)	(15)	(468)	747	543	339	85	(255)	(750)	(1,244)	(1,814)
Bayonne EC CTG1	61.8	(5.54)	476	23	1,239	1,035	830	576	236	(258)	(752)	(1,322)
Bayonne EC CTG4	60.9	(5.46)	477	24	1,240	1,035	831	577	237	(257)	(752)	(1,322)
Bayonne EC CTG9	60.5	(5.42)	477	24	1,240	1,036	832	577	237	(257)	(751)	(1,321)
Bayonne EC CTG10	60.5	(5.42)	477	24	1,240	1,036	832	577	237	(257)	(751)	(1,321)
Bayonne EC CTG8	60.3	(5.40)	478	25	1,240	1,036	832	577	237	(257)	(751)	(1,321)
Bayonne EC CTG2	60.2	(5.39)	478	25	1,240	1,036	832	578	238	(257)	(751)	(1,321)
Bayonne EC CTG7	60.0	(5.38)	478	25	1,241	1,036	832	578	238	(257)	(751)	(1,321)
Bayonne EC CTG5	59.7	(5.35)	478	25	1,241	1,037	832	578	238	(256)	(751)	(1,321)
Bayonne EC CTG6	59.6	(5.34)	478	25	1,241	1,037	832	578	238	(256)	(750)	(1,320)
Bayonne EC CTG3	58.1	(5.21)	480	27	1,242	1,038	834	579	239	(255)	(749)	(1,319)
KIAC_JFK (BTM:NG)	98.7	(4.01)	438	(15)	1,200	996	792	538	198	(297)	(791)	(1,361)
East River 1, 2, 6, & 7	636.5	(44.86)	(59)	(512)	704	499	295	41	(299)	(794)	(1,288)	(1,858)
Brooklyn Navy Yard	244.6	(9.93)	298	(155)	1,061	856	652	398	58	(437)	(931)	(1,501)
East River 7	184.2	(18.24)	366	(86)	1,129	925	721	466	126	(368)	(862)	(1,432)
East River 2	155.8	(6.33)	383	(70)	1,146	941	737	483	143	(351)	(846)	(1,416)
East River 1	155.1	(6.30)	384	(69)	1,146	942	738	484	144	(351)	(845)	(1,415)
East River 6	141.4	(14.00)	405	(48)	1,168	964	759	505	165	(329)	(824)	(1,394)
Arthur Kill Cogen	11.1	(1.32)	523	70	1,285	1,081	877	623	283	(212)	(706)	(1,276)

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Linden Cogen	789.5	(32.05)	(225)	(678)	538	333	129	(125)	(465)	(959)	(1,454)	(2,024)
Ravenswood ST 01, 02, & 03	1,730.3	(171.30)	(1,027)	(1,480)	(264)	(468)	(672)	(927)	(1,267)	(1,761)	(2,255)	(2,825)
Ravenswood ST 03	987.3	(97.74)	(357)	(810)	406	201	(3)	(257)	(597)	(1,091)	(1,586)	(2,156)
Ravenswood ST 02	374.5	(37.08)	195	(258)	958	753	549	295	(45)	(539)	(1,034)	(1,604)
Ravenswood ST 01	368.5	(36.48)	200	(253)	963	759	555	300	(40)	(534)	(1,028)	(1,598)
Ravenswood CC 04	223.2	(9.06)	318	(135)	1,081	877	672	418	78	(416)	(910)	(1,480)
Astoria CC 1 & 2	476.0	(19.33)	76	(377)	839	634	430	176	(164)	(659)	(1,153)	(1,723)
Astoria CC 1	238.0	(9.66)	304	(149)	1,067	863	658	404	64	(430)	(925)	(1,495)
Astoria CC 2	238.0	(9.66)	304	(149)	1,067	863	658	404	64	(430)	(925)	(1,495)
Gowanus 5 & 6	79.9	(8.05)	461	8	1,223	1,019	815	561	221	(274)	(768)	(1,338)
Hellgate 1 & 2	79.9	(8.05)	461	8	1,223	1,019	815	561	221	(274)	(768)	(1,338)
Harlem River 1 & 2	79.9	(8.05)	461	8	1,223	1,019	815	561	221	(274)	(768)	(1,338)
Vernon Blvd 2 & 3	79.9	(8.05)	461	8	1,223	1,019	815	561	221	(274)	(768)	(1,338)
Kent	45.8	(4.62)	491	38	1,254	1,050	845	591	251	(243)	(737)	(1,307)
Pouch	45.1	(4.55)	492	39	1,255	1,050	846	592	252	(242)	(737)	(1,307)
Gowanus 5	40.0	(4.03)	496	44	1,259	1,055	851	596	256	(238)	(732)	(1,302)
Hellgate 2	40.0	(4.03)	496	44	1,259	1,055	851	596	256	(238)	(732)	(1,302)
Harlem River 2	40.0	(4.03)	496	44	1,259	1,055	851	596	256	(238)	(732)	(1,302)
Vernon Blvd 2	40.0	(4.03)	496	44	1,259	1,055	851	596	256	(238)	(732)	(1,302)
Gowanus 6	39.9	(4.02)	497	44	1,259	1,055	851	596	256	(238)	(732)	(1,302)
Hellgate 1	39.9	(4.02)	497	44	1,259	1,055	851	596	256	(238)	(732)	(1,302)
Harlem River 1	39.9	(4.02)	497	44	1,259	1,055	851	596	256	(238)	(732)	(1,302)
Vernon Blvd 3	39.9	(4.02)	497	44	1,259	1,055	851	596	256	(238)	(732)	(1,302)
Arthur Kill ST 2 & 3	865.3	(85.66)	(247)	(700)	516	311	107	(147)	(487)	(982)	(1,476)	(2,046)
Arthur Kill ST 3	519.0	(51.38)	65	(388)	828	623	419	165	(175)	(670)	(1,164)	(1,734)
Arthur Kill ST 2	346.3	(34.28)	220	(233)	983	779	575	320	(20)	(514)	(1,008)	(1,578)

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	Summer DMNC (MW)	NERC 5-Year Class Average De-Rate (MW)	Transmission Security Margin Following Generator/Plant Outage									
Bethpage GT4	44.4	(4.48)	493	40	1,255	1,051	847	592	252	(242)	(736)	(1,306)
Bethpage	23.2	(0.94)	510	57	1,273	1,069	864	610	270	(224)	(718)	(1,288)
Stony Brook (BTM:NG)	0.0	0.00	532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Freeport CT 2	40.0	(4.03)	496	44	1,259	1,055	851	596	256	(238)	(732)	(1,302)
Freeport 1-2, 1-3, & 2-3	16.8	(1.80)	517	64	1,280	1,076	872	617	277	(217)	(711)	(1,281)
Freeport 2-3	12.5	(1.26)	521	68	1,284	1,080	875	621	281	(213)	(707)	(1,277)
Freeport 1-3	2.3	(0.29)	530	77	1,293	1,089	885	630	290	(204)	(698)	(1,268)
Freeport 1-2	2.0	(0.25)	531	78	1,293	1,089	885	631	291	(204)	(698)	(1,268)
Northport 1, 2, 3, and 4	1,518.6	(150.34)	(836)	(1,289)	(73)	(277)	(482)	(736)	(1,076)	(1,570)	(2,064)	(2,634)
Holtsville 01 through 10	525.9	(47.12)	54	(399)	816	612	408	154	(186)	(681)	(1,175)	(1,745)
Northport 2	397.5	(39.35)	174	(279)	937	733	528	274	(66)	(560)	(1,054)	(1,624)
Northport 3	396.5	(39.25)	175	(278)	938	734	529	275	(65)	(559)	(1,053)	(1,623)
Northport 1	396.2	(39.22)	175	(278)	938	734	530	275	(65)	(559)	(1,053)	(1,623)
Port Jefferson 3 & 4	383.5	(37.97)	187	(266)	950	745	541	287	(53)	(547)	(1,042)	(1,612)
Barrett ST 01 & 02	372.0	(36.83)	197	(256)	960	756	551	297	(43)	(537)	(1,031)	(1,601)
Northport 4	328.4	(32.51)	237	(216)	999	795	591	336	(4)	(498)	(992)	(1,562)
Caithness_CC_1	302.4	(12.28)	242	(211)	1,005	801	597	342	2	(492)	(986)	(1,556)
Barrett GT 01 through 12	256.5	(24.12)	300	(153)	1,063	859	654	400	60	(434)	(929)	(1,499)
Wading River 1, 2, & 3	227.0	(22.88)	328	(125)	1,091	887	683	428	88	(406)	(900)	(1,470)
Barrett ST 01	193.7	(19.18)	358	(95)	1,121	916	712	458	118	(376)	(871)	(1,441)
Port Jefferson 3	192.0	(19.01)	359	(94)	1,122	918	714	459	119	(375)	(869)	(1,439)
Port Jefferson 4	191.5	(18.96)	360	(93)	1,123	918	714	460	120	(374)	(869)	(1,439)
Barrett ST 02	178.3	(17.65)	372	(81)	1,135	930	726	472	132	(363)	(857)	(1,427)
Glenwood GT 02, 04, & 05	132.4	(13.35)	413	(40)	1,176	972	768	513	173	(321)	(815)	(1,385)
Far Rockaway GT1 & GT2	108.6	(9.73)	434	(19)	1,196	992	788	533	193	(301)	(795)	(1,365)
Shoreham GT 3 & 4	85.9	(8.66)	455	2	1,218	1,014	809	555	215	(279)	(773)	(1,343)

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Pilgrim GT1 & GT2	83.2	(8.39)	458	5	1,220	1,016	812	558	218	(277)	(771)	(1,341)
Port Jefferson GT 02 & 03	82.2	(8.29)	459	6	1,221	1,017	813	558	218	(276)	(770)	(1,340)
Wading River 1	76.8	(7.74)	463	10	1,226	1,022	818	563	223	(271)	(765)	(1,335)
Wading River 2	75.7	(7.63)	464	11	1,227	1,023	819	564	224	(270)	(764)	(1,334)
Bethpage 3	74.8	(3.04)	461	8	1,223	1,019	815	561	221	(274)	(768)	(1,338)
Wading River 3	74.5	(7.51)	465	12	1,228	1,024	820	565	225	(269)	(763)	(1,333)
Hempstead (RR)	73.0	(7.23)	467	14	1,229	1,025	821	567	227	(268)	(762)	(1,332)
Pinelawn Power 1	73.0	(2.96)	462	9	1,225	1,021	817	562	222	(272)	(766)	(1,336)
Holtsville 09	57.2	(5.13)	480	27	1,243	1,039	835	580	240	(254)	(748)	(1,318)
Holtsville 01	56.3	(5.04)	481	28	1,244	1,040	835	581	241	(253)	(747)	(1,317)
Far Rockaway GT2	55.8	(5.00)	482	29	1,244	1,040	836	582	242	(253)	(747)	(1,317)
Holtsville 02	55.0	(4.93)	482	29	1,245	1,041	837	582	242	(252)	(746)	(1,316)
Holtsville 04	54.1	(4.85)	483	30	1,246	1,042	837	583	243	(251)	(745)	(1,315)
Holtsville 05	52.8	(4.73)	484	31	1,247	1,043	839	584	244	(250)	(744)	(1,314)
Far Rockaway GT1	52.8	(4.73)	484	31	1,247	1,043	839	584	244	(250)	(744)	(1,314)
Greenport GT1	52.6	(4.71)	485	32	1,247	1,043	839	584	244	(250)	(744)	(1,314)
Holtsville 07	51.6	(4.62)	485	32	1,248	1,044	840	585	245	(249)	(743)	(1,313)
Holtsville 10	50.3	(4.51)	487	34	1,249	1,045	841	587	247	(248)	(742)	(1,312)
Holtsville 03	50.2	(4.50)	487	34	1,249	1,045	841	587	247	(248)	(742)	(1,312)
Glenwood GT 02	49.9	(5.03)	488	35	1,250	1,046	842	587	247	(247)	(741)	(1,311)
Holtsville 06	49.8	(4.46)	487	34	1,250	1,046	841	587	247	(247)	(742)	(1,312)
Holtsville 08	48.6	(4.35)	488	35	1,251	1,047	842	588	248	(246)	(740)	(1,310)
Shoreham GT4	43.1	(4.34)	494	41	1,256	1,052	848	594	254	(241)	(735)	(1,305)
Shoreham GT3	42.8	(4.31)	494	41	1,257	1,052	848	594	254	(240)	(735)	(1,305)
Glenwood GT 05	42.7	(4.30)	494	41	1,257	1,053	848	594	254	(240)	(735)	(1,305)
Pilgrim GT2	41.7	(4.20)	495	42	1,258	1,053	849	595	255	(239)	(734)	(1,304)

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Port Jefferson GT 02	41.5	(4.18)	495	42	1,258	1,054	849	595	255	(239)	(734)	(1,304)
Pilgrim GT1	41.5	(4.18)	495	42	1,258	1,054	849	595	255	(239)	(734)	(1,304)
Port Jefferson GT 03	40.7	(4.10)	496	43	1,259	1,054	850	596	256	(239)	(733)	(1,303)
Glenwood GT 04	39.8	(4.01)	497	44	1,259	1,055	851	597	257	(238)	(732)	(1,302)
Barrett 12	39.7	(3.56)	496	43	1,259	1,055	850	596	256	(238)	(732)	(1,302)
Barrett 09	38.5	(3.45)	497	44	1,260	1,056	852	597	257	(237)	(731)	(1,301)
Barrett 10	38.5	(3.45)	497	44	1,260	1,056	852	597	257	(237)	(731)	(1,301)
Barrett 11	38.5	(3.45)	497	44	1,260	1,056	852	597	257	(237)	(731)	(1,301)
Huntington (RR)	24.5	(2.43)	510	57	1,273	1,069	865	610	270	(224)	(718)	(1,288)
East Hampton GT 01, 2, 3, & 4	24.2	(2.38)	511	58	1,273	1,069	865	611	271	(224)	(718)	(1,288)
East Hampton GT 01	18.5	(1.66)	516	63	1,278	1,074	870	616	276	(219)	(713)	(1,283)
Babylon (RR)	16.0	(1.58)	518	65	1,281	1,076	872	618	278	(216)	(711)	(1,281)
Barrett GT 02	15.6	(1.57)	518	65	1,281	1,077	873	618	278	(216)	(710)	(1,280)
Barrett 03	15.0	(1.51)	519	66	1,282	1,077	873	619	279	(215)	(710)	(1,280)
Barrett 06	15.0	(1.51)	519	66	1,282	1,077	873	619	279	(215)	(710)	(1,280)
Barrett GT 01	14.9	(1.50)	519	66	1,282	1,078	873	619	279	(215)	(710)	(1,280)
Barrett 08	14.4	(1.45)	520	67	1,282	1,078	874	619	279	(215)	(709)	(1,279)
Barrett 04	13.3	(1.34)	521	68	1,283	1,079	875	620	280	(214)	(708)	(1,278)
Barrett 05	13.1	(1.32)	521	68	1,283	1,079	875	621	281	(214)	(708)	(1,278)
Southold 1	9.4	(0.95)	524	71	1,287	1,082	878	624	284	(210)	(705)	(1,275)
S Hampton 1	8.6	(0.87)	525	72	1,287	1,083	879	625	285	(210)	(704)	(1,274)
Islip (RR)	8.0	(0.79)	525	72	1,288	1,084	879	625	285	(209)	(703)	(1,273)
East Hampton 2	1.9	(0.24)	531	78	1,294	1,089	885	631	291	(204)	(698)	(1,268)
East Hampton 3	1.9	(0.24)	531	78	1,294	1,089	885	631	291	(204)	(698)	(1,268)
East Hampton 4	1.9	(0.24)	531	78	1,294	1,089	885	631	291	(204)	(698)	(1,268)
Flynn	139.0	(5.64)	399	(54)	1,162	958	753	499	159	(335)	(830)	(1,400)

Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Statewide System Margin Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			532	79	1,295	1,091	887	632	292	(202)	(696)	(1,266)
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Brentwood	45.5	(4.59)	492	39	1,254	1,050	846	591	251	(243)	(737)	(1,307)
Greenport IC 4, 5, & 6	5.6	(0.71)	528	75	1,290	1,086	882	627	287	(207)	(701)	(1,271)
Greenport IC 6	3.1	(0.39)	530	77	1,292	1,088	884	630	290	(205)	(699)	(1,269)
Greenport IC 5	1.5	(0.19)	531	78	1,294	1,090	885	631	291	(203)	(698)	(1,268)
Greenport IC 4	1.0	(0.13)	532	79	1,294	1,090	886	631	291	(203)	(697)	(1,267)
Charles P Killer 09 through 14	15.1	(1.79)	519	66	1,282	1,078	873	619	279	(215)	(710)	(1,280)
Charles P Keller 14	3.2	(0.38)	530	77	1,292	1,088	884	630	290	(205)	(699)	(1,269)
Charles P Keller 12	2.8	(0.33)	530	77	1,293	1,088	884	630	290	(204)	(699)	(1,269)
Charles P Keller 13	2.8	(0.33)	530	77	1,293	1,088	884	630	290	(204)	(699)	(1,269)
Charles P Keller 11	2.7	(0.32)	530	77	1,293	1,089	884	630	290	(204)	(699)	(1,269)
Charles P Keller 09	1.8	(0.21)	531	78	1,294	1,089	885	631	291	(204)	(698)	(1,268)
Charles P Keller 10	1.8	(0.21)	531	78	1,294	1,089	885	631	291	(204)	(698)	(1,268)
Freeport CT 1 & 2	85.4	(8.61)	456	3	1,218	1,014	810	556	216	(279)	(773)	(1,343)
Freeport CT 1	45.4	(4.58)	492	39	1,254	1,050	846	592	252	(243)	(737)	(1,307)

Notes

1. Utilizes the Higher Policy Statewide System Margin for Summer Peak with Expected Weather.
2. Utilizes the next largest generation contingency outage which is the loss of Bowline Units 1 and 2.

Figure 28: Statewide System Margin (1-in-10-Year Heatwave, Emergency Transfer Criteria)

Line	Item	Summer Peak - 1-in-10-Year Heatwave, Emergency Transfer Criteria (MW)									
		2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
A	NYCA Generation (1)	38,066	38,343	38,343	38,343	38,343	38,343	38,343	38,343	38,343	38,343
B	NYCA Generation Derates (2)	(5,863)	(6,567)	(6,582)	(6,596)	(6,610)	(6,624)	(6,624)	(6,639)	(6,653)	(6,653)
C	Temperature Based Generation Derates	(185)	(176)	(176)	(176)	(176)	(176)	(176)	(176)	(176)	(176)
D	External Area Interchanges (3)	1,844	1,844	3,094	3,094	3,094	3,094	3,094	3,094	3,094	3,094
E	SCRs (4), (5)	897	897	897	897	897	897	897	897	897	897
F	**Total Resources (A+B+C+D+E)**	34,759	34,340	35,576	35,562	35,547	35,533	35,533	35,519	35,504	35,504
G	Demand Forecast (6)	(33,579)	(33,432)	(33,232)	(33,079)	(32,943)	(32,905)	(33,053)	(33,329)	(33,709)	(34,139)
H	Large Load Forecast (7)	(552)	(816)	(1,072)	(1,194)	(1,224)	(1,254)	(1,307)	(1,307)	(1,307)	(1,307)
I	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
J	**Total Capability Requirement (G+H+I)**	(35,441)	(35,558)	(35,614)	(35,583)	(35,477)	(35,469)	(35,670)	(35,946)	(36,326)	(36,756)
K	**Statewide System Margin (F+J)**	(682)	(1,218)	(38)	(21)	70	64	(137)	(427)	(822)	(1,252)
L	Operating Reserve	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
M	**Statewide System Margin with Full Operating Reserve (K+L)**	(1,992)	(2,528)	(1,348)	(1,331)	(1,240)	(1,246)	(1,447)	(1,737)	(2,132)	(2,562)

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Interchanges are based on ERAG MMWG values.
4. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
5. Includes a derate of 384 MW for SCRs.
6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included.
7. Forecast of large load queue projects included in this assessment (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center, Q1536 - White Pines Phase 1 (Micron), and Q1446 - Massena Green Hydrogen (Air Products and Chemicals)).

Figure 29: Statewide System Margin (Hourly) (1-in-10-Year Heatwave, Emergency Transfer Criteria)

Summer Peak - Heatwave, Emergency Transfer Criteria (MW)										
Statewide System Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	4,044	3,331	4,429	4,346	4,340	4,287	4,134	3,942	3,695	3,422
HB1	4,105	3,400	4,511	4,445	4,458	4,428	4,299	4,135	3,920	3,680
HB2	4,947	4,250	5,369	5,315	5,342	5,330	5,219	5,077	4,885	4,671
HB3	5,438	4,746	5,871	5,824	5,860	5,858	5,761	5,631	5,455	5,257
HB4	5,511	4,819	5,947	5,902	5,942	5,945	5,853	5,730	5,560	5,370
HB5	4,954	4,262	5,385	5,337	5,372	5,369	5,270	5,140	4,961	4,763
HB6	3,854	3,201	4,339	4,301	4,342	4,341	4,238	4,101	3,913	3,701
HB7	3,558	3,050	4,260	4,280	4,368	4,399	4,317	4,193	4,013	3,805
HB8	2,666	2,389	3,711	3,825	3,987	4,074	4,030	3,931	3,771	3,576
HB9	1,891	1,856	3,298	3,518	3,765	3,920	3,926	3,866	3,741	3,574
HB10	973	1,126	2,663	2,966	3,283	3,493	3,542	3,518	3,421	3,283
HB11	375	643	2,239	2,595	2,956	3,202	3,281	3,282	3,209	3,092
HB12	(192)	92	1,695	2,072	2,474	2,750	2,839	2,844	2,770	2,649
HB13	(892)	(656)	919	1,291	1,707	1,993	2,078	2,075	1,986	1,850
HB14	(770)	(614)	919	1,035	1,454	1,742	1,015	1,000	894	738
HB15	(1,408)	(1,402)	48	341	730	987	544	488	335	130
HB16	(210)	(1,309)	(276)	(80)	239	(462)	(495)	(617)	(843)	(1,119)
HB17	(682)	(1,218)	(38)	22	219	307	191	(6)	(306)	(657)
HB18	(351)	(1,019)	35	(21)	70	64	(137)	(427)	(822)	(1,252)
HB19	(495)	(745)	251	143	191	151	(89)	(400)	(709)	(1,171)
HB20	(799)	(1,355)	(69)	41	58	892	649	345	(54)	(499)
HB21	(383)	(1,202)	(190)	(314)	(312)	(383)	(141)	(430)	(806)	(1,224)
HB22	897	109	1,146	1,029	1,022	947	1,532	1,264	921	538
HB23	2,830	2,078	3,144	3,043	3,034	2,967	2,780	2,546	2,248	1,916

Figure 30: Statewide System Margin Hourly Curve (1-in-10-Year Heatwave, Emergency Transfer Criteria)

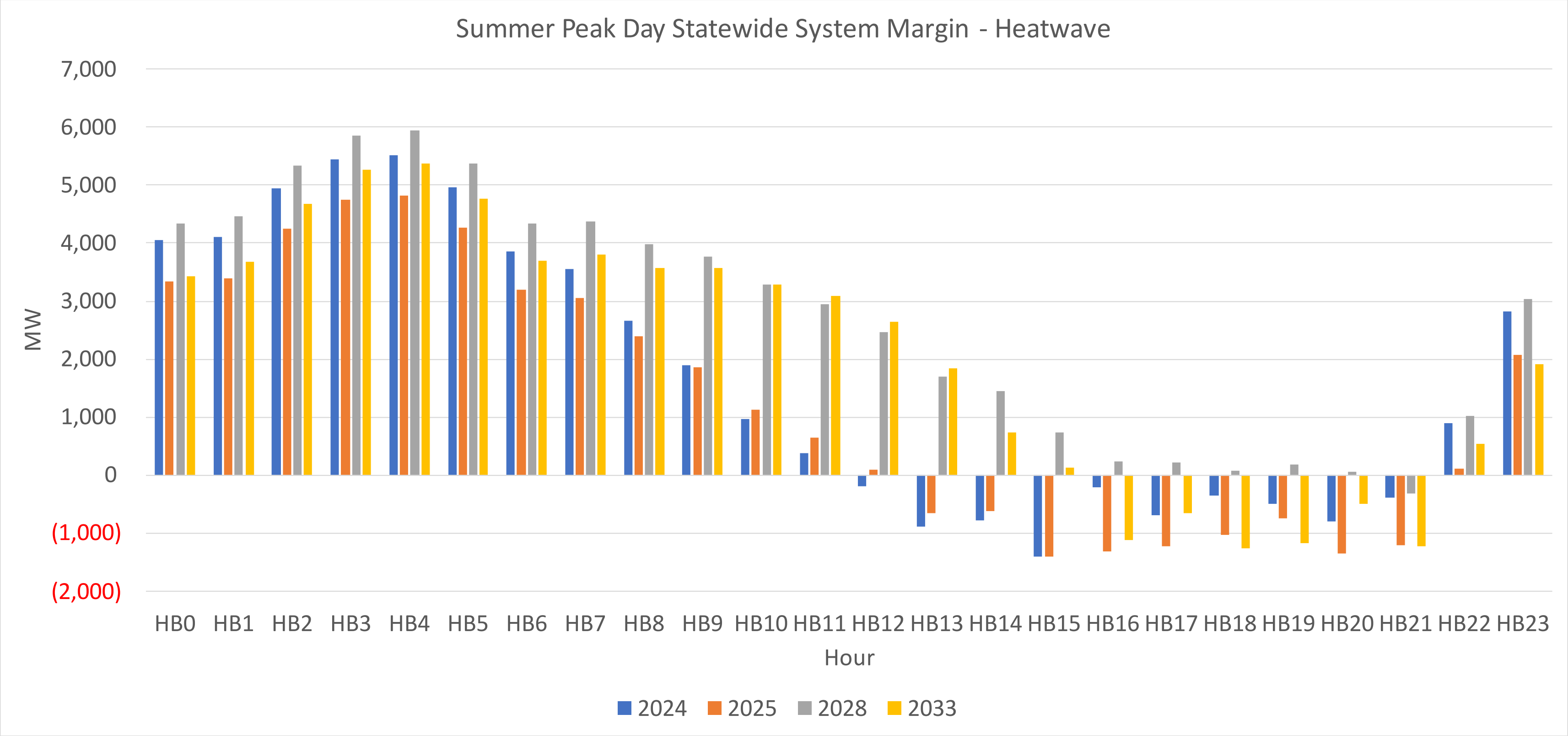


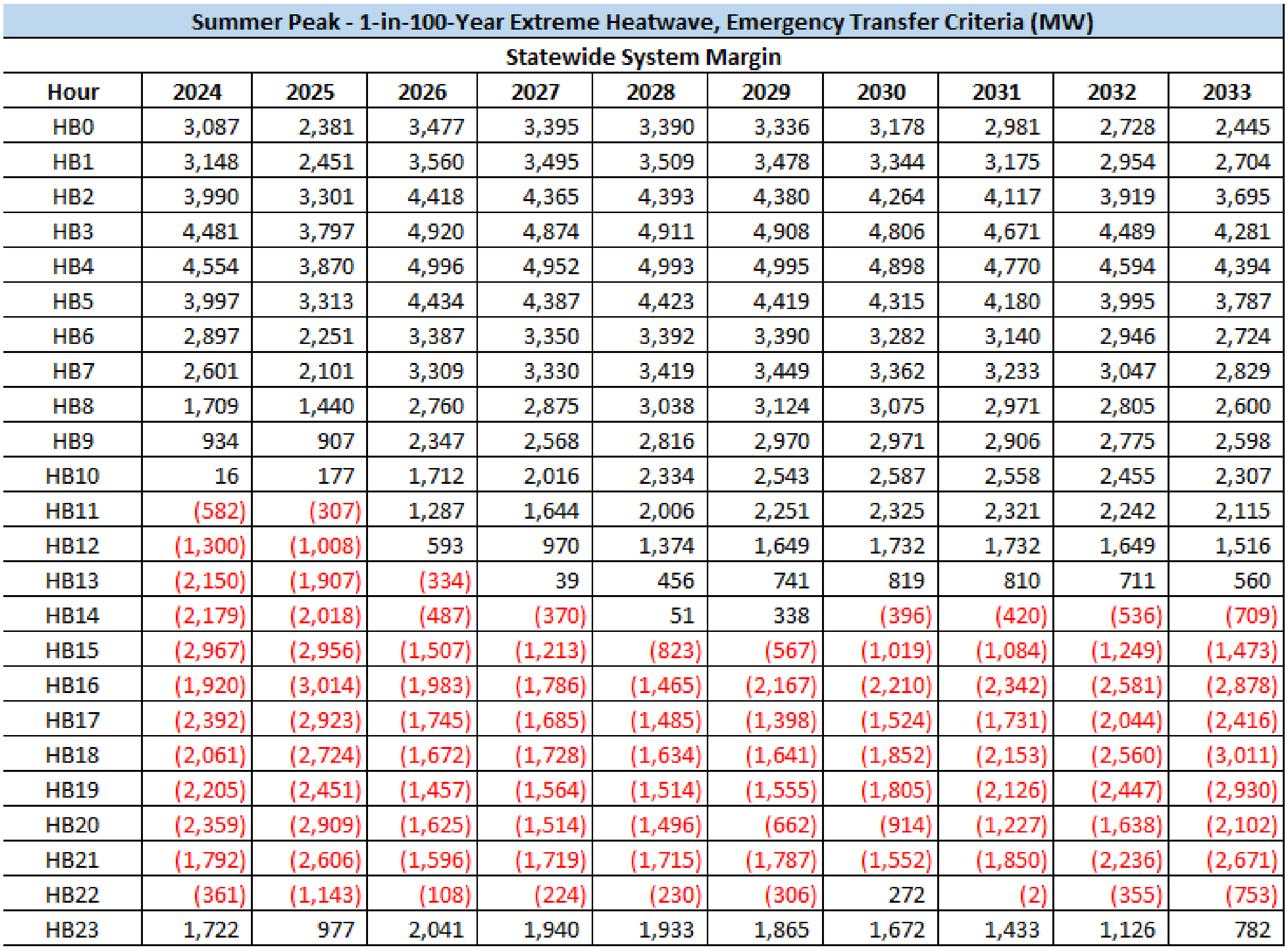
Figure 31: Statewide System Margin (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

Line	Item	Summer Peak - 1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria (MW)									
		2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
A	NYCA Generation (1)	38,066	38,343	38,343	38,343	38,343	38,343	38,343	38,343	38,343	38,343
B	NYCA Generation Derates (2)	(5,863)	(6,567)	(6,582)	(6,596)	(6,610)	(6,624)	(6,624)	(6,639)	(6,653)	(6,653)
C	Temperature Based Generation Derates	(389)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)
D	External Area Interchanges (3)	1,844	1,844	3,094	3,094	3,094	3,094	3,094	3,094	3,094	3,094
E	SCRs (4), (5)	897	897	897	897	897	897	897	897	897	897
F	**Total Resources (A+B+C+D+E)**	34,555	34,146	35,382	35,367	35,353	35,339	35,339	35,324	35,310	35,310
G	Demand Forecast (6)	(35,060)	(34,907)	(34,697)	(34,538)	(34,398)	(34,360)	(34,515)	(34,801)	(35,194)	(35,645)
H	Large Load Forecast (7)	(577)	(852)	(1,120)	(1,247)	(1,279)	(1,310)	(1,366)	(1,366)	(1,366)	(1,366)
I	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
J	**Total Capability Requirement (G+H+I)**	(36,947)	(37,069)	(37,127)	(37,095)	(36,987)	(36,980)	(37,191)	(37,477)	(37,870)	(38,321)
K	**Statewide System Margin (F+J)**	(2,392)	(2,923)	(1,745)	(1,728)	(1,634)	(1,641)	(1,852)	(2,153)	(2,560)	(3,011)
L	Operating Reserve	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
M	**Statewide System Margin with Full Operating Reserve (K+L)**	(3,702)	(4,233)	(3,055)	(3,038)	(2,944)	(2,951)	(3,162)	(3,463)	(3,870)	(4,321)

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Interchanges are based on ERAG MMWG values.
4. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
5. Includes a derate of 384 MW for SCRs.
6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included.
7. Forecast of large load queue projects included in this assessment (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center, Q1536 - White Pines Phase 1 (Micron), and Q1446 - Massena Green Hydrogen (Air Products and Chemicals)).

Figure 32: Statewide System Margin (Hourly) (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)



Summer Peak - 1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria (MW)										
Statewide System Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	3,087	2,381	3,477	3,395	3,390	3,336	3,178	2,981	2,728	2,445
HB1	3,148	2,451	3,560	3,495	3,509	3,478	3,344	3,175	2,954	2,704
HB2	3,990	3,301	4,418	4,365	4,393	4,380	4,264	4,117	3,919	3,695
HB3	4,481	3,797	4,920	4,874	4,911	4,908	4,806	4,671	4,489	4,281
HB4	4,554	3,870	4,996	4,952	4,993	4,995	4,898	4,770	4,594	4,394
HB5	3,997	3,313	4,434	4,387	4,423	4,419	4,315	4,180	3,995	3,787
HB6	2,897	2,251	3,387	3,350	3,392	3,390	3,282	3,140	2,946	2,724
HB7	2,601	2,101	3,309	3,330	3,419	3,449	3,362	3,233	3,047	2,829
HB8	1,709	1,440	2,760	2,875	3,038	3,124	3,075	2,971	2,805	2,600
HB9	934	907	2,347	2,568	2,816	2,970	2,971	2,906	2,775	2,598
HB10	16	177	1,712	2,016	2,334	2,543	2,587	2,558	2,455	2,307
HB11	(582)	(307)	1,287	1,644	2,006	2,251	2,325	2,321	2,242	2,115
HB12	(1,300)	(1,008)	593	970	1,374	1,649	1,732	1,732	1,649	1,516
HB13	(2,150)	(1,907)	(334)	39	456	741	819	810	711	560
HB14	(2,179)	(2,018)	(487)	(370)	51	338	(396)	(420)	(536)	(709)
HB15	(2,967)	(2,956)	(1,507)	(1,213)	(823)	(567)	(1,019)	(1,084)	(1,249)	(1,473)
HB16	(1,920)	(3,014)	(1,983)	(1,786)	(1,465)	(2,167)	(2,210)	(2,342)	(2,581)	(2,878)
HB17	(2,392)	(2,923)	(1,745)	(1,685)	(1,485)	(1,398)	(1,524)	(1,731)	(2,044)	(2,416)
HB18	(2,061)	(2,724)	(1,672)	(1,728)	(1,634)	(1,641)	(1,852)	(2,153)	(2,560)	(3,011)
HB19	(2,205)	(2,451)	(1,457)	(1,564)	(1,514)	(1,555)	(1,805)	(2,126)	(2,447)	(2,930)
HB20	(2,359)	(2,909)	(1,625)	(1,514)	(1,496)	(662)	(914)	(1,227)	(1,638)	(2,102)
HB21	(1,792)	(2,606)	(1,596)	(1,719)	(1,715)	(1,787)	(1,552)	(1,850)	(2,236)	(2,671)
HB22	(361)	(1,143)	(108)	(224)	(230)	(306)	272	(2)	(355)	(753)
HB23	1,722	977	2,041	1,940	1,933	1,865	1,672	1,433	1,126	782

Figure 33: Statewide System Margin Hourly Curve (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

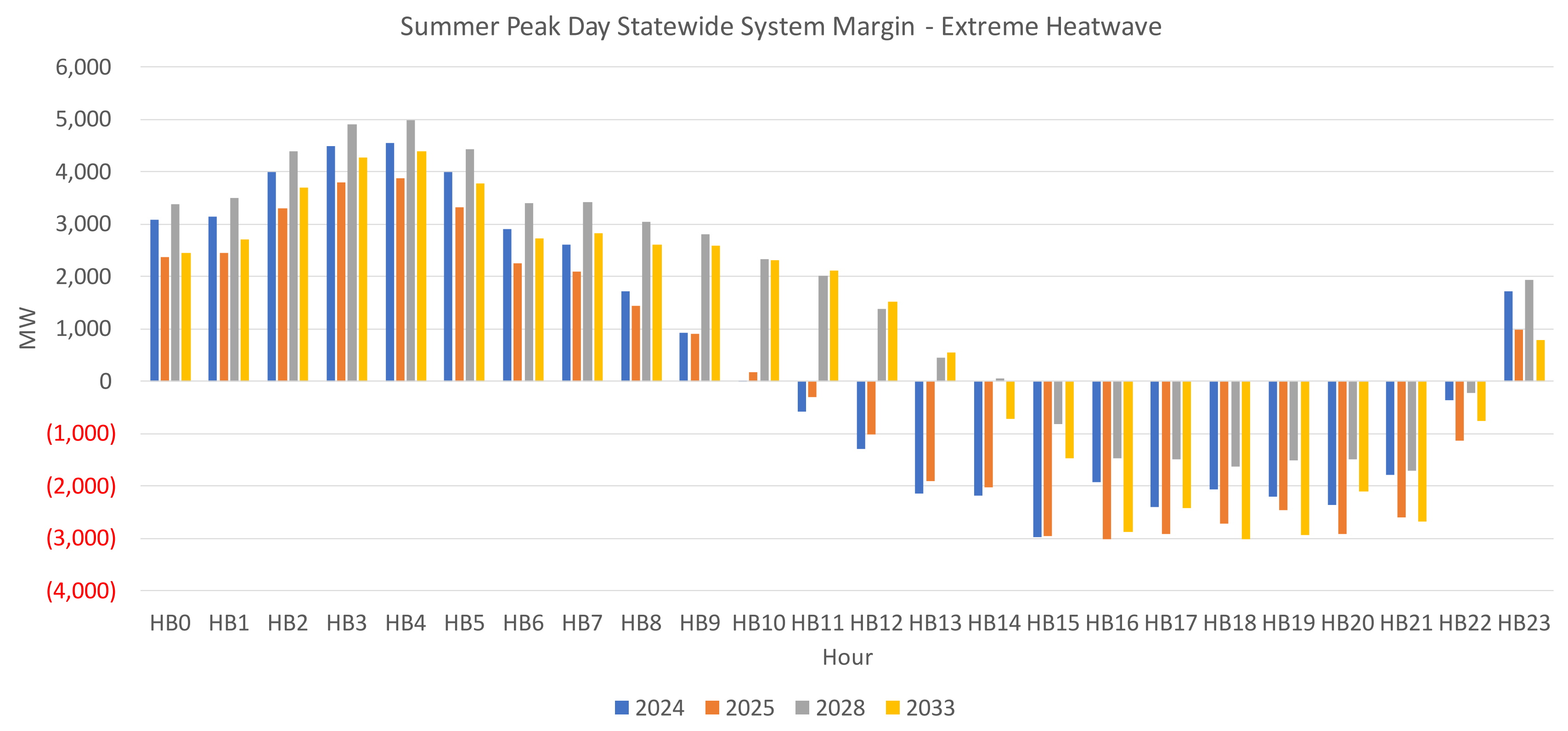


Figure 34: Statewide System Margin (Winter Peak - Expected Weather, Normal Transfer Criteria)

Line	Item	Winter Peak - Baseline Expected Winter Weather, Normal Transfer Criteria (MW)									
		2024-25	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	NYCA Generation (1)	41,037	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304
B	NYCA Generation Derates (2)	(7,026)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)
C	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
D	External Area Interchanges (3)	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268
E	**Total Resources (A+B+C+D)**	35,280	35,232	35,232	35,232	35,232	35,232	35,232	35,232	35,232	35,232
F	Demand Forecast (5)	(23,895)	(24,196)	(24,656)	(25,182)	(25,844)	(26,716)	(27,746)	(28,936)	(30,306)	(31,756)
G	Large Load Forecast (6)	(635)	(904)	(1,044)	(1,118)	(1,146)	(1,204)	(1,224)	(1,224)	(1,224)	(1,224)
H	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
I	**Total Capability Requirement (F+G+H)**	(25,840)	(26,410)	(27,010)	(27,610)	(28,300)	(29,230)	(30,280)	(31,470)	(32,840)	(34,290)
J	**Statewide System Margin (E+I)**	9,440	8,822	8,222	7,622	6,932	6,002	4,952	3,762	2,392	942
K	SCRs (7), (8)	582	582	582	582	582	582	582	582	582	582
L	**Statewide System Margin with SCR (J+K)**	10,022	9,404	8,804	8,204	7,514	6,584	5,534	4,344	2,974	1,524
M	Operating Reserve	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
N	**Statewide System Margin with Full Operating Reserve (L+M) (4)**	8,712	8,094	7,494	6,894	6,204	5,274	4,224	3,034	1,664	214

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).

3. Interchanges are based on ERAG MMWG values.
4. For informational purposes.
5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included.
6. Forecast of large load queue projects included in this assessment (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center, Q1536 - White Pines Phase 1 (Micron), and Q1446 - Massena Green Hydrogen (Air Products and Chemicals)).
7. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
8. Includes a derate of 221 MW for SCRs.

Figure 35: Statewide System Margin (1-in-10-Year Cold Snap, Emergency Transfer Criteria)

Line	Item	Winter Peak - 1-in-10-Year Cold Snap, Emergency Transfer Criteria (MW)									
		2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
A	NYCA Generation (1)	41,037	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304
B	NYCA Generation Derates (2)	(7,026)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)
C	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
D	External Area Interchanges (3)	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268
E	SCRs (4), (5)	582	582	582	582	582	582	582	582	582	582
F	**Total Resources (A+B+C+D+E)**	35,862	35,814	35,814	35,814	35,814	35,814	35,814	35,814	35,814	35,814
G	Demand Forecast (6)	(24,896)	(25,211)	(25,690)	(26,239)	(26,928)	(27,836)	(28,910)	(30,151)	(31,579)	(33,089)
H	Large Load Forecast (7)	(662)	(942)	(1,088)	(1,165)	(1,194)	(1,255)	(1,275)	(1,275)	(1,275)	(1,275)
I	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
J	**Total Capability Requirement (G+H+I)**	(26,868)	(27,463)	(28,088)	(28,714)	(29,432)	(30,401)	(31,495)	(32,736)	(34,164)	(35,674)
K	**Statewide System Margin (F+J)**	8,994	8,351	7,726	7,100	6,382	5,413	4,319	3,078	1,650	140
L	Operating Reserve	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
M	**Statewide System Margin with Full Operating Reserve (K+L)**	7,684	7,041	6,416	5,790	5,072	4,103	3,009	1,768	340	(1,170)

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Interchanges are based on ERAG MMWG values.
4. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
5. Includes a derate of 221 MW for SCRs.
6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included.
7. Forecast of large load queue projects included in this assessment (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center, Q1536 - White Pines Phase 1 (Micron), and Q1446 - Massena Green Hydrogen (Air Products and Chemicals)).

Figure 36: Statewide System Margin (1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria)

		Winter Peak - 1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria (MW)									
Line	Item	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
A	NYCA Generation (1)	41,037	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304
B	NYCA Generation Derates (2)	(7,026)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)	(7,340)
C	Temperature Based Generation Derates	0	1	2	3	4	5	6	7	8	9
D	External Area Interchanges (3)	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268
E	SCRs (4), (5)	582	582	582	582	582	582	582	582	582	582
F	**Total Resources (A+B+C+D+E)**	35,862	35,815	35,816	35,817	35,818	35,819	35,820	35,821	35,822	35,823
G	Demand Forecast (6)	(26,662)	(26,995)	(27,510)	(28,097)	(28,835)	(29,810)	(30,957)	(32,287)	(33,815)	(35,431)
H	Large Load Forecast (7)	(708)	(1,009)	(1,165)	(1,247)	(1,279)	(1,343)	(1,366)	(1,366)	(1,366)	(1,366)
I	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
J	**Total Capability Requirement (G+H+I)**	(28,680)	(29,314)	(29,985)	(30,654)	(31,424)	(32,463)	(33,633)	(34,963)	(36,491)	(38,107)
K	**Statewide System Margin (F+J)**	7,182	6,501	5,831	5,163	4,394	3,356	2,187	858	(669)	(2,284)
L	Operating Reserve	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
M	**Statewide System Margin with Full Operating Reserve (K+L)**	5,872	5,191	4,521	3,853	3,084	2,046	877	(452)	(1,979)	(3,594)

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Interchanges are based on ERAG MMWG values.
4. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
5. Includes a derate of 221 MW for SCRs.
6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included.
7. Forecast of large load queue projects included in this assessment (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center, Q1536 - White Pines Phase 1 (Micron), and Q1446 - Massena Green Hydrogen (Air Products and Chemicals)).

Figure 37: Summary of Statewide System Margin – Summer

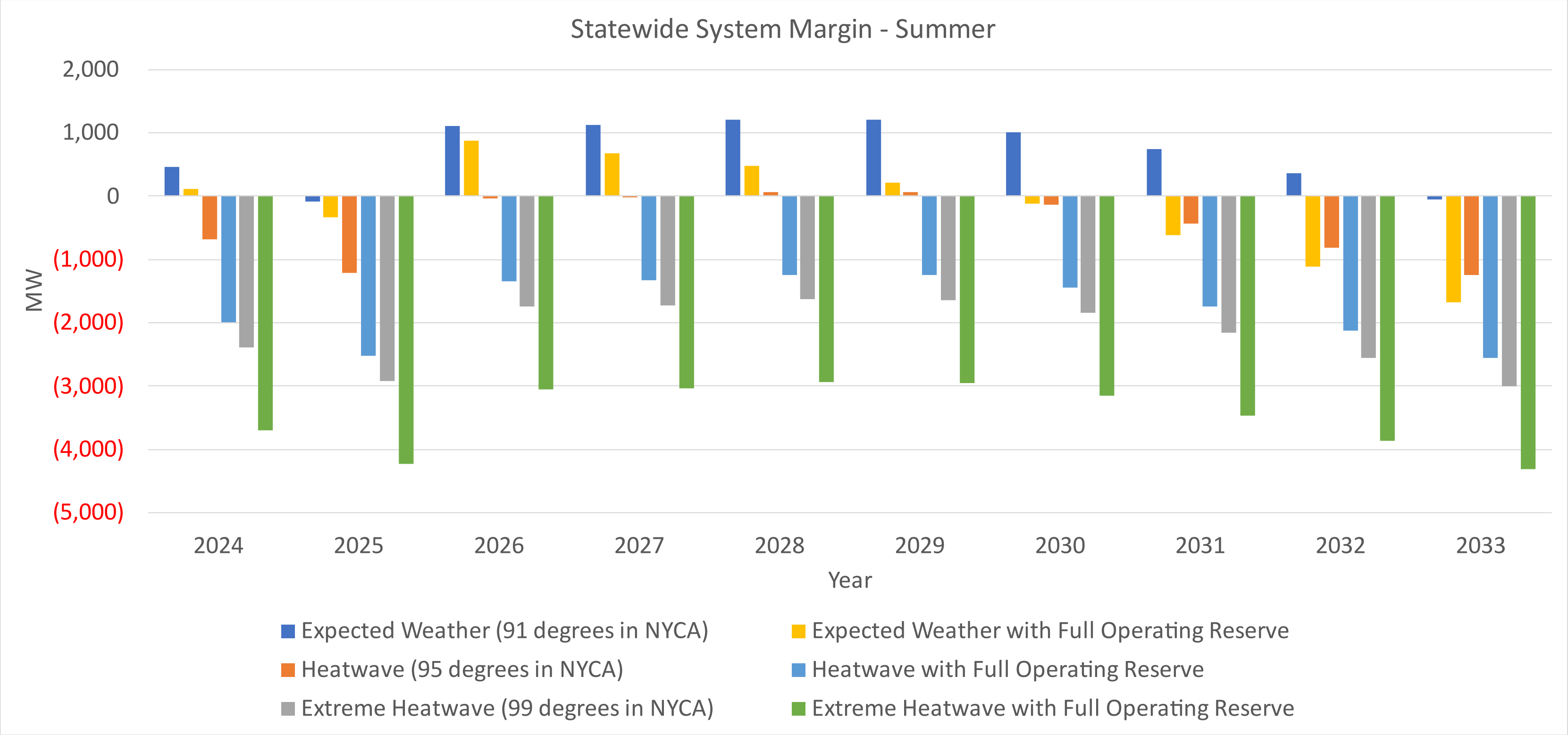


Figure 38: Summary of Statewide System Margin – Winter

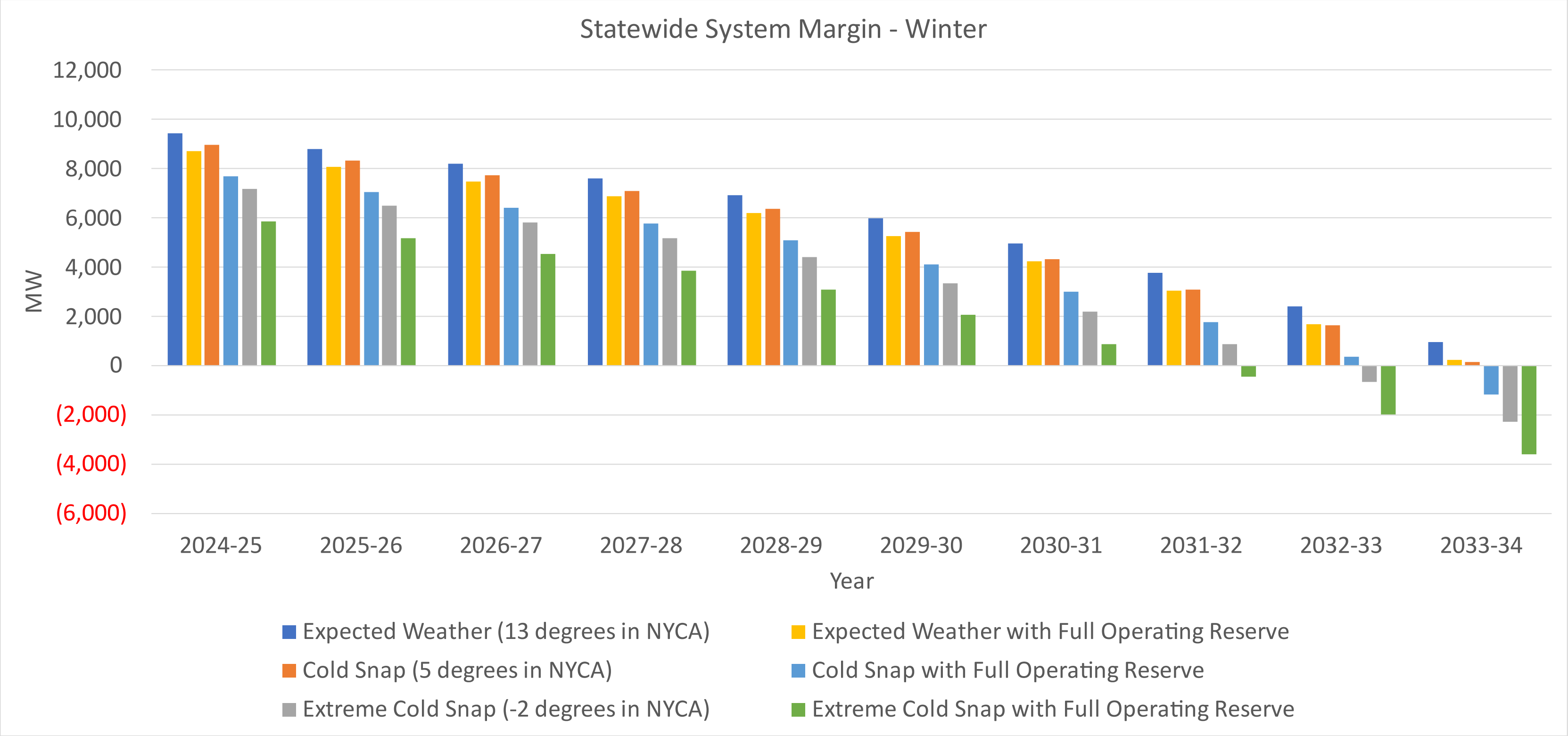
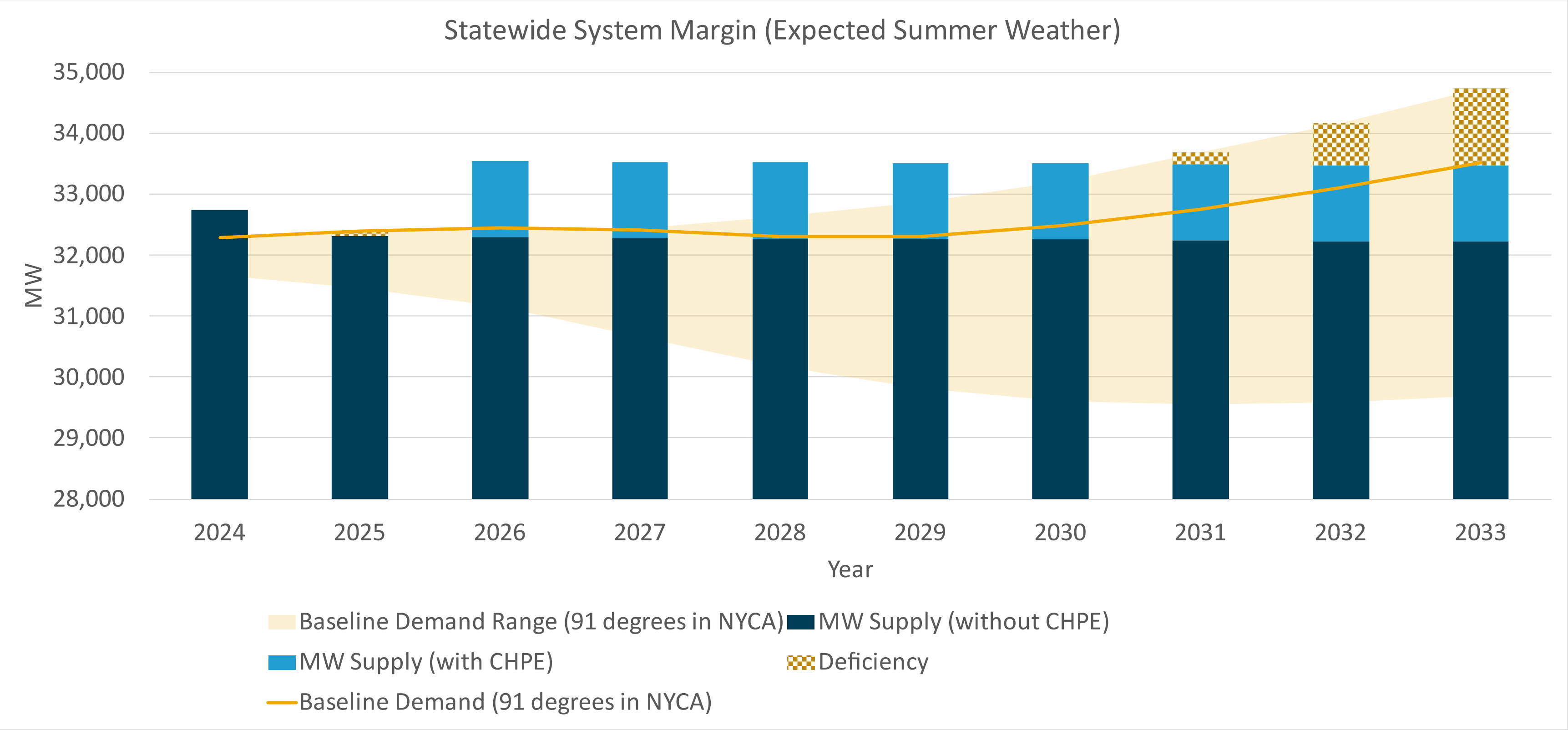


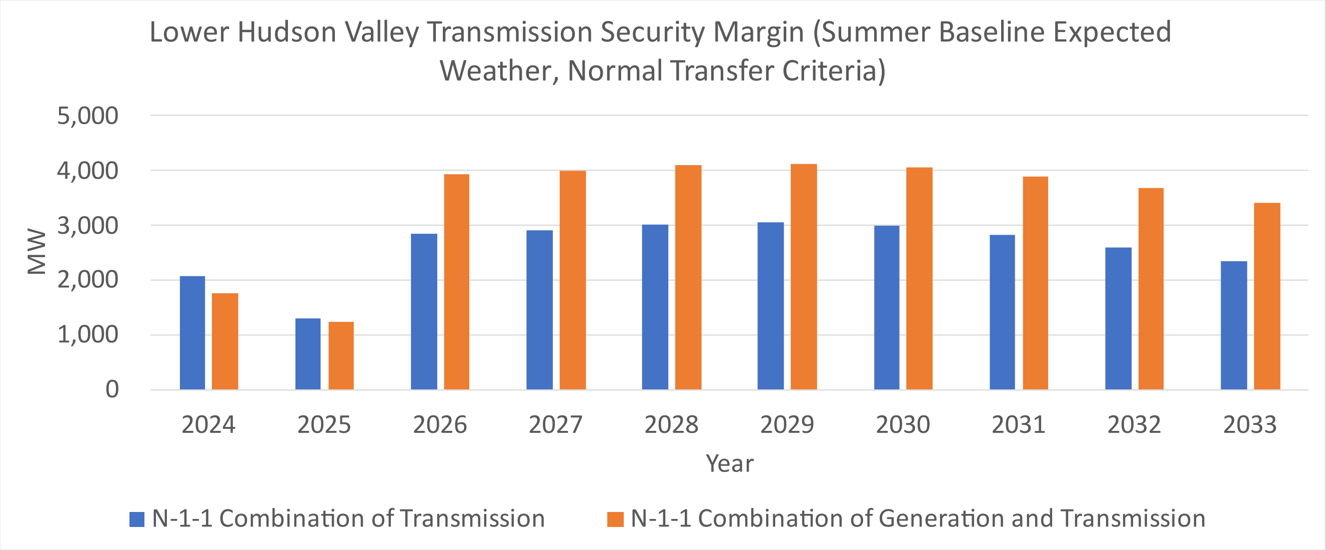
Figure 39: Statewide System Margin (Expected Weather, With and Without CHPE)



Lower Hudson Valley (Zones G-J) Transmission Security Margins

The Lower Hudson Valley, or southeastern New York (SENY) region, is comprised of Zones G-J and includes the electrical connections to the RECO load in PJM. To determine the transmission security margin for this area, the most limiting combination of two non-simultaneous contingency events (N-1-1) to the transmission security margin was determined. Design criteria N-1-1 combinations include various combinations of losses of generation and transmission. As the system changes the limiting contingency combination may also change. Figure 40 shows how the summer transmission security margin changes through time in consideration of the planned transmission system changes which impact the most limiting contingency combination for the year being evaluated. In summer 2024 the most limiting contingency combination to the transmission security margin under peak demand conditions is the loss of Ravenswood 3 followed by the loss of Pleasant Valley-Wood St. 345 kV (F30/F31). Starting in summer 2026, the limiting contingency combination changes to the loss of Knickerbocker – Pleasant Valley 345 kV followed by the loss of Athens-Van Wagner 345 kV and one of the Athens gas/steam combinations. The limiting contingency combination for winter also changes through time in consideration of the planned transmission system changes. Starting in winter 2024-25 and for the remainder of the 10-year study horizon, the limiting contingency combination is the loss of Ravenswood 3 followed by the loss of Pleasant Valley-Wood St. 345 kV (F30/F31).

Figure 40: Lower Hudson Valley Transmission Security Margin (Summer Baseline Peak Forecast – Expected Weather)



As transmission security analysis represents discrete snapshots in time of various credible combinations of system conditions, only the magnitude of a reliability need can be identified under those system conditions. Additional details are required to fully describe the nature of the need, such as evaluating the hourly demand shape and its impact on the need. To describe the nature of the Lower Hudson Valley transmission security margin, demand shapes are developed the Zone G, H, I, and J components of the statewide demand shape. Details of the demand shapes are provided later in this appendix. For this assessment, demand shapes were not developed past 2033 and are limited to the summer conditions. Figure 41 shows the forecasts summer peak load for the Lower Hudson Valley under baseline normal weather conditions (maximum temperature of 95 degrees Fahrenheit), as well as a 98-degree Fahrenheit heatwave expected once every ten years (90/10) and an extreme 1-in-100 year (99/1) heatwave with a maximum temperature of 102 degrees Fahrenheit.

Figure 42 shows the calculation of the Lower Hudson Valley transmission security margin for the statewide coincident summer peak demand hour with expected weather and with normal transfer criteria. The Lower Hudson Valley transmission security margin is sufficient for the 10-year horizon (line-item O). The transmission security margin coincident with the statewide system peak ranges from 1,768 MW in summer 2024 to 2,341 MW in summer 2033. The narrowest margin is in summer 2025 with 1,249 MW of margin. Considering the summer baseline peak demand transmission security margin, the Lower Hudson Valley would require several additional outages beyond design criteria to have a deficient transmission security margin. With the higher policy demand forecast the margins are also observed to be sufficient (line-item Q).

The demand shapes for the Lower Hudson Valley show the contributions of Zones G, H, I, (Figure 120) and J (Figure 121) towards the statewide shape (which represents the statewide coincident peak) for each hour of the day. Utilizing the demand shapes for the baseline summer peak day with expected weather, the Lower Hudson Valley transmission security margin for each hour utilizing normal transfer criteria is shown in Figure 43. The Lower Hudson Valley transmission security margin for each hour is created by using the demand forecast for each hour in the margin calculation (*i.e.*, Figure 42 line-item A) with additional adjustments to account for the appropriate derate for solar generation and energy limited resources in each hour (*i.e.*, Figure 42 line-item K). All other values in the margin calculations are held constant. A graphical representation of the hourly margin for the Lower Hudson Valley for the peak day in years 2024, 2025, 2028, and 2033 is provided in Figure 44. For all years in the 10-year study horizon, the assessment did not observe deficiencies considering the demand shapes under expected demand, normal transfer criteria for the Lower Hudson Valley. Figure 45 shows the impact of additional generator and plant outages on the Lower Hudson Valley transmission security margin.

It is possible for other combinations of events, such as a 1-in-10-year heatwave or 1-in-100-year extreme heatwave, to result in a deficient transmission security margin. Figure 46 shows that the Lower

Hudson Valley transmission security margin for the statewide coincident peak hour under the 1-in-10-year heatwave condition with the assumption that the system is using emergency transfer criteria. The transmission security margin under 1-in-10-year heatwave condition is sufficient for all years. The margin ranges from 1,779 MW in summer 2024 to 2,145 MW in summer 2033. The demand shapes for the Lower Hudson Valley under heatwave conditions are shown in Figure 126 (Zones G, H, and I) and Figure 127 (Zone J). Utilizing the Lower Hudson Valley demand-duration heatwave shapes, the transmission security margin for each hour utilizing emergency transfer criteria is shown in Figure 47. For all years in the 10-year horizon, there are no observed transmission security margin deficiencies considering the heatwave demand duration shapes for the Lower Hudson Valley with emergency transfer criteria. A graphical representation of the hourly margin for the Lower Hudson Valley for the peak day in years 2024, 2025, 2028, and 2033 heatwave, emergency transfer criteria conditions is provided in Figure 48.

Under a 1-in-100-year extreme heatwave, which also assumes the use of emergency transfer criteria, as shown in Figure 49 the margin is sufficient for all years. The margin ranges from 686 MW in summer 2024 to 1,038 in Summer 2033. The demand shapes for the Lower Hudson Valley under extreme heatwave conditions are shown in Figure 131 (Zones G, H, I, and J) and Figure 132 (Zone J). Utilizing the Lower Hudson Valley demand-duration extreme heatwave shapes, the transmission security margin for each hour utilizing emergency transfer criteria is shown in Figure 50. Figure 51 provides a graphical representation of the hourly transmission security margin for the peak day in years 2024, 2025, 2028, and 2033.

Figure 52 shows the Lower Hudson Valley transmission security margin under winter peak demand with expected weather. For winter peak, the margin is sufficient for all years and ranges from 7,515 MW in winter 2024-25 to 4,296 MW in winter 2033-34 (line-item O). Considering the winter baseline peak demand transmission security margin, multiple outages in the lower Hudson Valley would be required to show a deficient transmission security margin.

Figure 53 shows the Lower Hudson Valley transmission security margin in a 1-in-10-year cold snap with emergency transfer criteria. Under this condition, the margin is sufficient for all study years and ranges from 7,907 MW in winter 2024-25 to 4,554 MW in winter 2033-33 (line-item P). The 1-in-100-year extreme cold snap shown in Figure 54 (also assuming emergency transfer criteria) shows sufficient margin for all study years ranging from 7,121 MW in winter 2024-25 to 3,537 in winter 2033-34 (line-item P).

Figure 55 provides are summary of the summer peak Lower Hudson Valley transmission security margins under expected summer weather, heatwave, and extreme heatwave conditions. Figure 56 provides a summary of the winter peak Lower Hudson Valley transmission security margins under expected winter weather, cold snap, and extreme cold snap conditions. Figure 57 provides a summary of the Lower Hudson

Valley transmission security margin with the summer peak baseline demand range from the lower and higher policy demand forecasts.

Figure 41: Lower Hudson Valley Summer Peak Demand Forecasts

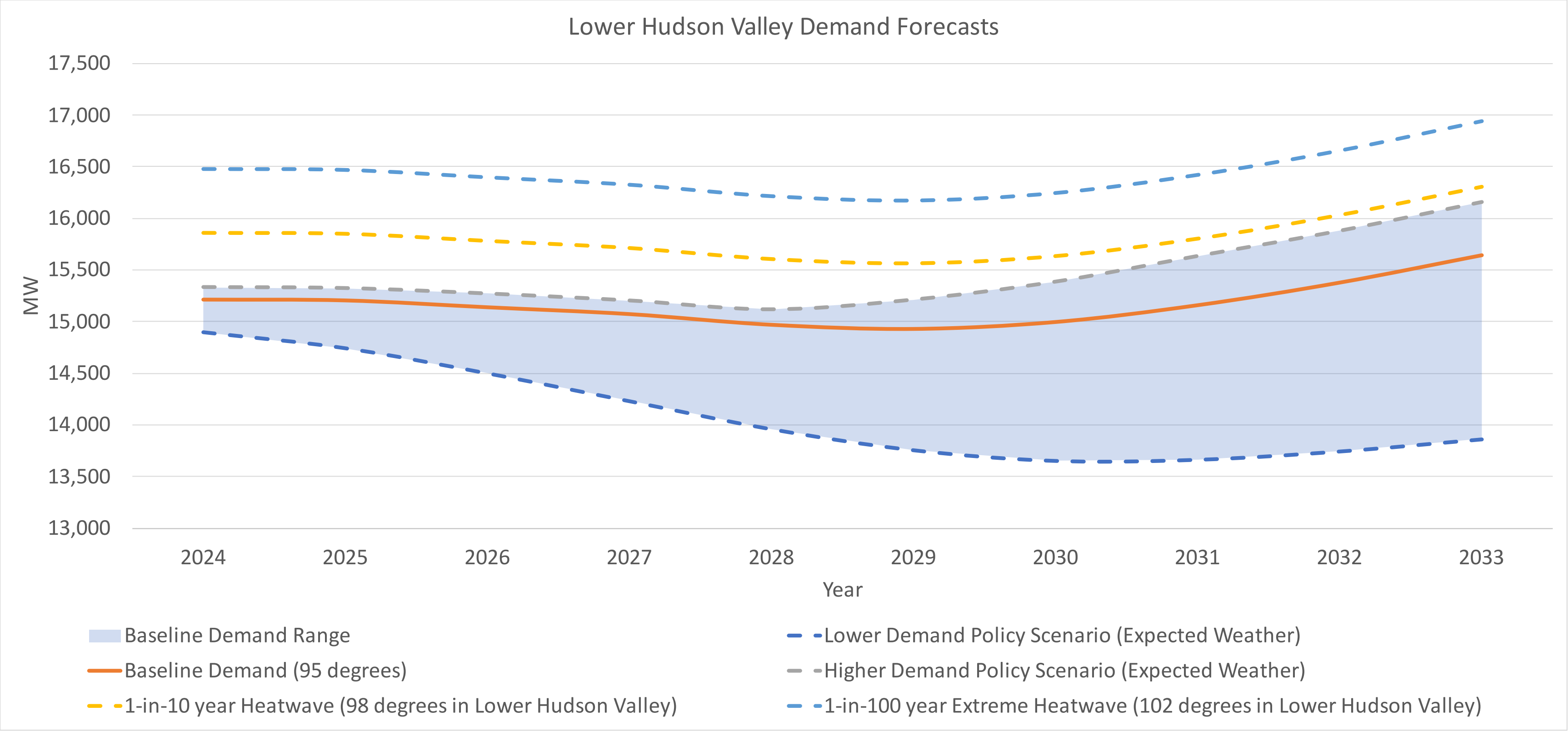


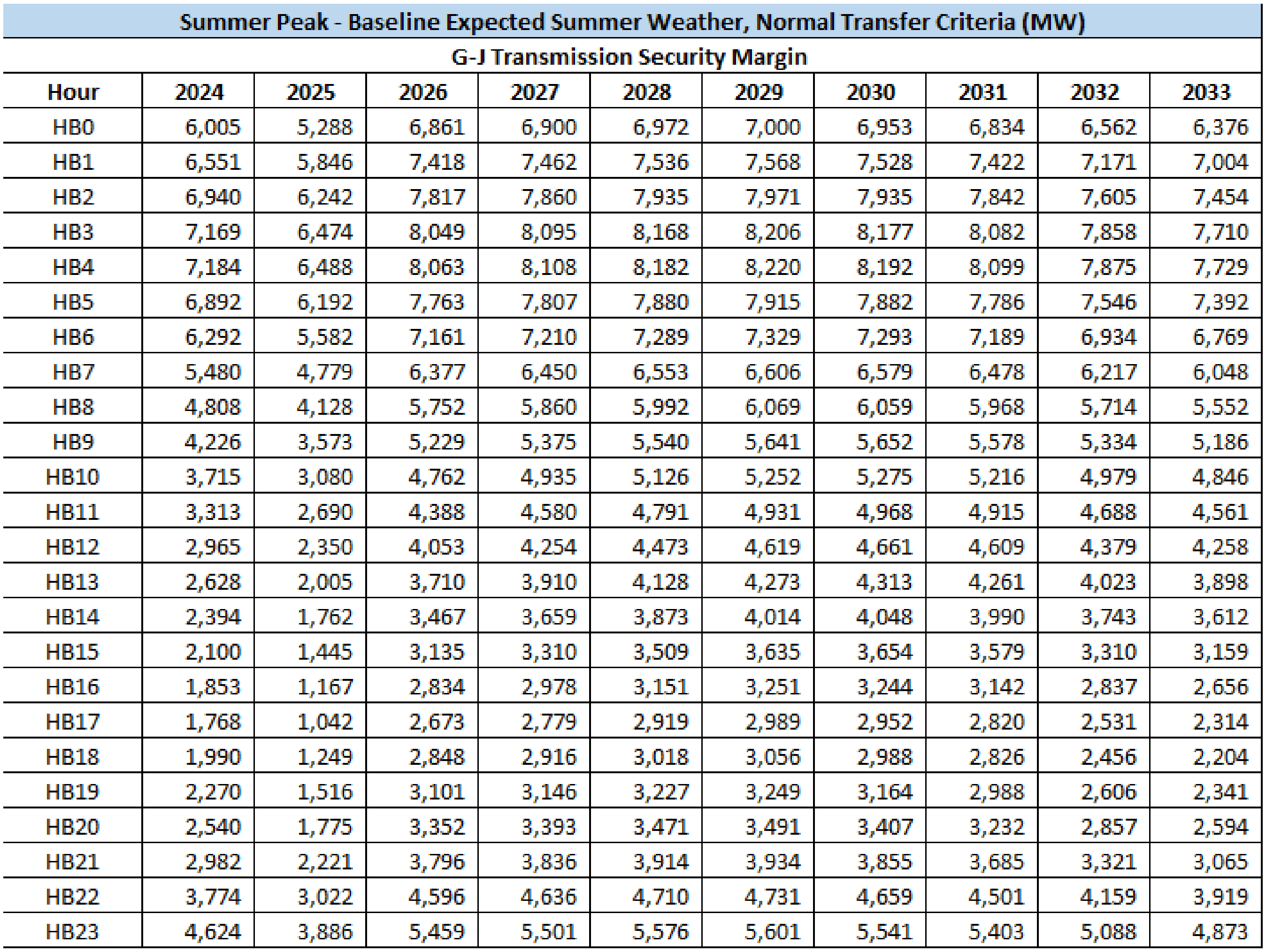
Figure 42: Lower Hudson Valley Transmission Security Margin (Summer Peak – Expected Weather, Normal Transfer Criteria)

Summer Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	G-J Demand Forecast (4)	(15,214)	(15,206)	(15,140)	(15,074)	(14,971)	(14,931)	(14,998)	(15,160)	(15,378)	(15,642)
B	RECO Demand	(389)	(389)	(389)	(387)	(387)	(387)	(387)	(387)	(388)	(388)
C	**Total Demand (A+B)**	(15,603)	(15,595)	(15,529)	(15,461)	(15,358)	(15,318)	(15,385)	(15,547)	(15,766)	(16,030)
D	UPNY-SENY Limit (3), (5)	5,725	5,725	5,025	5,025	5,025	5,025	5,025	5,025	5,025	5,025
E	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
F	K - SENY	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)
G	**Total SENY AC Import (D+E+F)**	5,631	5,631	4,931	4,931	4,931	4,931	4,931	4,931	4,931	4,931
H	Loss of Source Contingency	(987)	(987)	0	0	0	0	0	0	0	0
I	**Resource Need (C+G+H)**	(10,959)	(10,951)	(10,598)	(10,530)	(10,427)	(10,387)	(10,454)	(10,616)	(10,835)	(11,099)
J	G-J Generation (1)	13,495	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991
K	G-J Generation Derates (2)	(1,083)	(1,106)	(1,109)	(1,110)	(1,111)	(1,113)	(1,114)	(1,114)	(1,115)	(1,117)
L	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
M	Net ICAP External Imports	315	315	1,565	1,565	1,565	1,565	1,565	1,565	1,565	1,565
N	**Total Resources Available (J+K+L+M)**	12,727	12,200	13,447	13,446	13,445	13,443	13,442	13,442	13,441	13,440
O	**Transmission Security Margin (I+N)**	1,768	1,249	2,849	2,916	3,018	3,056	2,988	2,826	2,606	2,341
P	Higher Policy Demand Impact	(119)	(117)	(130)	(128)	(145)	(280)	(388)	(476)	(504)	(520)
Q	**Higher Policy Transmission Security Margin (O+P)**	1,649	1,132	2,719	2,788	2,873	2,776	2,600	2,350	2,102	1,821

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based on the summer peak 2032 representations evaluated in the 2022 RNA.
4. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
5. Does not reflect the delay of the Dover PAR presented by NY Transco at the June 16, 2023 ESPWG/TPAS meeting and the related impact of bypassing the Knickerbocker - Pleasant Valley series compensation. The NYISO has conservatively estimated a potential reduction in SENY transfers of 750 MW. As seen in line item O and Q a reduction of 750 MW to the SENY transfer would not result in a deficient transmission security margin.

Figure 43: Lower Hudson Valley Transmission Security Margin (Hourly) (Summer Peak – Expected Weather, Normal Transfer Criteria)



Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)										
G-J Transmission Security Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	6,005	5,288	6,861	6,900	6,972	7,000	6,953	6,834	6,562	6,376
HB1	6,551	5,846	7,418	7,462	7,536	7,568	7,528	7,422	7,171	7,004
HB2	6,940	6,242	7,817	7,860	7,935	7,971	7,935	7,842	7,605	7,454
HB3	7,169	6,474	8,049	8,095	8,168	8,206	8,177	8,082	7,858	7,710
HB4	7,184	6,488	8,063	8,108	8,182	8,220	8,192	8,099	7,875	7,729
HB5	6,892	6,192	7,763	7,807	7,880	7,915	7,882	7,786	7,546	7,392
HB6	6,292	5,582	7,161	7,210	7,289	7,329	7,293	7,189	6,934	6,769
HB7	5,480	4,779	6,377	6,450	6,553	6,606	6,579	6,478	6,217	6,048
HB8	4,808	4,128	5,752	5,860	5,992	6,069	6,059	5,968	5,714	5,552
HB9	4,226	3,573	5,229	5,375	5,540	5,641	5,652	5,578	5,334	5,186
HB10	3,715	3,080	4,762	4,935	5,126	5,252	5,275	5,216	4,979	4,846
HB11	3,313	2,690	4,388	4,580	4,791	4,931	4,968	4,915	4,688	4,561
HB12	2,965	2,350	4,053	4,254	4,473	4,619	4,661	4,609	4,379	4,258
HB13	2,628	2,005	3,710	3,910	4,128	4,273	4,313	4,261	4,023	3,898
HB14	2,394	1,762	3,467	3,659	3,873	4,014	4,048	3,990	3,743	3,612
HB15	2,100	1,445	3,135	3,310	3,509	3,635	3,654	3,579	3,310	3,159
HB16	1,853	1,167	2,834	2,978	3,151	3,251	3,244	3,142	2,837	2,656
HB17	1,768	1,042	2,673	2,779	2,919	2,989	2,952	2,820	2,531	2,314
HB18	1,990	1,249	2,848	2,916	3,018	3,056	2,988	2,826	2,456	2,204
HB19	2,270	1,516	3,101	3,146	3,227	3,249	3,164	2,988	2,606	2,341
HB20	2,540	1,775	3,352	3,393	3,471	3,491	3,407	3,232	2,857	2,594
HB21	2,982	2,221	3,796	3,836	3,914	3,934	3,855	3,685	3,321	3,065
HB22	3,774	3,022	4,596	4,636	4,710	4,731	4,659	4,501	4,159	3,919
HB23	4,624	3,886	5,459	5,501	5,576	5,601	5,541	5,403	5,088	4,873

Figure 44: Lower Hudson Valley Transmission Security Margin Hourly Curve (Summer Peak – Expected Weather, Normal Transfer Criteria)

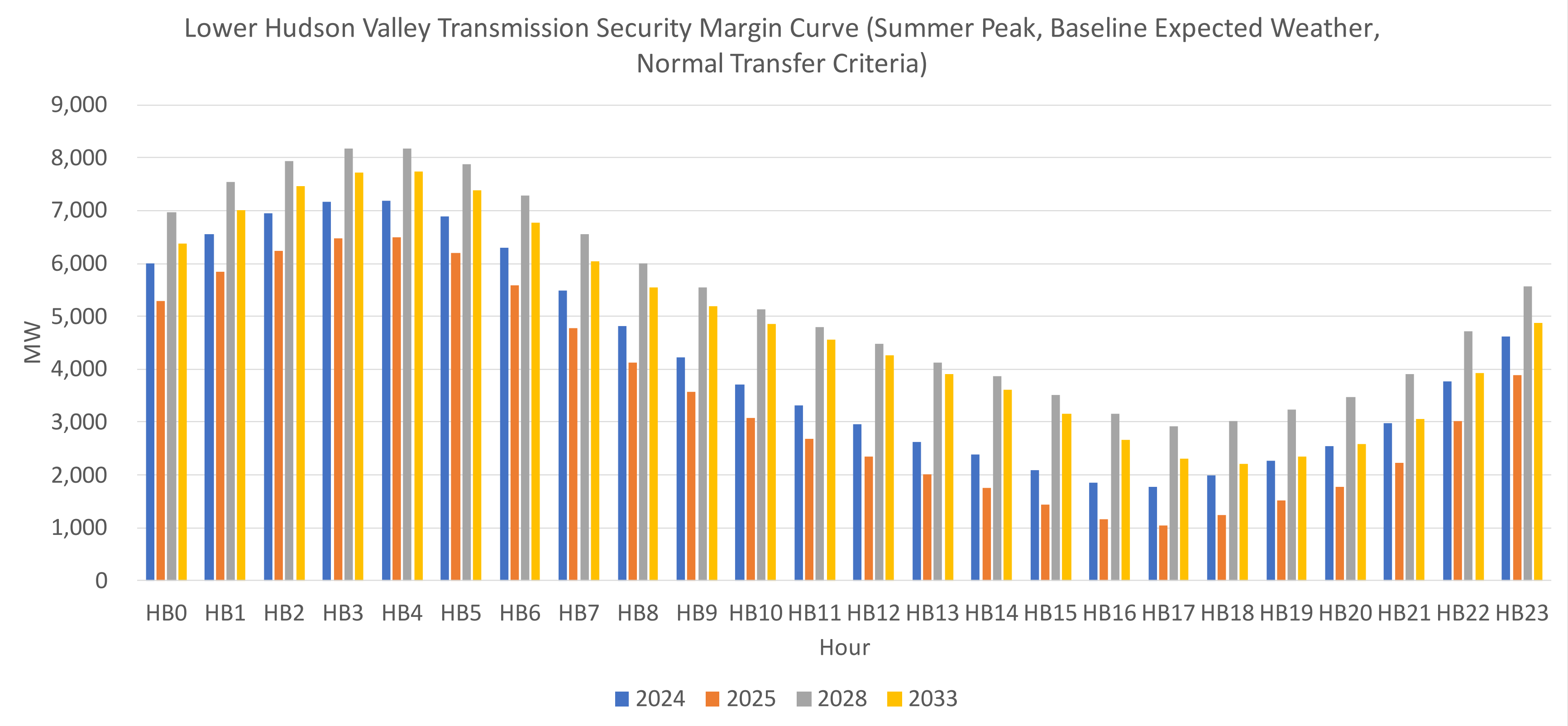


Figure 45: Impact of Generator Outages on Lower Hudson Valley Transmission Security Margin

Lower Hudson Valley												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Lower Hudson Valley Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			1,649	1,132	2,719	2,788	2,873	2,776	2,600	2,350	2,102	1,821
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Ravenswood ST 01, 02, & 03 (2)	1,730.3	(171.30)	521	(248)	1,160	1,229	1,314	1,217	1,041	791	543	262
Roseton 1 & 2	1,188.7	(117.68)	578	61	1,648	1,717	1,802	1,705	1,529	1,279	1,031	750
Bowline 1 & 2	1,139.0	(112.76)	623	106	1,693	1,762	1,847	1,750	1,574	1,324	1,076	794
Cricket Valley CC1, CC2, & CC3	1,029.3	(41.79)	661	144	1,732	1,801	1,885	1,789	1,613	1,363	1,114	833
Ravenswood ST 03 (2)	987.3	(97.74)	1,190	421	1,830	1,899	1,983	1,887	1,711	1,461	1,212	931
Astoria 2, 3, & 5	917.4	(90.82)	822	305	1,893	1,962	2,046	1,950	1,774	1,524	1,275	994
Arthur Kill ST 2 & 3	865.3	(85.66)	869	352	1,940	2,008	2,093	1,997	1,821	1,571	1,322	1,041
Linden Cogen	789.5	(32.05)	891	374	1,962	2,031	2,115	2,019	1,843	1,593	1,344	1,063
CPV Valley CC1 & CC2	651.8	(26.46)	1,023	506	2,094	2,163	2,247	2,151	1,975	1,725	1,477	1,195
East River 1, 2, 6, & 7	636.5	(44.86)	1,057	540	2,128	2,196	2,281	2,185	2,009	1,759	1,510	1,229
Roseton 2	612.5	(60.64)	1,097	580	2,168	2,236	2,321	2,225	2,048	1,798	1,550	1,269
Bayonne EC CT G1 through G10	601.6	(53.90)	1,101	584	2,172	2,240	2,325	2,229	2,052	1,802	1,554	1,273
Astoria East Energy CC1 & CC2	583.8	(23.70)	1,089	572	2,159	2,228	2,313	2,216	2,040	1,790	1,542	1,260
Bowline 1	582.0	(57.62)	1,124	607	2,195	2,264	2,348	2,252	2,076	1,826	1,578	1,296
Roseton 1	576.2	(57.04)	1,130	613	2,200	2,269	2,354	2,257	2,081	1,831	1,583	1,301
Astoria Energy 2 - CC3 & CC4	570.2	(23.15)	1,102	585	2,172	2,241	2,326	2,229	2,053	1,803	1,555	1,274
Bowline 2	557.0	(55.14)	1,147	630	2,218	2,286	2,371	2,275	2,098	1,848	1,600	1,319
Arthur Kill ST 3	519.0	(51.38)	1,181	664	2,252	2,320	2,405	2,309	2,133	1,883	1,634	1,353
Danskammer 1, 2, 3, & 4	496.2	(49.12)	1,202	685	2,272	2,341	2,426	2,329	2,153	1,903	1,655	1,374
Astoria CC 1 & 2	476.0	(19.33)	1,192	675	2,263	2,331	2,416	2,320	2,144	1,894	1,645	1,364
Astoria 5	374.7	(37.10)	1,311	794	2,382	2,450	2,535	2,439	2,263	2,013	1,764	1,483
Ravenswood ST 02	374.5	(37.08)	1,311	794	2,382	2,451	2,535	2,439	2,263	2,013	1,764	1,483
Astoria 3	372.2	(36.85)	1,313	796	2,384	2,453	2,537	2,441	2,265	2,015	1,767	1,485
Ravenswood ST 01	368.5	(36.48)	1,317	800	2,387	2,456	2,541	2,444	2,268	2,018	1,770	1,489
Arthur Kill ST 2	346.3	(34.28)	1,337	820	2,407	2,476	2,561	2,464	2,288	2,038	1,790	1,509

Lower Hudson Valley												
Year			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Lower Hudson Valley Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			1,649	1,132	2,719	2,788	2,873	2,776	2,600	2,350	2,102	1,821
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Cricket Valley CC2	343.6	(13.95)	1,319	802	2,390	2,458	2,543	2,447	2,271	2,021	1,772	1,491
Cricket Valley CC3	343.3	(13.94)	1,319	802	2,390	2,459	2,543	2,447	2,271	2,021	1,773	1,491
Cricket Valley CC1	342.4	(13.90)	1,320	803	2,391	2,460	2,544	2,448	2,272	2,022	1,773	1,492
CPV Valley CC1	325.9	(13.23)	1,336	819	2,407	2,475	2,560	2,464	2,288	2,038	1,789	1,508
CPV Valley CC2	325.9	(13.23)	1,336	819	2,407	2,475	2,560	2,464	2,288	2,038	1,789	1,508
Astoria East Energy - CC1	291.9	(11.85)	1,369	852	2,439	2,508	2,593	2,496	2,320	2,070	1,822	1,541
Astoria East Energy - CC2	291.9	(11.85)	1,369	852	2,439	2,508	2,593	2,496	2,320	2,070	1,822	1,541
Astoria Energy 2 - CC3	285.1	(11.58)	1,375	858	2,446	2,515	2,599	2,503	2,327	2,077	1,828	1,547
Astoria Energy 2 - CC4	285.1	(11.58)	1,375	858	2,446	2,515	2,599	2,503	2,327	2,077	1,828	1,547
Brooklyn Navy Yard	244.6	(9.93)	1,414	897	2,485	2,553	2,638	2,542	2,366	2,116	1,867	1,586
Astoria CC 1	238.0	(9.66)	1,420	903	2,491	2,560	2,644	2,548	2,372	2,122	1,874	1,592
Astoria CC 2	238.0	(9.66)	1,420	903	2,491	2,560	2,644	2,548	2,372	2,122	1,874	1,592
Ravenswood CC 04	223.2	(9.06)	1,435	918	2,505	2,574	2,659	2,562	2,386	2,136	1,888	1,606
Danskammer 4	222.1	(21.99)	1,449	932	2,519	2,588	2,673	2,576	2,400	2,150	1,902	1,620
East River 7	184.2	(18.24)	1,483	966	2,553	2,622	2,707	2,611	2,434	2,184	1,936	1,655
Astoria 2	170.5	(16.88)	1,495	978	2,566	2,634	2,719	2,623	2,447	2,197	1,948	1,667
East River 2	155.8	(6.33)	1,499	982	2,570	2,639	2,723	2,627	2,451	2,201	1,952	1,671
East River 1	155.1	(6.30)	1,500	983	2,571	2,639	2,724	2,628	2,451	2,201	1,953	1,672
East River 6	141.4	(14.00)	1,521	1,004	2,592	2,661	2,745	2,649	2,473	2,223	1,974	1,693
Danskammer 3	139.7	(13.83)	1,523	1,006	2,594	2,662	2,747	2,651	2,474	2,224	1,976	1,695
KIAC_JFK (BTM:NG)	98.7	(4.01)	1,554	1,037	2,625	2,693	2,778	2,682	2,506	2,256	2,007	1,726
Gowanus 5 & 6	79.9	(8.05)	1,577	1,060	2,648	2,716	2,801	2,705	2,528	2,278	2,030	1,749
Hellgate 1 & 2	79.9	(8.05)	1,577	1,060	2,648	2,716	2,801	2,705	2,528	2,278	2,030	1,749
Harlem River 1 & 2	79.9	(8.05)	1,577	1,060	2,648	2,716	2,801	2,705	2,528	2,278	2,030	1,749
Vernon Blvd 2 & 3	79.9	(8.05)	1,577	1,060	2,648	2,716	2,801	2,705	2,528	2,278	2,030	1,749
Danskammer 1	70.2	(6.95)	1,586	1,069	2,656	2,725	2,810	2,713	2,537	2,287	2,039	1,757

Lower Hudson Valley												
Year			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Lower Hudson Valley Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			1,649	1,132	2,719	2,788	2,873	2,776	2,600	2,350	2,102	1,821
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Danskammer 2	64.2	(6.36)	1,591	1,074	2,662	2,730	2,815	2,719	2,542	2,292	2,044	1,763
Bayonne EC CTG1	61.8	(5.54)	1,593	1,076	2,663	2,732	2,817	2,720	2,544	2,294	2,046	1,764
Bayonne EC CTG4	60.9	(5.46)	1,593	1,076	2,664	2,733	2,817	2,721	2,545	2,295	2,046	1,765
Bayonne EC CTG9	60.5	(5.42)	1,594	1,077	2,664	2,733	2,818	2,721	2,545	2,295	2,047	1,766
Bayonne EC CTG10	60.5	(5.42)	1,594	1,077	2,664	2,733	2,818	2,721	2,545	2,295	2,047	1,766
Bayonne EC CTG8	60.3	(5.40)	1,594	1,077	2,664	2,733	2,818	2,722	2,545	2,295	2,047	1,766
Bayonne EC CTG2	60.2	(5.39)	1,594	1,077	2,665	2,733	2,818	2,722	2,545	2,295	2,047	1,766
Bayonne EC CTG7	60.0	(5.38)	1,594	1,077	2,665	2,733	2,818	2,722	2,546	2,296	2,047	1,766
Bayonne EC CTG5	59.7	(5.35)	1,594	1,077	2,665	2,734	2,818	2,722	2,546	2,296	2,048	1,766
Bayonne EC CTG6	59.6	(5.34)	1,595	1,078	2,665	2,734	2,819	2,722	2,546	2,296	2,048	1,766
Bayonne EC CTG3	58.1	(5.21)	1,596	1,079	2,667	2,735	2,820	2,724	2,547	2,297	2,049	1,768
Wheelabrator Westchester	52.1	(5.16)	1,602	1,085	2,672	2,741	2,826	2,730	2,553	2,303	2,055	1,774
Kent	45.8	(4.62)	1,608	1,091	2,678	2,747	2,832	2,735	2,559	2,309	2,061	1,779
Pouch	45.1	(4.55)	1,608	1,091	2,679	2,748	2,832	2,736	2,560	2,310	2,061	1,780
Gowanus 5	40.0	(4.03)	1,613	1,096	2,683	2,752	2,837	2,741	2,564	2,314	2,066	1,785
Hellgate 2	40.0	(4.03)	1,613	1,096	2,683	2,752	2,837	2,741	2,564	2,314	2,066	1,785
Harlem River 2	40.0	(4.03)	1,613	1,096	2,683	2,752	2,837	2,741	2,564	2,314	2,066	1,785
Vernon Blvd 2	40.0	(4.03)	1,613	1,096	2,683	2,752	2,837	2,741	2,564	2,314	2,066	1,785
Gowanus 6	39.9	(4.02)	1,613	1,096	2,684	2,752	2,837	2,741	2,564	2,314	2,066	1,785
Hellgate 1	39.9	(4.02)	1,613	1,096	2,684	2,752	2,837	2,741	2,564	2,314	2,066	1,785
Harlem River 1	39.9	(4.02)	1,613	1,096	2,684	2,752	2,837	2,741	2,564	2,314	2,066	1,785
Vernon Blvd 3	39.9	(4.02)	1,613	1,096	2,684	2,752	2,837	2,741	2,564	2,314	2,066	1,785
Hillburn GT	35.7	(3.20)	1,616	1,099	2,687	2,756	2,840	2,744	2,568	2,318	2,069	1,788
Shoemaker GT	32.7	(2.93)	1,619	1,102	2,690	2,758	2,843	2,747	2,570	2,320	2,072	1,791
Arthur Kill Cogen	11.1	(1.32)	1,639	1,122	2,710	2,778	2,863	2,767	2,590	2,340	2,092	1,811
DCRRA	6.2	(0.61)	1,643	1,126	2,714	2,783	2,867	2,771	2,595	2,345	2,096	1,815

Lower Hudson Valley												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Lower Hudson Valley Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			1,649	1,132	2,719	2,788	2,873	2,776	2,600	2,350	2,102	1,821
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									

Notes

1. Utilizes the Higher Policy Transmission Security Margin for Summer Peak with Expected Weather.
2. In 2024 and 2025 the most limiting contingency combination includes the loss of Ravenswood 3. For this calculation the margin based on the loss of two transmission elements is utilized. Other combinations with loss of generation may be more limiting.

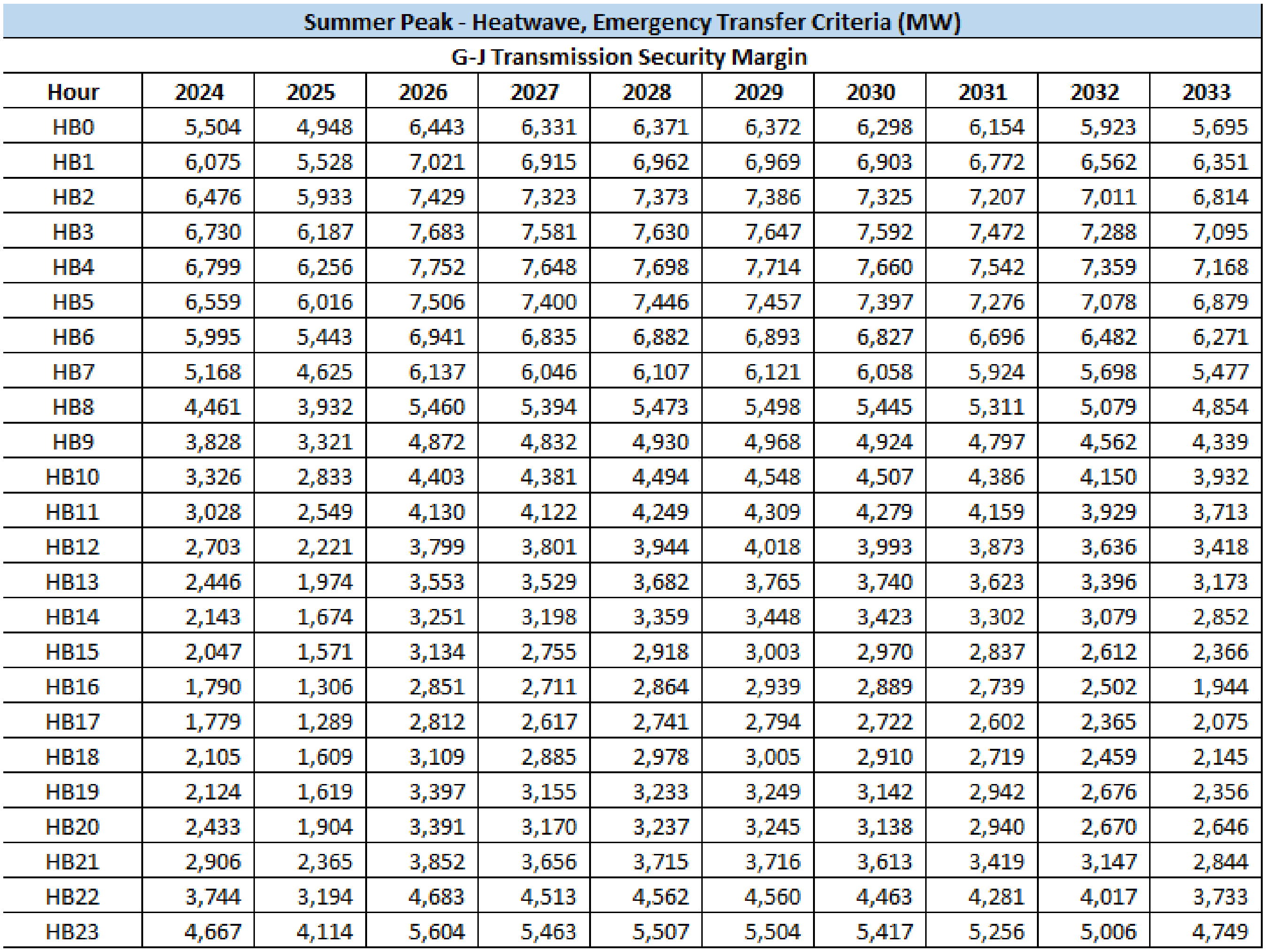
Figure 46: Lower Hudson Valley Transmission Security Margin (1-in-10-Year Heatwave, Emergency Transfer Criteria)

Summer Peak - 1-in-10-Year Heatwave, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	G-J Demand Forecast (6)	(15,859)	(15,850)	(15,781)	(15,712)	(15,605)	(15,564)	(15,634)	(15,803)	(16,032)	(16,306)
B	RECO Demand	(412)	(412)	(412)	(410)	(410)	(410)	(410)	(410)	(411)	(411)
C	**Total Demand (A+B)**	(16,271)	(16,262)	(16,193)	(16,122)	(16,015)	(15,974)	(16,044)	(16,213)	(16,443)	(16,717)
D	UPNY-SENY Limit (5)	5,450	5,450	5,650	5,650	5,650	5,650	5,650	5,650	5,650	5,650
E	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
F	K - SENY	(317)	(298)	(291)	(288)	(301)	(313)	(337)	(359)	(387)	(426)
G	**Total SENY AC Import (D+E+F)**	5,122	5,141	5,348	5,351	5,338	5,326	5,302	5,280	5,252	5,213
H	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
I	**Resource Need (C+G+H)**	(11,149)	(11,122)	(10,846)	(10,772)	(10,677)	(10,649)	(10,742)	(10,933)	(11,192)	(11,504)
J	G-J Generation (1)	13,495	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991
K	G-J Generation Derates (2)	(1,083)	(1,106)	(1,109)	(1,110)	(1,111)	(1,113)	(1,114)	(1,114)	(1,115)	(1,117)
L	Temperature Based Generation Derates	(87)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)
M	Net ICAP External Imports	315	315	1,565	1,565	1,565	1,565	1,565	1,565	1,565	1,565
N	SCRs (3), (4)	288	288	288	288	288	288	288	288	288	288
O	**Total Resources Available (J+K+L+M+N)**	12,928	12,410	13,658	13,656	13,655	13,654	13,652	13,652	13,651	13,650
P	**Transmission Security Margin (I+O)**	1,779	1,289	2,812	2,885	2,978	3,005	2,910	2,719	2,459	2,145

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 239 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2032 are based on the summer peak 2033 representations evaluated in the 2022 RNA.
6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 47: Lower Hudson Valley Transmission Security Margin (Hourly) (1-in-10-Year Heatwave, Emergency Transfer Criteria)



Summer Peak - Heatwave, Emergency Transfer Criteria (MW)										
G-J Transmission Security Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	5,504	4,948	6,443	6,331	6,371	6,372	6,298	6,154	5,923	5,695
HB1	6,075	5,528	7,021	6,915	6,962	6,969	6,903	6,772	6,562	6,351
HB2	6,476	5,933	7,429	7,323	7,373	7,386	7,325	7,207	7,011	6,814
HB3	6,730	6,187	7,683	7,581	7,630	7,647	7,592	7,472	7,288	7,095
HB4	6,799	6,256	7,752	7,648	7,698	7,714	7,660	7,542	7,359	7,168
HB5	6,559	6,016	7,506	7,400	7,446	7,457	7,397	7,276	7,078	6,879
HB6	5,995	5,443	6,941	6,835	6,882	6,893	6,827	6,696	6,482	6,271
HB7	5,168	4,625	6,137	6,046	6,107	6,121	6,058	5,924	5,698	5,477
HB8	4,461	3,932	5,460	5,394	5,473	5,498	5,445	5,311	5,079	4,854
HB9	3,828	3,321	4,872	4,832	4,930	4,968	4,924	4,797	4,562	4,339
HB10	3,326	2,833	4,403	4,381	4,494	4,548	4,507	4,386	4,150	3,932
HB11	3,028	2,549	4,130	4,122	4,249	4,309	4,279	4,159	3,929	3,713
HB12	2,703	2,221	3,799	3,801	3,944	4,018	3,993	3,873	3,636	3,418
HB13	2,446	1,974	3,553	3,529	3,682	3,765	3,740	3,623	3,396	3,173
HB14	2,143	1,674	3,251	3,198	3,359	3,448	3,423	3,302	3,079	2,852
HB15	2,047	1,571	3,134	2,755	2,918	3,003	2,970	2,837	2,612	2,366
HB16	1,790	1,306	2,851	2,711	2,864	2,939	2,889	2,739	2,502	1,944
HB17	1,779	1,289	2,812	2,617	2,741	2,794	2,722	2,602	2,365	2,075
HB18	2,105	1,609	3,109	2,885	2,978	3,005	2,910	2,719	2,459	2,145
HB19	2,124	1,619	3,397	3,155	3,233	3,249	3,142	2,942	2,676	2,356
HB20	2,433	1,904	3,391	3,170	3,237	3,245	3,138	2,940	2,670	2,646
HB21	2,906	2,365	3,852	3,656	3,715	3,716	3,613	3,419	3,147	2,844
HB22	3,744	3,194	4,683	4,513	4,562	4,560	4,463	4,281	4,017	3,733
HB23	4,667	4,114	5,604	5,463	5,507	5,504	5,417	5,256	5,006	4,749

Figure 48: Lower Hudson Valley Transmission Security Margin Hourly Curve (1-in-10-Year Heatwave, Emergency Transfer Criteria)

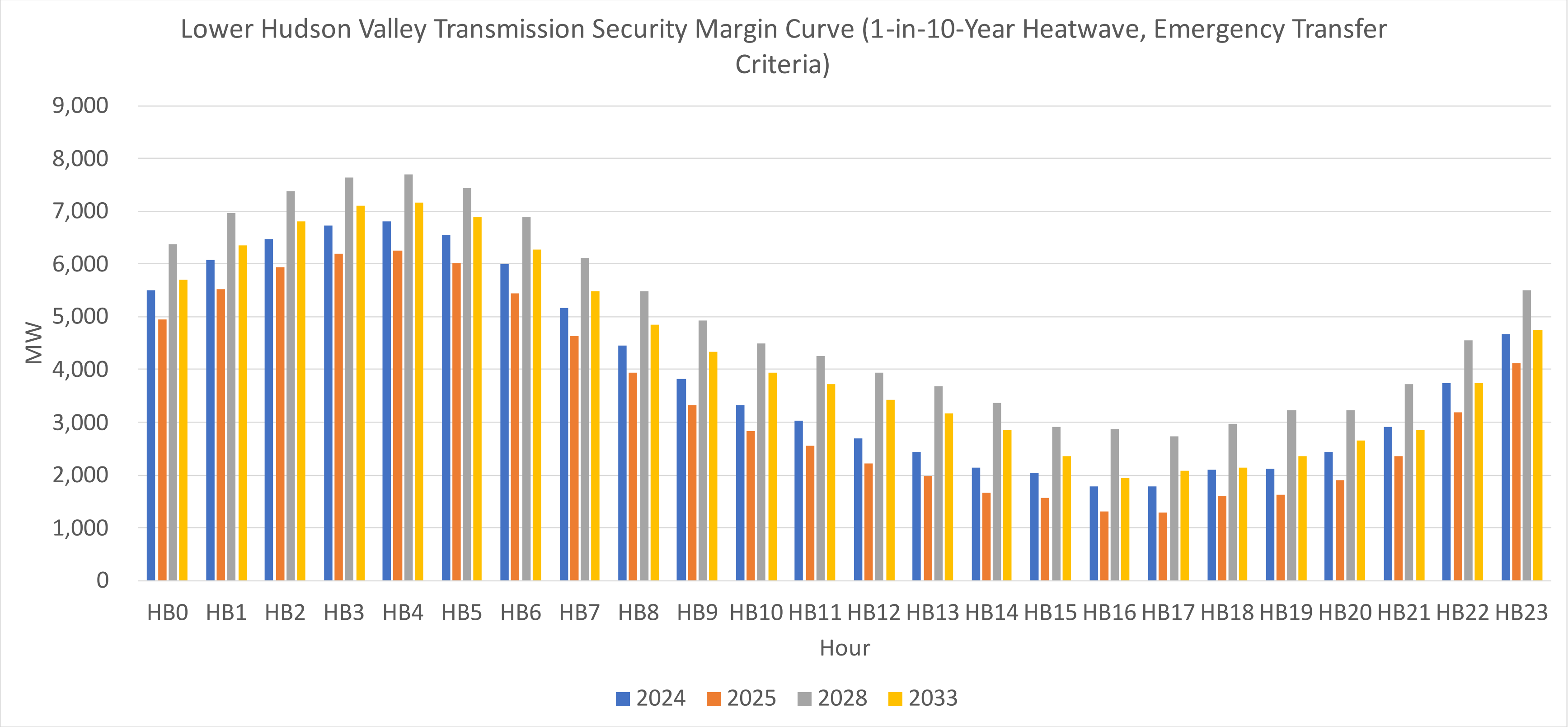


Figure 49: Lower Hudson Valley Transmission Security Margin (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

Summer Peak - 1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	G-J Demand Forecast (6)	(16,476)	(16,467)	(16,395)	(16,323)	(16,212)	(16,170)	(16,243)	(16,419)	(16,655)	(16,941)
B	RECO Demand	(429)	(429)	(429)	(426)	(426)	(426)	(426)	(426)	(427)	(427)
C	**Total Demand (A+B)**	(16,905)	(16,896)	(16,824)	(16,749)	(16,638)	(16,596)	(16,669)	(16,845)	(17,082)	(17,368)
D	UPNY-SENY Limit (5)	5,450	5,450	5,650	5,650	5,650	5,650	5,650	5,650	5,650	5,650
E	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
F	K - SENY	(680)	(661)	(653)	(649)	(664)	(677)	(702)	(725)	(754)	(796)
G	**Total SENY AC Import (D+E+F)**	4,759	4,778	4,986	4,990	4,975	4,962	4,937	4,914	4,885	4,843
H	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
I	**Resource Need (C+G+H)**	(12,145)	(12,118)	(11,838)	(11,760)	(11,663)	(11,635)	(11,732)	(11,931)	(12,198)	(12,525)
J	G-J Generation (1)	13,495	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991
K	G-J Generation Derates (2)	(1,083)	(1,106)	(1,109)	(1,110)	(1,111)	(1,113)	(1,114)	(1,114)	(1,115)	(1,117)
L	Temperature Based Generation Derates	(184)	(164)	(164)	(164)	(164)	(164)	(164)	(164)	(164)	(164)
M	Net ICAP External Imports	315	315	1,565	1,565	1,565	1,565	1,565	1,565	1,565	1,565
N	SCRs (3), (4)	288	288	288	288	288	288	288	288	288	288
O	**Total Resources Available (J+K+L+M+N)**	12,831	12,323	13,571	13,570	13,568	13,567	13,566	13,566	13,564	13,563
P	**Transmission Security Margin (I+O)**	686	206	1,733	1,810	1,905	1,932	1,833	1,634	1,366	1,038

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 239 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2032 are based on the summer peak 2033 representations evaluated in the 2022 RNA.
6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 50: Lower Hudson Valley Transmission Security Margin (Hourly) (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

Summer Peak - 1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria (MW)										
G-J Transmission Security Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	4,720	4,176	5,675	5,559	5,600	5,600	5,524	5,375	5,141	4,902
HB1	5,292	4,757	6,252	6,143	6,190	6,197	6,129	5,993	5,779	5,559
HB2	5,693	5,161	6,660	6,551	6,602	6,614	6,551	6,428	6,227	6,021
HB3	5,947	5,416	6,915	6,810	6,859	6,875	6,819	6,693	6,505	6,302
HB4	6,017	5,486	6,985	6,878	6,928	6,943	6,888	6,764	6,577	6,375
HB5	5,778	5,247	6,740	6,630	6,678	6,687	6,626	6,500	6,296	6,087
HB6	5,213	4,672	6,172	6,064	6,111	6,120	6,053	5,917	5,697	5,476
HB7	4,384	3,850	5,363	5,269	5,330	5,343	5,278	5,138	4,906	4,675
HB8	3,672	3,153	4,682	4,612	4,689	4,713	4,656	4,516	4,279	4,044
HB9	3,038	2,537	4,088	4,043	4,139	4,176	4,128	3,994	3,755	3,520
HB10	2,534	2,048	3,617	3,589	3,701	3,751	3,707	3,579	3,337	3,107
HB11	2,237	1,763	3,344	3,330	3,454	3,512	3,477	3,350	3,114	2,886
HB12	1,840	1,362	2,938	2,934	3,074	3,145	3,115	2,987	2,742	2,512
HB13	1,522	1,053	2,630	2,600	2,749	2,829	2,799	2,674	2,438	2,200
HB14	1,157	692	2,268	2,206	2,365	2,451	2,420	2,290	2,059	1,814
HB15	997	527	2,091	1,703	1,862	1,946	1,905	1,763	1,528	1,265
HB16	682	205	1,750	1,604	1,756	1,829	1,773	1,613	1,366	792
HB17	686	206	1,733	1,530	1,656	1,707	1,630	1,502	1,258	951
HB18	1,021	537	2,042	1,810	1,905	1,932	1,833	1,634	1,366	1,038
HB19	1,042	550	2,335	2,086	2,166	2,183	2,072	1,864	1,591	1,257
HB20	1,409	894	2,386	2,161	2,230	2,237	2,128	1,923	1,645	1,606
HB21	1,939	1,411	2,905	2,703	2,763	2,765	2,658	2,458	2,180	1,865
HB22	2,834	2,299	3,791	3,618	3,667	3,665	3,564	3,378	3,109	2,812
HB23	3,816	3,275	4,768	4,625	4,669	4,666	4,577	4,411	4,155	3,888

Figure 51: Lower Hudson Valley Transmission Security Margin Hourly Curve (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

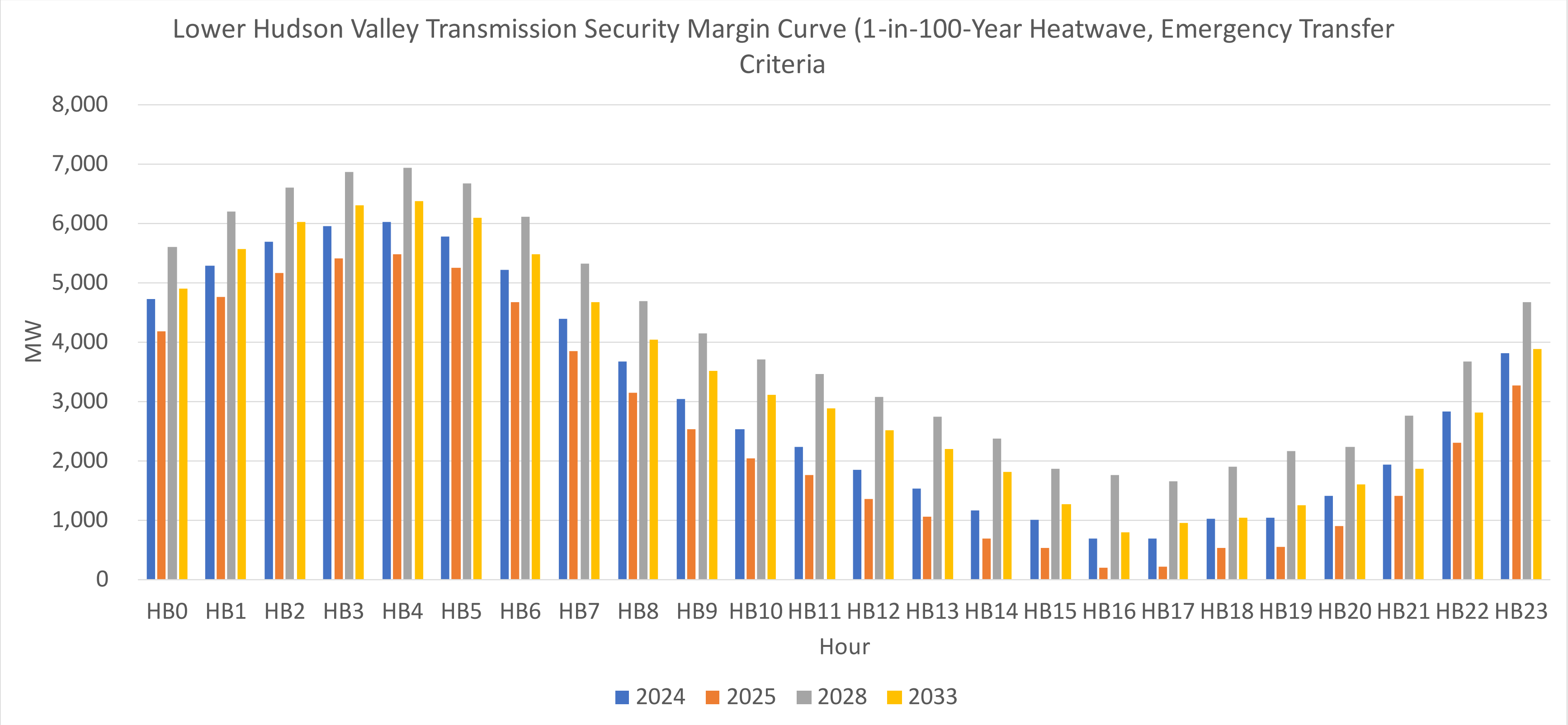


Figure 52: Lower Hudson Valley Transmission Security Margin (Winter Peak – Expected Weather, Normal Transfer Criteria)

Winter Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	G-J Demand Forecast (5)	(10,500)	(10,596)	(10,779)	(10,969)	(11,220)	(11,568)	(11,986)	(12,483)	(13,055)	(13,659)
B	RECO Demand	(229)	(229)	(229)	(234)	(234)	(234)	(234)	(234)	(240)	(240)
C	**Total Demand (A+B)**	(10,729)	(10,825)	(11,008)	(11,203)	(11,454)	(11,802)	(12,220)	(12,717)	(13,295)	(13,899)
D	UPNY-SENY Limit (3), (4)	5,725	5,725	5,725	5,725	5,725	5,725	5,725	5,725	5,725	5,725
E	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
F	K - SENY (4)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)
G	**Total SENY AC Import (D+E+F)**	5,631	5,631	5,631	5,631	5,631	5,631	5,631	5,631	5,631	5,631
H	Loss of Source Contingency	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)
I	**Resource Need (C+G+H)**	(6,066)	(6,162)	(6,345)	(6,540)	(6,791)	(7,139)	(7,557)	(8,054)	(8,632)	(9,236)
J	G-J Generation (1)	14,529	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,263)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)
L	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
M	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
N	**Total Resources Available (J+K+L+M)**	13,581	13,532	13,532	13,532	13,532	13,532	13,532	13,532	13,532	13,532
O	**Transmission Security Margin (I+N)**	7,515	7,370	7,187	6,992	6,741	6,393	5,975	5,478	4,900	4,296

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
4. As a conservative winter peak assumption these limits utilize the summer values.
5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 53: Lower Hudson Valley Transmission Security Margin (1-in-10-Year Cold Snap, Emergency Transfer Criteria)

Winter Peak - 1-in-10-Year Cold Snap, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	G-J Demand Forecast (7)	(10,940)	(11,041)	(11,231)	(11,430)	(11,691)	(12,054)	(12,489)	(13,008)	(13,603)	(14,232)
B	RECO Demand	(243)	(243)	(243)	(248)	(248)	(248)	(248)	(248)	(254)	(254)
C	**Total Demand (A+B)**	(11,183)	(11,284)	(11,474)	(11,678)	(11,939)	(12,302)	(12,737)	(13,256)	(13,857)	(14,486)
D	UPNY-SENY Limit (5), (6)	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450
E	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
F	K - SENY (6)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)
G	**Total SENY AC Import (D+E+F)**	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357
H	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
I	**Resource Need (C+G+H)**	(5,826)	(5,927)	(6,117)	(6,321)	(6,582)	(6,945)	(7,380)	(7,899)	(8,500)	(9,129)
J	G-J Generation (1)	14,529	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,263)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)
L	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
M	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
N	SCRs (3), (4)	152	152	152	152	152	152	152	152	152	152
O	**Total Resources Available (J+K+L+M+N)**	13,733	13,684	13,684	13,684	13,684	13,684	13,684	13,684	13,684	13,684
P	**Transmission Security Margin (I+O)**	7,907	7,757	7,567	7,363	7,102	6,739	6,304	5,785	5,183	4,554

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 124 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 54: Lower Hudson Valley Transmission Security Margin (1-in-100-year Extreme Cold Snap, Emergency Transfer Criteria)

Winter Peak - 1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	G-J Demand Forecast (7)	(11,716)	(11,822)	(12,027)	(12,239)	(12,519)	(12,907)	(13,373)	(13,929)	(14,567)	(15,240)
B	RECO Demand	(252)	(252)	(252)	(258)	(258)	(258)	(258)	(258)	(264)	(264)
C	**Total Demand (A+B)**	(11,968)	(12,074)	(12,279)	(12,497)	(12,777)	(13,165)	(13,631)	(14,187)	(14,831)	(15,504)
D	UPNY-SENY Limit (5), (6)	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450
E	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
F	K - SENY (6)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)
G	**Total SENY AC Import (D+E+F)**	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357
H	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
I	**Resource Need (C+G+H)**	(6,611)	(6,717)	(6,922)	(7,140)	(7,420)	(7,808)	(8,274)	(8,830)	(9,474)	(10,147)
J	G-J Generation (1)	14,529	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,263)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)	(1,258)
L	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
M	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
N	SCRs (3), (4)	152	152	152	152	152	152	152	152	152	152
O	**Total Resources Available (J+K+L+M+N)**	13,733	13,684	13,684	13,684	13,684	13,684	13,684	13,684	13,684	13,684
P	**Transmission Security Margin (I+O)**	7,121	6,967	6,762	6,544	6,264	5,876	5,410	4,854	4,210	3,537

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 124 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 55: Summary of Lower Hudson Valley Summer Transmission Security Margin – Summer

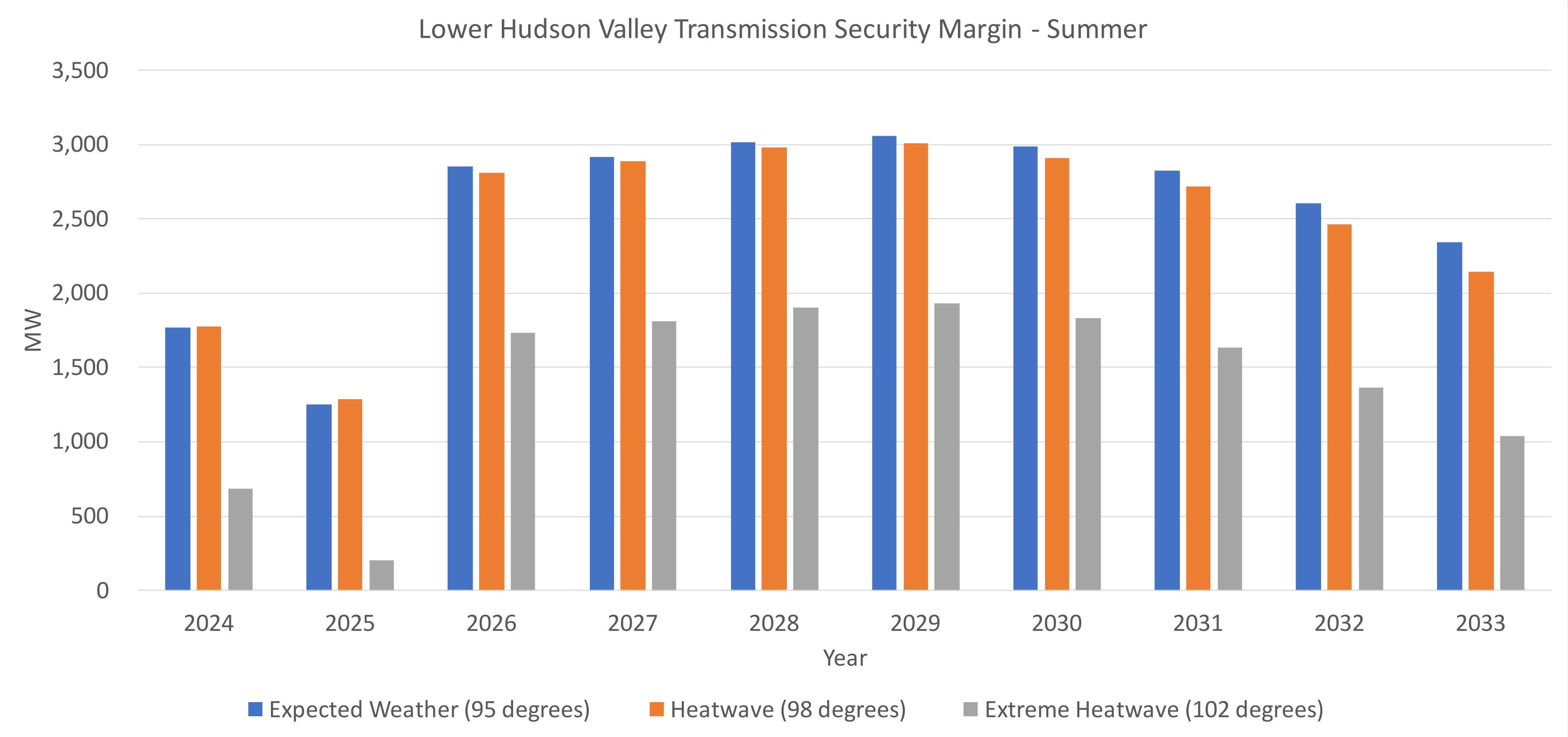


Figure 56: Summary of Lower Hudson Valley Summer Transmission Security Margin – Winter

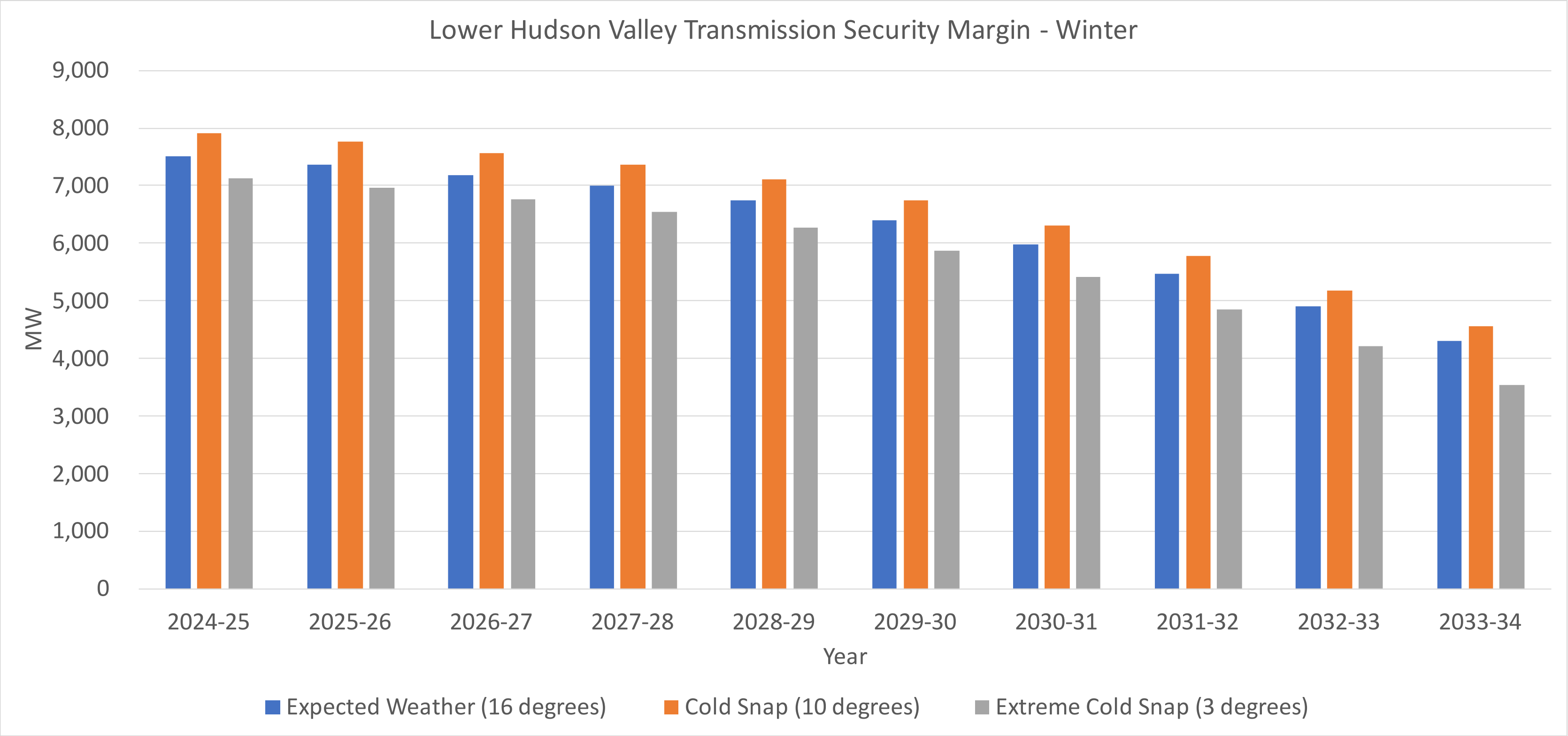
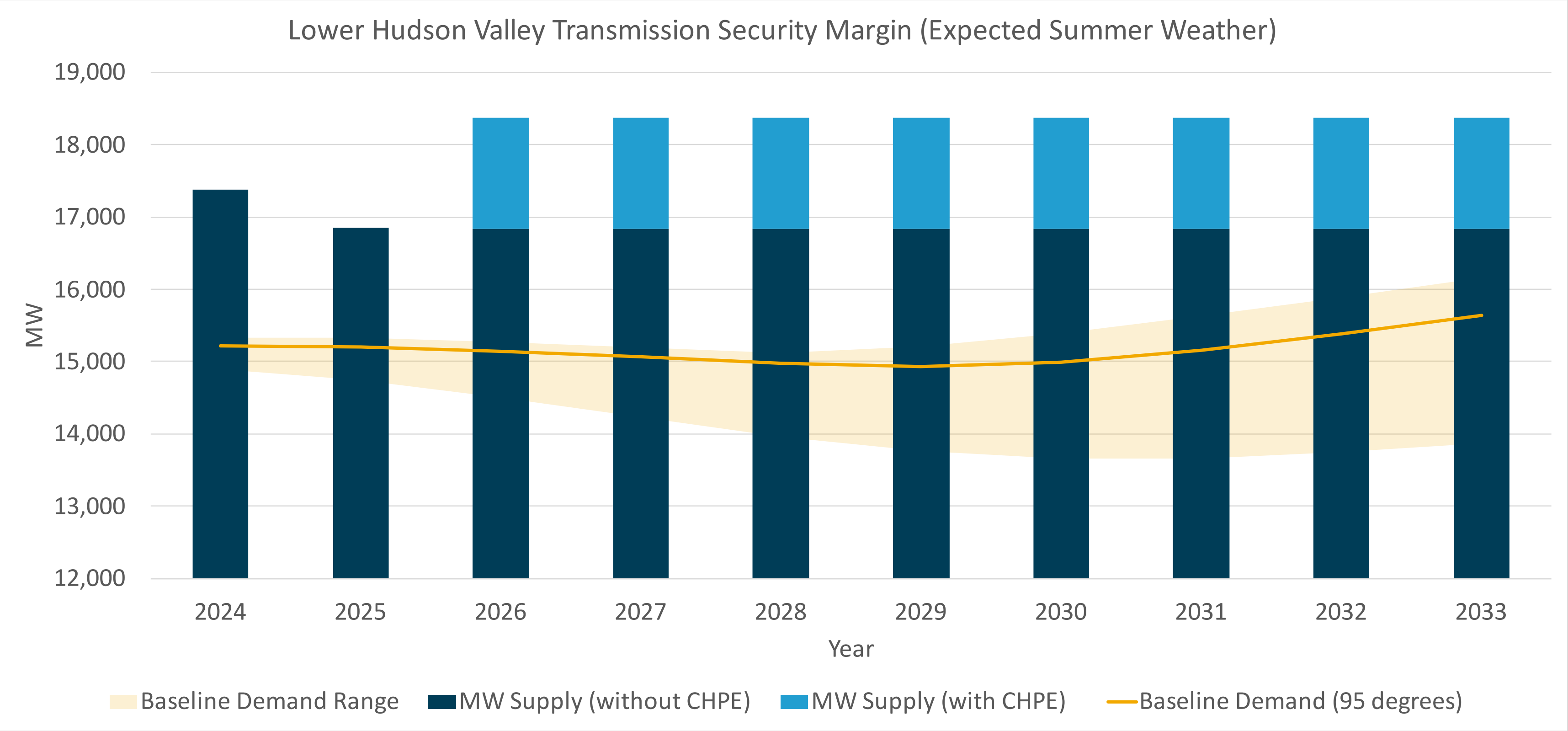


Figure 57: Lower Hudson Valley Transmission Security Margin (Expected Weather, With and Without CHPE)



New York City (Zone J) Transmission Security Margins

Within the Con Edison service territory, the 345 kV transmission system along with specific portions of the 138 kV transmission system are designed for the occurrence of two non-simultaneous contingencies and a return to normal (N-1-1-0).[41] Design criteria N-1-1-0 combinations include various combinations of the loss of generation and transmission facilities. As the system changes, the limiting contingency combination may also change.

Figure 58 shows how the summer transmission security margin changes through time based on planned transmission system changes and the impact on the most limiting contingency combination for the year being evaluated. In summers 2024 and 2025, the Con Edison 345 kV transmission system is most limiting for the combined loss of Ravenswood 3 followed by the loss of Mott Haven – Rainey 345 kV (Q12) (N-1-1-0). Starting in summer 2026, the most limiting contingency combination to the Con Edison 345 kV transmission system changes to the loss of CHPE followed by the loss of Ravenswood 3. Other contingency combinations result in changing the power flowing into Zone J from other NYCA zones. For example, in considering the possible combinations of N-1-1-0 events, these can include a mix of generation and transmission, two transmission events, or two generation events. Figure 58 shows the transmission security margin for the contingency combinations of: Ravenswood 3 and Mott Haven — Rainey (Q12) 345 kV, Ravenswood 3, and Bayonne Energy Center (for years 2024 and 2025) or CHPE and Ravenswood 3 (years 2026 through 2033), and Sprain Brook-W. 49th St. 345 kV (M51 and M52). As seen in Figure 58, the interface flow with the lowest value (3,191 MW for the loss of M51/M52) does not result in the smallest transmission security margin. The limiting contingency combination for all winters is the loss of Ravenswood 3 followed by the loss of Mott Haven – Rainey 345 kV (Q12). This is due to the assumption that following the in-service status of CHPE by summer 2026, its schedule is 0 MW for the winter seasons.

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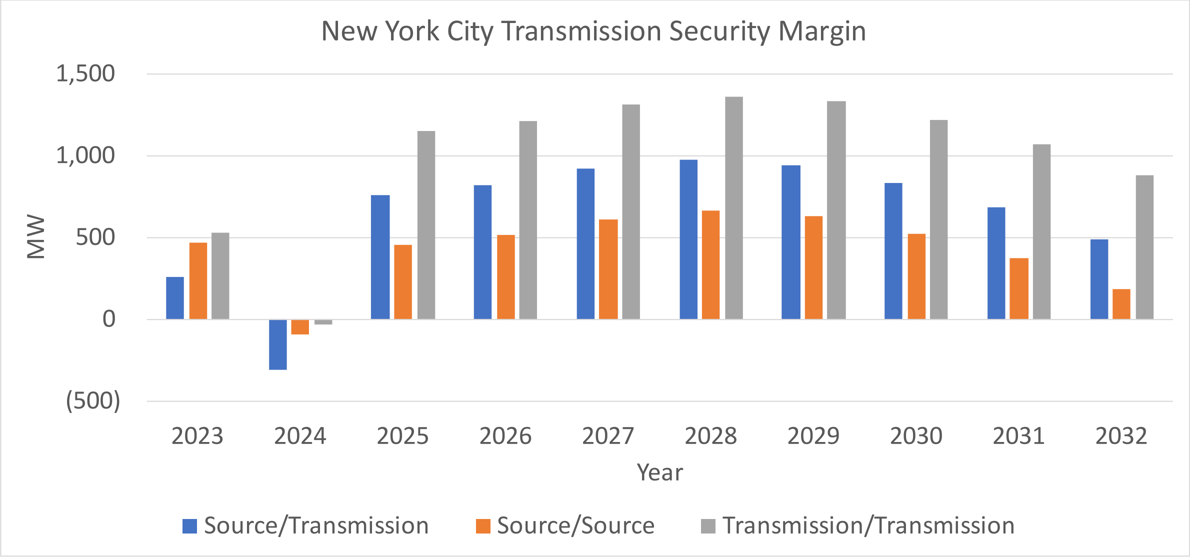
[41] Con Edison, TP-7100-18 Transmission Planning Criteria, dated August 2019.

Figure 58: Impact of Contingency Combination on Zone J Transmission Security Margin



As transmission security analysis represents discrete snapshots in time of various credible combinations of system conditions, only the magnitude of a reliability need can be identified under those system conditions. Additional details are required to fully describe the nature of the need such as evaluating the hourly demand shape and its impact on the need. To describe the nature of the New York City transmission security margin, demand shapes are developed for the Zone J component of the statewide demand shape. Details of the demand shapes are provided later in this appendix. For this assessment, demand shapes are not developed past 2033 and only developed for the summer conditions.

Figure 62 shows the calculation of the New York City transmission security margin for the statewide coincident summer peak demand hour with expected weather and with normal transfer criteria. The New York City transmission security margin coincident with the statewide system peak ranges from 244 MW in summer 2024 to 182 MW by summer 2033 with year 2025 have a deficient margin of 306 MW (line-item L). Additionally, Figure 62 also shows the impact on the transmission security margin with the higher demand policy forecast. Regardless of the demand forecast under expected weather and normal transfer criteria, the New York City transmission security margin improves in 2026 with the anticipated addition of the CHPE connection from Hydro Quebec to New York City. However, the margin gradually erodes following CHPE's addition as the baseline demand grows in New York City. With the higher demand policy forecast, the margin in 2025 is deficient by 446 MW. For the higher demand policy forecast by 2032, the margin is deficient by 88 MW worsening to a deficiency of 268 MW by 2033 (line-item N). Figure 63 shows the New York City transmission security margin without CHPE. Figure 64 provides a summary of the results for the baseline demand transmission security margin with CHPE in service by summer 2026. Figure 65 provides a summary of the results with a delay in CHPE.

The demand shapes for New York City show the contribution of Zone J (Figure 121) towards the statewide shape (which represents the statewide coincident peak) for each hour of the day. Utilizing the demand shape for the expected weather summer peak day, the New York City transmission security margin for each hour is shown in Figure 66. The hourly margin is created by using the demand forecast for each hour in the margin calculation (*i.e.*, Figure 62 line-item A) with additional adjustments to account for the appropriate derate for solar generation and energy limited resources in each hour (*i.e.*, Figure 62 line-item H). All other values in the margin calculations are held constant. For all years in the 10-year study horizon, Figure 66 shows that in 2025 the margin is deficient over seven hours (2,221 MWh). However, the Zone J demand during the system peak day does not necessarily peak during the same hour as the NYCA as a whole. In summer 2025, the Zone J peak hour is 17, while the statewide peak is hour 18. As such, the New York City transmission security margin under a non-statewide coincident peak hour for summer 2025 is a deficiency of 524 MW. For all other years, the margin is sufficient. However, by 2033 the hourly margin within New York city is as narrow as 9 MW during a non-coincident peak hour. A graphical representation of the New York City transmission security margin curve for summer peak expected weather for the peak day in years 2024, 2025, 2028, and 2033 is provided Figure 67.

This assessment recognizes there is uncertainty in the demand forecast driven by uncertainties in key assumptions, such as population and economic growth, energy efficiency, the installation of behind-the-meter renewable energy resources, and electric vehicle adoption and charging patterns. These risks can be considered in the transmission security margin calculations through the use of the lower and higher policy scenarios published in the 2023 Gold Book. Both the lower and higher demand policy forecasts reflect achievement of all state policy targets through alternative pathways and assume the same weather factors as the baseline demand forecast. Figure 59 provides a summary of the New York City demand forecasts from the 2023 Gold Book. The range of the demand forecast for both the lower and higher demand policy forecasts as compared to the baseline demand forecast within New York City is also provided in Figure 60. Based on the lower demand policy forecast, the transmission security in New York City is only narrowly sufficient in 2025 at 14 MW. However, the higher demand policy forecast shows that the transmission security margin in New York City could be deficient by up to 446 MW (Figure 62, line-item N). For the higher demand policy forecast, the transmission security margin is sufficient following the inclusion of CHPE in year 2026; however, the transmission security margin becomes deficient again in year 2032 by 88 MW worsening to 268 MW by 2033. Figure 68 provides the hourly transmission security margin with the higher demand policy forecast. As shown in Figure 69, the margin with the higher demand policy forecast is deficient for 9 hours.

Figure 59: Summary of New York City Summer Demand Forecasts

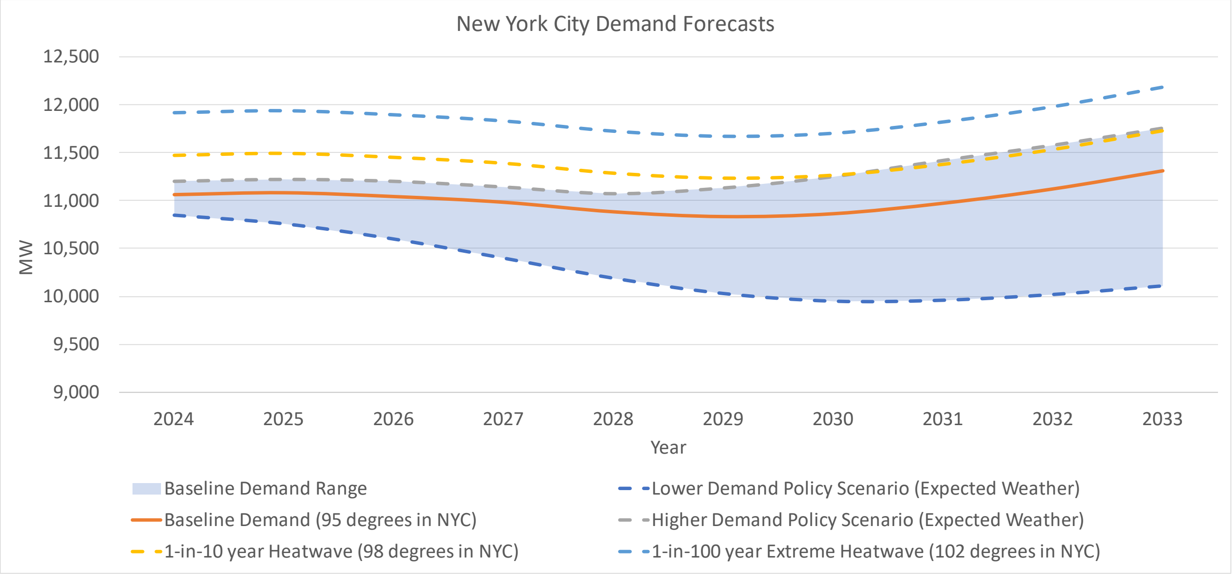
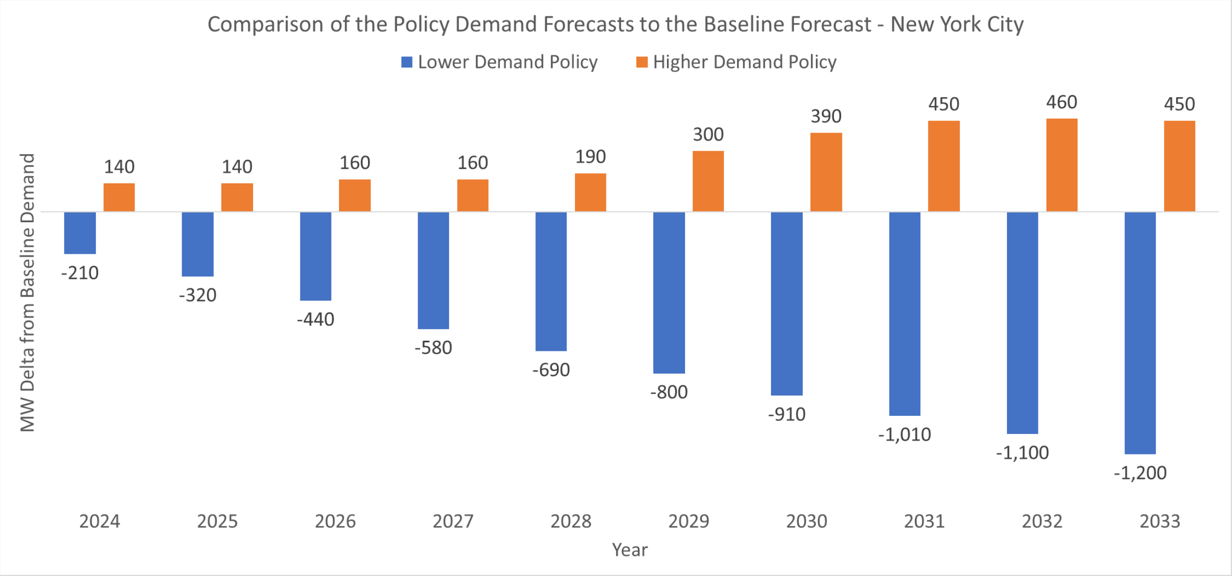
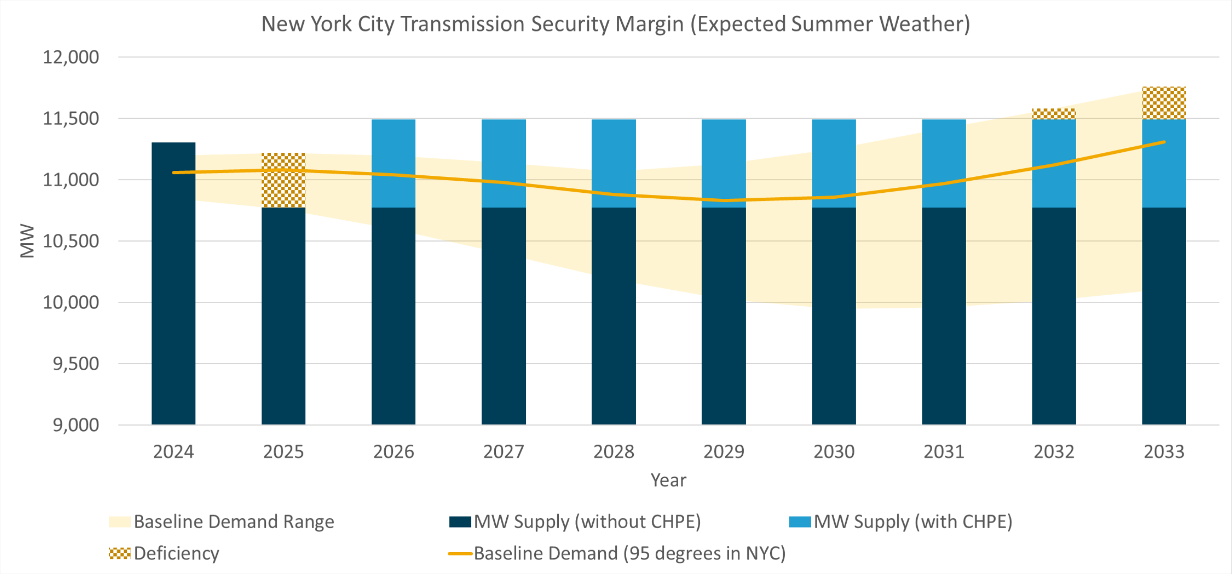


Figure 60: Summary of New York City Summer Coincident Peak Demand Range



Overall, the New York City transmission security margin improves in 2026 when it is planned to CHPE enter service (currently scheduled in spring 2026). However, the margin gradually erodes through time as demand grows. As shown in Figure 61, the forecasted reliability margins within New York City may also not be sufficient beyond 2025 if (1) the CHPE project experiences a significant delay or (2) additional power plants become unavailable, or (3) demand significantly exceeds current forecasts. For the baseline or higher demand policy forecast, the reliability margins continue to be deficient for the ten-year planning horizon without the CHPE project in service or other offsetting changes or solutions. In addition, while CHPE will contribute to reliability in the summer, the facility is not expected to provide any capacity in the winter. The details of the margin calculations without CHPE are provided in Figure 63 with a graphical summary provided in Figure 65. Figure 70 shows the impact of additional generator and plant outages on the New York City transmission security margin.

Figure 61: New York City Transmission Security Margin (Expected Weather, With and Without CHPE)



It is possible for other combinations of events, such as 1-in-10-year heatwaves and 1-in-100-year extreme heatwaves, to result in a deficient transmission security margin. Figure 71 shows the New York City transmission security margin for the statewide coincident peak hour under the 1-in-10-year heatwave condition with the assumption that the system is using emergency transfer criteria. As seen in Figure 71, the margin is narrowly sufficient in 2024 with 9 MW and is deficient in summer2025 and 2033; however, the margin is sufficient in years 2026 through 2032 due to the inclusion of CHPE as well as the demand forecast (line-item M). The demand shapes for Zone J under a heatwave is provided in Figure 127. Utilizing the New York City demand-duration heatwave shape, the transmission security margin for each hour utilizing emergency transfer criteria is shown in Figure 72. As shown in Figure 72, the deficiency in summer 2025 is observed over 11 hours (3,856 MWh). While Figure 71 does not show the system to be deficient in years 2024 and 2032, as seen in Figure 72, the demand shape results in off-peak hours with some deficiency. Figure 73 provides a graphical representation of the New York City transmission security margin curve for the 1-in-10-year heatwave for the peak day in years 2024, 2025, 2028, and 2033.

The 1-in-100-year extreme heatwave transmission security margin in Figure 74 shows that the transmission security margin is deficient for all years in the 10-year horizon (line-item M). Figure 75 provides the hourly margin curve which has variations in the magnitude in duration of the deficiency. Figure 76 provides a graphical representation of the New York City transmission security margin curve for the 1-in-100-year extreme heatwave for the peak day in years 2024, 2025, 2028, and 2033.

Figure 77 shows the New York City transmission security margin under winter peak demand with expected weather conditions and with normal transfer criteria. For winter peak, the margins are sufficient for all years and range from 4,380 MW in winter 2024-25 to 2,183 in winter 2033-34 (line-item L). Considering the winter baseline peak demand transmission security margin, multiple outages in New York City would be required to show a deficient transmission security margin.

Figure 78 shows the New York City transmission security margin in a 1-in-10-year cold snap with emergency transfer criteria. Under this condition the margins are sufficient for all years and ranges from 4,180 MW in winter 2024-25 to 1,892 MW in winter 2033-34. Similarly, Figure 79 shows the New York City transmission security margins for the 1-in-100-year extreme cold snap with emergency transfer criteria. The margin under this condition is sufficient for all years and ranges from 3,621 MW in winter 2024-25 to 1,174 MW in winter 2033-34.

Figure 80 provides a summary of the summer peak New York City transmission security margins under expected summer weather, heatwave, and extreme heatwave conditions. Figure 81 provides a summary of the winter peak New York City transmission security margins under expected winter weather, cold snap, and extreme cold snap conditions.

Figure 62: New York City Transmission Security Margin (Summer Peak – Expected Weather, Normal Transfer Criteria with CHPE)

Summer Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	**Zone J Demand Forecast (4)**	(11,060)	(11,080)	(11,040)	(10,980)	(10,880)	(10,830)	(10,860)	(10,970)	(11,120)	(11,310)
B	I+K to J (3)	3,904	3,904	4,622	4,622	4,622	4,622	4,622	4,622	4,622	4,622
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J AC Import (B+C)**	3,893	3,893	4,611	4,611	4,611	4,611	4,611	4,611	4,611	4,611
E	Loss of Source Contingency	(987)	(987)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)
F	**Resource Need (A+D+E)**	(8,154)	(8,174)	(8,666)	(8,606)	(8,506)	(8,456)	(8,486)	(8,596)	(8,746)	(8,936)
G	J Generation (1)	8,749	8,159	8,159	8,159	8,159	8,159	8,159	8,159	8,159	8,159
H	J Generation Derates (2)	(665)	(605)	(605)	(605)	(605)	(605)	(605)	(605)	(605)	(605)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	315	315	1,565	1,565	1,565	1,565	1,565	1,565	1,565	1,565
K	**Total Resources Available (G+H+I+J)**	8,399	7,868	9,118	9,118	9,118	9,118	9,118	9,118	9,118	9,118
L	**Baseline Transmission Security Margin (F+K)**	244	(306)	452	512	612	662	632	522	372	182
M	Higher Policy Demand Impact	(140)	(140)	(160)	(160)	(190)	(300)	(390)	(450)	(460)	(450)
N	**Higher Policy Transmission Security Margin (L+M)**	104	(446)	292	352	422	362	242	72	(88)	(268)

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at
3. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based on the summer peak 2032 represenations evalauted in the 2022 RNA.
4. Reflects the he final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG (No large load projects included in this assessment are within this locality).

Figure 63: New York City Transmission Security Margin (Summer Peak – Expected Weather, Normal Transfer Criteria without CHPE)

Summer Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	**Zone J Demand Forecast (4)**	(11,060)	(11,080)	(11,040)	(10,980)	(10,880)	(10,830)	(10,860)	(10,970)	(11,120)	(11,310)
B	I+K to J (3)	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J AC Import (B+C)**	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893
E	Loss of Source Contingency	(987)	(987)	(987)	(987)	(987)	(987)	(987)	(987)	(987)	(987)
F	**Resource Need (A+D+E)**	(8,154)	(8,174)	(8,134)	(8,074)	(7,974)	(7,924)	(7,954)	(8,064)	(8,214)	(8,404)
G	J Generation (1)	8,749	8,159	8,159	8,159	8,159	8,159	8,159	8,159	8,159	8,159
H	J Generation Derates (2)	(665)	(605)	(605)	(605)	(605)	(605)	(605)	(605)	(605)	(605)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
K	**Total Resources Available (G+H+I+J)**	8,399	7,868	7,868	7,868	7,868	7,868	7,868	7,868	7,868	7,868
L	**Baseline Transmission Security Margin (F+K)**	244	(306)	(266)	(206)	(106)	(56)	(86)	(196)	(346)	(536)
M	Higher Policy Demand Impact	(140)	(140)	(160)	(160)	(190)	(300)	(390)	(450)	(460)	(450)
N	**Higher Policy Transmission Security Margin (L+M)**	104	(446)	(426)	(366)	(296)	(356)	(476)	(646)	(806)	(986)

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based on the summer peak 2032 represenations evalauted in the 2022 RNA.
4. Reflects the he final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG (No large load projects included in this assessment are within this locality).

Figure 64: Summary of New York City Summer Transmission Security Margin Demand Policy Impact – Summer (with CHPE)

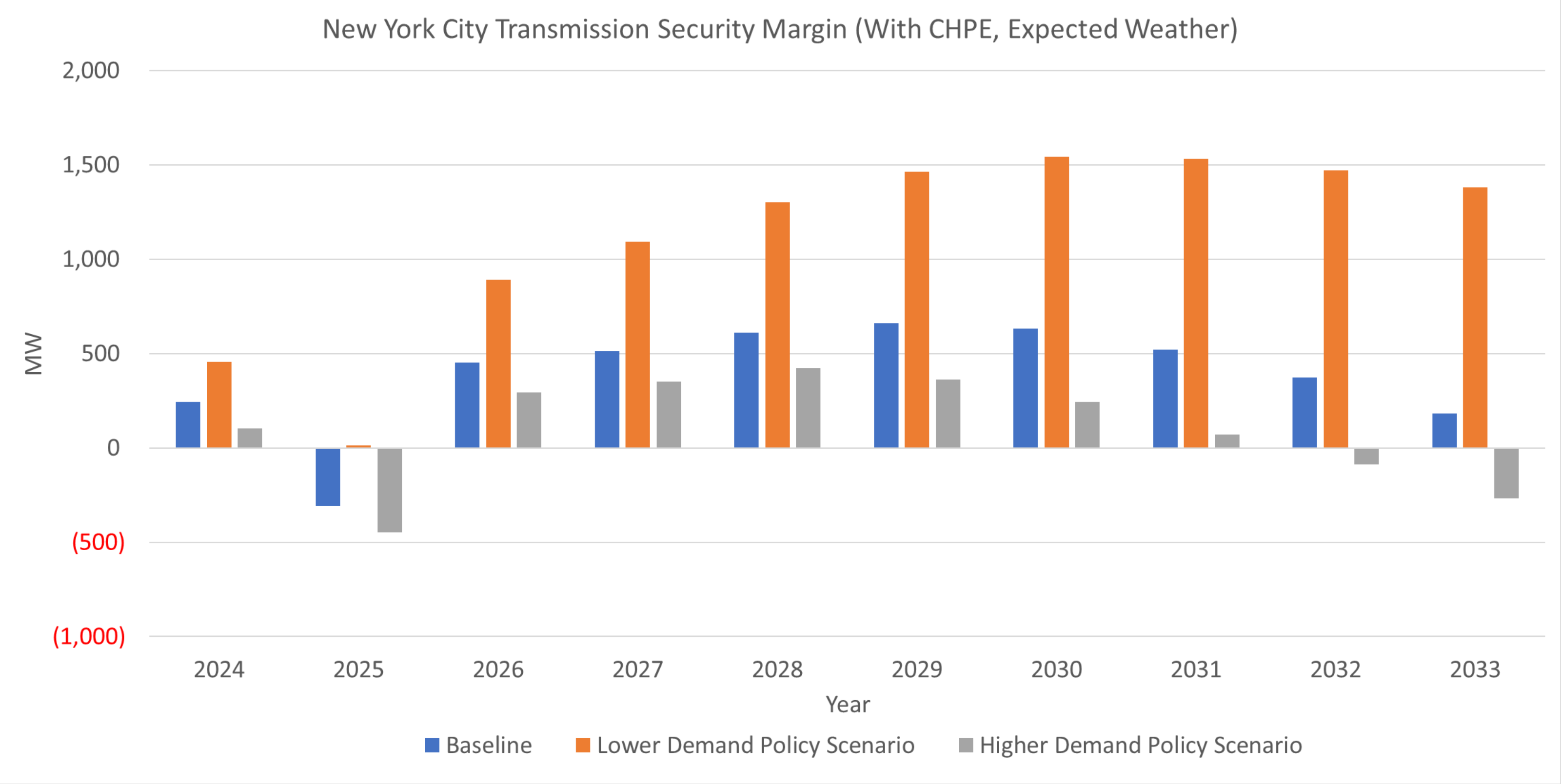


Figure 65: Summary of New York City Summer Transmission Security Margin Demand Policy Impact – Summer (without CHPE)

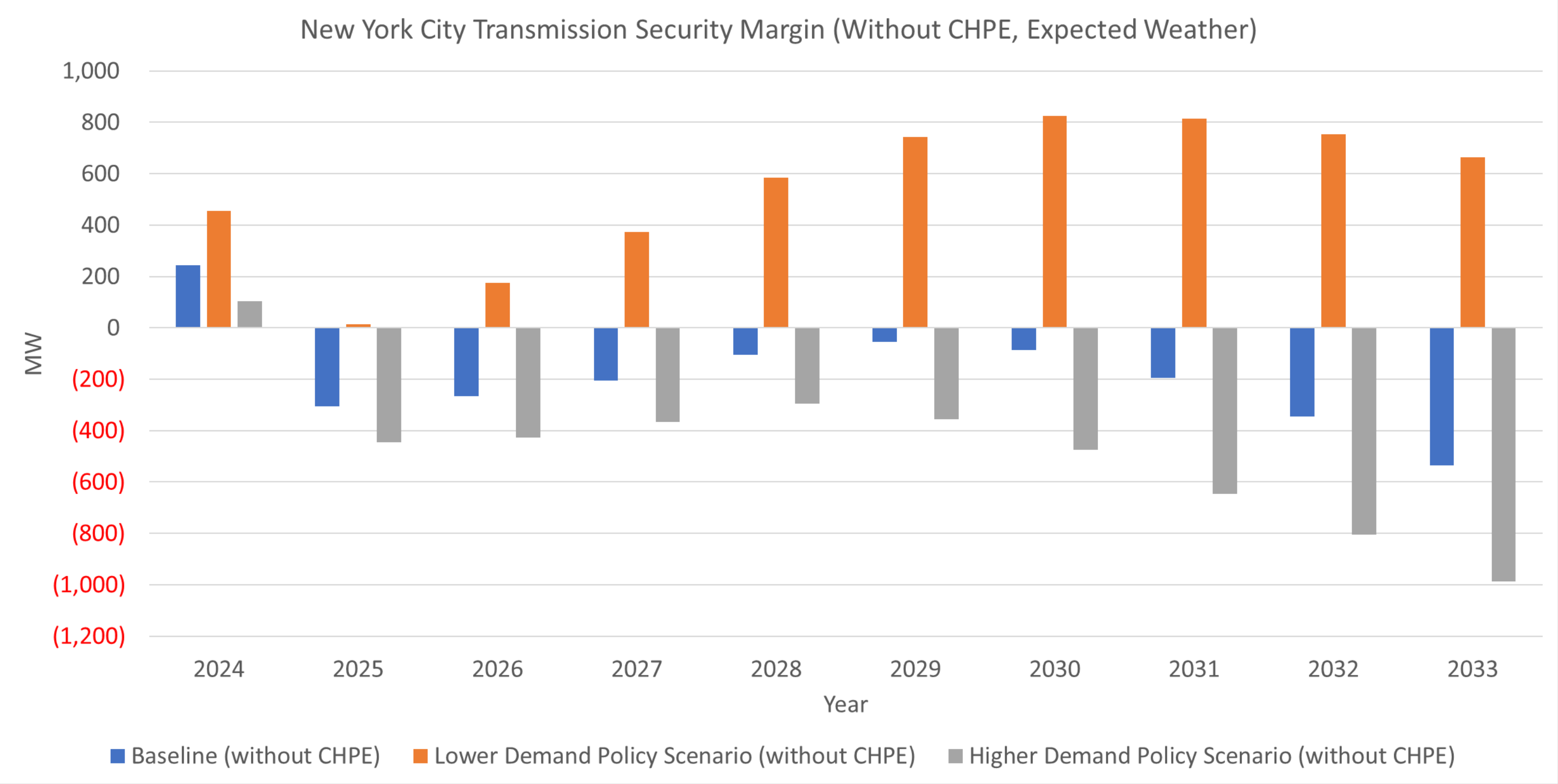


Figure 66: New York City Transmission Security Margin (Hourly) (Summer Peak – Baseline Demand Expected Weather, Normal Transfer Criteria)

Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)										
J Transmission Security Margin										
Hour	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
HB0	3,072	2,355	3,100	3,142	3,219	3,258	3,238	3,157	2,950	2,812
HB1	3,444	2,738	3,482	3,528	3,603	3,644	3,628	3,555	3,363	3,237
HB2	3,710	3,012	3,757	3,800	3,876	3,918	3,905	3,839	3,655	3,540
HB3	3,856	3,161	3,907	3,951	4,024	4,068	4,057	3,990	3,814	3,700
HB4	3,847	3,151	3,896	3,940	4,013	4,056	4,044	3,978	3,801	3,687
HB5	3,615	2,912	3,655	3,696	3,768	3,809	3,793	3,722	3,532	3,410
HB6	3,143	2,428	3,174	3,218	3,294	3,335	3,317	3,239	3,035	2,902
HB7	2,520	1,796	2,550	2,606	2,694	2,744	2,729	2,649	2,437	2,298
HB8	1,972	1,244	2,010	2,081	2,185	2,245	2,240	2,165	1,951	1,815
HB9	1,528	800	1,580	1,669	1,788	1,860	1,863	1,796	1,585	1,453
HB10	1,194	463	1,254	1,356	1,486	1,569	1,577	1,516	1,306	1,181
HB11	967	235	1,032	1,142	1,283	1,372	1,388	1,329	1,123	1,000
HB12	782	51	850	965	1,110	1,203	1,222	1,164	956	837
HB13	620	(116)	685	800	946	1,039	1,058	1,001	789	667
HB14	511	(230)	573	685	830	923	939	878	663	538
HB15	352	(398)	399	505	644	731	740	672	444	310
HB16	237	(522)	264	357	486	563	560	478	231	81
HB17	244	(524)	247	325	440	504	488	391	177	9
HB18	466	(306)	452	512	612	662	632	522	246	62
HB19	647	(126)	624	675	765	808	769	653	372	182
HB20	803	32	779	828	915	955	917	801	524	335
HB21	1,044	278	1,024	1,070	1,157	1,197	1,160	1,047	776	589
HB22	1,540	786	1,531	1,576	1,660	1,698	1,665	1,559	1,303	1,128
HB23	2,086	1,347	2,092	2,138	2,219	2,260	2,234	2,140	1,902	1,744

Figure 67: New York City Transmission Security Margin Hourly Curve (Summer Peak – Expected Weather, Normal Transfer Criteria)

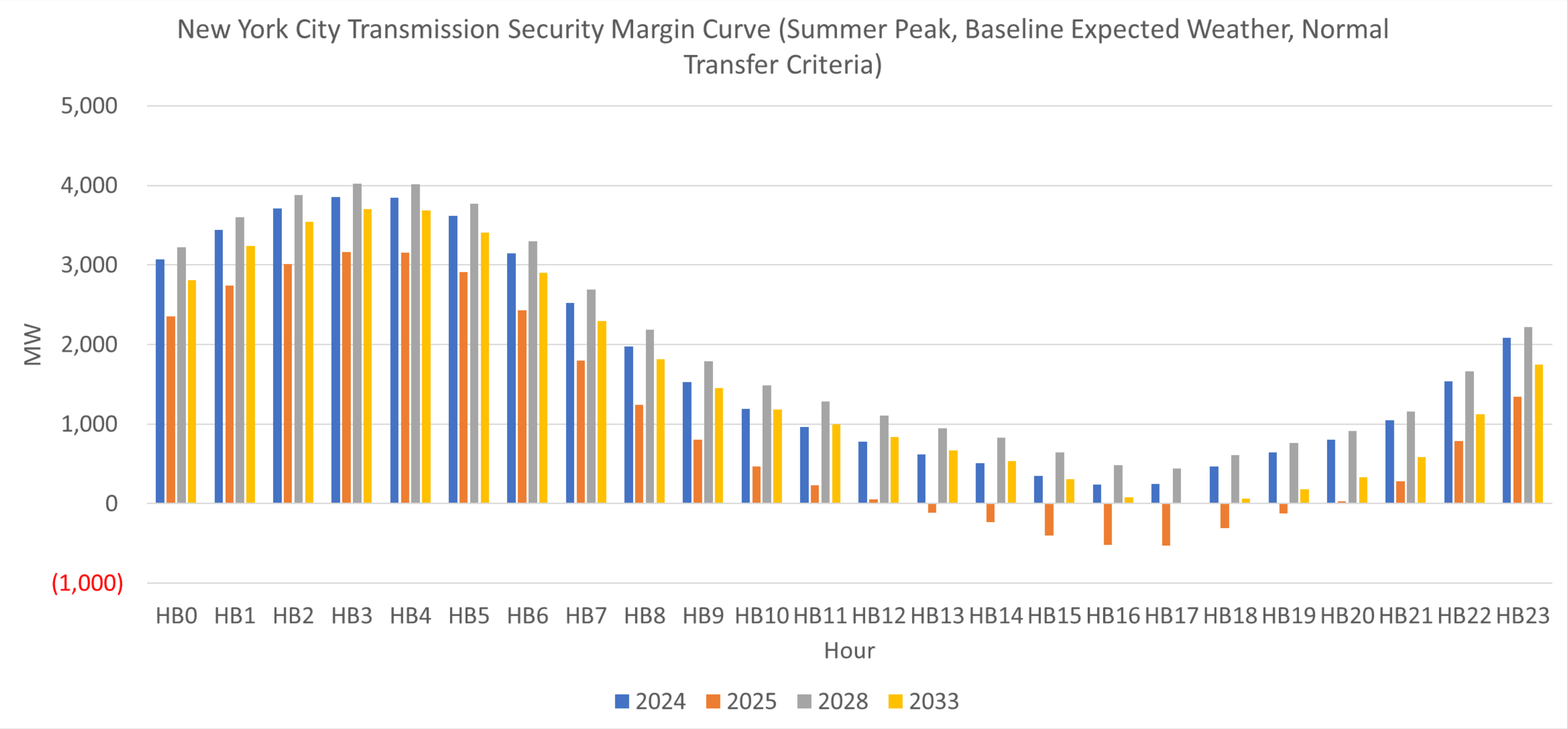


Figure 68: New York City Transmission Security Margin (Hourly) (Summer Peak – Higher Policy with Expected Weather, Normal Transfer Criteria)

Summer Peak - Higher Policy with Expected Summer Weather, Normal Transfer Criteria (MW)										
J Transmission Security Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	2,932	2,215	2,940	2,982	3,029	2,958	2,848	2,707	2,490	2,362
HB1	3,304	2,598	3,322	3,368	3,413	3,344	3,238	3,105	2,903	2,787
HB2	3,570	2,872	3,597	3,640	3,686	3,618	3,515	3,389	3,195	3,090
HB3	3,716	3,021	3,747	3,791	3,834	3,768	3,667	3,540	3,354	3,250
HB4	3,707	3,011	3,736	3,780	3,823	3,756	3,654	3,528	3,341	3,237
HB5	3,475	2,772	3,495	3,536	3,578	3,509	3,403	3,272	3,072	2,960
HB6	3,003	2,288	3,014	3,058	3,104	3,035	2,927	2,789	2,575	2,452
HB7	2,380	1,656	2,390	2,446	2,504	2,444	2,339	2,199	1,977	1,848
HB8	1,832	1,104	1,850	1,921	1,995	1,945	1,850	1,715	1,491	1,365
HB9	1,388	660	1,420	1,509	1,598	1,560	1,473	1,346	1,125	1,003
HB10	1,054	323	1,094	1,196	1,296	1,269	1,187	1,066	846	731
HB11	827	95	872	982	1,093	1,072	998	879	663	550
HB12	642	(89)	690	805	920	903	832	714	496	387
HB13	480	(256)	525	640	756	739	668	551	329	217
HB14	371	(370)	413	525	640	623	549	428	203	88
HB15	212	(538)	239	345	454	431	350	222	(16)	(140)
HB16	97	(662)	104	197	296	263	170	28	(229)	(369)
HB17	104	(664)	87	165	250	204	98	(59)	(283)	(441)
HB18	326	(446)	292	352	422	362	242	72	(214)	(388)
HB19	507	(266)	464	515	575	508	379	203	(88)	(268)
HB20	663	(108)	619	668	725	655	527	351	64	(115)
HB21	904	138	864	910	967	897	770	597	316	139
HB22	1,400	646	1,371	1,416	1,470	1,398	1,275	1,109	843	678
HB23	1,946	1,207	1,932	1,978	2,029	1,960	1,844	1,690	1,442	1,294

Figure 69: New York City Transmission Security Margin Hourly Curve (Summer Peak – Baseline and Higher Policy Demand, Normal Transfer Criteria)

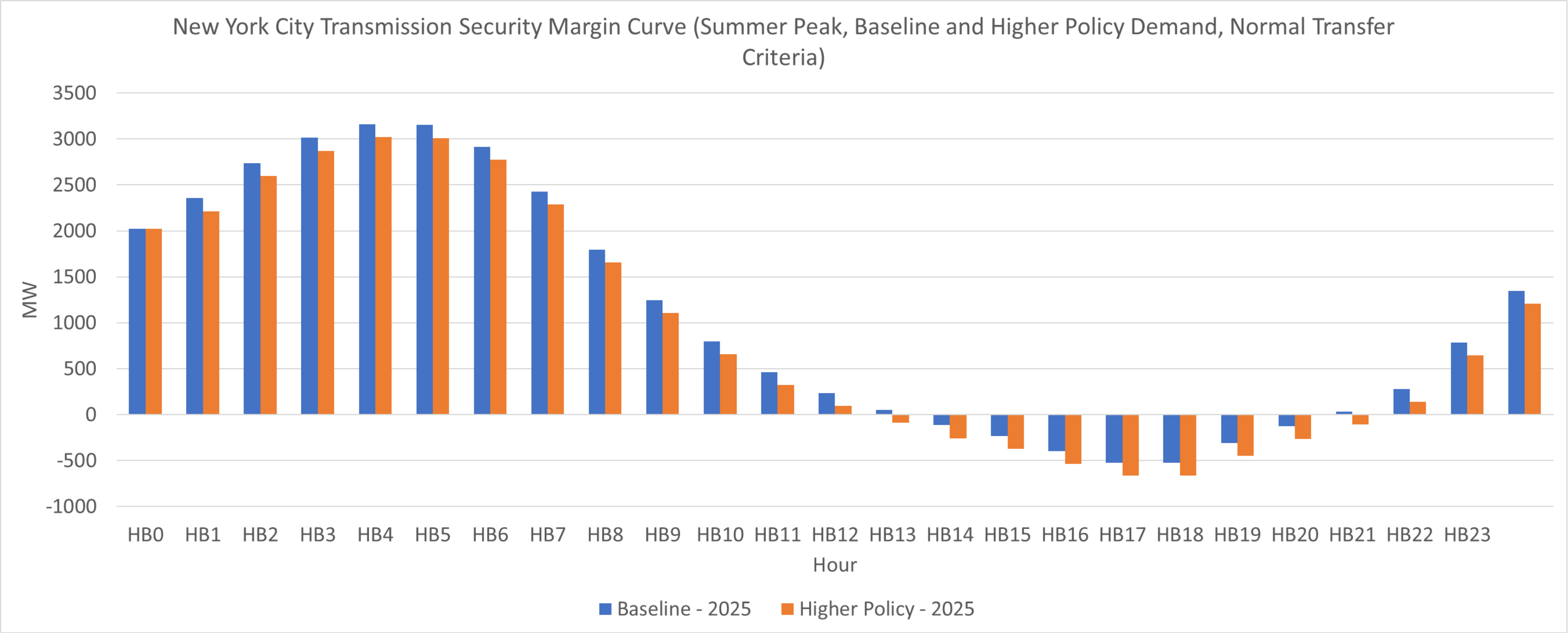


Figure 70: Impact of Generator Outages on New York City Transmission Security Margin

New York City												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
New York City Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			117	(446)	292	352	422	362	242	72	(88)	(268)
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Astoria Energy 2 - CC3 & CC4	570.2	(23.15)	(430)	(993)	(255)	(195)	(125)	(185)	(305)	(475)	(635)	(815)
Astoria Energy 2 - CC3	285.1	(11.58)	(157)	(719)	19	79	149	89	(31)	(201)	(361)	(541)
Astoria Energy 2 - CC4	285.1	(11.58)	(157)	(719)	19	79	149	89	(31)	(201)	(361)	(541)
Astoria East Energy CC1 & CC2	583.8	(23.70)	(443)	(1,006)	(268)	(208)	(138)	(198)	(318)	(488)	(648)	(828)
Astoria East Energy - CC1	291.9	(11.85)	(163)	(726)	12	72	142	82	(38)	(208)	(368)	(548)
Astoria East Energy - CC2	291.9	(11.85)	(163)	(726)	12	72	142	82	(38)	(208)	(368)	(548)
Astoria 2, 3, & 5	917.4	(90.82)	(710)	(1,272)	(534)	(474)	(404)	(464)	(584)	(754)	(914)	(1,094)
Astoria 5	374.7	(37.10)	(221)	(784)	(46)	14	84	24	(96)	(266)	(426)	(606)
Astoria 3	372.2	(36.85)	(219)	(781)	(43)	17	87	27	(93)	(263)	(423)	(603)
Astoria 2	170.5	(16.88)	(37)	(600)	138	198	268	208	88	(82)	(242)	(422)
Bayonne EC CT G1 through G10	601.6	(53.90)	(431)	(994)	(256)	(196)	(126)	(186)	(306)	(476)	(636)	(816)
Bayonne EC CTG1	61.8	(5.54)	61	(502)	236	296	366	306	186	16	(144)	(324)
Bayonne EC CTG4	60.9	(5.46)	61	(501)	237	297	367	307	187	17	(143)	(323)
Bayonne EC CTG9	60.5	(5.42)	62	(501)	237	297	367	307	187	17	(143)	(323)
Bayonne EC CTG10	60.5	(5.42)	62	(501)	237	297	367	307	187	17	(143)	(323)
Bayonne EC CTG8	60.3	(5.40)	62	(501)	237	297	367	307	187	17	(143)	(323)
Bayonne EC CTG2	60.2	(5.39)	62	(501)	237	297	367	307	187	17	(143)	(323)
Bayonne EC CTG7	60.0	(5.38)	62	(501)	237	297	367	307	187	17	(143)	(323)
Bayonne EC CTG5	59.7	(5.35)	62	(500)	238	298	368	308	188	18	(142)	(322)
Bayonne EC CTG6	59.6	(5.34)	63	(500)	238	298	368	308	188	18	(142)	(322)
Bayonne EC CTG3	58.1	(5.21)	64	(499)	239	299	369	309	189	19	(141)	(321)
KIAC_JFK (BTM:NG)	98.7	(4.01)	22	(541)	197	257	327	267	147	(23)	(183)	(363)
East River 1, 2, 6, & 7	636.5	(44.86)	(475)	(1,038)	(300)	(240)	(170)	(230)	(350)	(520)	(680)	(860)
Brooklyn Navy Yard	244.6	(9.93)	(118)	(681)	57	117	187	127	7	(163)	(323)	(503)
East River 7	184.2	(18.24)	(49)	(612)	126	186	256	196	76	(94)	(254)	(434)

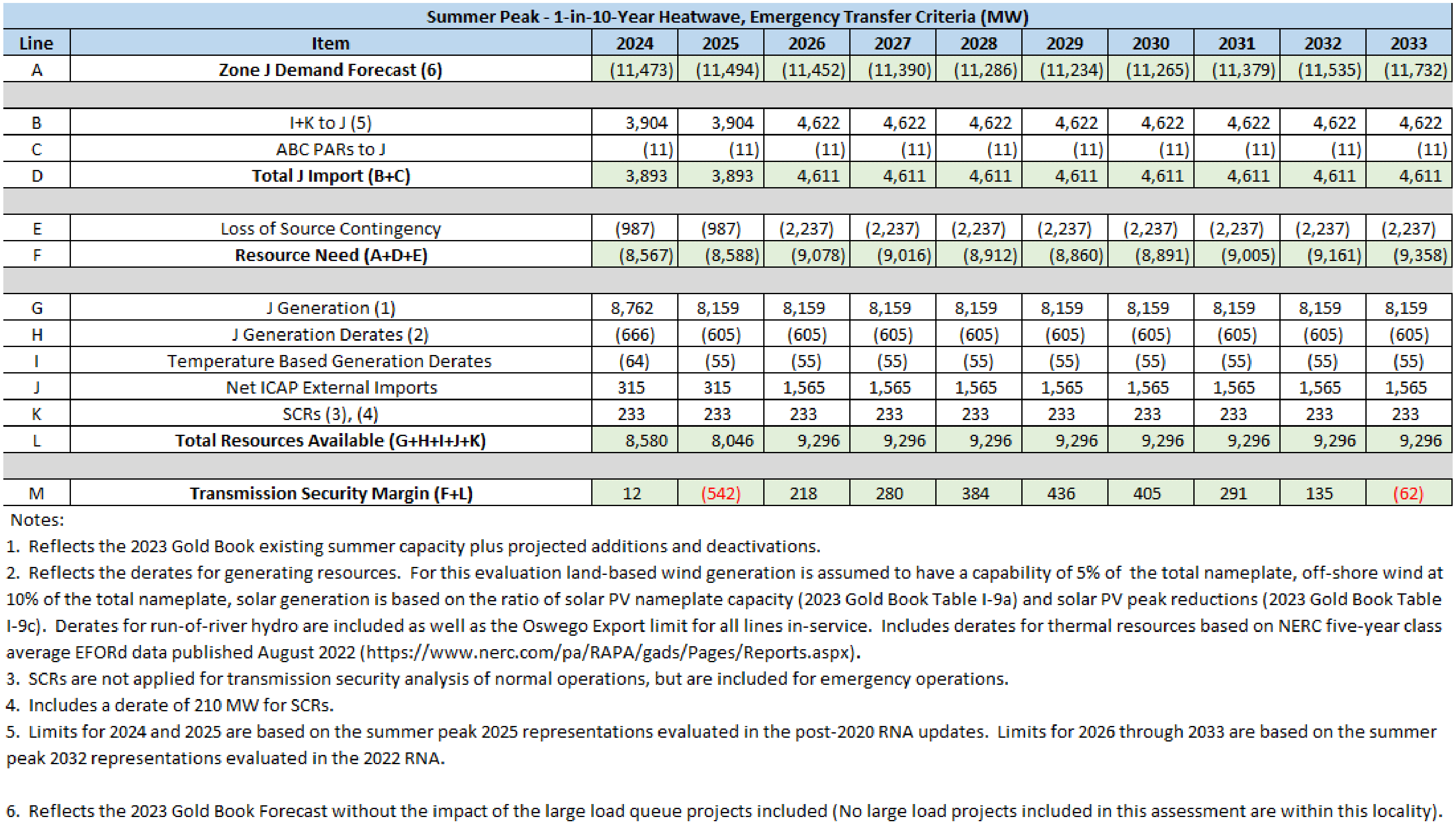
New York City												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
New York City Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			117	(446)	292	352	422	362	242	72	(88)	(268)
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
East River 2	155.8	(6.33)	(33)	(595)	143	203	273	213	93	(77)	(237)	(417)
East River 1	155.1	(6.30)	(32)	(595)	143	203	273	213	93	(77)	(237)	(417)
East River 6	141.4	(14.00)	(11)	(573)	165	225	295	235	115	(55)	(215)	(395)
Arthur Kill Cogen	11.1	(1.32)	107	(456)	282	342	412	352	232	62	(98)	(278)
Linden Cogen	789.5	(32.05)	(641)	(1,203)	(465)	(405)	(335)	(395)	(515)	(685)	(845)	(1,025)
Ravenswood ST 01, 02, & 03 (2)	1,730.3	(171.30)	(1,028)	(1,591)	(798)	(738)	(638)	(588)	(618)	(728)	(878)	(1,068)
Ravenswood ST 03 (2)	987.3	(97.74)	(359)	(921)	(128)	(68)	32	82	52	(58)	(208)	(398)
Ravenswood ST 02	374.5	(37.08)	(221)	(783)	(45)	15	85	25	(95)	(265)	(425)	(605)
Ravenswood ST 01	368.5	(36.48)	(215)	(778)	(40)	20	90	30	(90)	(260)	(420)	(600)
Ravenswood CC 04	223.2	(9.06)	(97)	(660)	78	138	208	148	28	(142)	(302)	(482)
Astoria CC 1 & 2	476.0	(19.33)	(340)	(903)	(165)	(105)	(35)	(95)	(215)	(385)	(545)	(725)
Astoria CC 1	238.0	(9.66)	(112)	(674)	64	124	194	134	14	(156)	(316)	(496)
Astoria CC 2	238.0	(9.66)	(112)	(674)	64	124	194	134	14	(156)	(316)	(496)
Gowanus 5 & 6	79.9	(8.05)	45	(518)	220	280	350	290	170	0	(160)	(340)
Hellgate 1 & 2	79.9	(8.05)	45	(518)	220	280	350	290	170	0	(160)	(340)
Harlem River 1 & 2	79.9	(8.05)	45	(518)	220	280	350	290	170	0	(160)	(340)
Vernon Blvd 2 & 3	79.9	(8.05)	45	(518)	220	280	350	290	170	0	(160)	(340)
Kent	45.8	(4.62)	76	(487)	251	311	381	321	201	31	(129)	(309)
Pouch	45.1	(4.55)	76	(486)	252	312	382	322	202	32	(128)	(308)
Gowanus 5	40.0	(4.03)	81	(482)	256	316	386	326	206	36	(124)	(304)
Hellgate 2	40.0	(4.03)	81	(482)	256	316	386	326	206	36	(124)	(304)
Harlem River 2	40.0	(4.03)	81	(482)	256	316	386	326	206	36	(124)	(304)
Vernon Blvd 2	40.0	(4.03)	81	(482)	256	316	386	326	206	36	(124)	(304)
Gowanus 6	39.9	(4.02)	81	(482)	256	316	386	326	206	36	(124)	(304)
Hellgate 1	39.9	(4.02)	81	(482)	256	316	386	326	206	36	(124)	(304)
Harlem River 1	39.9	(4.02)	81	(482)	256	316	386	326	206	36	(124)	(304)

New York City												
Year			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
New York City Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			117	(446)	292	352	422	362	242	72	(88)	(268)
Unit Name	Summer DMNC (MW)	NERC 5-Year Class Average De-Rate (MW)	Transmission Security Margin Following Generator/Plant Outage									
Vernon Blvd 3	39.9	(4.02)	81	(482)	256	316	386	326	206	36	(124)	(304)
Arthur Kill ST 2 & 3	865.3	(85.66)	(663)	(1,226)	(488)	(428)	(358)	(418)	(538)	(708)	(868)	(1,048)
Arthur Kill ST 3	519.0	(51.38)	(351)	(914)	(176)	(116)	(46)	(106)	(226)	(396)	(556)	(736)
Arthur Kill ST 2	346.3	(34.28)	(195)	(758)	(20)	40	110	50	(70)	(240)	(400)	(580)

Notes

1. Utilizes the Higher Policy Transmission Security Margin for Summer Peak with Expected Weather.
2. In all years the most limiting contingency includes the loss of Ravenswood 3. For this calculation the margin based on the loss of two transmission elements is utilized. Other combinations with loss of generation may be more limiting.

Figure 71: New York City Transmission Security Margin (1-in-10-Year Heatwave, Emergency Transfer Criteria)



Summer Peak - 1-in-10-Year Heatwave, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	**Zone J Demand Forecast (6)**	(11,473)	(11,494)	(11,452)	(11,390)	(11,286)	(11,234)	(11,265)	(11,379)	(11,535)	(11,732)
B	I+K to J (5)	3,904	3,904	4,622	4,622	4,622	4,622	4,622	4,622	4,622	4,622
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J Import (B+C)**	3,893	3,893	4,611	4,611	4,611	4,611	4,611	4,611	4,611	4,611
E	Loss of Source Contingency	(987)	(987)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)
F	**Resource Need (A+D+E)**	(8,567)	(8,588)	(9,078)	(9,016)	(8,912)	(8,860)	(8,891)	(9,005)	(9,161)	(9,358)
G	J Generation (1)	8,762	8,159	8,159	8,159	8,159	8,159	8,159	8,159	8,159	8,159
H	J Generation Derates (2)	(666)	(605)	(605)	(605)	(605)	(605)	(605)	(605)	(605)	(605)
I	Temperature Based Generation Derates	(64)	(55)	(55)	(55)	(55)	(55)	(55)	(55)	(55)	(55)
J	Net ICAP External Imports	315	315	1,565	1,565	1,565	1,565	1,565	1,565	1,565	1,565
K	SCRs (3), (4)	233	233	233	233	233	233	233	233	233	233
L	**Total Resources Available (G+H+I+J+K)**	8,580	8,046	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296
M	**Transmission Security Margin (F+L)**	12	(542)	218	280	384	436	405	291	135	(62)

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 210 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based on the summer peak 2032 representations evaluated in the 2022 RNA.

6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 72: New York City Transmission Security Margin (Hourly) (1-in-10-Year Heatwave, Emergency Transfer Criteria)

Summer Peak - Heatwave, Emergency Transfer Criteria (MW)										
J Transmission Security Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	2,394	1,801	2,553	2,441	2,506	2,535	2,515	2,432	2,285	2,146
HB1	2,782	2,198	2,947	2,840	2,906	2,939	2,924	2,849	2,716	2,588
HB2	3,054	2,476	3,226	3,117	3,186	3,221	3,209	3,141	3,016	2,897
HB3	3,216	2,640	3,390	3,283	3,349	3,387	3,377	3,308	3,190	3,073
HB4	3,246	2,670	3,419	3,311	3,377	3,414	3,402	3,334	3,216	3,098
HB5	3,054	2,472	3,219	3,107	3,170	3,202	3,186	3,113	2,982	2,856
HB6	2,608	2,016	2,765	2,652	2,715	2,743	2,722	2,640	2,495	2,357
HB7	1,973	1,373	2,125	2,017	2,082	2,113	2,090	2,001	1,842	1,694
HB8	1,396	786	1,543	1,441	1,512	1,542	1,523	1,431	1,260	1,106
HB9	914	298	1,061	966	1,042	1,075	1,054	961	783	622
HB10	590	(31)	737	648	726	761	738	644	460	298
HB11	448	(174)	598	513	597	633	615	520	337	173
HB12	284	(344)	424	345	439	486	471	376	188	24
HB13	192	(421)	348	245	350	403	392	301	124	(44)
HB14	272	(329)	442	79	192	255	243	151	(16)	(186)
HB15	55	(537)	232	73	192	257	245	150	(14)	(190)
HB16	(58)	(636)	127	(64)	59	127	110	9	(153)	(339)
HB17	12	(542)	218	(8)	105	166	143	85	(65)	(256)
HB18	81	(471)	284	280	384	436	405	291	135	(62)
HB19	281	(269)	481	239	337	387	350	234	78	(121)
HB20	457	(106)	643	426	515	556	521	405	243	48
HB21	711	134	884	690	773	809	773	660	491	302
HB22	1,232	648	1,396	1,229	1,304	1,335	1,302	1,196	1,031	854
HB23	1,824	1,236	1,984	1,845	1,913	1,943	1,917	1,822	1,663	1,504

Figure 73: New York City Transmission Security Margin Hourly Curve (1-in-10-Year Heatwave, Emergency Transfer Criteria)

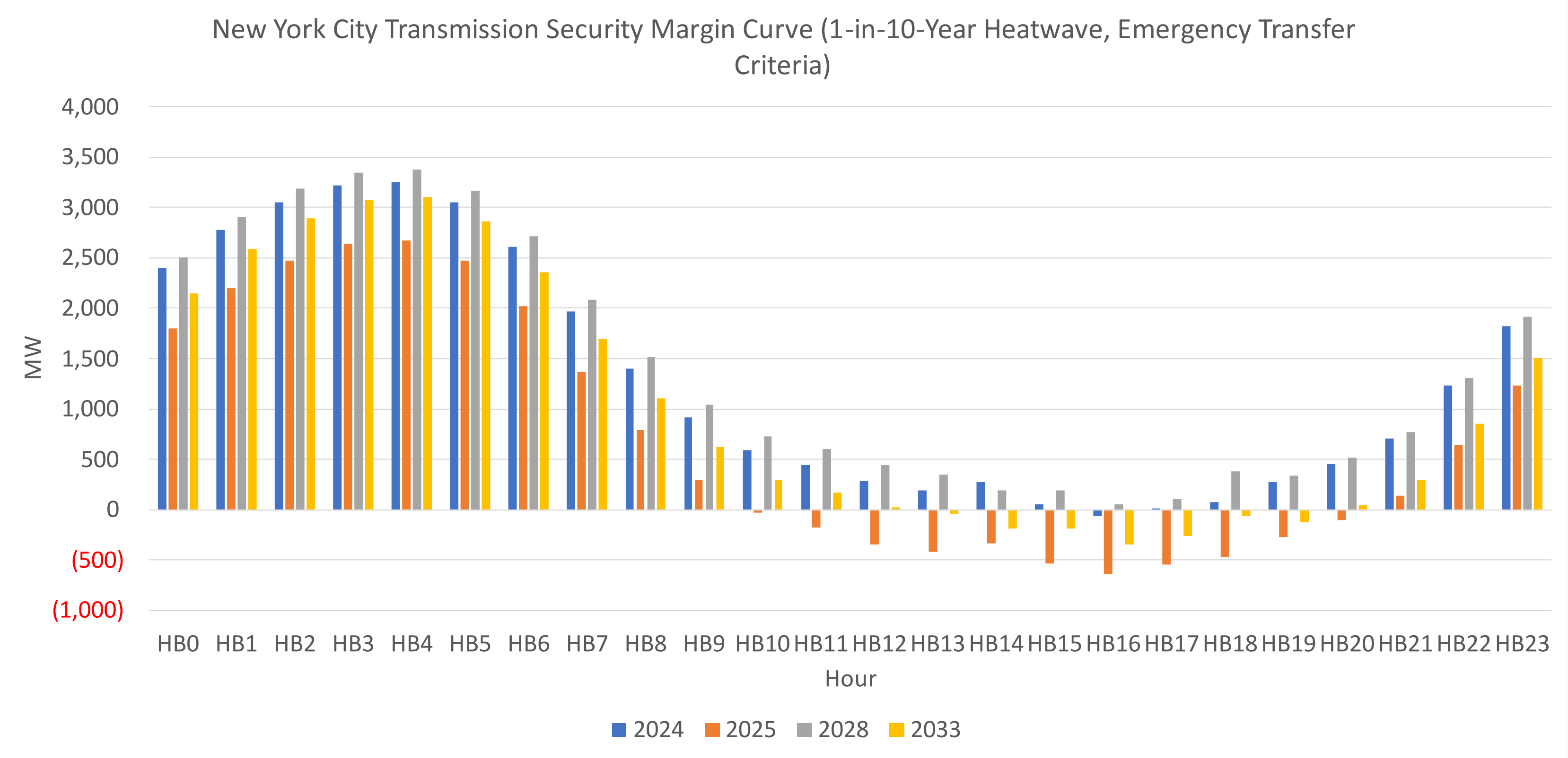


Figure 74: New York City Transmission Security Margin (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

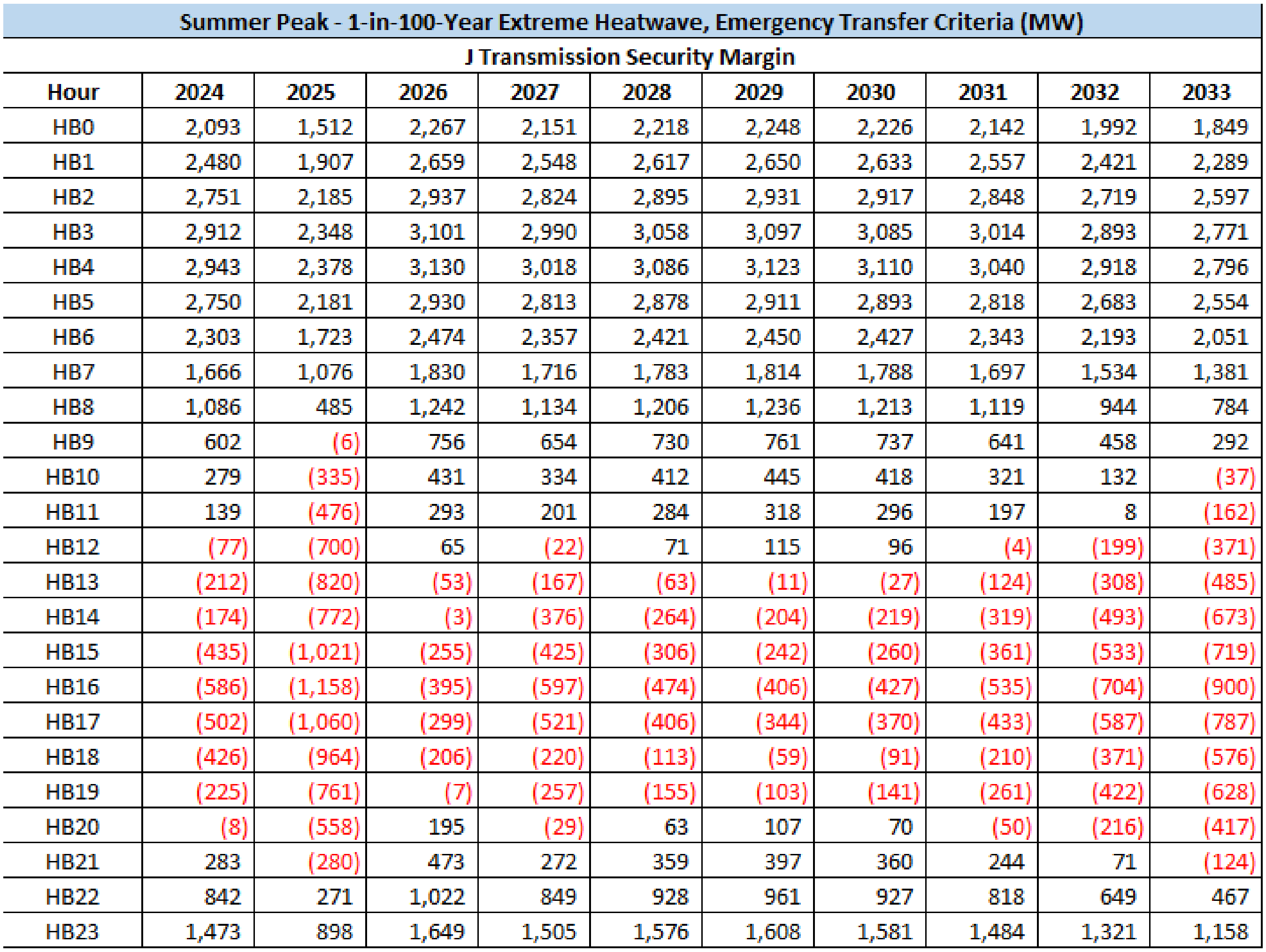
Summer Peak - 1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	**Zone J Demand Forecast (6)**	(11,916)	(11,937)	(11,894)	(11,829)	(11,722)	(11,668)	(11,700)	(11,819)	(11,980)	(12,185)
B	I+K to J (5)	3,904	3,904	4,622	4,622	4,622	4,622	4,622	4,622	4,622	4,622
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J Import (B+C)**	3,893	3,893	4,611	4,611	4,611	4,611	4,611	4,611	4,611	4,611
E	Loss of Source Contingency	(987)	(987)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)
F	**Resource Need (A+D+E)**	(9,010)	(9,031)	(9,520)	(9,455)	(9,348)	(9,294)	(9,326)	(9,445)	(9,606)	(9,811)
G	J Generation (1)	8,762	8,159	8,159	8,159	8,159	8,159	8,159	8,159	8,159	8,159
H	J Generation Derates (2)	(666)	(605)	(605)	(605)	(605)	(605)	(605)	(605)	(605)	(605)
I	Temperature Based Generation Derates	(135)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)
J	Net ICAP External Imports	315	315	1,565	1,565	1,565	1,565	1,565	1,565	1,565	1,565
K	SCRs (3), (4)	233	233	233	233	233	233	233	233	233	233
L	**Total Resources Available (G+H+I+J+K)**	8,508	7,985	9,235	9,235	9,235	9,235	9,235	9,235	9,235	9,235
M	**Transmission Security Margin (F+L)**	(502)	(1,046)	(285)	(220)	(113)	(59)	(91)	(210)	(371)	(576)

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 210 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based on the summer peak 2032 representations evaluated in the 2022 RNA.

6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 75: New York City Transmission Security Margin (Hourly) (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)



Summer Peak - 1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria (MW)										
J Transmission Security Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	2,093	1,512	2,267	2,151	2,218	2,248	2,226	2,142	1,992	1,849
HB1	2,480	1,907	2,659	2,548	2,617	2,650	2,633	2,557	2,421	2,289
HB2	2,751	2,185	2,937	2,824	2,895	2,931	2,917	2,848	2,719	2,597
HB3	2,912	2,348	3,101	2,990	3,058	3,097	3,085	3,014	2,893	2,771
HB4	2,943	2,378	3,130	3,018	3,086	3,123	3,110	3,040	2,918	2,796
HB5	2,750	2,181	2,930	2,813	2,878	2,911	2,893	2,818	2,683	2,554
HB6	2,303	1,723	2,474	2,357	2,421	2,450	2,427	2,343	2,193	2,051
HB7	1,666	1,076	1,830	1,716	1,783	1,814	1,788	1,697	1,534	1,381
HB8	1,086	485	1,242	1,134	1,206	1,236	1,213	1,119	944	784
HB9	602	(6)	756	654	730	761	737	641	458	292
HB10	279	(335)	431	334	412	445	418	321	132	(37)
HB11	139	(476)	293	201	284	318	296	197	8	(162)
HB12	(77)	(700)	65	(22)	71	115	96	(4)	(199)	(371)
HB13	(212)	(820)	(53)	(167)	(63)	(11)	(27)	(124)	(308)	(485)
HB14	(174)	(772)	(3)	(376)	(264)	(204)	(219)	(319)	(493)	(673)
HB15	(435)	(1,021)	(255)	(425)	(306)	(242)	(260)	(361)	(533)	(719)
HB16	(586)	(1,158)	(395)	(597)	(474)	(406)	(427)	(535)	(704)	(900)
HB17	(502)	(1,060)	(299)	(521)	(406)	(344)	(370)	(433)	(587)	(787)
HB18	(426)	(964)	(206)	(220)	(113)	(59)	(91)	(210)	(371)	(576)
HB19	(225)	(761)	(7)	(257)	(155)	(103)	(141)	(261)	(422)	(628)
HB20	(8)	(558)	195	(29)	63	107	70	(50)	(216)	(417)
HB21	283	(280)	473	272	359	397	360	244	71	(124)
HB22	842	271	1,022	849	928	961	927	818	649	467
HB23	1,473	898	1,649	1,505	1,576	1,608	1,581	1,484	1,321	1,158

Figure 76: New York City Transmission Security Margin Hourly Curve (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

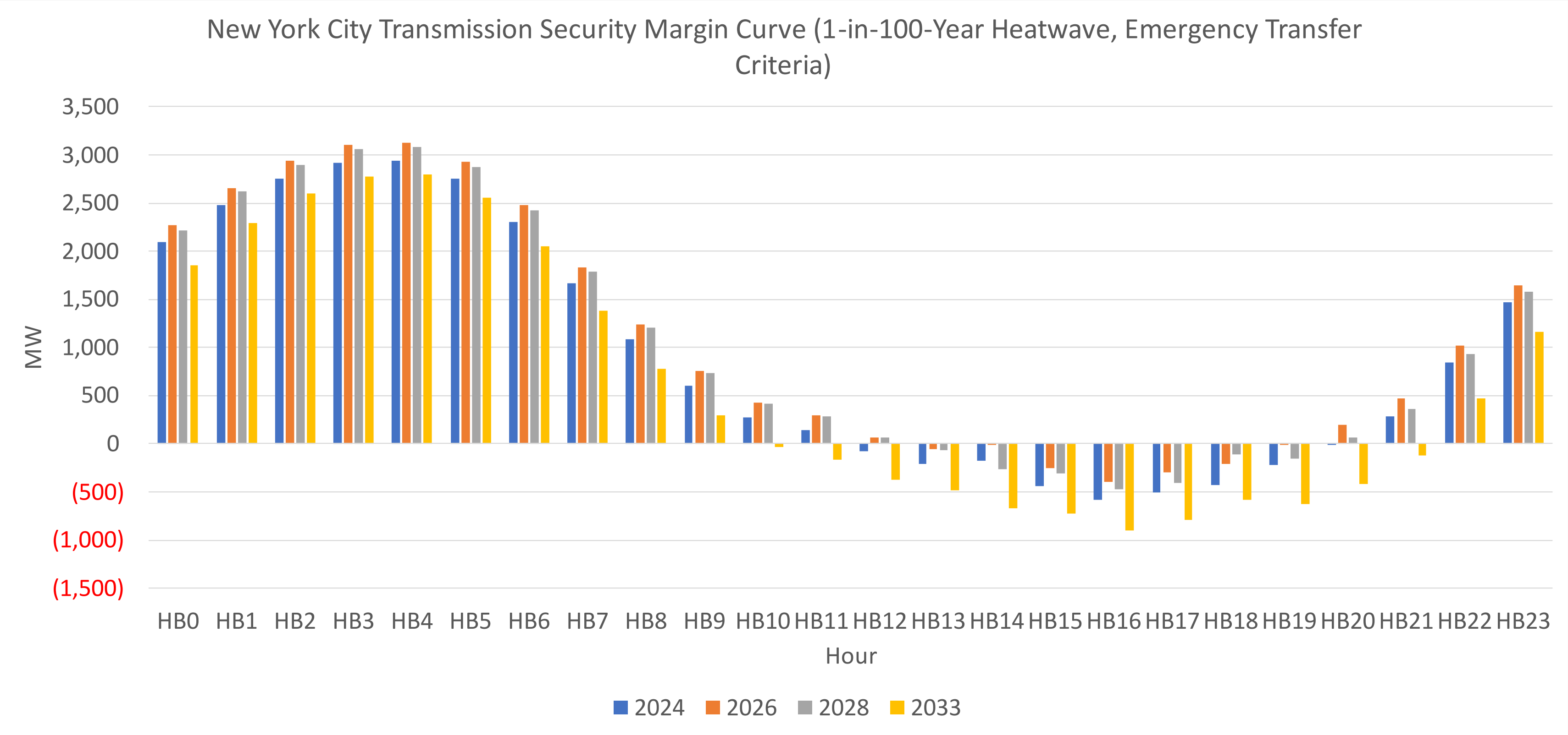


Figure 77: New York City Transmission Security Margin (Winter Peak – Expected Weather, Normal Transfer Criteria)

Winter Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone J Demand Forecast (5)**	(7,580)	(7,670)	(7,790)	(7,920)	(8,080)	(8,310)	(8,590)	(8,930)	(9,320)	(9,730)
B	I+K to J (3), (4)	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J AC Import (B+C)**	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893
E	Loss of Source Contingency	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)
F	**Resource Need (A+D+E)**	(4,655)	(4,745)	(4,865)	(4,995)	(5,155)	(5,385)	(5,665)	(6,005)	(6,395)	(6,805)
G	J Generation (1)	9,433	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(712)	(706)	(706)	(706)	(706)	(706)	(706)	(706)	(706)	(706)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
K	**Total Resources Available (G+H+I+J)**	9,036	8,988	8,988	8,988	8,988	8,988	8,988	8,988	8,988	8,988
L	**Transmission Security Margin (F+K)**	4,380	4,243	4,123	3,993	3,833	3,603	3,323	2,983	2,593	2,183

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
4. As a conservative winter peak assumption these limits utilize the summer values.
5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 78: New York City Transmission Security Margin (1-in-10-Year Cold Snap, Emergency Transfer Criteria)

Winter Peak - 1-in-10-Year Cold Snap, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone J Demand Forecast (7)**	(7,898)	(7,992)	(8,117)	(8,252)	(8,419)	(8,659)	(8,950)	(9,305)	(9,711)	(10,138)
B	I+K to J (5), (6)	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J Import (B+C)**	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893
E	Loss of Source Contingency	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)
F	**Resource Need (A+D+E)**	(4,973)	(5,067)	(5,192)	(5,327)	(5,494)	(5,734)	(6,025)	(6,380)	(6,786)	(7,213)
G	J Generation (1)	9,433	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(712)	(706)	(706)	(706)	(706)	(706)	(706)	(706)	(706)	(706)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
K	SCRs (3), (4)	118	118	118	118	118	118	118	118	118	118
L	**Total Resources Available (G+H+I+J+K)**	9,153	9,106	9,106	9,106	9,106	9,106	9,106	9,106	9,106	9,106
M	**Transmission Security Margin (F+L)**	4,180	4,038	3,913	3,778	3,611	3,371	3,080	2,725	2,319	1,892

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 106 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 79: New York City Transmission Security Margin (1-in-100-year Extreme Cold Snap, Emergency Transfer Criteria)

Winter Peak - 1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone J Demand Forecast (7)**	(8,457)	(8,558)	(8,692)	(8,837)	(9,015)	(9,272)	(9,584)	(9,964)	(10,399)	(10,856)
B	I+K to J (5), (6)	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J Import (B+C)**	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893
E	Loss of Source Contingency	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)
F	**Resource Need (A+D+E)**	(5,532)	(5,633)	(5,767)	(5,912)	(6,090)	(6,347)	(6,659)	(7,039)	(7,474)	(7,931)
G	J Generation (1)	9,433	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(712)	(706)	(706)	(706)	(706)	(706)	(706)	(706)	(706)	(706)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
K	SCRs (3), (4)	118	118	118	118	118	118	118	118	118	118
L	**Total Resources Available (G+H+I+J+K)**	9,153	9,106	9,106	9,106	9,106	9,106	9,106	9,106	9,106	9,106
M	**Transmission Security Margin (F+L)**	3,621	3,472	3,338	3,193	3,015	2,758	2,446	2,066	1,631	1,174

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 106 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 80: Summary of New York City Summer Transmission Security Margin – Summer

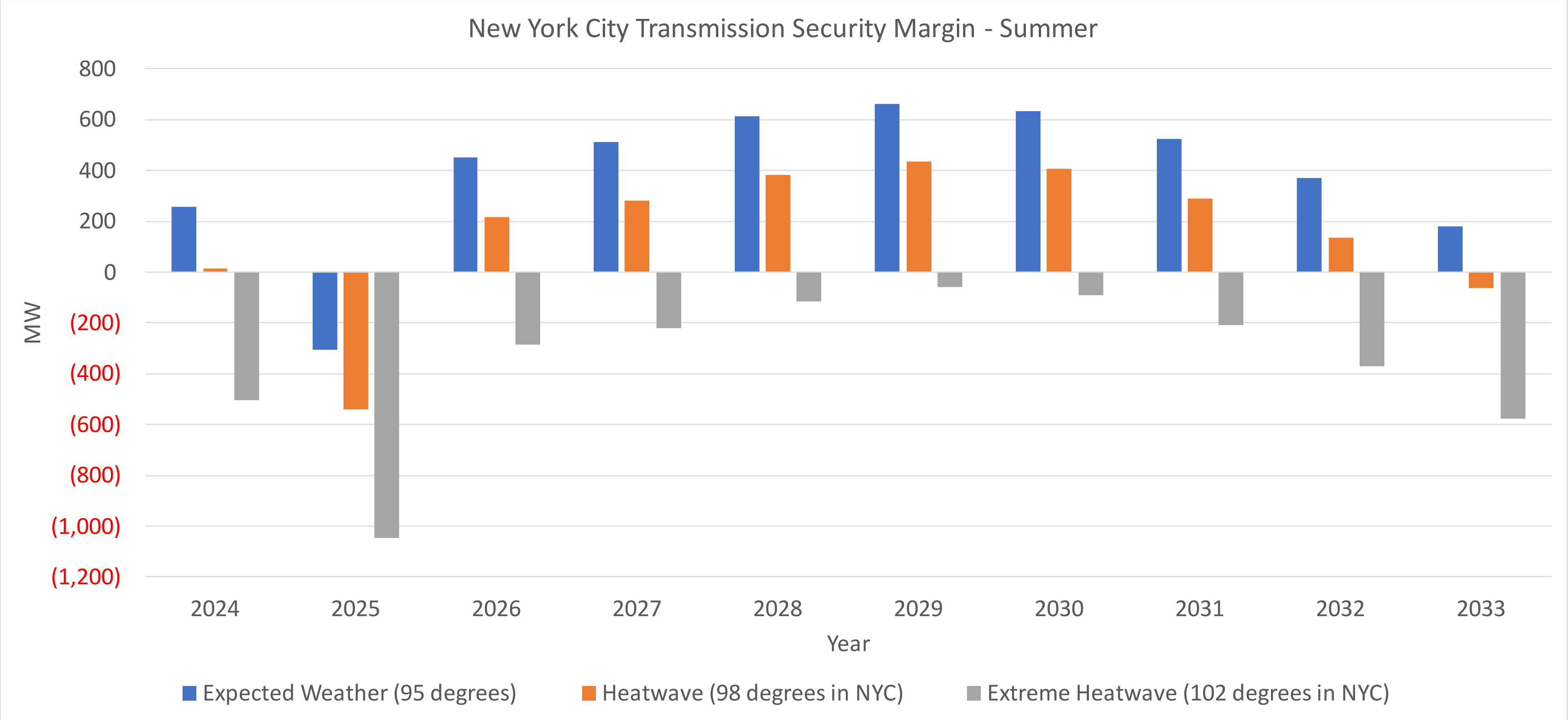
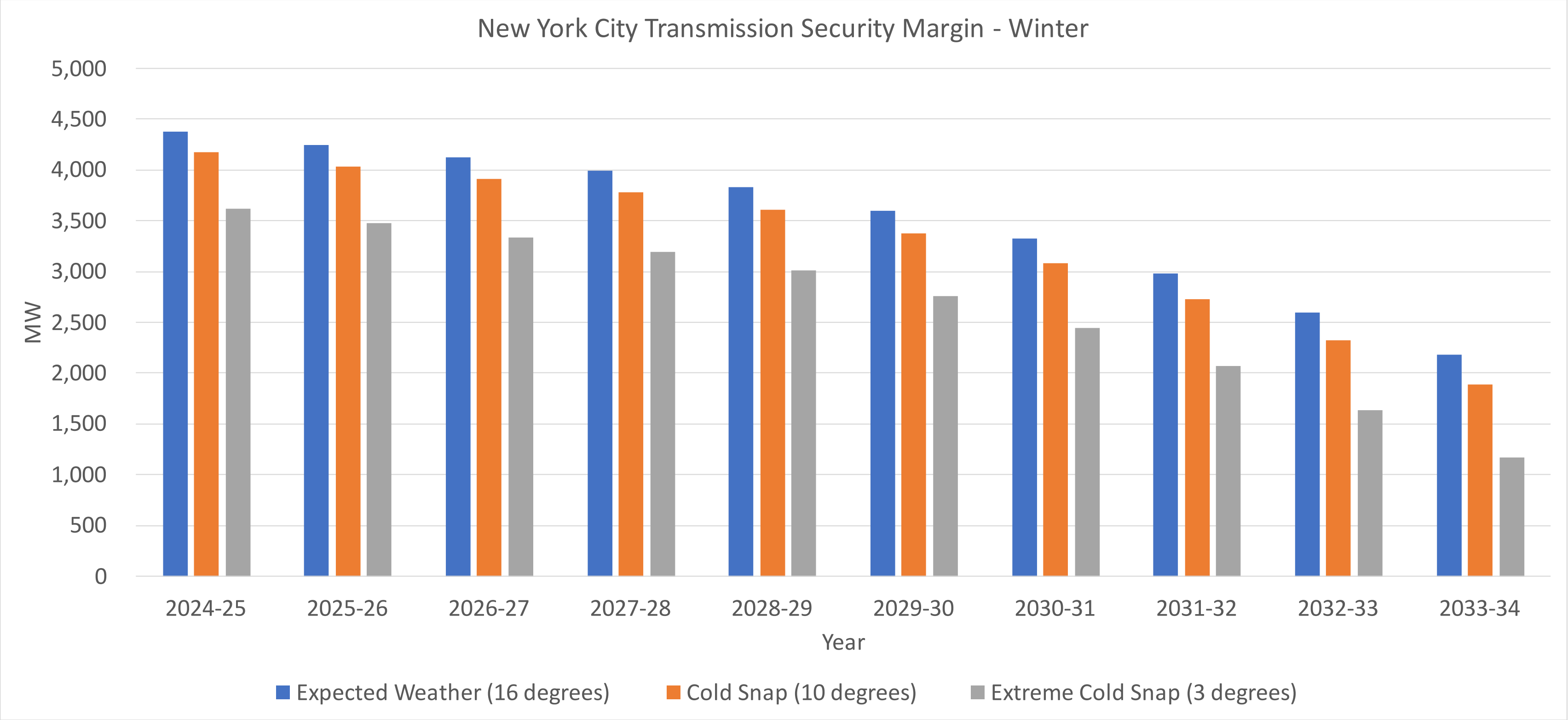


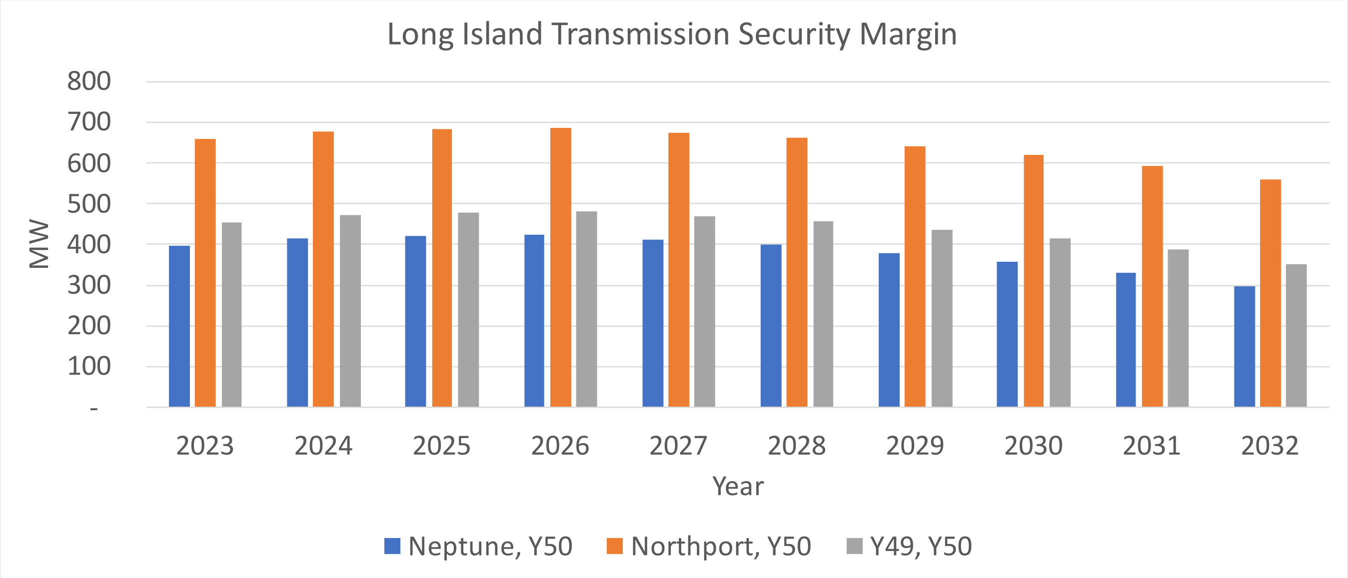
Figure 81: Summary of New York City Summer Transmission Security Margin – Winter



Long Island (Zone K) Transmission Security Margins

Within the PSEG Long Island service territory, the BPTF system (primarily comprised of 138 kV transmission) is designed for N-1-1. As shown in Figure 82, the most limiting N-1-1 combination for the transmission security margin under normal conditions is the outage of Neptune HVDC (660 MW) followed by securing for the loss of Dunwoodie — Shore Road 345 kV (Y50) for all evaluated years.

Figure 82: Impact of Contingency Combination on Zone K Transmission Security Margin



As transmission security analysis represents discrete snapshots in time of various credible combinations of system conditions, only the magnitude of a reliability need can be identified under those system conditions. Additional details are required to fully describe the nature of the need, such as evaluating the hourly demand shape and its impact on the need. To describe the nature of the Long Island transmission security margin, demand shapes are developed for the Zone K component of the statewide demand shape. Details of the demand shapes are provided later in this appendix. For this assessment, demand shapes were not developed past 2033 and have only been developed for the summer conditions. Figure 83 shows the forecasts summer peak load for the Lower Hudson Valley under baseline normal weather conditions (maximum temperature of 92 degrees Fahrenheit), as well as a 98-degree Fahrenheit heatwave expected once every ten years (90/10) and an extreme 1-in-100 year (99/1) heatwave with a maximum temperature of 103 degrees Fahrenheit.

Figure 84 shows the calculation of the Long Island transmission security margin for the statewide coincident summer peak demand hour with expected weather and with normal transfer criteria. The Long Island transmission security margin ranges from 397 MW in summer 2024 to 296 MW in summer 2033 (see line-item L). Under the high policy demand forecast the margins are also observed to be sufficient for all years (see line-item N). The demand shapes for Long Island show the contribution of Zone K (Figure 123) towards the statewide shape (which represents the statewide coincident peak) for each hour of the day. Utilizing the demand shape for the expected weather summer peak day, the Long Island transmission security margin for each hour is shown in Figure 85. The hourly margin is created by using the demand forecast for each hour in the margin calculation (*i.e.*, placing each hour into Figure 84 line-item A) with additional adjustments to account for the appropriate derate for solar generation and energy limited resources in each hour (*i.e.*, Figure 84 line-item H). All other values in the margin calculations are held constant. For all years in the 10-year study horizon, Figure 85 shows that there are no observed non-coincident peak hour deficiencies considering the demand shapes under expected demand and normal transfer criteria for Long Island. A graphical representation of the Long Island transmission security margin cure for summer peak expected weather, normal transfer criteria for the peak day in years 2024, 2025, 2028 and 2033 is shown in Figure 86. Figure 87 shows the impact of additional generator and plant outages on the Long Island transmission security margin.

It is possible for other combinations of events such as 1-in-10-year heatwaves and 1-in-100-year extreme heatwaves to have a deficient transmission security margin. Figure 88 shows the Long Island transmission security margin for the statewide coincident peak hour under the 1-in-10-year heatwave condition with the assumption that the system is using emergency transfer criteria. As seen in Figure 88, the system is sufficient under these conditions within the 10-year study horizon and ranges from 621 MW in summer 2024 to 512 MW in summer 2033 (*see* line-item M). The demand shapes for Zone K under heatwave conditions is provided in Figure 128. Additionally, the hourly margin in Figure 89 show that for each hour of the heatwave day the margin is sufficient. A graphical representation of the Long Island transmission security margins for the 1-in-10-year heatwave day with emergency transfer criteria for the peak day in years 2024, 2025, 2028 and 2033 is shown in Figure 90.

The 1-in-100-year extreme heatwave transmission security margin is shown in Figure 91. These margins assume that the system is using emergency transfer criteria. Under this condition, the margin is sufficient for all years in the 10-year study horizon and ranges from 258 MW in summer 2024 to 142 MW in summer 2033 (*see* line-item M). Additionally, the hourly margin in Figure 92 shows that for each hour the margin is sufficient for the extreme heatwave day. The demand shapes for Zone K under an extreme heatwave is provided in Figure 133. A graphical representation of the Long Island transmission security margins for the 1-in-100-year extreme heatwave day with emergency transfer criteria for the peak day in years 2024, 2025, 2028, and 2033 is shown in Figure 93.

Figure 94 shows the Long Island transmission security margin under winter peak demand and expected weather conditions. For winter peak, the margin ranges from 2,514 MW in winter 2024-25 to 1,031 MW in winter 2033-34. Considering the winter baseline peak demand transmission security margin, multiple outages in Long Island would be required to have a deficient margin.

Figure 95 shows Long Island transmission security margin in a 1-in-10-year cold snap. Under this system condition the transmission security margins for all years are sufficient and range from 3,024 MW in winter 2024-25 to 1,479 MW in winter 2033-34. Similarly, Figure 96 shows the transmission security margins for Long Island with a 1-in-100-year extreme cold snap (with emergency transfer criteria) is sufficient with the margin ranging from 2,780 MW in winter 2024-25 to 1,126 MW in winter 2033-34.

Figure 97 provides a summary of the summer peak Long Island transmission security margins under expected summer weather, heatwave, and extreme heatwave conditions. Figure 98 provides a summary of the winter peak Long Island transmission security margins under expected winter weather, cold snap, and extreme cold snap conditions. Figure 99 provides a summary of the Long Island transmission security margin with the summer peak baseline demand range from the lower and higher policy demand forecasts.

Figure 83: Long Island Summer Peak Demand Forecasts

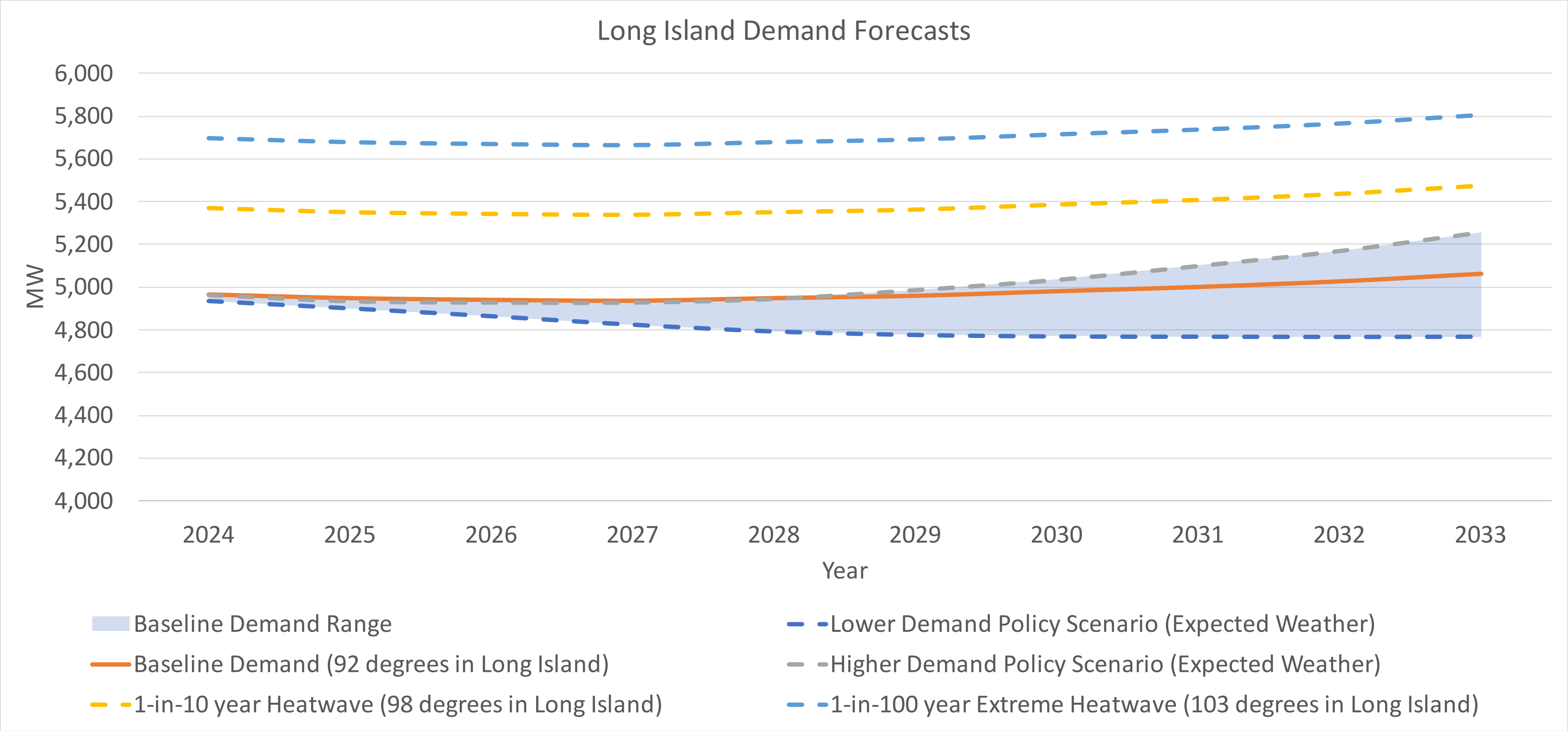


Figure 84: Long Island Transmission Security Margin (Summer Peak – Expected Weather, Normal Transfer Criteria)

Summer Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	**Zone K Demand Forecast (3)**	(4,967)	(4,950)	(4,942)	(4,938)	(4,950)	(4,961)	(4,982)	(5,002)	(5,028)	(5,063)
B	I+J to K	959	959	959	959	959	959	959	959	959	959
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	959	959	959	959	959	959	959	959	959	959
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(4,668)	(4,651)	(4,643)	(4,639)	(4,651)	(4,662)	(4,683)	(4,703)	(4,729)	(4,764)
G	K Generation (1)	5,007	5,007	5,007	5,007	5,007	5,007	5,007	5,007	5,007	5,007
H	K Generation Derates (2)	(602)	(603)	(604)	(605)	(605)	(606)	(606)	(606)	(607)	(607)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	660	660	660	660	660	660	660	660	660	660
K	**Total Resources Available (G+H+I+J)**	5,065	5,065	5,064	5,063	5,062	5,061	5,061	5,061	5,060	5,060
L	**Transmission Security Margin (F+K)**	397	414	421	424	411	399	378	358	331	296
M	Higher Policy Demand Impact	2	14	12	8	3	(27)	(54)	(99)	(143)	(195)
N	**Higher Policy Transmission Security Margin (L+M)**	399	428	433	432	414	372	324	259	188	101

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 85: Long Island Transmission Security Margin (Hourly) (Summer Peak – Expected Weather, Normal Transfer Criteria)

Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)										
K Transmission Security Margin										
Hour	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
HB0	2,293	2,251	2,251	2,245	2,232	2,219	2,202	2,185	2,096	2,075
HB1	2,503	2,467	2,466	2,463	2,452	2,443	2,429	2,415	2,334	2,318
HB2	2,651	2,616	2,617	2,615	2,605	2,598	2,587	2,575	2,503	2,489
HB3	2,734	2,700	2,701	2,700	2,692	2,688	2,679	2,669	2,600	2,589
HB4	2,741	2,710	2,711	2,711	2,704	2,699	2,692	2,684	2,616	2,607
HB5	2,677	2,645	2,647	2,646	2,640	2,635	2,627	2,620	2,550	2,541
HB6	2,550	2,518	2,521	2,522	2,518	2,514	2,506	2,500	2,427	2,418
HB7	2,300	2,265	2,276	2,289	2,291	2,294	2,293	2,291	2,216	2,211
HB8	2,008	1,971	1,992	2,022	2,038	2,053	2,057	2,061	1,988	1,987
HB9	1,721	1,686	1,720	1,769	1,798	1,825	1,842	1,854	1,787	1,793
HB10	1,430	1,395	1,440	1,502	1,545	1,584	1,607	1,628	1,565	1,581
HB11	1,168	1,133	1,186	1,257	1,308	1,354	1,385	1,413	1,350	1,372
HB12	964	928	983	1,058	1,112	1,160	1,192	1,222	1,157	1,182
HB13	784	745	800	873	925	972	1,004	1,033	963	988
HB14	649	609	661	731	780	824	853	880	806	828
HB15	561	515	561	622	663	697	718	738	652	669
HB16	443	393	428	471	495	518	527	535	433	437
HB17	397	339	360	383	389	396	390	384	266	255
HB18	476	414	421	424	411	399	378	358	251	223
HB19	639	574	575	567	545	525	497	468	331	296
HB20	818	756	753	743	721	700	669	642	505	471
HB21	1,050	992	988	978	957	938	910	884	754	722
HB22	1,424	1,371	1,368	1,359	1,338	1,321	1,295	1,272	1,152	1,121
HB23	1,796	1,749	1,747	1,739	1,722	1,707	1,684	1,664	1,558	1,532

Figure 86: Long Island Transmission Security Margin Hourly Curve (Summer Peak – Expected Weather, Normal Transfer Criteria)

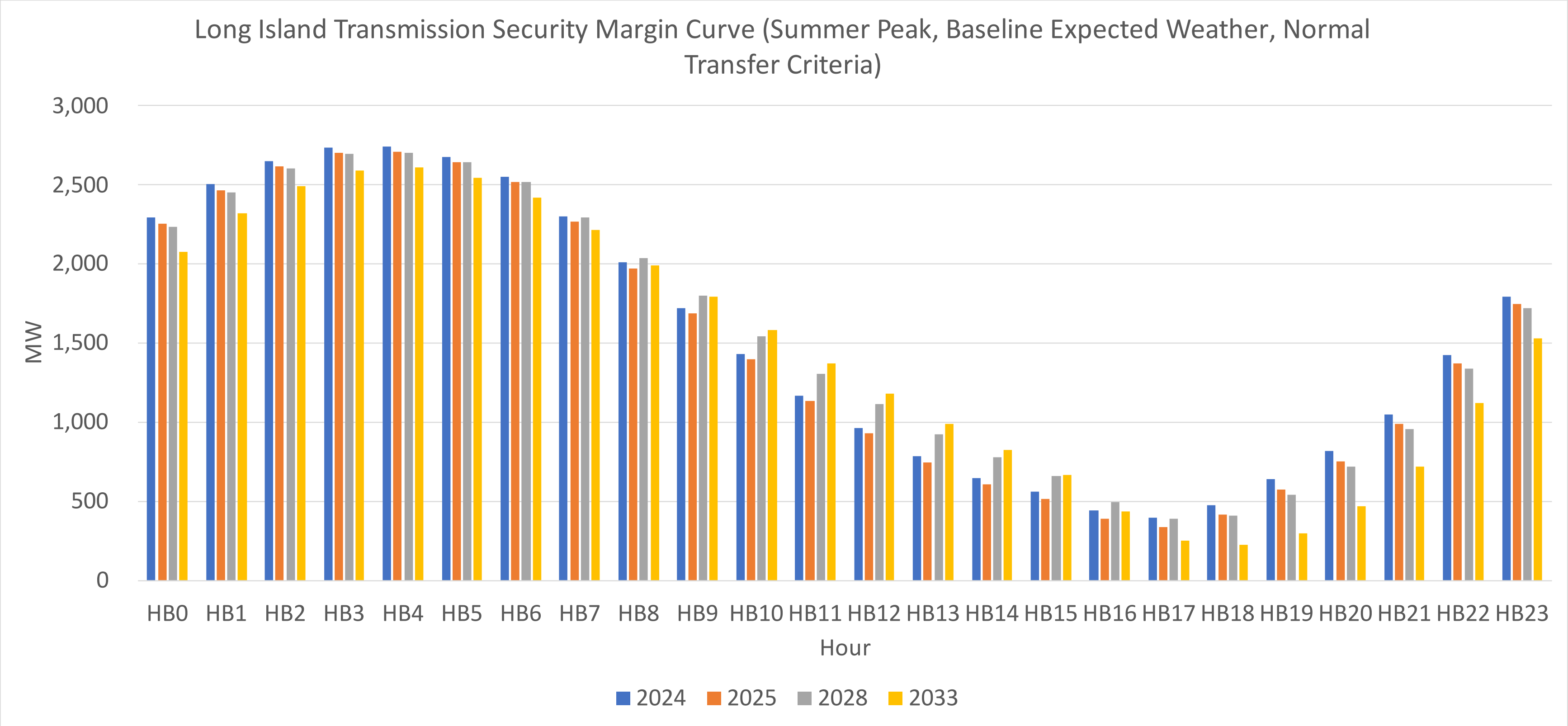


Figure 87: Impact of Generator Outages on Long Island Transmission Security Margin

Long Island												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Long Island Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			399	428	433	432	414	372	324	259	188	101
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Bethpage GT4	44.4	(4.48)	359	388	393	392	374	333	284	219	148	61
Bethpage	23.2	(0.94)	377	405	410	409	392	350	302	237	166	79
Stony Brook (BTM:NG)	0.0	0.00	399	428	433	432	414	372	324	259	188	101
Freeport CT 2	40.0	(4.03)	363	392	397	396	378	337	288	223	152	65
Freeport 1-2, 1-3, & 2-3	16.8	(1.80)	384	413	418	417	399	357	309	244	173	86
Freeport 2-3	12.5	(1.26)	388	417	421	420	403	361	313	248	177	90
Freeport 1-3	2.3	(0.29)	397	426	431	430	412	370	322	257	186	99
Freeport 1-2	2.0	(0.25)	398	426	431	430	412	371	322	257	187	99
Northport 1, 2, 3, and 4	1,518.6	(150.34)	(969)	(941)	(936)	(937)	(954)	(996)	(1,044)	(1,109)	(1,180)	(1,267)
Holtsville 01 through 10	525.9	(47.12)	(79)	(51)	(46)	(47)	(65)	(106)	(155)	(220)	(290)	(378)
Northport 2	397.5	(39.35)	41	70	75	73	56	14	(34)	(99)	(170)	(257)
Northport 3	396.5	(39.25)	42	71	75	74	57	15	(33)	(98)	(169)	(256)
Northport 1	396.2	(39.22)	42	71	76	75	57	16	(33)	(98)	(169)	(256)
Port Jefferson 3 & 4	383.5	(37.97)	54	82	87	86	68	27	(22)	(87)	(157)	(245)
Barrett ST 01 & 02	372.0	(36.83)	64	93	97	96	79	37	(11)	(76)	(147)	(234)
Northport 4	328.4	(32.51)	103	132	137	136	118	77	28	(37)	(107)	(195)
Caithness_CC_1	302.4	(12.28)	109	138	143	141	124	82	34	(31)	(102)	(189)
Barrett GT 01 through 12	256.5	(24.12)	167	195	200	199	182	140	92	27	(44)	(132)
Wading River 1, 2, & 3	227.0	(22.88)	195	224	229	227	210	168	120	55	(16)	(103)
Barrett ST 01	193.7	(19.18)	225	253	258	257	240	198	149	84	14	(74)
Port Jefferson 3	192.0	(19.01)	226	255	260	259	241	199	151	86	15	(72)
Port Jefferson 4	191.5	(18.96)	227	255	260	259	241	200	151	86	16	(72)

Long Island												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Long Island Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			399	428	433	432	414	372	324	259	188	101
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Barrett ST 02	178.3	(17.65)	239	267	272	271	253	212	163	98	28	(60)
Glenwood GT 02, 04, & 05	132.4	(13.35)	280	309	314	313	295	253	205	140	69	(18)
Far Rockaway GT1 & GT2	108.6	(9.73)	300	329	334	333	315	274	225	160	90	2
Shoreham GT 3 & 4	85.9	(8.66)	322	351	355	354	337	295	247	182	111	24
Pilgrim GT1 & GT2	83.2	(8.39)	324	353	358	357	339	298	249	184	114	26
Port Jefferson GT 02 & 03	82.2	(8.29)	325	354	359	358	340	299	250	185	114	27
Wading River 1	76.8	(7.74)	330	359	364	363	345	303	255	190	119	32
Wading River 2	75.7	(7.63)	331	360	365	364	346	304	256	191	120	33
Bethpage 3	74.8	(3.04)	328	356	361	360	342	301	252	187	117	29
Wading River 3	74.5	(7.51)	332	361	366	365	347	305	257	192	121	34
Hempstead (RR)	73.0	(7.23)	334	362	367	366	348	307	258	193	123	35
Pinelawn Power 1	73.0	(2.96)	329	358	363	362	344	302	254	189	118	31
Holtsville 09	57.2	(5.13)	347	376	381	379	362	320	272	207	136	49
Holtsville 01	56.3	(5.04)	348	376	381	380	363	321	273	208	137	50
Far Rockaway GT2	55.8	(5.00)	348	377	382	381	363	322	273	208	138	50
Holtsville 02	55.0	(4.93)	349	378	383	382	364	322	274	209	138	51
Holtsville 04	54.1	(4.85)	350	378	383	382	365	323	275	210	139	52
Holtsville 05	52.8	(4.73)	351	380	385	384	366	324	276	211	140	53
Far Rockaway GT1	52.8	(4.73)	351	380	385	384	366	324	276	211	140	53
Greenport GT1	52.6	(4.71)	351	380	385	384	366	325	276	211	141	53
Holtsville 07	51.6	(4.62)	352	381	386	385	367	326	277	212	141	54
Holtsville 10	50.3	(4.51)	353	382	387	386	368	327	278	213	143	55
Holtsville 03	50.2	(4.50)	354	382	387	386	368	327	278	213	143	55
Glenwood GT 02	49.9	(5.03)	354	383	388	387	369	328	279	214	144	56

Long Island												
Year			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Long Island Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			399	428	433	432	414	372	324	259	188	101
Unit Name	Summer DMNC (MW)	NERC 5-Year Class Average De-Rate (MW)	Transmission Security Margin Following Generator/Plant Outage									
Holtsville 06	49.8	(4.46)	354	382	387	386	369	327	279	214	143	56
Holtsville 08	48.6	(4.35)	355	384	388	387	370	328	280	215	144	57
Shoreham GT4	43.1	(4.34)	361	389	394	393	375	334	285	220	150	62
Shoreham GT3	42.8	(4.31)	361	389	394	393	376	334	285	220	150	62
Glenwood GT 05	42.7	(4.30)	361	389	394	393	376	334	286	221	150	62
Pilgrim GT2	41.7	(4.20)	362	390	395	394	377	335	286	221	151	63
Port Jefferson GT 02	41.5	(4.18)	362	390	395	394	377	335	287	222	151	64
Pilgrim GT1	41.5	(4.18)	362	390	395	394	377	335	287	222	151	64
Port Jefferson GT 03	40.7	(4.10)	363	391	396	395	377	336	287	222	152	64
Glenwood GT 04	39.8	(4.01)	364	392	397	396	378	337	288	223	153	65
Barrett 12	39.7	(3.56)	363	392	397	395	378	336	288	223	152	65
Barrett 09	38.5	(3.45)	364	393	398	397	379	337	289	224	153	66
Barrett 10	38.5	(3.45)	364	393	398	397	379	337	289	224	153	66
Barrett 11	38.5	(3.45)	364	393	398	397	379	337	289	224	153	66
Huntington (RR)	24.5	(2.43)	377	406	411	409	392	350	302	237	166	79
East Hampton GT 01, 2, 3, & 4	24.2	(2.38)	377	406	411	410	392	351	302	237	167	79
East Hampton GT 01	18.5	(1.66)	382	411	416	415	397	356	307	242	172	84
Babylon (RR)	16.0	(1.58)	385	413	418	417	400	358	310	245	174	86
Barrett GT 02	15.6	(1.57)	385	414	419	418	400	358	310	245	174	87
Barrett 03	15.0	(1.51)	386	414	419	418	401	359	310	245	175	87
Barrett 06	15.0	(1.51)	386	414	419	418	401	359	310	245	175	87
Barrett GT 01	14.9	(1.50)	386	414	419	418	401	359	311	246	175	87
Barrett 08	14.4	(1.45)	386	415	420	419	401	360	311	246	175	88
Barrett 04	13.3	(1.34)	387	416	421	420	402	361	312	247	176	89

Long Island												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Long Island Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			399	428	433	432	414	372	324	259	188	101
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Following Generator/Plant Outage									
Barrett 05	13.1	(1.32)	388	416	421	420	402	361	312	247	177	89
Southold 1	9.4	(0.95)	391	419	424	423	406	364	315	250	180	92
S Hampton 1	8.6	(0.87)	392	420	425	424	406	365	316	251	181	93
Islip (RR)	8.0	(0.79)	392	421	425	424	407	365	317	252	181	94
East Hampton 2	1.9	(0.24)	398	426	431	430	412	371	322	257	187	99
East Hampton 3	1.9	(0.24)	398	426	431	430	412	371	322	257	187	99
East Hampton 4	1.9	(0.24)	398	426	431	430	412	371	322	257	187	99
Flynn	139.0	(5.64)	266	294	299	298	281	239	191	126	55	(33)
Brentwood	45.5	(4.59)	358	387	392	391	373	332	283	218	147	60
Greenport IC 4, 5, & 6	5.6	(0.71)	394	423	428	427	409	368	319	254	184	96
Greenport IC 6	3.1	(0.39)	397	425	430	429	411	370	321	256	186	98
Greenport IC 5	1.5	(0.19)	398	426	431	430	413	371	323	258	187	100
Greenport IC 4	1.0	(0.13)	398	427	432	431	413	372	323	258	188	100
Charles P Killer 09 through 14	15.1	(1.79)	386	414	419	418	401	359	311	246	175	88
Charles P Keller 14	3.2	(0.38)	396	425	430	429	411	370	321	256	186	98
Charles P Keller 12	2.8	(0.33)	397	425	430	429	412	370	321	256	186	98
Charles P Keller 13	2.8	(0.33)	397	425	430	429	412	370	321	256	186	98
Charles P Keller 11	2.7	(0.32)	397	425	430	429	412	370	322	257	186	98
Charles P Keller 09	1.8	(0.21)	398	426	431	430	412	371	322	257	187	99
Charles P Keller 10	1.8	(0.21)	398	426	431	430	412	371	322	257	187	99
Freeport CT 1 & 2	85.4	(8.61)	323	351	356	355	337	296	247	182	112	24
Freeport CT 1	45.4	(4.58)	358	387	392	391	373	332	283	218	148	60

Notes

1. Utilizes the Higher Policy Transmission Security Margin for Summer Peak with Expected Weather.

Figure 88: Long Island Transmission Security Margin (1-in-10-Year Heatwave, Emergency Transfer Criteria)

Summer Peak - 1-in-10-Year Heatwave, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	**Zone K Demand Forecast (5)**	(5,369)	(5,350)	(5,342)	(5,338)	(5,350)	(5,362)	(5,385)	(5,407)	(5,435)	(5,473)
B	I+J to K	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(4,431)	(4,412)	(4,404)	(4,400)	(4,412)	(4,424)	(4,447)	(4,469)	(4,497)	(4,535)
G	K Generation (1)	5,007	5,007	5,007	5,007	5,007	5,007	5,007	5,007	5,007	5,007
H	K Generation Derates (2)	(602)	(603)	(604)	(605)	(605)	(606)	(606)	(606)	(607)	(607)
I	Temperature Based Generation Derates	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)
J	Net ICAP External Imports	660	660	660	660	660	660	660	660	660	660
K	SCRs (3), (4)	19	19	19	19	19	19	19	19	19	19
L	**Total Resources Available (G+H+I+J+K)**	5,052	5,052	5,051	5,050	5,049	5,049	5,048	5,048	5,048	5,047
M	**Transmission Security Margin (F+L)**	621	640	647	650	637	625	601	579	551	512

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 16 MW for SCRs.

5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 89: Long Island Transmission Security Margin (Hourly) (1-in-10-Year Heatwave, Emergency Transfer Criteria)

Summer Peak - Heatwave, Emergency Transfer Criteria (MW)										
K Transmission Security Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	2,567	2,573	2,571	2,512	2,492	2,472	2,454	2,436	2,385	2,363
HB1	2,789	2,800	2,798	2,742	2,725	2,710	2,696	2,681	2,638	2,621
HB2	2,944	2,955	2,955	2,901	2,885	2,874	2,862	2,849	2,815	2,800
HB3	3,036	3,047	3,047	2,994	2,981	2,973	2,964	2,953	2,922	2,909
HB4	3,058	3,073	3,072	3,021	3,009	2,999	2,992	2,983	2,954	2,943
HB5	3,009	3,023	3,024	2,971	2,960	2,950	2,941	2,934	2,903	2,892
HB6	2,895	2,910	2,911	2,859	2,849	2,839	2,830	2,823	2,788	2,778
HB7	2,637	2,649	2,657	2,615	2,608	2,603	2,599	2,594	2,556	2,549
HB8	2,327	2,336	2,351	2,324	2,327	2,331	2,329	2,329	2,289	2,283
HB9	2,017	2,026	2,051	2,040	2,052	2,064	2,074	2,078	2,042	2,039
HB10	1,719	1,726	1,760	1,759	1,782	1,803	1,815	1,827	1,792	1,797
HB11	1,480	1,488	1,528	1,533	1,561	1,587	1,606	1,623	1,586	1,595
HB12	1,278	1,281	1,321	1,329	1,362	1,392	1,412	1,429	1,389	1,399
HB13	1,101	1,108	1,145	1,143	1,177	1,209	1,229	1,246	1,209	1,217
HB14	921	932	966	953	988	1,019	1,038	1,053	1,020	1,024
HB15	805	816	843	814	827	852	864	874	838	838
HB16	663	678	695	642	661	679	683	683	641	628
HB17	621	640	647	567	570	575	564	554	508	484
HB18	735	752	748	650	637	625	601	579	551	512
HB19	892	907	899	792	790	771	743	712	655	610
HB20	1,107	1,120	1,110	1,010	986	964	933	905	839	799
HB21	1,370	1,383	1,373	1,281	1,256	1,235	1,205	1,179	1,113	1,077
HB22	1,783	1,793	1,786	1,705	1,679	1,657	1,630	1,606	1,543	1,508
HB23	2,200	2,209	2,203	2,133	2,109	2,090	2,065	2,044	1,987	1,958

Figure 90: Long Island Transmission Security Margin Hourly Curve (1-in-10-Year Heatwave, Emergency Transfer Criteria)

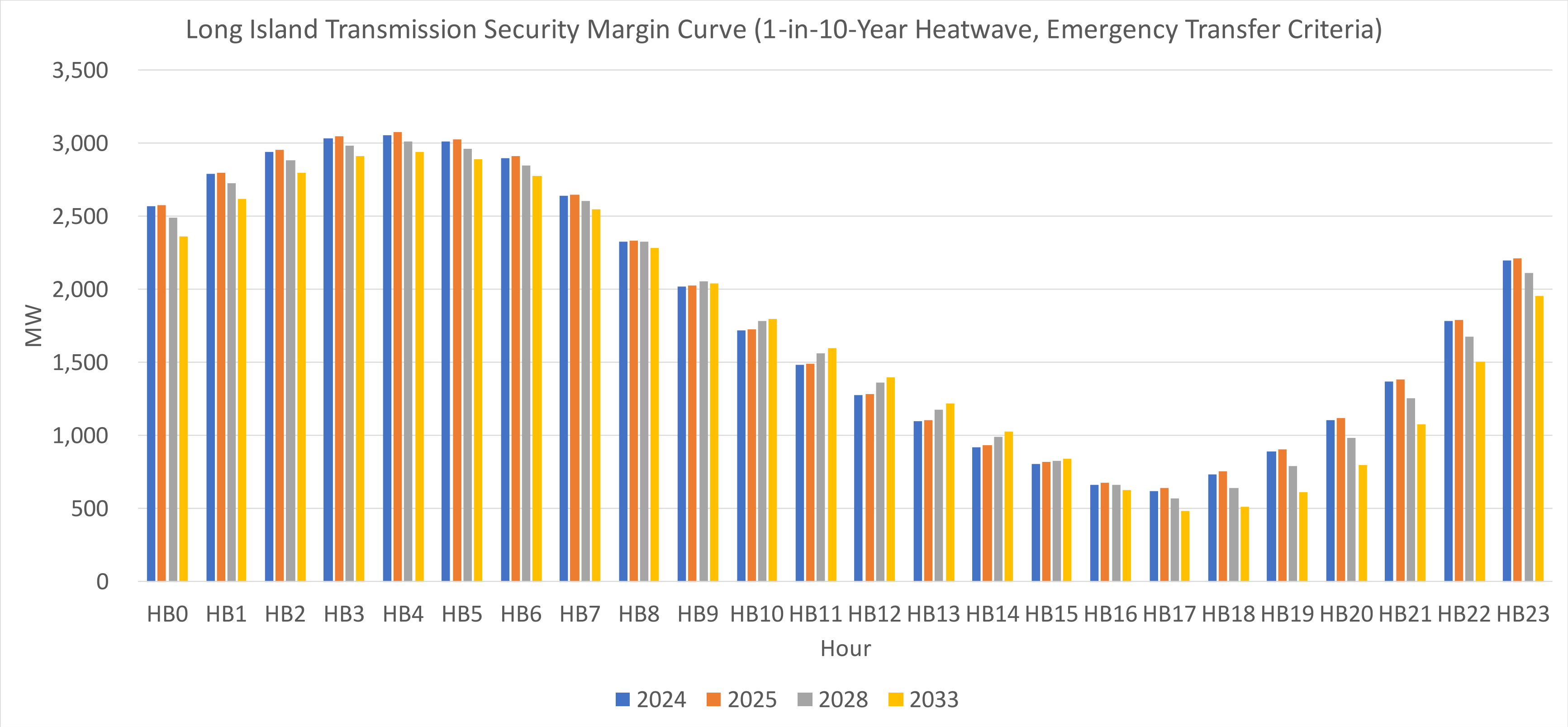


Figure 91: Long Island Transmission Security Margin (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

Summer Peak - 1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
A	**Zone K Demand Forecast (5)**	(5,696)	(5,677)	(5,668)	(5,663)	(5,677)	(5,690)	(5,714)	(5,737)	(5,766)	(5,807)
B	I+J to K	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(4,758)	(4,739)	(4,730)	(4,725)	(4,739)	(4,752)	(4,776)	(4,799)	(4,828)	(4,869)
G	K Generation (1)	5,007	5,007	5,007	5,007	5,007	5,007	5,007	5,007	5,007	5,007
H	K Generation Derates (2)	(602)	(603)	(604)	(605)	(605)	(606)	(606)	(606)	(607)	(607)
I	Temperature Based Generation Derates	(68)	(68)	(68)	(68)	(68)	(68)	(68)	(68)	(68)	(68)
J	Net ICAP External Imports	660	660	660	660	660	660	660	660	660	660
K	SCRs (3), (4)	19	19	19	19	19	19	19	19	19	19
L	**Total Resources Available (G+H+I+J+K)**	5,016	5,016	5,015	5,014	5,013	5,013	5,012	5,012	5,012	5,011
M	**Transmission Security Margin (F+L)**	258	277	285	289	274	261	236	213	184	142

Notes:

1. Reflects the 2023 Gold Book existing summer capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 5% of the total nameplate, off-shore wind at 10% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 16 MW for SCRs.

5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 92: Long Island Transmission Security Margin (Hourly) (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

Summer Peak - 1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria (MW)										
K Transmission Security Margin										
Hour	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HB0	2,385	2,390	2,390	2,329	2,308	2,288	2,269	2,251	2,199	2,177
HB1	2,609	2,620	2,618	2,561	2,543	2,528	2,513	2,497	2,454	2,436
HB2	2,766	2,776	2,777	2,721	2,705	2,693	2,681	2,667	2,633	2,617
HB3	2,859	2,869	2,870	2,816	2,802	2,793	2,783	2,772	2,741	2,727
HB4	2,881	2,895	2,895	2,842	2,830	2,820	2,812	2,803	2,773	2,762
HB5	2,832	2,847	2,848	2,793	2,782	2,772	2,762	2,754	2,723	2,712
HB6	2,719	2,734	2,736	2,682	2,671	2,661	2,651	2,644	2,609	2,598
HB7	2,459	2,470	2,479	2,436	2,428	2,422	2,418	2,413	2,375	2,366
HB8	2,145	2,152	2,168	2,139	2,142	2,145	2,144	2,143	2,103	2,095
HB9	1,831	1,837	1,863	1,850	1,862	1,874	1,882	1,887	1,850	1,846
HB10	1,528	1,533	1,568	1,564	1,586	1,607	1,619	1,630	1,594	1,599
HB11	1,285	1,290	1,331	1,334	1,362	1,387	1,405	1,422	1,384	1,392
HB12	1,058	1,058	1,098	1,104	1,137	1,166	1,185	1,202	1,160	1,169
HB13	847	851	889	883	917	947	967	983	944	950
HB14	633	640	674	658	692	723	740	755	719	722
HB15	483	491	501	468	499	523	533	544	504	502
HB16	308	322	340	283	301	318	319	319	274	261
HB17	258	277	285	201	203	207	195	184	136	110
HB18	375	393	391	289	274	261	236	213	184	142
HB19	536	553	566	454	433	412	383	352	291	245
HB20	786	801	793	689	664	641	608	580	512	471
HB21	1,085	1,097	1,089	995	969	946	916	890	821	783
HB22	1,533	1,543	1,537	1,453	1,426	1,404	1,376	1,352	1,286	1,251
HB23	1,983	1,992	1,989	1,915	1,891	1,870	1,845	1,824	1,766	1,735

Figure 93: Long Island Transmission Security Margin Hourly Curve (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

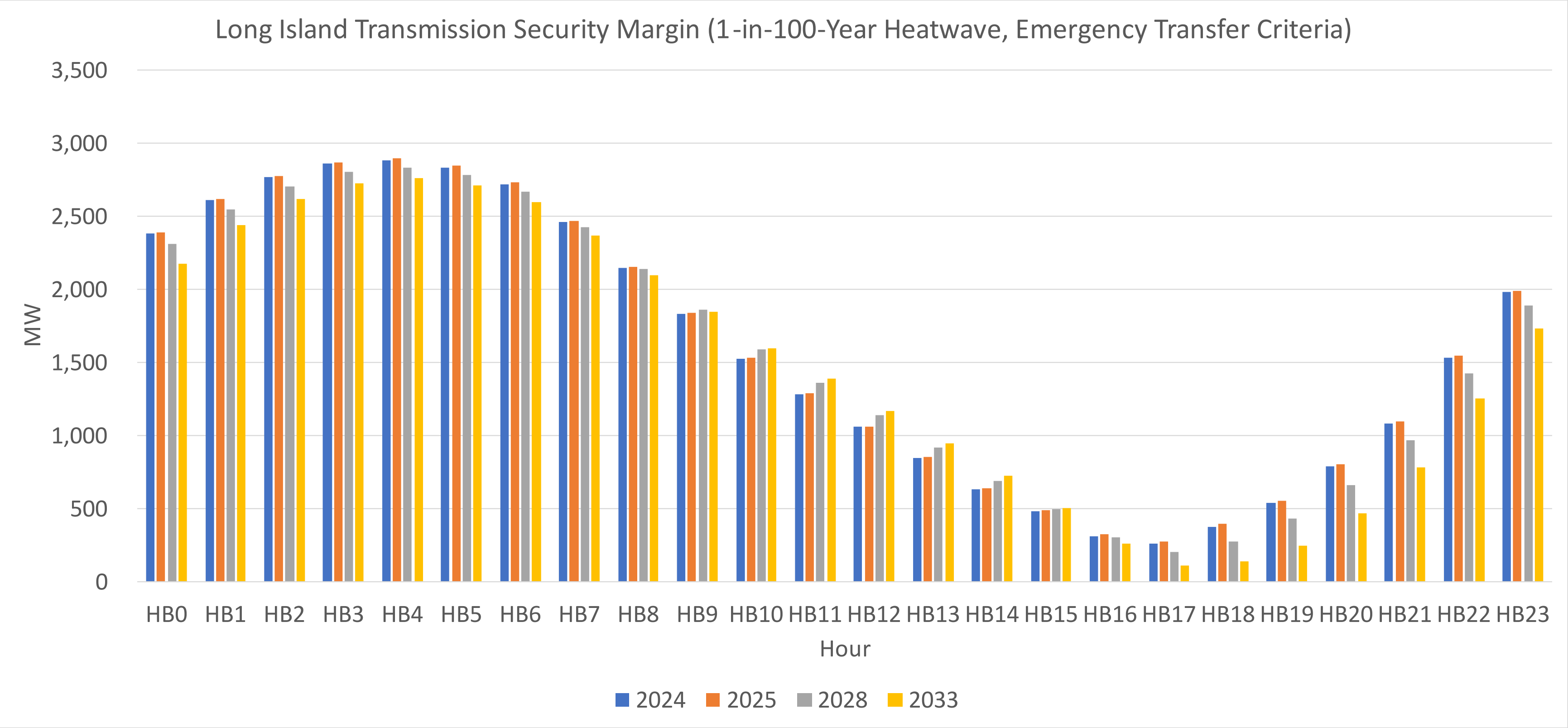


Figure 94: Long Island Transmission Security Margin (Winter Peak – Expected Weather, Normal Transfer Criteria)

Winter Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	Item	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
A	**Zone K Demand Forecast (5)**	(3,301)	(3,388)	(3,495)	(3,609)	(3,744)	(3,908)	(4,093)	(4,300)	(4,536)	(4,783)
B	I+J to K (3), (4)	959	959	959	959	959	959	959	959	959	959
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	959	959	959	959	959	959	959	959	959	959
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(3,002)	(3,089)	(3,196)	(3,310)	(3,445)	(3,609)	(3,794)	(4,001)	(4,237)	(4,484)
G	K Generation (1)	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504
H	K Generation Derates (2)	(648)	(648)	(648)	(648)	(648)	(648)	(648)	(648)	(648)	(648)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	660	660	660	660	660	660	660	660	660	660
K	**Total Resources Available (G+H+I+J)**	5,516	5,516	5,516	5,516	5,516	5,516	5,516	5,516	5,516	5,516
L	**Transmission Security Margin (F+K)**	2,514	2,427	2,320	2,206	2,071	1,906	1,721	1,514	1,279	1,031

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2032 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
4. As a conservative winter peak assumption these limits utilize the summer values.
5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 95: Long Island Transmission Security Margin (1-in-10-Year Cold Snap, Emergency Transfer Criteria)

Winter Peak - 1-in-10-Year Cold Snap, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone K Demand Forecast (7)**	(3,439)	(3,530)	(3,641)	(3,760)	(3,901)	(4,072)	(4,265)	(4,481)	(4,726)	(4,984)
B	I+J to K (5), (6)	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(2,501)	(2,592)	(2,703)	(2,822)	(2,963)	(3,134)	(3,327)	(3,543)	(3,788)	(4,046)
G	K Generation (1)	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504
H	K Generation Derates (2)	(648)	(648)	(648)	(648)	(648)	(648)	(648)	(648)	(648)	(648)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	660	660	660	660	660	660	660	660	660	660
K	SCRs (3), (4)	9	9	9	9	9	9	9	9	9	9
L	**Total Resources Available (G+H+I+J+K)**	5,525	5,525	5,525	5,525	5,525	5,525	5,525	5,525	5,525	5,525
M	**Transmission Security Margin (F+L)**	3,024	2,933	2,822	2,703	2,562	2,391	2,198	1,982	1,737	1,479

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 8 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2032 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 96: Long Island Transmission Security Margin (1-in-100-year Extreme Cold Snap, Emergency Transfer Criteria)

Winter Peak - 1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone K Demand Forecast (7)**	(3,683)	(3,780)	(3,899)	(4,027)	(4,177)	(4,361)	(4,567)	(4,798)	(5,061)	(5,337)
B	I+J to K (5), (6)	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(2,745)	(2,842)	(2,961)	(3,089)	(3,239)	(3,423)	(3,629)	(3,860)	(4,123)	(4,399)
G	K Generation (1)	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504
H	K Generation Derates (2)	(648)	(648)	(648)	(648)	(648)	(648)	(648)	(648)	(648)	(648)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	660	660	660	660	660	660	660	660	660	660
K	SCRs (3), (4)	9	9	9	9	9	9	9	9	9	9
L	**Total Resources Available (G+H+I+J+K)**	5,525	5,525	5,525	5,525	5,525	5,525	5,525	5,525	5,525	5,525
M	**Transmission Security Margin (F+L)**	2,780	2,683	2,564	2,436	2,286	2,102	1,896	1,665	1,402	1,126

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 8 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2032 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).

Figure 97: Summary of Long Island Summer Transmission Security Margin – Summer

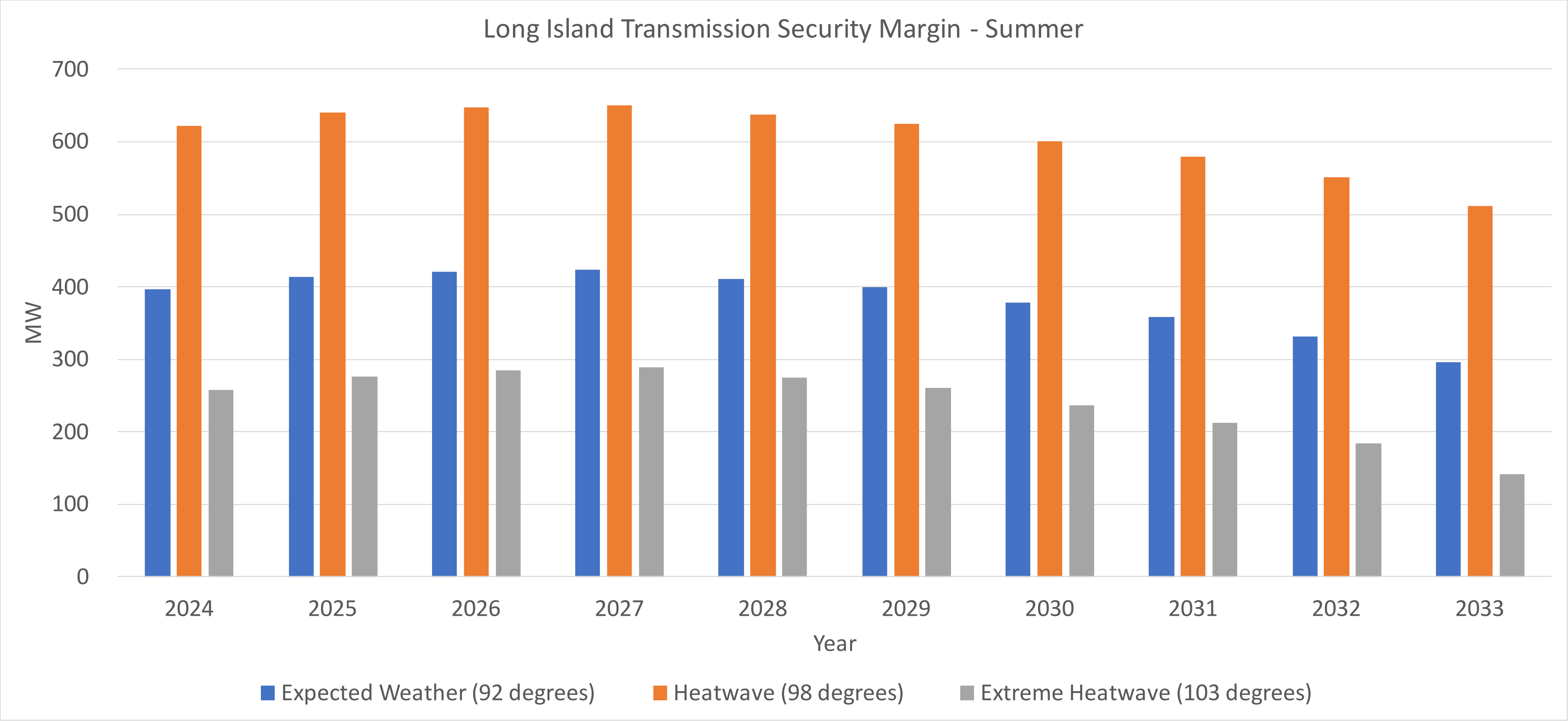


Figure 98: Summary of Long Island Summer Transmission Security Margin – Winter

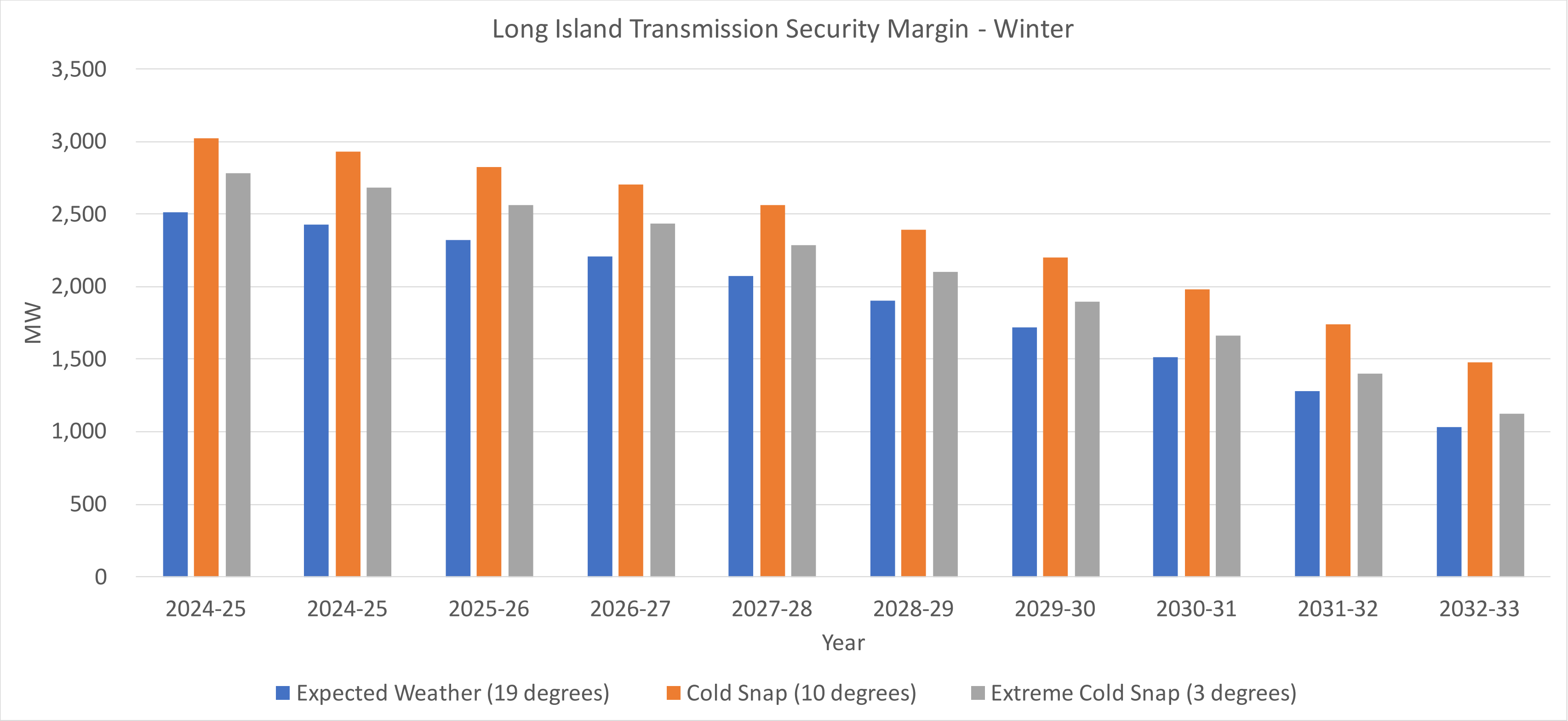
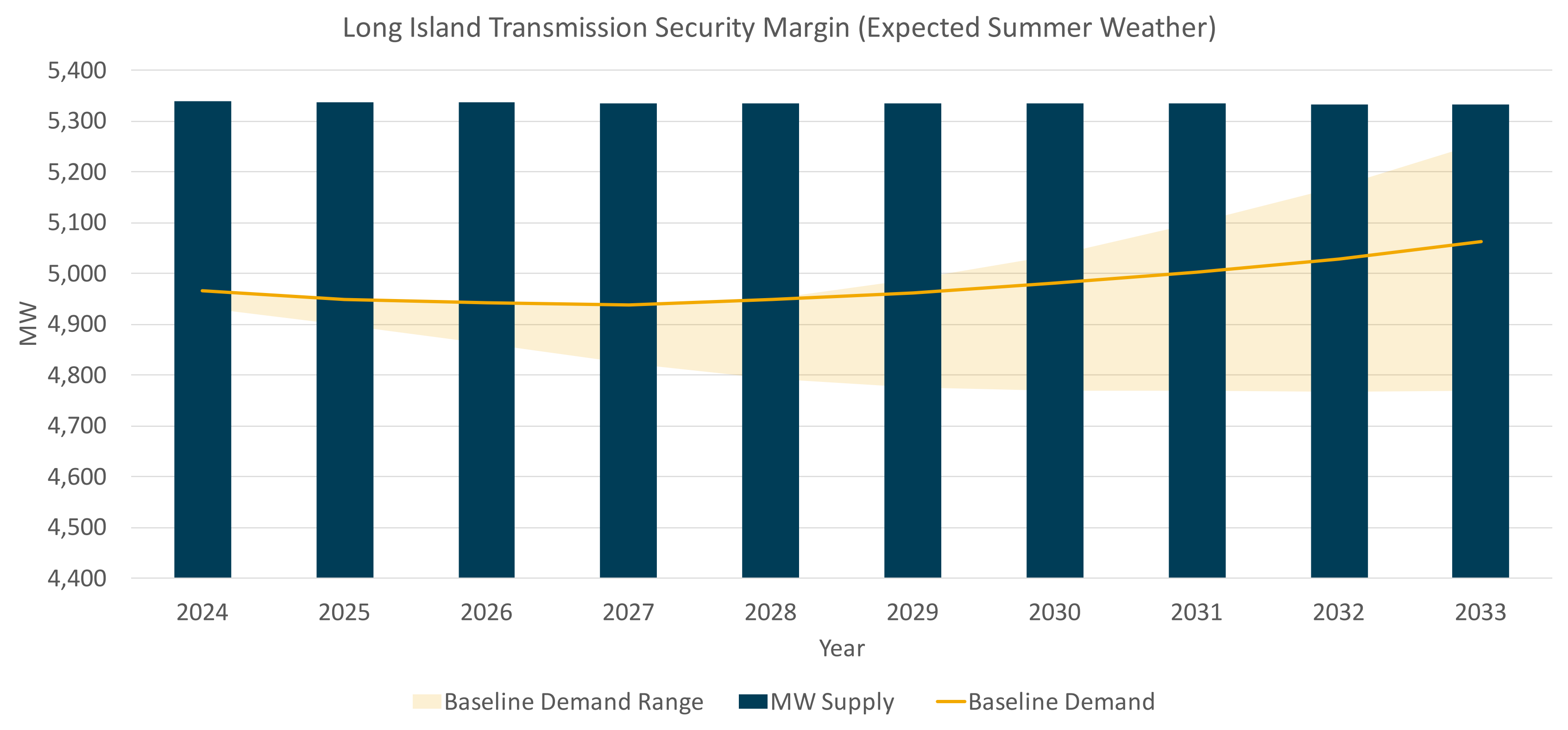


Figure 99: Summary of Long Island Summer Transmission Security Margin Demand Policy Impact – Summer



Loss of Gas Fuel Supply Extreme System Condition Impact to Transmission Security Margins

Natural gas fired generation in the NYCA is supplied by various networks of major gas pipelines. From a statewide perspective, New York has a relatively diverse mix of generation resources. Details of the fuel mix in New York State are provided in the 2023 Gold Book.

The study conditions for evaluating the impact of the loss of gas fuel supply are identified in NPCC Directory #1 and the NYSRC Reliability Rules as an extreme system condition. Extreme system conditions are beyond design criteria conditions and are meant to evaluate the robustness of the system. However, efforts are underway nationally, regionally, and locally to review the established design criteria and conditions in consideration of heatwave, cold snaps, and other system conditions. For instance, FERC issued a Notice of Proposed Rulemaking in 2022 to "address reliability concerns pertaining to transmission system planning for extreme heat or cold weather events that impact the Reliable Operation of the Bulk-Power System."[42] In response to this NOPR, the NYISO supported the Commission's guidance to NERC and the industry at large that will help stakeholders plan for, and develop responses to, extreme heat and cold weather events.[43] Locally, the NYSRC has established goals to identify actions to preserve NYCA reliability for extreme weather events and other extreme system conditions.[44]

The Analysis Group conducted an assessment in 2019 of the fuel and energy security in New York to examine the fuel and energy security of the New York electric grid.[45] Following this report, the NYISO has continued to evaluate and update stakeholders regarding the key factors that could impact fuel and energy security in New York.[46] The NYISO 2023 project, Enhancing Fuel and Energy Security, has been established to refresh the assumptions from the 2019 fuel and energy security report to assess emerging operational and grid reliability concerns.[47] At the nationwide level, NERC identified a project, entitled Project 2022-03 Energy Assurance with Energy-Constrained Resources, that proposes to address several energy assurance concerns related to both the operations and planning time horizons.[48]

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[42] Transmission System Planning Performance Requirements for Extreme Weather, *Notice of Proposed Rulemaking*, Docket No. RM22-10-000 (June 16, 2022).

[43] NYISO comments to RM22-10-000 are found here

[44] A copy of the NYSRC 2022 goals is available here.

[45] Analysis Group, Final Report on Fuel and Energy Security In New York State, An Assessment of Winter Operational Risks for a Power System in Transition (November 2019), which is available here.

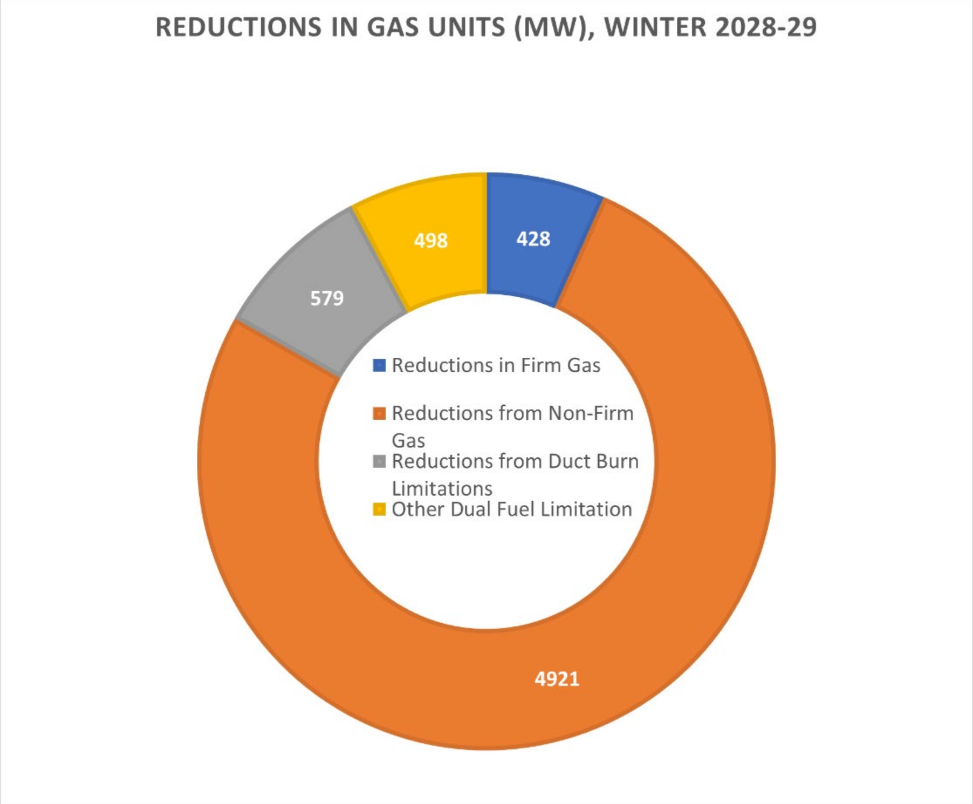
[46] One example is the 2021-2022 Fuel & Energy Security Update that the NYISO presented at its Installed Capacity Working Group in June of 2022, which is available at here.

[47] Additional details on the 2023 Enhancing Fuel and Energy Security project are available here. Preliminary study results were presented to stakeholders at the August 8, 2023 ICAPWG/MIWG/PRLWG meeting (here).

[48] Additional details on NERC's Project 2022-03 Energy Assurance with Energy-Constrained Resources are available here.

For the transmission security margin evaluation of gas shortage conditions, all gas-only units within the NYCA are assumed unavailable with consideration of firm gas fuel contracts. Dual-fuel units with duct-burn capability are also assumed to be unavailable. This assessment assumes the remaining units have available fuel for the peak period. Figure 100 shows a breakdown of the reduction in gas units from units with non-firm gas, units with reductions in firm gas (the amount of firm gas does not equal the stated winter capability for this unit), reductions from duct burn limitations, and other dual-fuel unit limitations. This results in a little more than 6,400 MW of winter generation capability. This value is consistent with the 2022-23 Winter Assessment & Winter Preparedness review, which included an extreme scenario showing the impact of a reduction of 6,484 MW for gas units and duct burn capabilities.[49]

Figure 100: NYCA Reductions in Gas Units



In the Area Transmission Review (ATR) assessments conducted by the NYISO, an evaluation of the loss of gas fuel supply is conducted using the winter peak demand level. In the 2020 Comprehensive ATR, the NYISO evaluated the extreme system condition of a natural gas fuel

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[49] The 2022-23 Winter Assessment & Winter Preparedness review was presented to stakeholders at the November 17, 2022 Operating Committee meeting (which is available here). The winter capacity assessment extreme scenarios on slide 8 shows a gas and duct burner reduction of -8,968 MW with an add back of units with firm gas contracts of 2,484 MW. This results in a total gas reduction of -6,484 MW.

shortage using the winter baseline expected weather forecast with normal transfer criteria.[50] The 2020 Comprehensive ATR found no thermal or voltage violations. However, there were dynamic stability issues observed around the Oswego area. Due to these dynamic stability issues, the NYISO conducted an evaluation to better understand the nature of the issue and found that reduced clearing times, as well as additional dynamic reactive capability in the local area, address the stability issues.

Utilizing the winter system conditions evaluated for the transmission security margins under winter peak for baseline, cold snap, and extreme cold snaps the statewide system margin as well as the Lower Hudson Valley, New York City, and Long Island localities can be evaluated for the extreme scenario of a shortage of gas fuel supply.

For the statewide system margin Figure 101 shows that the statewide system margin is only sufficient through winter 2028-29. Beginning in winter 2029-30 the statewide system margin is deficient by 89 MW which worsens to a deficiency of 5,149 MW by winter 2033-34 (line-item K). In comparison to the summer peak statewide system margin (shown in Figure 24), the winter peak with a shortage of gas fuel supply leads the potential for system deficiencies. Figure 102 shows that under a cold snap the system is deficient as early as winter 2029-30 by 678 MW which worsens to 5,951 MW winter 2033-34 (line-item L). Figure 103 shows that under an extreme cold snap, the system is deficient starting in winter 2026-27 by 292 MW which worsens to 8,384 MW by winter 2033-34 (line-item L). Figure 104 provides a graphical representation of the statewide system margin under baseline expected load, cold snap, and extreme cold snap conditions with gas units being available (as provided in Figure 34) along with the impact of a shortage of gas fuel supply.

Figure 105 shows the impact of a shortage of gas fuel supply on the Lower Hudson Valley winter peak transmission security margin under baseline expected weather conditions. Figure 106 shows the margins under cold snap conditions with Figure 107 showing the results under an extreme cold snap. Within the Lower Hudson Valley, gas unavailability impacts approximately 2,690 MW of gas generation. Under baseline expected load for winter as well as cold snap and extreme cold snap conditions the margins are sufficient for all years. Figure 108 provides a graphical representation of the Lower Hudson Valley transmission security margin under baseline expected load, cold snap, and extreme cold snap conditions with gas units being available (as provided in Figure 52) along with the impact of a shortage of gas fuel supply.

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[50] The 2020 Comprehensive Area Transmission Review of the New York State Bulk Power Transmission System (Study Year 2025) is available here.

Figure 109 shows the impact of a shortage of gas fuel supply on the New York City winter peak transmission security margin under baseline expected weather conditions. Within the New York City locality (Zone J), gas unavailability impacts approximately 2,130 MW of gas generation. Under baseline expected weather, normal transfer criteria conditions the margins are sufficient for all years (see line-item M). Under a 1-in-10-year cold snap, the system is also sufficient for all years until winter 2033-34 which is deficient by 90 MW (see Figure 110, line-item M). As shown in Figure 111, under an extreme cold snap the margins are deficient beginning in winter 2032-33 by 351 which worsen to 808 MW the next winter. Figure 112 provides a graphical representation of the New York City transmission security margin under baseline expected load, cold snap, and extreme cold snap conditions with gas units being available (as provided in Figure 77) along with the impact of a shortage of gas fuel supply.

Figure 113 shows the impact of a shortage of gas fuel supply on the Long Island winter peak transmission security margin under baseline expected weather conditions. Figure 114 shows the margins under cold snap conditions with Figure 115 showing the results under an extreme cold snap. Within the Long Island locality (Zone K), gas unavailability impacts 621 MW of gas generation. Under baseline expected load for winter as well as cold snap and extreme cold snap conditions the margins are sufficient for all years. Figure 116 provides a graphical representation of the Long Island transmission security margin under baseline expected load, cold snap, and extreme cold snap conditions with gas units being available (as provided in Figure 94) along with the impact of the shortage of gas fuel supply.

Figure 101: Statewide System Margin with a Shortage of Gas Fuel Supply (Winter Peak - Expected Weather, Normal Transfer Criteria)

Line	Item	Winter Peak - Baseline Expected Winter Weather, Gas Fuel Shortage, Normal Transfer Criteria (MW)									
		2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
A	NYCA Generation (1)	41,037	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304
B	NYCA Generation Derates (2)	(6,688)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)
C	Shortage of Gas Fuel Supply (6)	(6,461)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)
D	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
E	External Area Interchanges (3)	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268
F	**Total Resources (A+B+C+D+E)**	29,157	29,141	29,141	29,141	29,141	29,141	29,141	29,141	29,141	29,141
G	Demand Forecast (5)	(23,895)	(24,196)	(24,656)	(25,182)	(25,844)	(26,716)	(27,746)	(28,936)	(30,306)	(31,756)
H	Large Load Forecast (7)	(635)	(904)	(1,044)	(1,118)	(1,146)	(1,204)	(1,224)	(1,224)	(1,224)	(1,224)
I	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
J	**Total Capability Requirement (G+H+I)**	(25,840)	(26,410)	(27,010)	(27,610)	(28,300)	(29,230)	(30,280)	(31,470)	(32,840)	(34,290)
K	**Statewide System Margin (F+J)**	3,317	2,731	2,131	1,531	841	(89)	(1,139)	(2,329)	(3,699)	(5,149)
L	SCRs (8), (9)	582	582	582	582	582	582	582	582	582	582
M	**Statewide System Margin with SCR (K+L)**	3,899	3,313	2,713	2,113	1,423	493	(557)	(1,747)	(3,117)	(4,567)
N	Operating Reserve	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
O	**Statewide System Margin with Full Operating Reserve (M+N) (4)**	2,589	2,003	1,403	803	113	(817)	(1,867)	(3,057)	(4,427)	(5,877)

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).

3. Interchanges are based on ERAG MMWG values.
4. For informational purposes.
5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included.
6. Includes all gas only units that do not have a firm gas contract. Also includes reductions in units with duct burner capabilities. Duct burner derates on dual fual combined cycle units with non-firm gas account for approximately 500 MW of derated capacity.
7. Forecast of large load queue projects included in this assessment (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center, Q1536 - White Pines Phase 1 (Micron), and Q1446 - Massena Green Hydrogen (Air Products and Chemicals)).
9. Includes a derate of 221 MW for SCRs

Figure 102: Extreme System Condition – Winter Peak Statewide System Margin (1-in-10-Year Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply

		Winter Peak - 1-in-10-Year Cold Snap, Gas Fuel Shortage, Emergency Transfer Criteria (MW)									
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	NYCA Generation (1)	41,037	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304
B	Shortage of Gas Fuel Supply (7)	(6,688)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)
C	NYCA Generation Derates (2)	(6,461)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)
D	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
E	External Area Interchanges (3)	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268
F	SCRs (4), (5)	582	582	582	582	582	582	582	582	582	582
G	**Total Resources (A+B+C+D+E+F)**	29,739	29,723	29,723	29,723	29,723	29,723	29,723	29,723	29,723	29,723
H	Demand Forecast (6)	(24,896)	(25,211)	(25,690)	(26,239)	(26,928)	(27,836)	(28,910)	(30,151)	(31,579)	(33,089)
I	Large Load Forecast (8)	(662)	(942)	(1,088)	(1,165)	(1,194)	(1,255)	(1,275)	(1,275)	(1,275)	(1,275)
J	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
K	**Total Capability Requirement (H+I+J)**	(26,868)	(27,463)	(28,088)	(28,714)	(29,432)	(30,401)	(31,495)	(32,736)	(34,164)	(35,674)
L	**Statewide System Margin (G+K)**	2,871	2,260	1,635	1,009	291	(678)	(1,772)	(3,013)	(4,441)	(5,951)
M	Operating Reserve	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
N	**Statewide System Margin with Full Operating Reserve (L+M)**	1,561	950	325	(301)	(1,019)	(1,988)	(3,082)	(4,323)	(5,751)	(7,261)

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).

3. Interchanges are based on ERAG MMWG values.
4. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
5. Includes a derate of 221 MW for SCRs.
6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included.
7. Includes all gas only units that do not have a firm gas contract. Also includes reductions in units with duct burner capabilities. Duct burner derates on dual fual combined cycle units with non-firm gas account for approximately 500 MW of derated capacity.
8. Forecast of large load queue projects included in this assessment (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center, Q1536 - White Pines Phase 1 (Micron), and Q1446 - Massena Green Hydrogen (Air Products and Chemicals)).

Figure 103: Extreme System Condition – Winter Peak Statewide System Margin (1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply

Line	Item	Winter Peak - 1-in-100-Year Extreme Cold Snap, Gas Fuel Shortage, Emergency Transfer Criteria (MW)									
		2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
A	NYCA Generation (1)	41,037	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304	41,304
B	Shortage of Gas Fuel Supply (7)	(6,688)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)	(7,005)
C	NYCA Generation Derates (2)	(6,461)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)	(6,426)
D	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
E	External Area Interchanges (3)	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268
F	SCRs (4), (5)	582	582	582	582	582	582	582	582	582	582
G	**Total Resources (A+B+C+D+E+F)**	29,739	29,723	29,723	29,723	29,723	29,723	29,723	29,723	29,723	29,723
H	Demand Forecast (6)	(26,662)	(26,995)	(27,510)	(28,097)	(28,835)	(29,810)	(30,957)	(32,287)	(33,815)	(35,431)
I	Large Load Forecast (7)	(708)	(1,009)	(1,165)	(1,247)	(1,279)	(1,343)	(1,366)	(1,366)	(1,366)	(1,366)
J	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
K	**Total Capability Requirement (H+I+J)**	(28,680)	(29,314)	(29,985)	(30,654)	(31,424)	(32,463)	(33,633)	(34,963)	(36,491)	(38,107)
L	**Statewide System Margin (G+K)**	1,059	409	(262)	(931)	(1,701)	(2,740)	(3,910)	(5,240)	(6,768)	(8,384)
M	Operating Reserve	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
Notes:	**Statewide System Margin with Full Operating Reserve (L+M)**	(251)	(901)	(1,572)	(2,241)	(3,011)	(4,050)	(5,220)	(6,550)	(8,078)	(9,694)

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).

3. Interchanges are based on ERAG MMWG values.
4. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
5. Includes a derate of 221 MW for SCRs.
6. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included.
7. Includes all gas only units that do not have a firm gas contract. Also includes reductions in units with duct burner capabilities. Duct burner derates on dual fual combined cycle units with non-firm gas account for approximately 500 MW of derated capacity.
8. Forecast of large load queue projects included in this assessment (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center, Q1536 - White Pines Phase 1 (Micron), and Q1446 - Massena Green Hydrogen (Air Products and Chemicals)).

Figure 104: Extreme System Condition – Summary of Winter Peak Statewide System Margin with A Shortage of Gas Fuel Supply

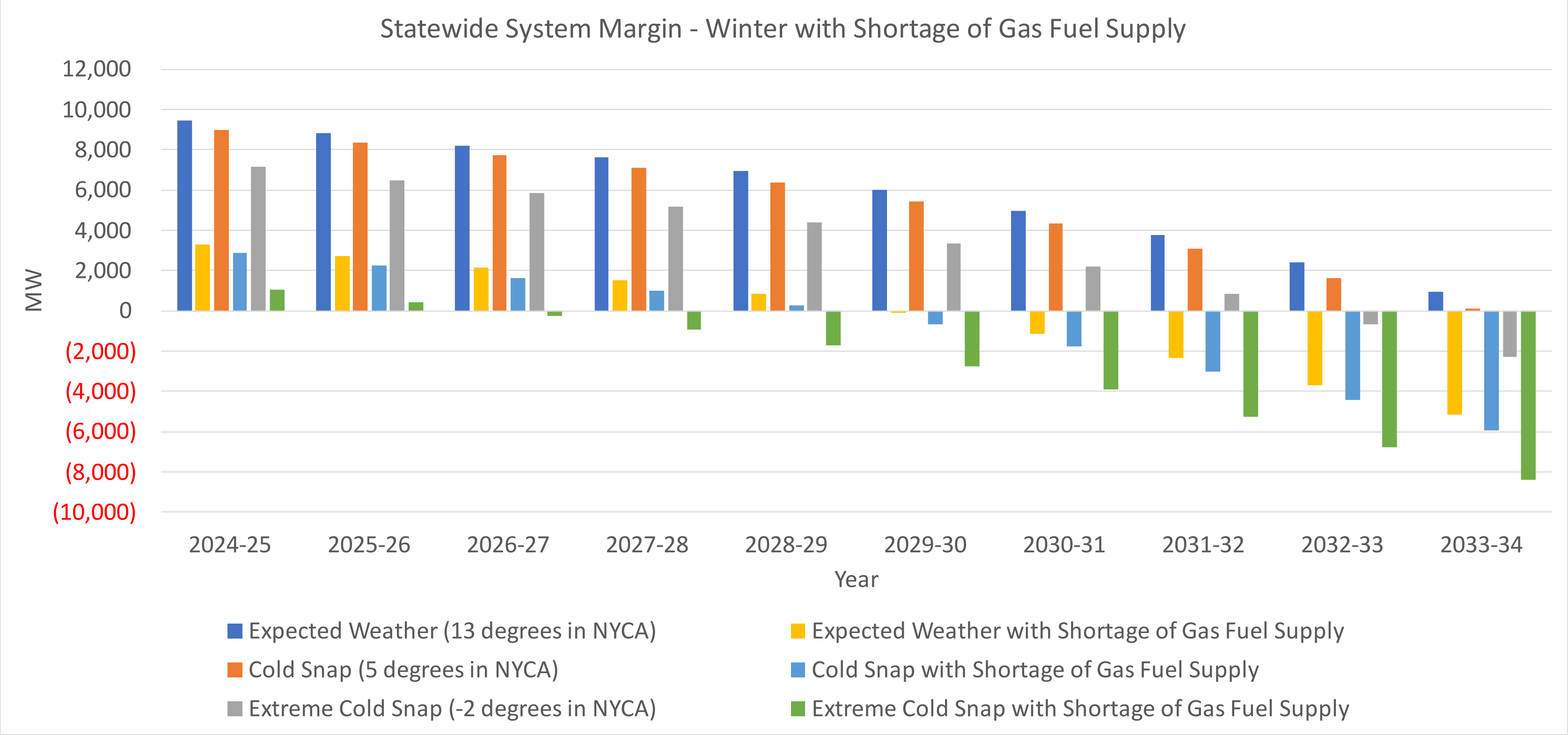
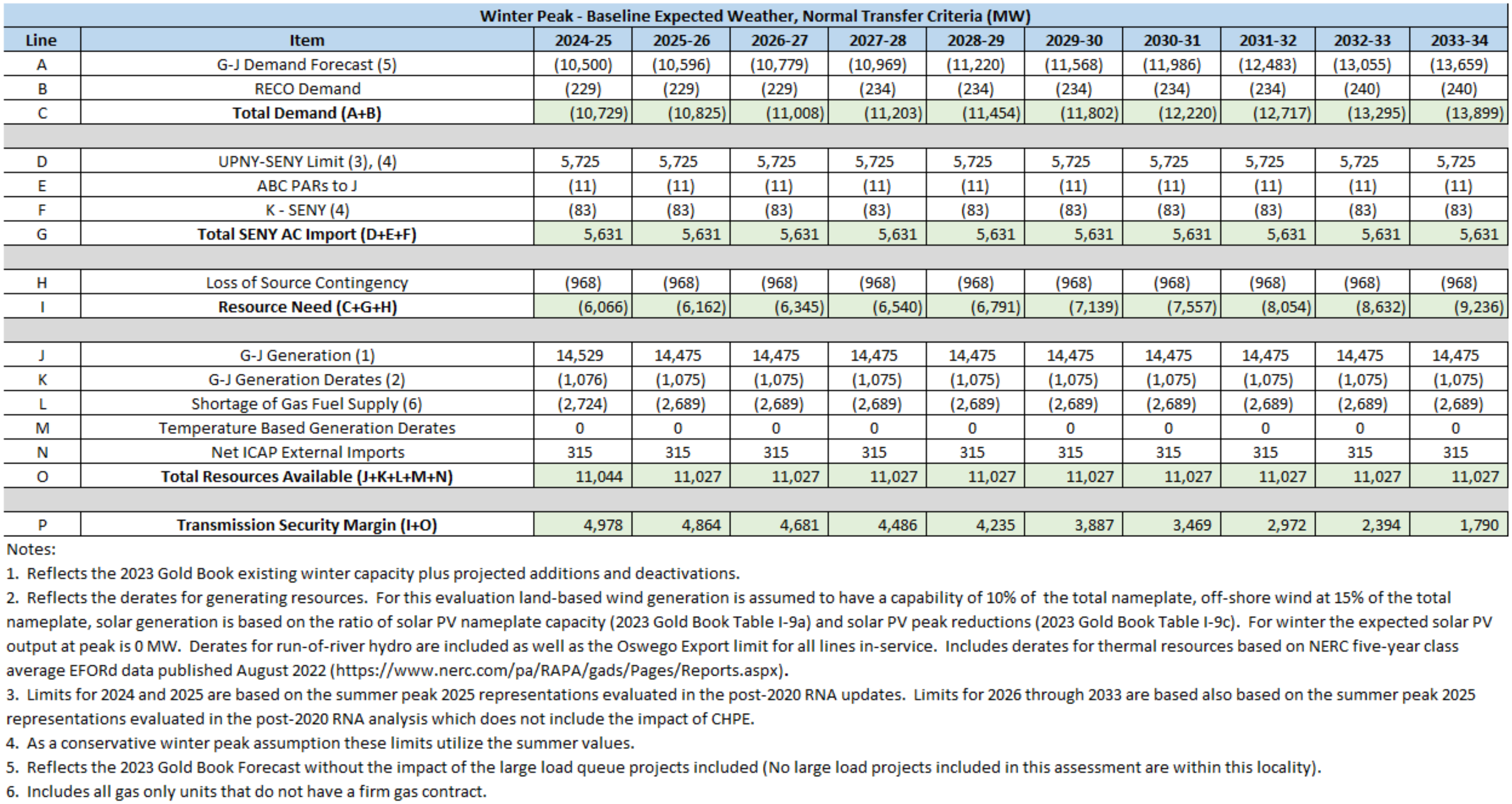


Figure 105: Extreme System Condition – Winter Peak Lower Hudson Valley Transmission Security Margin with A Shortage of Gas Fuel Supply

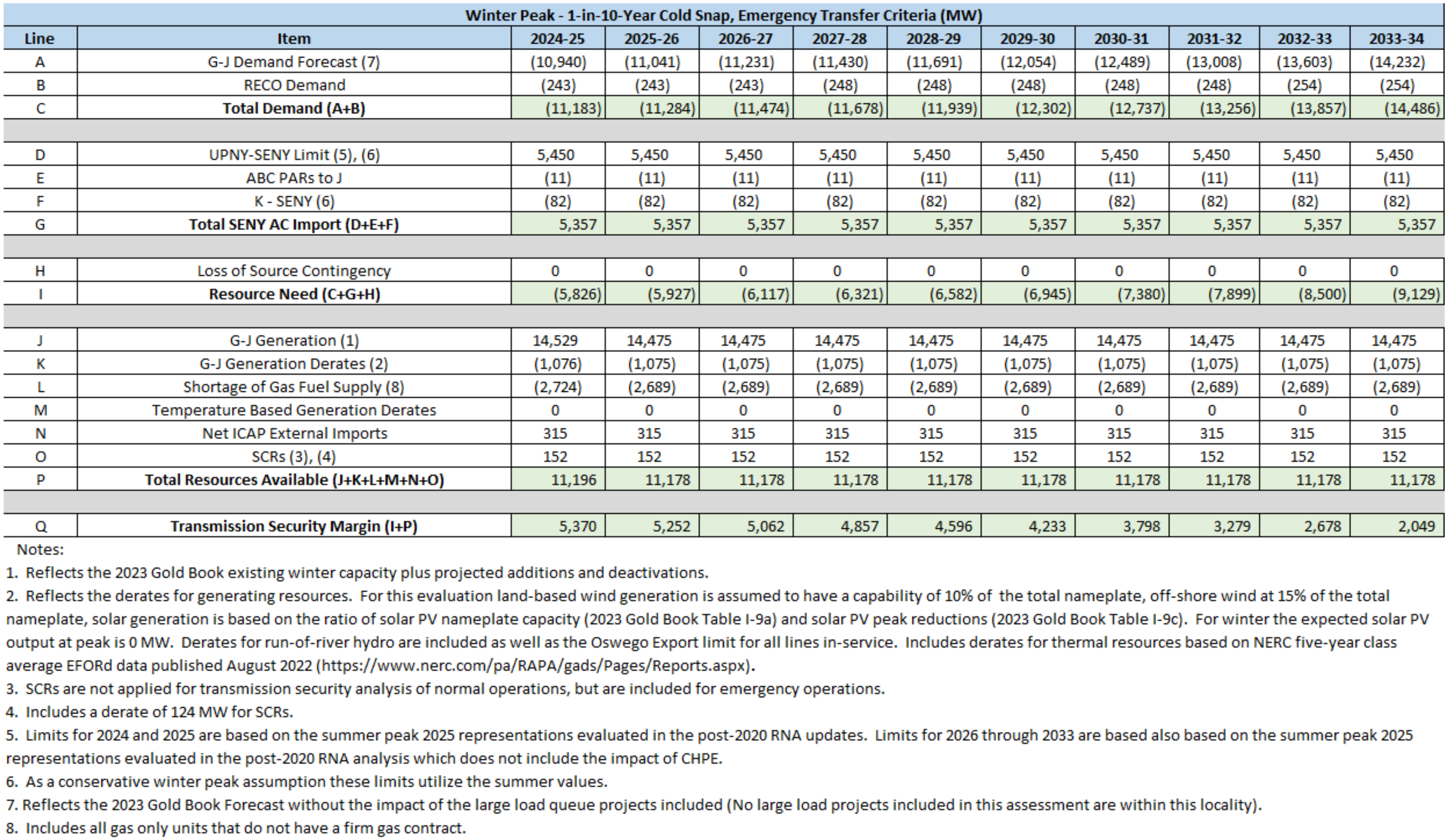


Winter Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	G-J Demand Forecast (5)	(10,500)	(10,596)	(10,779)	(10,969)	(11,220)	(11,568)	(11,986)	(12,483)	(13,055)	(13,659)
B	RECO Demand	(229)	(229)	(229)	(234)	(234)	(234)	(234)	(234)	(240)	(240)
C	**Total Demand (A+B)**	(10,729)	(10,825)	(11,008)	(11,203)	(11,454)	(11,802)	(12,220)	(12,717)	(13,295)	(13,899)
D	UPNY-SENY Limit (3), (4)	5,725	5,725	5,725	5,725	5,725	5,725	5,725	5,725	5,725	5,725
E	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
F	K - SENY (4)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)	(83)
G	**Total SENY AC Import (D+E+F)**	5,631	5,631	5,631	5,631	5,631	5,631	5,631	5,631	5,631	5,631
H	Loss of Source Contingency	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)
I	**Resource Need (C+G+H)**	(6,066)	(6,162)	(6,345)	(6,540)	(6,791)	(7,139)	(7,557)	(8,054)	(8,632)	(9,236)
J	G-J Generation (1)	14,529	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,076)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)
L	Shortage of Gas Fuel Supply (6)	(2,724)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)
M	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
N	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
O	**Total Resources Available (J+K+L+M+N)**	11,044	11,027	11,027	11,027	11,027	11,027	11,027	11,027	11,027	11,027
P	**Transmission Security Margin (I+O)**	4,978	4,864	4,681	4,486	4,235	3,887	3,469	2,972	2,394	1,790

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
4. As a conservative winter peak assumption these limits utilize the summer values.
5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
6. Includes all gas only units that do not have a firm gas contract.

Figure 106: Extreme System Condition – Winter Peak Lower Hudson Valley Transmission Security Margin (1-in-10-Year Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply



Winter Peak - 1-in-10-Year Cold Snap, Emergency Transfer Criteria (MW)											
Line	Item	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
A	G-J Demand Forecast (7)	(10,940)	(11,041)	(11,231)	(11,430)	(11,691)	(12,054)	(12,489)	(13,008)	(13,603)	(14,232)
B	RECO Demand	(243)	(243)	(243)	(248)	(248)	(248)	(248)	(248)	(254)	(254)
C	**Total Demand (A+B)**	(11,183)	(11,284)	(11,474)	(11,678)	(11,939)	(12,302)	(12,737)	(13,256)	(13,857)	(14,486)
D	UPNY-SENY Limit (5), (6)	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450
E	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
F	K - SENY (6)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)
G	**Total SENY AC Import (D+E+F)**	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357
H	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
I	**Resource Need (C+G+H)**	(5,826)	(5,927)	(6,117)	(6,321)	(6,582)	(6,945)	(7,380)	(7,899)	(8,500)	(9,129)
J	G-J Generation (1)	14,529	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,076)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)
L	Shortage of Gas Fuel Supply (8)	(2,724)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)
M	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
N	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
O	SCRs (3), (4)	152	152	152	152	152	152	152	152	152	152
P	**Total Resources Available (J+K+L+M+N+O)**	11,196	11,178	11,178	11,178	11,178	11,178	11,178	11,178	11,178	11,178
Q	**Transmission Security Margin (I+P)**	5,370	5,252	5,062	4,857	4,596	4,233	3,798	3,279	2,678	2,049

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 124 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
8. Includes all gas only units that do not have a firm gas contract.

Figure 107: Extreme System Condition – Winter Peak Lower Hudson Valley Transmission Security Margin (1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply

Winter Peak - 1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria (MW)											
Line	Item	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
A	G-J Demand Forecast (7)	(11,716)	(11,822)	(12,027)	(12,239)	(12,519)	(12,907)	(13,373)	(13,929)	(14,567)	(15,240)
B	RECO Demand	(252)	(252)	(252)	(258)	(258)	(258)	(258)	(258)	(264)	(264)
C	**Total Demand (A+B)**	(11,968)	(12,074)	(12,279)	(12,497)	(12,777)	(13,165)	(13,631)	(14,187)	(14,831)	(15,504)
D	UPNY-SENY Limit (5), (6)	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450
E	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
F	K - SENY (6)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)	(82)
G	**Total SENY AC Import (D+E+F)**	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357	5,357
H	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
I	**Resource Need (C+G+H)**	(6,611)	(6,717)	(6,922)	(7,140)	(7,420)	(7,808)	(8,274)	(8,830)	(9,474)	(10,147)
J	G-J Generation (1)	14,529	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,076)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)	(1,075)
	Shortage of Gas Fuel Supply (8)	(2,724)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)	(2,689)
L	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
M	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
N	SCRs (3), (4)	152	152	152	152	152	152	152	152	152	152
O	**Total Resources Available (J+K+L+M+N)**	11,196	11,178	11,178	11,178	11,178	11,178	11,178	11,178	11,178	11,178
P	**Transmission Security Margin (I+O)**	4,584	4,461	4,256	4,039	3,759	3,371	2,905	2,349	1,704	1,031

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 124 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
8. Includes all gas only units that do not have a firm gas contract.

Figure 108: Extreme System Condition – Summary of Winter Peak Lower Hudson Valley Transmission Security Margin with A Shortage of Gas Fuel Supply

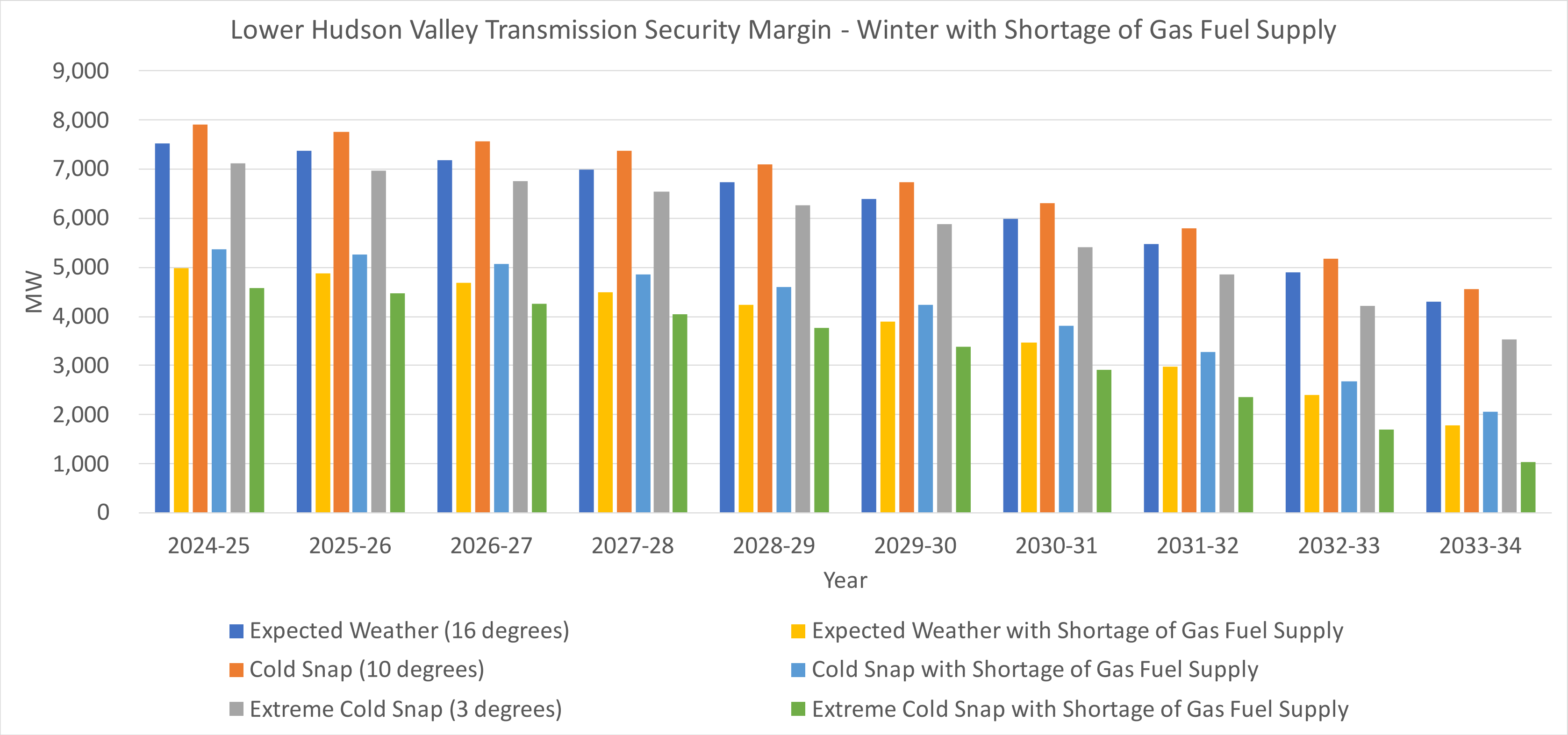


Figure 109: Extreme System Condition – Winter Peak New York City Transmission Security Margin with A Shortage of Gas Fuel Supply

Winter Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	Item	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
A	**Zone J Demand Forecast (5)**	(7,580)	(7,670)	(7,790)	(7,920)	(8,080)	(8,310)	(8,590)	(8,930)	(9,320)	(9,730)
B	I+K to J (3), (4)	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J AC Import (B+C)**	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893
E	Loss of Source Contingency	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)
F	**Resource Need (A+D+E)**	(4,655)	(4,745)	(4,865)	(4,995)	(5,155)	(5,385)	(5,665)	(6,005)	(6,395)	(6,805)
G	J Generation (1)	9,433	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(562)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)
I	Shortage of Gas Fuel Supply (6)	(2,164)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)
J	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
K	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
L	**Total Resources Available (G+H+I+J+K)**	7,022	7,006	7,006	7,006	7,006	7,006	7,006	7,006	7,006	7,006
M	**Transmission Security Margin (F+L)**	2,367	2,261	2,141	2,011	1,851	1,621	1,341	1,001	611	201

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
4. As a conservative winter peak assumption these limits utilize the summer values.
5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
6. Includes all gas only units that do not have a firm gas contract.

Figure 110: Extreme System Condition – Winter Peak New York City Transmission Security Margin (1-in-10-Year Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply

Winter Peak - 1-in-10-Year Cold Snap, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone J Demand Forecast (7)**	(7,898)	(7,992)	(8,117)	(8,252)	(8,419)	(8,659)	(8,950)	(9,305)	(9,711)	(10,138)
B	I+K to J (5), (6)	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J Import (B+C)**	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893
E	Loss of Source Contingency	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)
F	**Resource Need (A+D+E)**	(4,973)	(5,067)	(5,192)	(5,327)	(5,494)	(5,734)	(6,025)	(6,380)	(6,786)	(7,213)
G	J Generation (1)	9,433	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(562)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)
I	Shortage of Gas Fuel Supply (8)	(2,164)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)
J	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
K	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
L	SCRs (3), (4)	118	118	118	118	118	118	118	118	118	118
M	**Total Resources Available (G+H+I+J+K)**	7,140	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124
N	**Transmission Security Margin (F+L)**	2,167	2,056	1,931	1,796	1,629	1,389	1,098	743	337	(90)

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 106 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
8. Includes all gas only units that do not have a firm gas contract.

Figure 111: Extreme System Condition – Winter Peak New York City Transmission Security Margin (1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply

Winter Peak - 1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria (MW)											
Line	Item	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
A	**Zone J Demand Forecast (7)**	(8,457)	(8,558)	(8,692)	(8,837)	(9,015)	(9,272)	(9,584)	(9,964)	(10,399)	(10,856)
B	I+K to J (5), (6)	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904	3,904
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J Import (B+C)**	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893	3,893
E	Loss of Source Contingency	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)	(968)
F	**Resource Need (A+D+E)**	(5,532)	(5,633)	(5,767)	(5,912)	(6,090)	(6,347)	(6,659)	(7,039)	(7,474)	(7,931)
G	J Generation (1)	9,433	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(562)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)
I	Shortage of Gas Fuel Supply (8)	(2,164)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)	(2,129)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	315	315	315	315	315	315	315	315	315	315
K	SCRs (3), (4)	118	118	118	118	118	118	118	118	118	118
L	**Total Resources Available (G+H+I+J+K)**	7,140	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124
M	**Transmission Security Margin (F+L)**	1,608	1,490	1,356	1,211	1,033	776	464	84	(351)	(808)

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 106 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2033 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
8. Includes all gas only units that do not have a firm gas contract.

Figure 112: Extreme System Condition – Summary of Winter Peak New York City Transmission Security Margin with A Shortage of Gas Fuel Supply

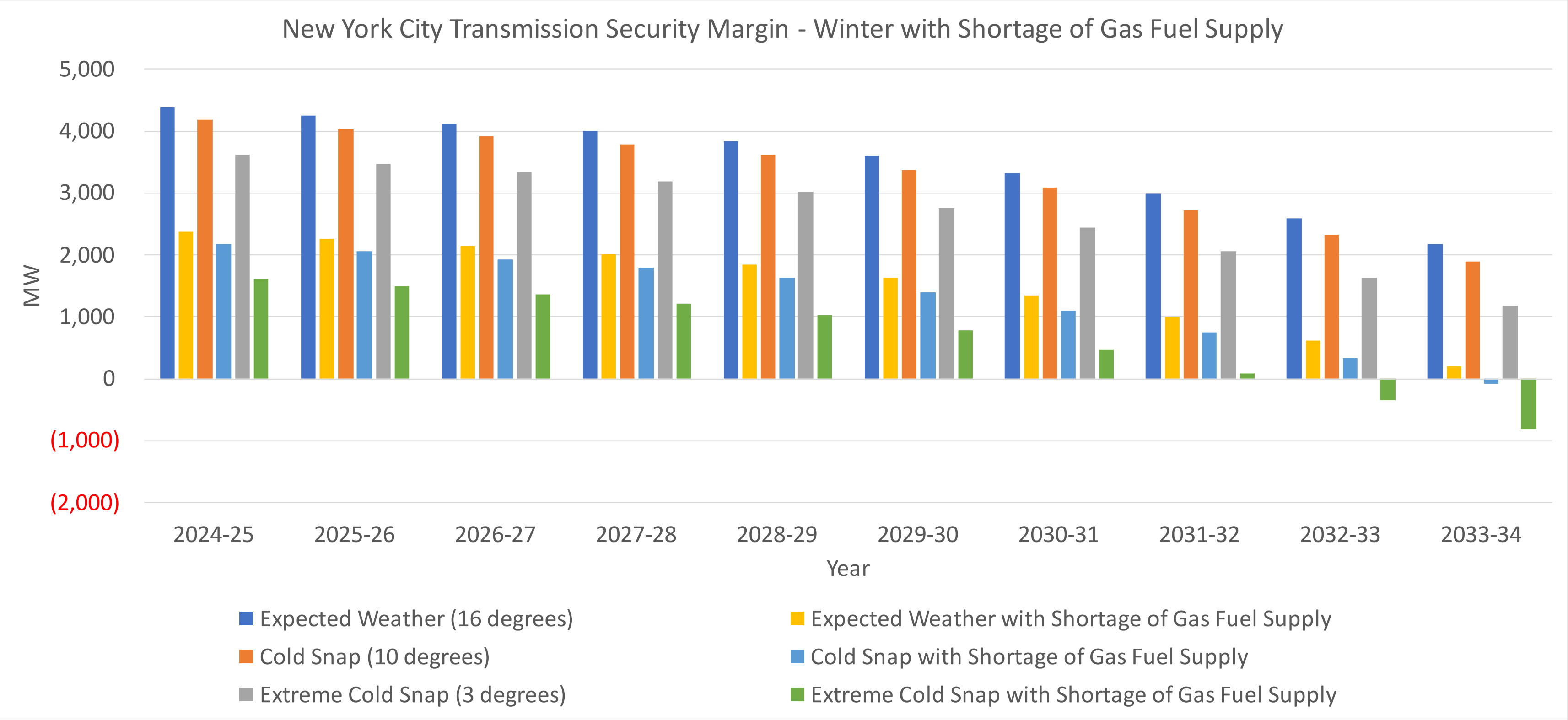


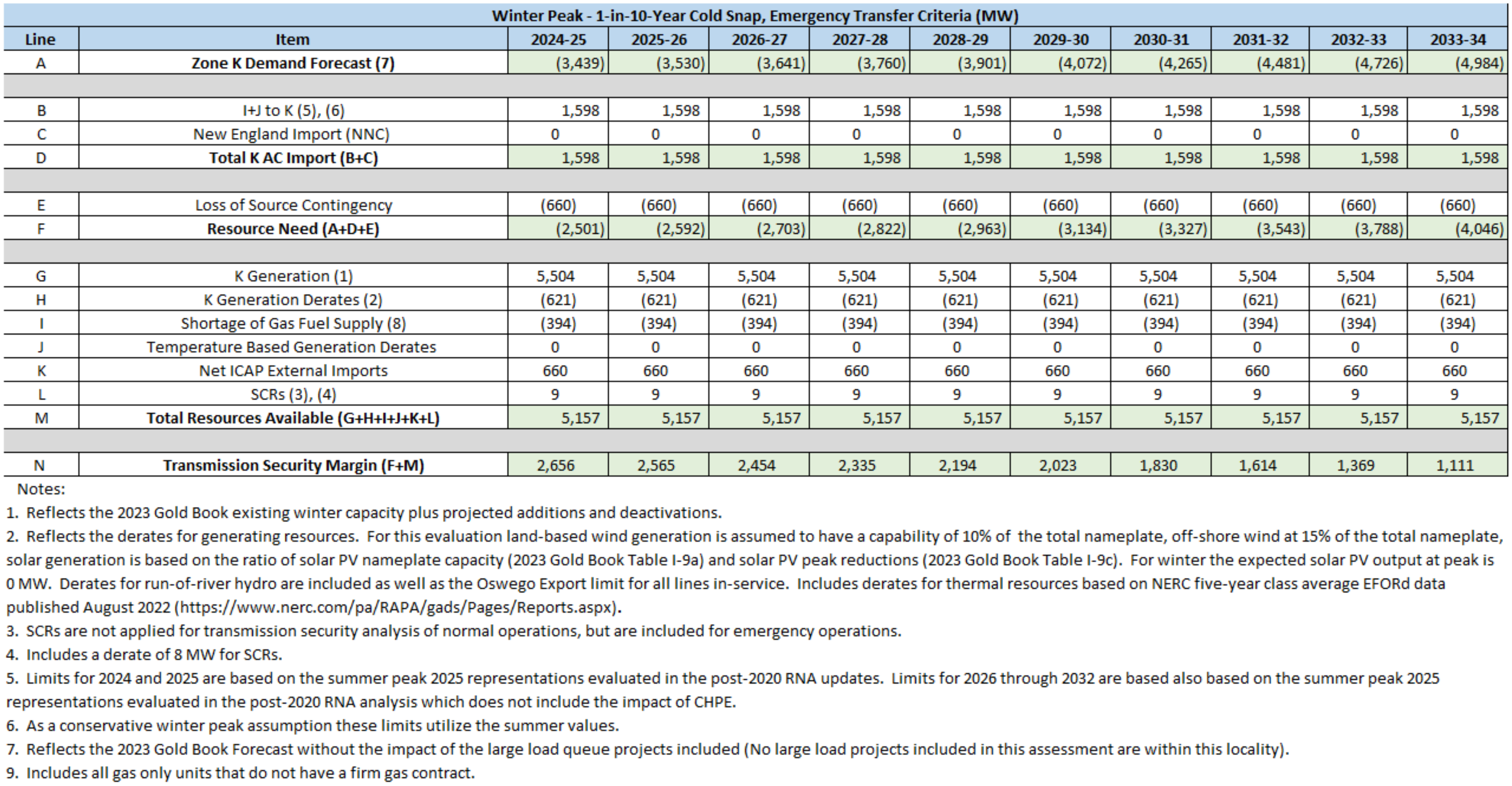
Figure 113: Extreme System Condition – Winter Peak Long Island Transmission Security Margin with A Shortage of Gas Fuel Supply

Winter Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone K Demand Forecast (5)**	(3,301)	(3,388)	(3,495)	(3,609)	(3,744)	(3,908)	(4,093)	(4,300)	(4,536)	(4,783)
B	I+J to K (3), (4)	959	959	959	959	959	959	959	959	959	959
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	959	959	959	959	959	959	959	959	959	959
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(3,002)	(3,089)	(3,196)	(3,310)	(3,445)	(3,609)	(3,794)	(4,001)	(4,237)	(4,484)
G	K Generation (1)	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504
H	K Generation Derates (2)	(621)	(621)	(621)	(621)	(621)	(621)	(621)	(621)	(621)	(621)
I	Shortage of Gas Fuel Supply (6)	(394)	(394)	(394)	(394)	(394)	(394)	(394)	(394)	(394)	(394)
J	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
K	Net ICAP External Imports	660	660	660	660	660	660	660	660	660	660
L	**Total Resources Available (G+H+I+J+K)**	5,148	5,148	5,148	5,148	5,148	5,148	5,148	5,148	5,148	5,148
M	**Transmission Security Margin (F+L)**	2,146	2,059	1,953	1,838	1,703	1,539	1,354	1,147	912	664

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2032 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
4. As a conservative winter peak assumption these limits utilize the summer values.
5. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
6. Includes all gas only units that do not have a firm gas contract.

Figure 114: Extreme System Condition – Winter Peak Long Island Transmission Security Margin (1-in-10-Year Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply



Winter Peak - 1-in-10-Year Cold Snap, Emergency Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone K Demand Forecast (7)**	(3,439)	(3,530)	(3,641)	(3,760)	(3,901)	(4,072)	(4,265)	(4,481)	(4,726)	(4,984)
B	I+J to K (5), (6)	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(2,501)	(2,592)	(2,703)	(2,822)	(2,963)	(3,134)	(3,327)	(3,543)	(3,788)	(4,046)
G	K Generation (1)	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504
H	K Generation Derates (2)	(621)	(621)	(621)	(621)	(621)	(621)	(621)	(621)	(621)	(621)
I	Shortage of Gas Fuel Supply (8)	(394)	(394)	(394)	(394)	(394)	(394)	(394)	(394)	(394)	(394)
J	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
K	Net ICAP External Imports	660	660	660	660	660	660	660	660	660	660
L	SCRs (3), (4)	9	9	9	9	9	9	9	9	9	9
M	**Total Resources Available (G+H+I+J+K+L)**	5,157	5,157	5,157	5,157	5,157	5,157	5,157	5,157	5,157	5,157
N	**Transmission Security Margin (F+M)**	2,656	2,565	2,454	2,335	2,194	2,023	1,830	1,614	1,369	1,111

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 8 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2032 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
9. Includes all gas only units that do not have a firm gas contract.

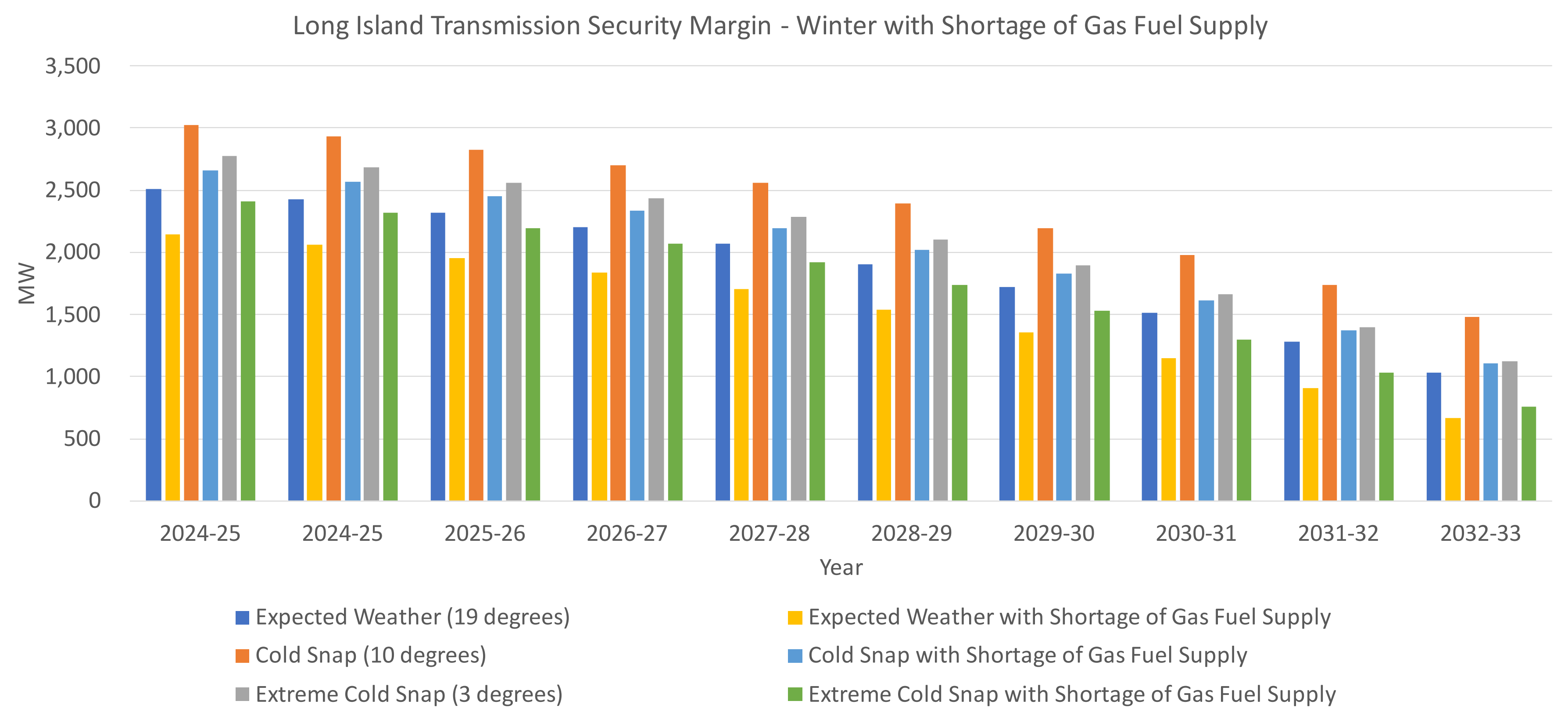
Figure 115: Extreme System Condition – Winter Peak Long Island Transmission Security Margin (1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply

	Winter Peak - 1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria (MW)										
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone K Demand Forecast (7)**	(3,683)	(3,780)	(3,899)	(4,027)	(4,177)	(4,361)	(4,567)	(4,798)	(5,061)	(5,337)
B	I+J to K (5), (6)	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(2,745)	(2,842)	(2,961)	(3,089)	(3,239)	(3,423)	(3,629)	(3,860)	(4,123)	(4,399)
G	K Generation (1)	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504	5,504
H	K Generation Derates (2)	(621)	(621)	(621)	(621)	(621)	(621)	(621)	(621)	(621)	(621)
I	Shortage of Gas Fuel Supply (8)	(394)	(394)	(394)	(394)	(394)	(394)	(394)	(394)	(394)	(394)
J	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
K	Net ICAP External Imports	660	660	660	660	660	660	660	660	660	660
L	SCRs (3), (4)	9	9	9	9	9	9	9	9	9	9
M	**Total Resources Available (G+H+I+J+K+L)**	5,157	5,157	5,157	5,157	5,157	5,157	5,157	5,157	5,157	5,157
N	**Transmission Security Margin (F+M)**	2,412	2,315	2,196	2,068	1,918	1,734	1,528	1,297	1,034	758

Notes:

1. Reflects the 2023 Gold Book existing winter capacity plus projected additions and deactivations.
2. Reflects the derates for generating resources. For this evaluation land-based wind generation is assumed to have a capability of 10% of the total nameplate, off-shore wind at 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2023 Gold Book Table I-9a) and solar PV peak reductions (2023 Gold Book Table I-9c). For winter the expected solar PV output at peak is 0 MW. Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2022 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
4. Includes a derate of 8 MW for SCRs.
5. Limits for 2024 and 2025 are based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2032 are based also based on the summer peak 2025 representations evaluated in the post-2020 RNA analysis which does not include the impact of CHPE.
6. As a conservative winter peak assumption these limits utilize the summer values.
7. Reflects the 2023 Gold Book Forecast without the impact of the large load queue projects included (No large load projects included in this assessment are within this locality).
9. Includes all gas only units that do not have a firm gas contract.

Figure 116: Extreme System Condition – Summary of Winter Peak Long Island Transmission Security Margin with A Shortage of Gas Fuel Supply



Demand Shape Details for Transmission Security Margins

As part of the 2023 Gold Book, representative demand shapes for the NYCA summer high demand day were produced.[51] For the transmission security margin analysis, the shapes are adjusted to match the Gold Book coincident peak forecasts. These shapes reflect the current observed base demand shape, using the average demand shape of high demand days from recent summers. The shapes also incorporate the evolving and increasing impacts of BtM-PV, electric vehicle charging, and building electrification on summer hourly loads. For the statewide coincident summer peak, the system peaks later in the day over the ten-year horizon.

The contribution of the hourly shapes from Zones A-F, GHI, J, and K as a fraction of the overall NYCA shape are calculated from the same sample of historical summer high demand days used to calculate the NYCA shape. For the localities, the BtM-PV, electric vehicle, and electrification shape impacts for each locality are based on their share of the expected penetration for each technology. Similar processes were utilized to create the 1-in-10-year heatwave and 1-in-100-year extreme heatwave shapes.

As seen in Figure 117, the demand shapes show a changing peak hour in Zones A-F, GHI, J, and K from 2024 through the 10-year horizon in 2033. For instance, the peak hour in A-F changes from HB18 in 2024 to HB 19 in 2033. In reality, zones will often peak on different hours during the same high summer demand day and will not be fully coincident with the NYCA peak hour itself.

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[51] The 2023 Long-Term Forecast Load Shape Projections are available here.

Figure 117: NYCA Expected Weather Summer Peak Demand Shape

	A-F		GHI		J		K		NYCA	
Hour	**2024**	**2033**	**2024**	**2033**	**2024**	**2033**	**2024**	**2033**	**2024**	**2033**
HB0	9,284	9,622	2,740	2,916	8,232	8,680	3,062	3,280	23,318	24,498
HB1	8,868	9,131	2,566	2,713	7,860	8,255	2,852	3,037	22,146	23,136
HB2	8,587	8,790	2,443	2,566	7,594	7,952	2,704	2,866	21,328	22,174
HB3	8,456	8,611	2,360	2,470	7,448	7,792	2,621	2,766	20,885	21,639
HB4	8,514	8,645	2,336	2,438	7,457	7,805	2,614	2,748	20,921	21,636
HB5	8,825	8,955	2,396	2,498	7,689	8,082	2,678	2,814	21,588	22,349
HB6	9,297	9,350	2,525	2,617	8,161	8,590	2,806	2,938	22,789	23,495
HB7	9,735	9,480	2,716	2,746	8,784	9,194	3,062	3,151	24,297	24,571
HB8	9,983	9,250	2,845	2,778	9,332	9,677	3,362	3,383	25,522	25,088
HB9	10,121	8,866	2,987	2,801	9,776	10,039	3,657	3,585	26,541	25,291
HB10	10,323	8,645	3,168	2,884	10,110	10,311	3,954	3,803	27,555	25,643
HB11	10,511	8,566	3,345	2,997	10,337	10,492	4,220	4,016	28,413	26,071
HB12	10,731	8,707	3,508	3,140	10,522	10,655	4,425	4,207	29,186	26,709
HB13	11,020	9,058	3,683	3,327	10,684	10,825	4,604	4,400	29,991	27,610
HB14	11,204	9,374	3,806	3,478	10,793	10,954	4,737	4,558	30,540	28,364
HB15	11,424	9,914	3,939	3,693	10,952	11,182	4,821	4,713	31,136	29,502
HB16	11,778	10,790	4,068	3,953	11,067	11,411	4,932	4,938	31,845	31,092
HB17	12,099	11,777	4,154	4,193	11,060	11,483	4,967	5,108	32,280	32,561
HB18	12,274	12,548	4,153	4,349	10,838	11,430	4,888	5,136	32,153	33,463
HB19	12,236	12,815	4,054	4,332	10,657	11,310	4,717	5,063	31,664	33,520
HB20	11,984	12,613	3,936	4,221	10,501	11,157	4,537	4,884	30,958	32,875
HB21	11,538	12,126	3,735	4,004	10,260	10,903	4,305	4,633	29,838	31,666
HB22	10,781	11,313	3,439	3,689	9,764	10,364	3,931	4,234	27,915	29,600
HB23	9,982	10,426	3,135	3,351	9,218	9,748	3,559	3,823	25,894	27,348

Figure 118 shows the demand shapes for the expected weather summer peak conditions. The statewide behavior can be broken down further into groups of zones. Figure 119 shows the Zones A-F component of the NYCA expected weather forecast for the summer peak day. As seen in Figure 119, the demand continues to flatten in the zones in the early morning hours and shifts the peak to later in the day over each year with increased penetrations of BtM-PV.[52] Figure 120shows the Zones G-I component of the NYCA expected weather forecast for the summer peak day. As seen in Figure 120, the increased BtM-PV results in a slight flattening of the demand and a shifting of the peak hour.[53] Figure 121 shows the Zone J component of the NYCA expected weather forecast for the summer peak day. As seen in Figure 121, the BtM-PV primarily reduces the demand from year to

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[52] From Table I-9a in the 2023 Load and Capacity Data report, in 2024 Zones A-F has 3,830 MW (nameplate) of the 6,186 MW of BtM-PV (nameplate) statewide (approximately 62% of the statewide BtM-PV). In 2033, the forecast for BtM-PV in Zones A-F increases to 6,781 MW (nameplate) of the 10,936 MW (nameplate) of the BtM-PV statewide (approximately 62% of the statewide BtM-PV).

[53] In 2024, Zones G-I has 955 MW (nameplate) of the 6,186 MW (nameplate) of BtM-PV statewide (approximately 15% of the statewide BtM-PV). In 2033, the forecast for BtM-PV in Zones G-I increases to 1,745 MW (nameplate) (approximately 16% of the statewide BtM-PV).

year but has negligible impact on the shifting of the peak hour.[54] Figure 123 shows the Zone K component of the NYCA expected weather forecast for the summer peak day. As seen in Figure 123, BtM-PV has some impact on the Zone K shape over time.[55] Similar shapes were developed for the heatwave (Figure 124 through Figure 128) and extreme heatwave conditions (Figure 129 through Figure 133).

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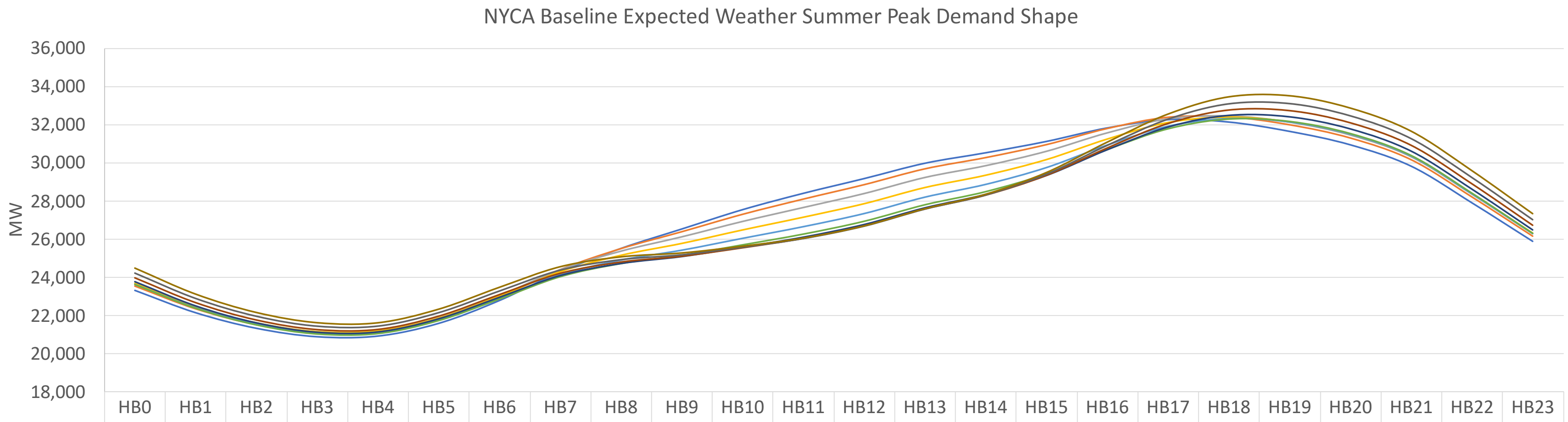
[54] In 2024, Zone J has 476 MW (nameplate) of the 6,186 MW of BtM-PV (nameplate) statewide (approximately 8% of the statewide BtM-PV). In 2033, the forecast for BtM-PV in Zone J increases to 858 MW (nameplate) (approximately 8% of the statewide BtM-PV in Zone J).

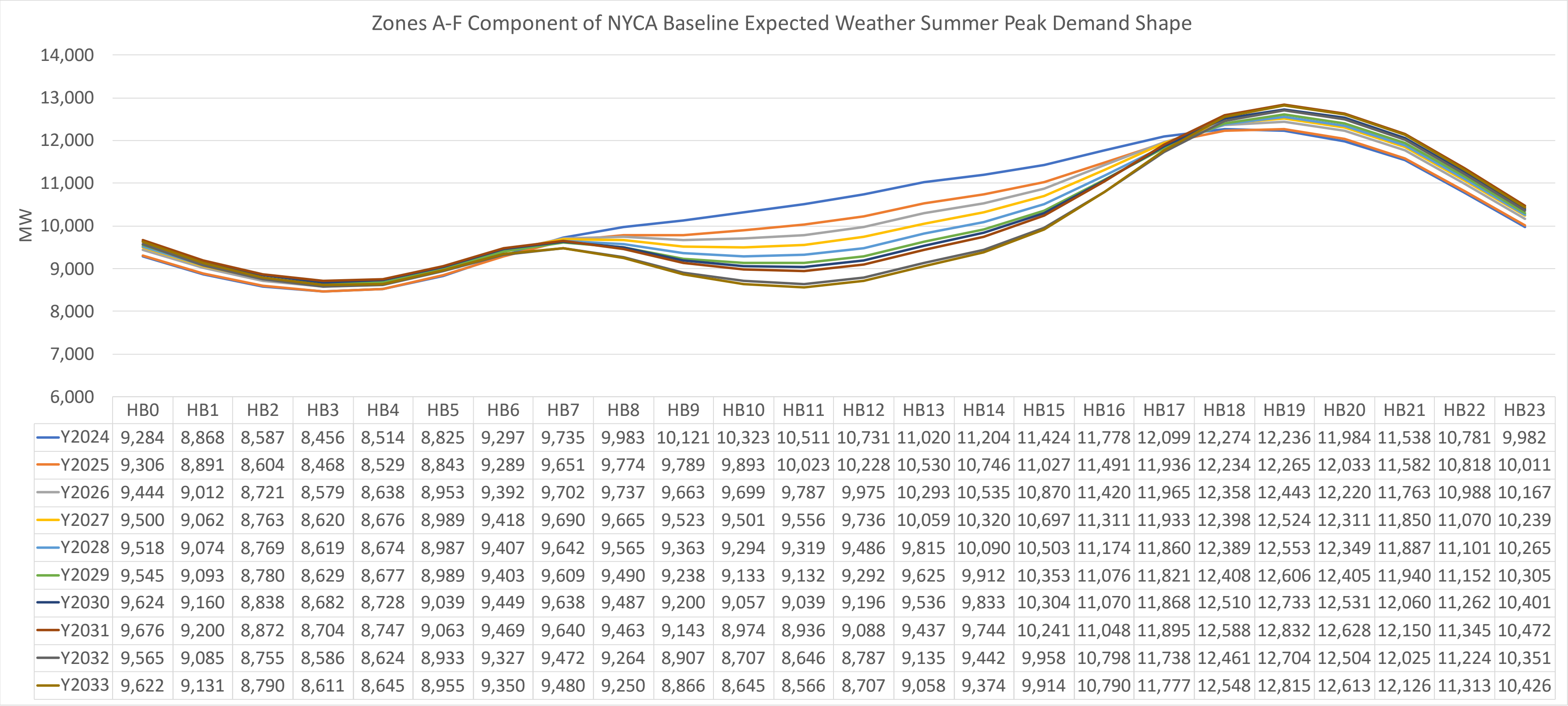
[55] In 2024, Zone K has 925 MW (nameplate) of the 6,186 MW of BtM-PV (nameplate) statewide (approximately 15% of the statewide BtM-PV). In 2033, the forecast for BtM-PV in Zone K increases to 1,552 MW (nameplate) (approximately 14% of the statewide BtM-PV in Zone K).

Figure 118: NYCA Baseline Expected Weather Summer Peak Demand Shape



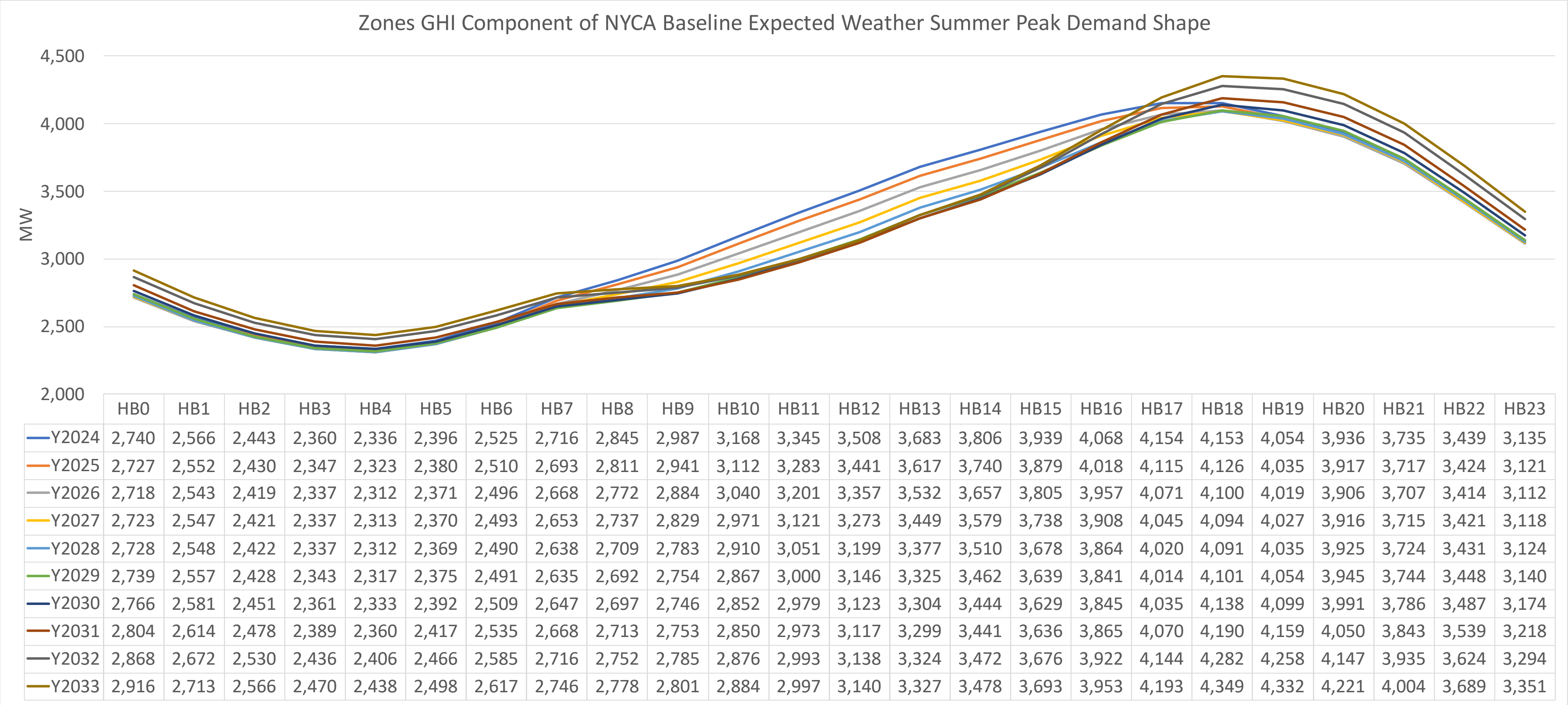
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
—Y2024	23,318	22,146	21,328	20,885	20,921	21,588	22,789	24,297	25,522	26,541	27,555	28,413	29,186	29,991	30,540	31,136	31,845	32,280	32,153	31,664	30,958	29,838	27,915	25,894
—Y2025	23,556	22,367	21,535	21,083	21,120	21,795	22,983	24,419	25,514	26,396	27,305	28,100	28,853	29,680	30,267	30,945	31,787	32,374	32,390	31,982	31,291	30,158	28,214	26,165
—Y2026	23,658	22,454	21,613	21,155	21,190	21,869	23,041	24,398	25,369	26,117	26,921	27,650	28,380	29,220	29,836	30,589	31,552	32,284	32,440	32,111	31,441	30,305	28,350	26,287
—Y2027	23,683	22,465	21,616	21,153	21,185	21,864	23,019	24,302	25,161	25,784	26,490	27,158	27,867	28,715	29,361	30,182	31,258	32,125	32,410	32,157	31,503	30,364	28,403	26,327
—Y2028	23,642	22,414	21,557	21,087	21,116	21,795	22,933	24,149	24,913	25,430	26,049	26,659	27,344	28,201	28,868	29,748	30,924	31,906	32,310	32,126	31,485	30,344	28,381	26,295
—Y2029	23,654	22,410	21,539	21,063	21,086	21,767	22,893	24,060	24,746	25,177	25,723	26,286	26,956	27,819	28,505	29,438	30,703	31,790	32,300	32,175	31,542	30,396	28,428	26,325
—Y2030	23,797	22,531	21,644	21,154	21,172	21,858	22,983	24,117	24,749	25,111	25,601	26,125	26,786	27,658	28,363	29,349	30,695	31,880	32,490	32,414	31,783	30,623	28,636	26,504
—Y2031	23,985	22,691	21,783	21,281	21,292	21,985	23,113	24,222	24,812	25,116	25,556	26,047	26,700	27,582	28,305	29,341	30,767	32,045	32,750	32,718	32,082	30,909	28,900	26,733
—Y2032	24,234	22,907	21,974	21,455	21,460	22,164	23,298	24,389	24,939	25,190	25,588	26,046	26,693	27,587	28,323	29,412	30,923	32,294	33,097	33,110	32,469	31,277	29,240	27,032
—Y2033	24,498	23,136	22,174	21,639	21,636	22,349	23,495	24,571	25,088	25,291	25,643	26,071	26,709	27,610	28,364	29,502	31,092	32,561	33,463	33,520	32,875	31,666	29,600	27,348

Figure 119: Zones A-F Component of NYCA Baseline Expected Weather Summer Peak Demand Shape



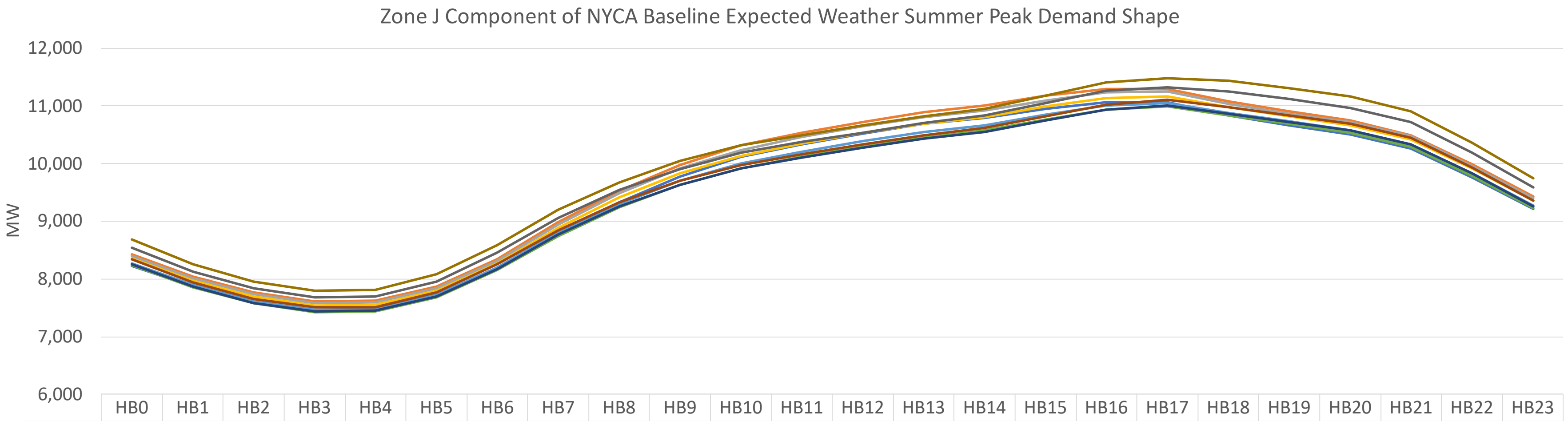
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	9,284	8,868	8,587	8,456	8,514	8,825	9,297	9,735	9,983	10,121	10,323	10,511	10,731	11,020	11,204	11,424	11,778	12,099	12,274	12,236	11,984	11,538	10,781	9,982
Y2025	9,306	8,891	8,604	8,468	8,529	8,843	9,289	9,651	9,774	9,789	9,893	10,023	10,228	10,530	10,746	11,027	11,491	11,936	12,234	12,265	12,033	11,582	10,818	10,011
Y2026	9,444	9,012	8,721	8,579	8,638	8,953	9,392	9,702	9,737	9,663	9,699	9,787	9,975	10,293	10,535	10,870	11,420	11,965	12,358	12,443	12,220	11,763	10,988	10,167
Y2027	9,500	9,062	8,763	8,620	8,676	8,989	9,418	9,690	9,665	9,523	9,501	9,556	9,736	10,059	10,320	10,697	11,311	11,933	12,398	12,524	12,311	11,850	11,070	10,239
Y2028	9,518	9,074	8,769	8,619	8,674	8,987	9,407	9,642	9,565	9,363	9,294	9,319	9,486	9,815	10,090	10,503	11,174	11,860	12,389	12,553	12,349	11,887	11,101	10,265
Y2029	9,545	9,093	8,780	8,629	8,677	8,989	9,403	9,609	9,490	9,238	9,133	9,132	9,292	9,625	9,912	10,353	11,076	11,821	12,408	12,606	12,405	11,940	11,152	10,305
Y2030	9,624	9,160	8,838	8,682	8,728	9,039	9,449	9,638	9,487	9,200	9,057	9,039	9,196	9,536	9,833	10,304	11,070	11,868	12,510	12,733	12,531	12,060	11,262	10,401
Y2031	9,676	9,200	8,872	8,704	8,747	9,063	9,469	9,640	9,463	9,143	8,974	8,936	9,088	9,437	9,744	10,241	11,048	11,895	12,588	12,832	12,628	12,150	11,345	10,472
Y2032	9,565	9,085	8,755	8,586	8,624	8,933	9,327	9,472	9,264	8,907	8,707	8,646	8,787	9,135	9,442	9,958	10,798	11,738	12,461	12,704	12,504	12,025	11,224	10,351
Y2033	9,622	9,131	8,790	8,611	8,645	8,955	9,350	9,480	9,250	8,866	8,645	8,566	8,707	9,058	9,374	9,914	10,790	11,777	12,548	12,815	12,613	12,126	11,313	10,426

Figure 120: Zones GHI Component of NYCA Baseline Expected Weather Summer Peak Demand Shape



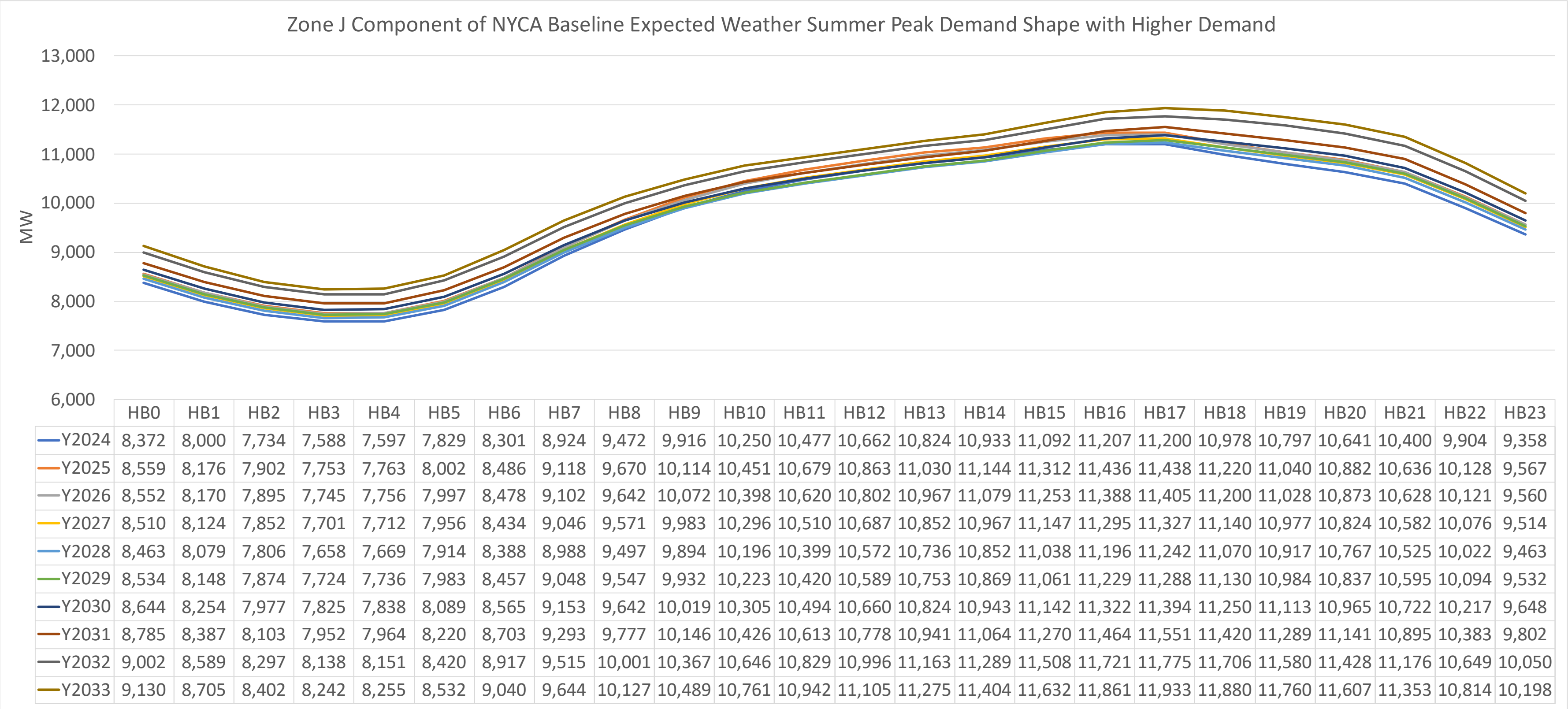
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	2,740	2,566	2,443	2,360	2,336	2,396	2,525	2,716	2,845	2,987	3,168	3,345	3,508	3,683	3,806	3,939	4,068	4,154	4,153	4,054	3,936	3,735	3,439	3,135
Y2025	2,727	2,552	2,430	2,347	2,323	2,380	2,510	2,693	2,811	2,941	3,112	3,283	3,441	3,617	3,740	3,879	4,018	4,115	4,126	4,035	3,917	3,717	3,424	3,121
Y2026	2,718	2,543	2,419	2,337	2,312	2,371	2,496	2,668	2,772	2,884	3,040	3,201	3,357	3,532	3,657	3,805	3,957	4,071	4,100	4,019	3,906	3,707	3,414	3,112
Y2027	2,723	2,547	2,421	2,337	2,313	2,370	2,493	2,653	2,737	2,829	2,971	3,121	3,273	3,449	3,579	3,738	3,908	4,045	4,094	4,027	3,916	3,715	3,421	3,118
Y2028	2,728	2,548	2,422	2,337	2,312	2,369	2,490	2,638	2,709	2,783	2,910	3,051	3,199	3,377	3,510	3,678	3,864	4,020	4,091	4,035	3,925	3,724	3,431	3,124
Y2029	2,739	2,557	2,428	2,343	2,317	2,375	2,491	2,635	2,692	2,754	2,867	3,000	3,146	3,325	3,462	3,639	3,841	4,014	4,101	4,054	3,945	3,744	3,448	3,140
Y2030	2,766	2,581	2,451	2,361	2,333	2,392	2,509	2,647	2,697	2,746	2,852	2,979	3,123	3,304	3,444	3,629	3,845	4,035	4,138	4,099	3,991	3,786	3,487	3,174
Y2031	2,804	2,614	2,478	2,389	2,360	2,417	2,535	2,668	2,713	2,753	2,850	2,973	3,117	3,299	3,441	3,636	3,865	4,070	4,190	4,159	4,050	3,843	3,539	3,218
Y2032	2,868	2,672	2,530	2,436	2,406	2,466	2,585	2,716	2,752	2,785	2,876	2,993	3,138	3,324	3,472	3,676	3,922	4,144	4,282	4,258	4,147	3,935	3,624	3,294
Y2033	2,916	2,713	2,566	2,470	2,438	2,498	2,617	2,746	2,778	2,801	2,884	2,997	3,140	3,327	3,478	3,693	3,953	4,193	4,349	4,332	4,221	4,004	3,689	3,351

Figure 121: Zone J Component of NYCA Baseline Expected Weather Summer Peak Demand Shape



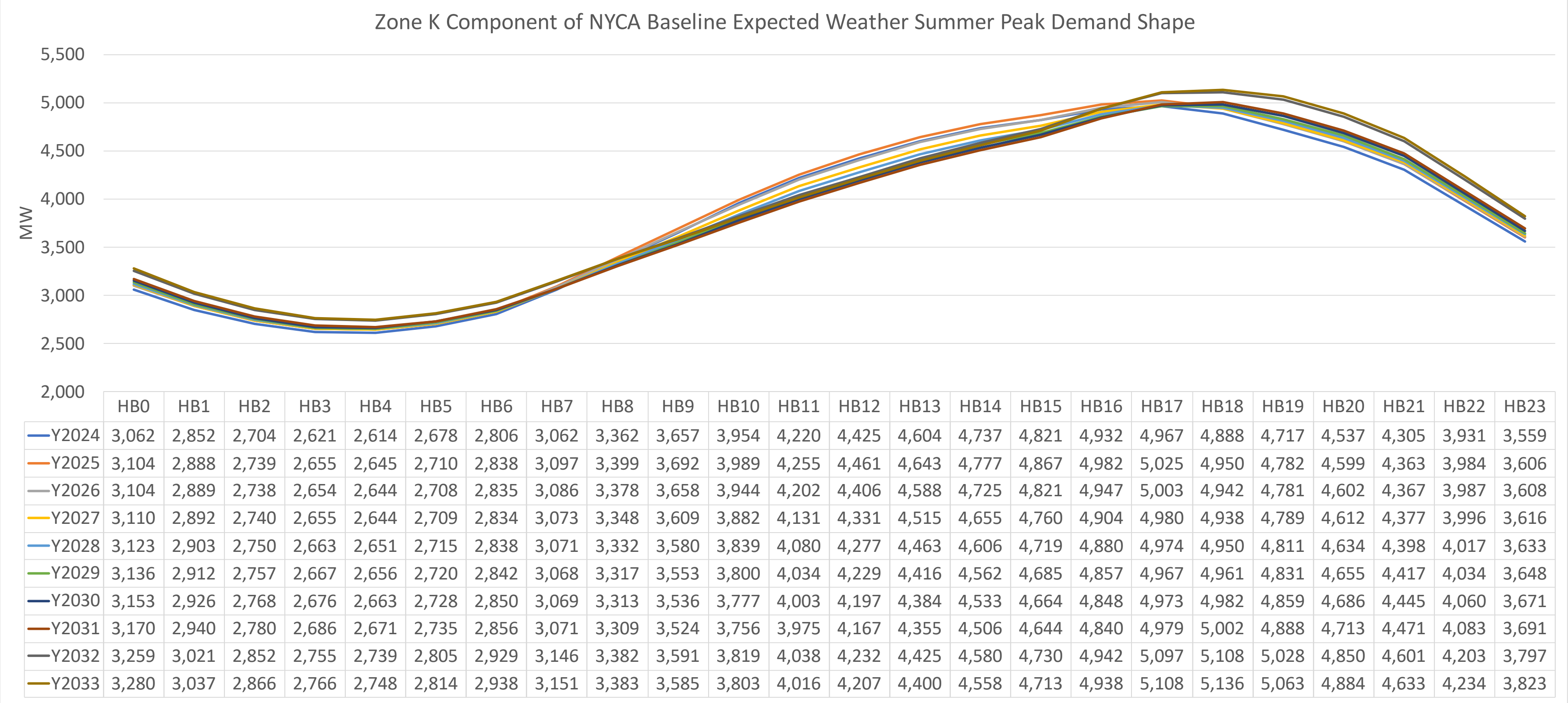
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
—Y2024	8,232	7,860	7,594	7,448	7,457	7,689	8,161	8,784	9,332	9,776	10,110	10,337	10,522	10,684	10,793	10,952	11,067	11,060	10,838	10,657	10,501	10,260	9,764	9,218
—Y2025	8,419	8,036	7,762	7,613	7,623	7,862	8,346	8,978	9,530	9,974	10,311	10,539	10,723	10,890	11,004	11,172	11,296	11,298	11,080	10,900	10,742	10,496	9,988	9,427
—Y2026	8,392	8,010	7,735	7,585	7,596	7,837	8,318	8,942	9,482	9,912	10,238	10,460	10,642	10,807	10,919	11,093	11,228	11,245	11,040	10,868	10,713	10,468	9,961	9,400
—Y2027	8,350	7,964	7,692	7,541	7,552	7,796	8,274	8,886	9,411	9,823	10,136	10,350	10,527	10,692	10,807	10,987	11,135	11,167	10,980	10,817	10,664	10,422	9,916	9,354
—Y2028	8,273	7,889	7,616	7,468	7,479	7,724	8,198	8,798	9,307	9,704	10,006	10,209	10,382	10,546	10,662	10,848	11,006	11,052	10,880	10,727	10,577	10,335	9,832	9,273
—Y2029	8,234	7,848	7,574	7,424	7,436	7,683	8,157	8,748	9,247	9,632	9,923	10,120	10,289	10,453	10,569	10,761	10,929	10,988	10,830	10,684	10,537	10,295	9,794	9,232
—Y2030	8,254	7,864	7,587	7,435	7,448	7,699	8,175	8,763	9,252	9,629	9,915	10,104	10,270	10,434	10,553	10,752	10,932	11,004	10,860	10,723	10,575	10,332	9,827	9,258
—Y2031	8,335	7,937	7,653	7,502	7,514	7,770	8,253	8,843	9,327	9,696	9,976	10,163	10,328	10,491	10,614	10,820	11,014	11,101	10,970	10,839	10,691	10,445	9,933	9,352
—Y2032	8,542	8,129	7,837	7,678	7,691	7,960	8,457	9,055	9,541	9,907	10,186	10,369	10,536	10,703	10,829	11,048	11,261	11,315	11,246	11,120	10,968	10,716	10,189	9,590
—Y2033	8,680	8,255	7,952	7,792	7,805	8,082	8,590	9,194	9,677	10,039	10,311	10,492	10,655	10,825	10,954	11,182	11,411	11,483	11,430	11,310	11,157	10,903	10,364	9,748

Figure 122: Zone J Component of NYCA Higher Policy Expected Weather Summer Peak Demand Shape



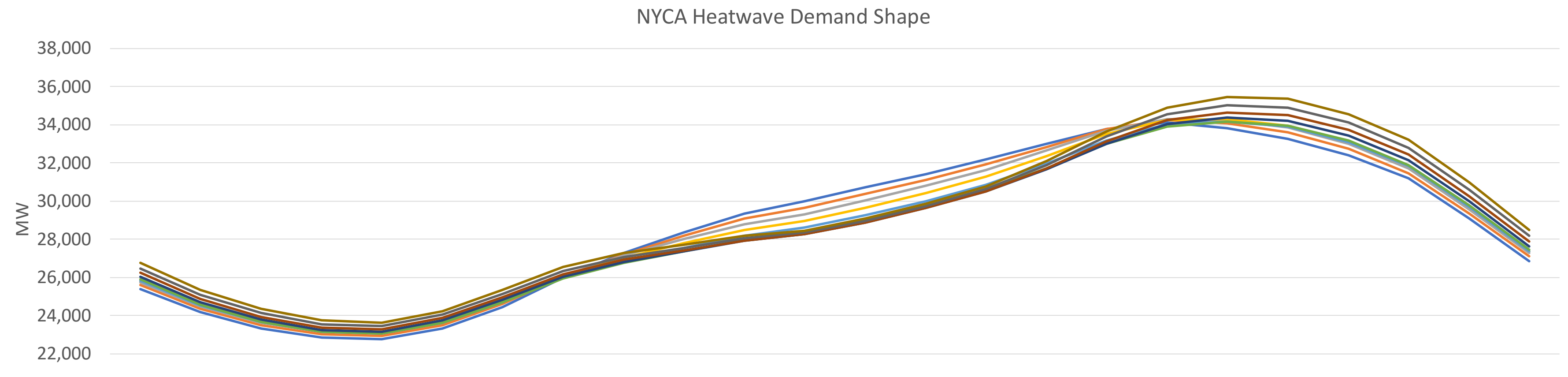
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	8,372	8,000	7,734	7,588	7,597	7,829	8,301	8,924	9,472	9,916	10,250	10,477	10,662	10,824	10,933	11,092	11,207	11,200	10,978	10,797	10,641	10,400	9,904	9,358
Y2025	8,559	8,176	7,902	7,753	7,763	8,002	8,486	9,118	9,670	10,114	10,451	10,679	10,863	11,030	11,144	11,312	11,436	11,438	11,220	11,040	10,882	10,636	10,128	9,567
Y2026	8,552	8,170	7,895	7,745	7,756	7,997	8,478	9,102	9,642	10,072	10,398	10,620	10,802	10,967	11,079	11,253	11,388	11,405	11,200	11,028	10,873	10,628	10,121	9,560
Y2027	8,510	8,124	7,852	7,701	7,712	7,956	8,434	9,046	9,571	9,983	10,296	10,510	10,687	10,852	10,967	11,147	11,295	11,327	11,140	10,977	10,824	10,582	10,076	9,514
Y2028	8,463	8,079	7,806	7,658	7,669	7,914	8,388	8,988	9,497	9,894	10,196	10,399	10,572	10,736	10,852	11,038	11,196	11,242	11,070	10,917	10,767	10,525	10,022	9,463
Y2029	8,534	8,148	7,874	7,724	7,736	7,983	8,457	9,048	9,547	9,932	10,223	10,420	10,589	10,753	10,869	11,061	11,229	11,288	11,130	10,984	10,837	10,595	10,094	9,532
Y2030	8,644	8,254	7,977	7,825	7,838	8,089	8,565	9,153	9,642	10,019	10,305	10,494	10,660	10,824	10,943	11,142	11,322	11,394	11,250	11,113	10,965	10,722	10,217	9,648
Y2031	8,785	8,387	8,103	7,952	7,964	8,220	8,703	9,293	9,777	10,146	10,426	10,613	10,778	10,941	11,064	11,270	11,464	11,551	11,420	11,289	11,141	10,895	10,383	9,802
Y2032	9,002	8,589	8,297	8,138	8,151	8,420	8,917	9,515	10,001	10,367	10,646	10,829	10,996	11,163	11,289	11,508	11,721	11,775	11,706	11,580	11,428	11,176	10,649	10,050
Y2033	9,130	8,705	8,402	8,242	8,255	8,532	9,040	9,644	10,127	10,489	10,761	10,942	11,105	11,275	11,404	11,632	11,861	11,933	11,880	11,760	11,607	11,353	10,814	10,198

Figure 123: Zone K Component of NYCA Baseline Expected Weather Summer Peak Demand Shape



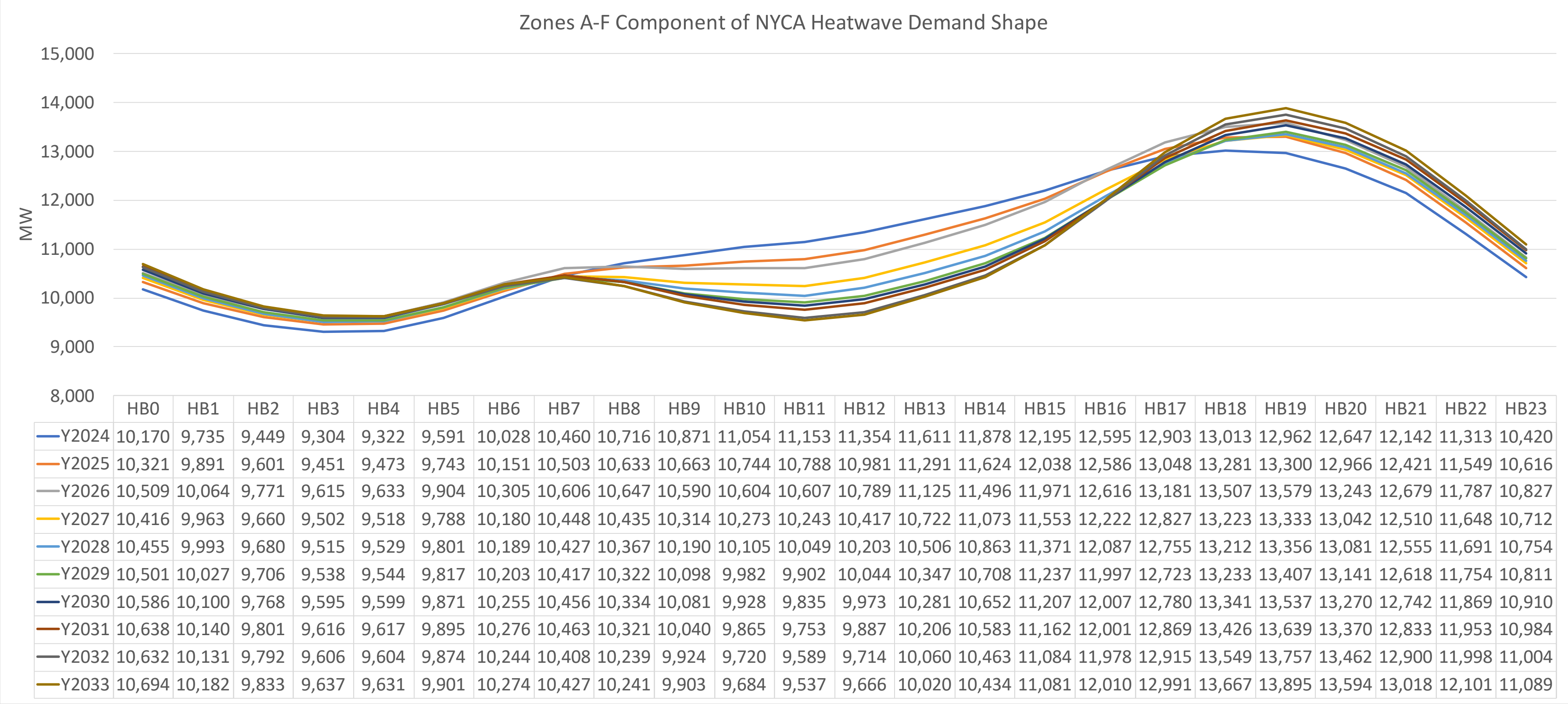
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
—Y2024	3,062	2,852	2,704	2,621	2,614	2,678	2,806	3,062	3,362	3,657	3,954	4,220	4,425	4,604	4,737	4,821	4,932	4,967	4,888	4,717	4,537	4,305	3,931	3,559
—Y2025	3,104	2,888	2,739	2,655	2,645	2,710	2,838	3,097	3,399	3,692	3,989	4,255	4,461	4,643	4,777	4,867	4,982	5,025	4,950	4,782	4,599	4,363	3,984	3,606
—Y2026	3,104	2,889	2,738	2,654	2,644	2,708	2,835	3,086	3,378	3,658	3,944	4,202	4,406	4,588	4,725	4,821	4,947	5,003	4,942	4,781	4,602	4,367	3,987	3,608
—Y2027	3,110	2,892	2,740	2,655	2,644	2,709	2,834	3,073	3,348	3,609	3,882	4,131	4,331	4,515	4,655	4,760	4,904	4,980	4,938	4,789	4,612	4,377	3,996	3,616
—Y2028	3,123	2,903	2,750	2,663	2,651	2,715	2,838	3,071	3,332	3,580	3,839	4,080	4,277	4,463	4,606	4,719	4,880	4,974	4,950	4,811	4,634	4,398	4,017	3,633
—Y2029	3,136	2,912	2,757	2,667	2,656	2,720	2,842	3,068	3,317	3,553	3,800	4,034	4,229	4,416	4,562	4,685	4,857	4,967	4,961	4,831	4,655	4,417	4,034	3,648
—Y2030	3,153	2,926	2,768	2,676	2,663	2,728	2,850	3,069	3,313	3,536	3,777	4,003	4,197	4,384	4,533	4,664	4,848	4,973	4,982	4,859	4,686	4,445	4,060	3,671
—Y2031	3,170	2,940	2,780	2,686	2,671	2,735	2,856	3,071	3,309	3,524	3,756	3,975	4,167	4,355	4,506	4,644	4,840	4,979	5,002	4,888	4,713	4,471	4,083	3,691
—Y2032	3,259	3,021	2,852	2,755	2,739	2,805	2,929	3,146	3,382	3,591	3,819	4,038	4,232	4,425	4,580	4,730	4,942	5,097	5,108	5,028	4,850	4,601	4,203	3,797
—Y2033	3,280	3,037	2,866	2,766	2,748	2,814	2,938	3,151	3,383	3,585	3,803	4,016	4,207	4,400	4,558	4,713	4,938	5,108	5,136	5,063	4,884	4,633	4,234	3,823

Figure 124: NYCA Heatwave Demand Shape



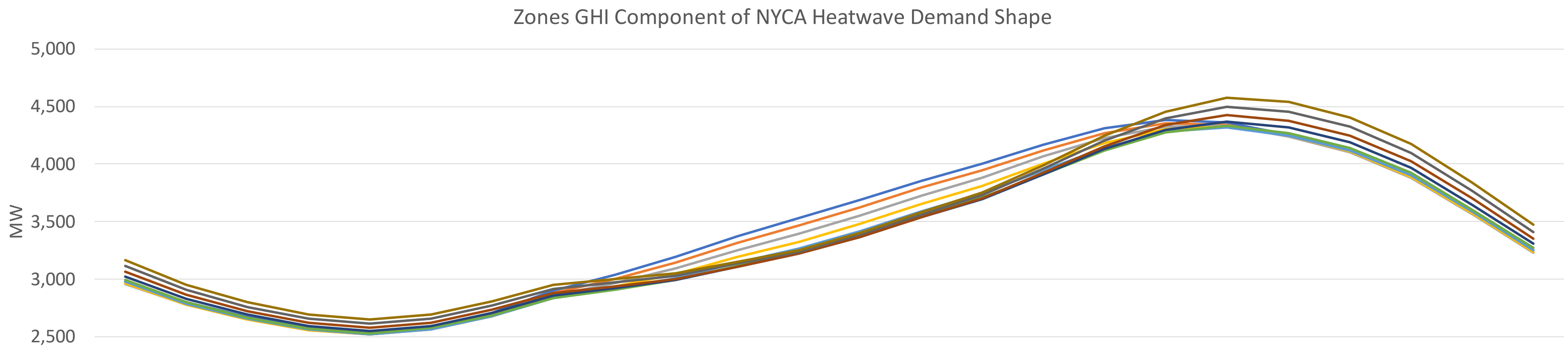
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	25,406	24,178	23,336	22,845	22,772	23,330	24,448	25,972	27,258	28,368	29,361	30,003	30,732	31,422	32,168	32,998	33,787	34,131	33,800	33,258	32,414	31,173	29,093	26,860
Y2025	25,592	24,355	23,505	23,009	22,936	23,496	24,596	26,044	27,206	28,185	29,075	29,654	30,385	31,112	31,913	32,838	33,768	34,248	34,049	33,584	32,734	31,465	29,354	27,085
Y2026	25,744	24,494	23,636	23,134	23,058	23,623	24,708	26,084	27,134	27,993	28,788	29,308	30,032	30,787	31,630	32,638	33,693	34,304	34,231	33,838	32,991	31,703	29,567	27,269
Y2027	25,827	24,560	23,690	23,181	23,103	23,671	24,746	26,064	27,020	27,773	28,485	28,952	29,655	30,415	31,279	32,345	33,497	34,230	34,273	33,946	33,116	31,827	29,684	27,370
Y2028	25,833	24,547	23,663	23,145	23,063	23,636	24,705	25,976	26,858	27,526	28,168	28,591	29,253	29,999	30,860	31,956	33,178	34,018	34,167	33,898	33,099	31,825	29,691	27,379
Y2029	25,886	24,577	23,675	23,147	23,060	23,639	24,706	25,945	26,771	27,371	27,958	28,345	28,977	29,713	30,572	31,699	32,982	33,916	34,159	33,938	33,161	31,896	29,766	27,446
Y2030	26,039	24,706	23,786	23,244	23,152	23,738	24,809	26,027	26,815	27,365	27,909	28,266	28,888	29,628	30,499	31,667	33,015	34,032	34,360	34,178	33,404	32,129	29,981	27,633
Y2031	26,231	24,870	23,928	23,374	23,275	23,868	24,946	26,151	26,914	27,425	27,933	28,265	28,883	29,631	30,514	31,723	33,137	34,229	34,636	34,489	33,708	32,418	30,249	27,867
Y2032	26,478	25,085	24,120	23,550	23,445	24,047	25,134	26,331	27,074	27,550	28,030	28,338	28,957	29,720	30,620	31,876	33,363	34,529	35,016	34,903	34,107	32,794	30,592	28,165
Y2033	26,751	25,325	24,334	23,748	23,635	24,245	25,346	26,539	27,269	27,717	28,168	28,455	29,078	29,856	30,776	32,081	33,639	34,880	35,446	35,365	34,552	33,212	30,975	28,497

Figure 125: Zones A-F Component of NYCA Heatwave Demand Shape



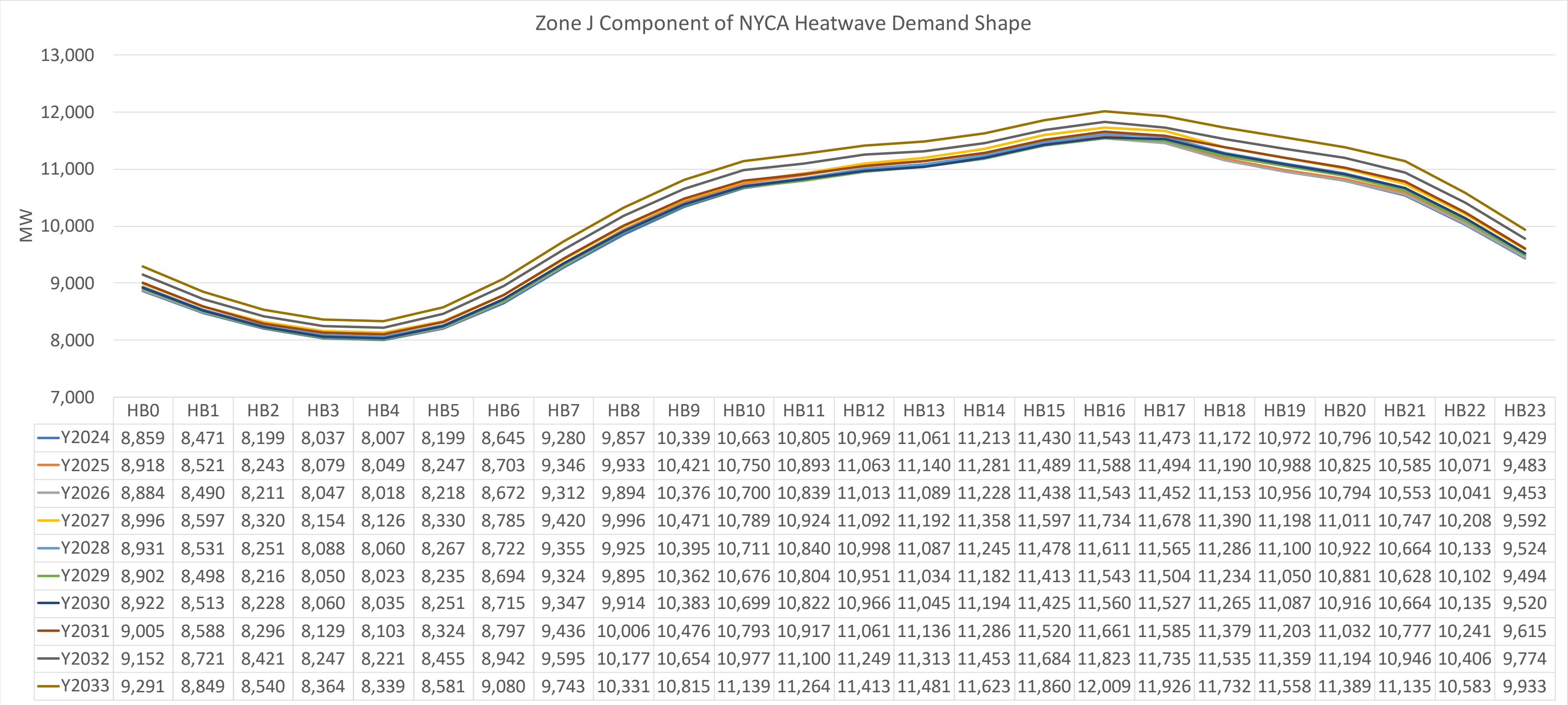
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
—Y2024	10,170	9,735	9,449	9,304	9,322	9,591	10,028	10,460	10,716	10,871	11,054	11,153	11,354	11,611	11,878	12,195	12,595	12,903	13,013	12,962	12,647	12,142	11,313	10,420
—Y2025	10,321	9,891	9,601	9,451	9,473	9,743	10,151	10,503	10,633	10,663	10,744	10,788	10,981	11,291	11,624	12,038	12,586	13,048	13,281	13,300	12,966	12,421	11,549	10,616
—Y2026	10,509	10,064	9,771	9,615	9,633	9,904	10,305	10,606	10,647	10,590	10,604	10,607	10,789	11,125	11,496	11,971	12,616	13,181	13,507	13,579	13,243	12,679	11,787	10,827
—Y2027	10,416	9,963	9,660	9,502	9,518	9,788	10,180	10,448	10,435	10,314	10,273	10,243	10,417	10,722	11,073	11,553	12,222	12,827	13,223	13,333	13,042	12,510	11,648	10,712
—Y2028	10,455	9,993	9,680	9,515	9,529	9,801	10,189	10,427	10,367	10,190	10,105	10,049	10,203	10,506	10,863	11,371	12,087	12,755	13,212	13,356	13,081	12,555	11,691	10,754
—Y2029	10,501	10,027	9,706	9,538	9,544	9,817	10,203	10,417	10,322	10,098	9,982	9,902	10,044	10,347	10,708	11,237	11,997	12,723	13,233	13,407	13,141	12,618	11,754	10,811
—Y2030	10,586	10,100	9,768	9,595	9,599	9,871	10,255	10,456	10,334	10,081	9,928	9,835	9,973	10,281	10,652	11,207	12,007	12,780	13,341	13,537	13,270	12,742	11,869	10,910
—Y2031	10,638	10,140	9,801	9,616	9,617	9,895	10,276	10,463	10,321	10,040	9,865	9,753	9,887	10,206	10,583	11,162	12,001	12,869	13,426	13,639	13,370	12,833	11,953	10,984
—Y2032	10,632	10,131	9,792	9,606	9,604	9,874	10,244	10,408	10,239	9,924	9,720	9,589	9,714	10,060	10,463	11,084	11,978	12,915	13,549	13,757	13,462	12,900	11,998	11,004
—Y2033	10,694	10,182	9,833	9,637	9,631	9,901	10,274	10,427	10,241	9,903	9,684	9,537	9,666	10,020	10,434	11,081	12,010	12,991	13,667	13,895	13,594	13,018	12,101	11,089

Figure 126: Zones GHI Component of NYCA Heatwave Demand Shape



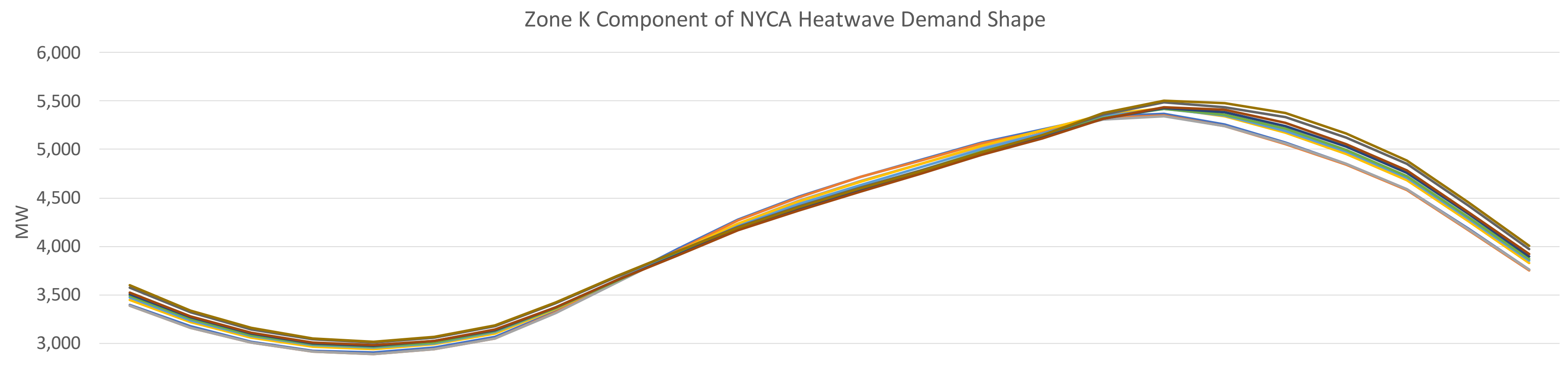
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	2,982	2,799	2,670	2,578	2,539	2,587	2,706	2,900	3,035	3,190	3,372	3,530	3,691	3,856	4,005	4,170	4,311	4,386	4,360	4,253	4,116	3,897	3,580	3,249
Y2025	2,964	2,781	2,654	2,564	2,525	2,567	2,688	2,875	2,999	3,142	3,316	3,466	3,626	3,794	3,947	4,119	4,271	4,356	4,340	4,240	4,101	3,880	3,565	3,233
Y2026	2,960	2,776	2,647	2,557	2,517	2,563	2,678	2,854	2,967	3,093	3,253	3,395	3,555	3,723	3,879	4,064	4,228	4,329	4,330	4,239	4,102	3,882	3,563	3,230
Y2027	2,965	2,780	2,649	2,557	2,518	2,562	2,676	2,842	2,936	3,043	3,191	3,323	3,479	3,649	3,808	4,001	4,182	4,303	4,322	4,244	4,111	3,889	3,571	3,237
Y2028	2,977	2,786	2,655	2,561	2,521	2,566	2,679	2,833	2,916	3,008	3,143	3,268	3,418	3,588	3,747	3,945	4,140	4,279	4,319	4,250	4,120	3,900	3,584	3,248
Y2029	2,993	2,800	2,665	2,570	2,530	2,575	2,684	2,838	2,908	2,990	3,112	3,231	3,378	3,546	3,708	3,912	4,120	4,275	4,330	4,270	4,141	3,923	3,605	3,269
Y2030	3,023	2,827	2,690	2,591	2,548	2,595	2,705	2,854	2,919	2,990	3,106	3,220	3,365	3,536	3,698	3,910	4,130	4,300	4,369	4,315	4,189	3,966	3,645	3,306
Y2031	3,062	2,861	2,718	2,620	2,576	2,621	2,732	2,877	2,939	3,002	3,111	3,223	3,368	3,540	3,705	3,926	4,157	4,340	4,424	4,377	4,249	4,025	3,699	3,350
Y2032	3,117	2,909	2,760	2,657	2,612	2,659	2,772	2,915	2,970	3,029	3,134	3,240	3,387	3,561	3,731	3,957	4,202	4,398	4,497	4,456	4,328	4,099	3,769	3,412
Y2033	3,167	2,953	2,799	2,694	2,646	2,693	2,806	2,949	3,003	3,053	3,151	3,254	3,402	3,577	3,750	3,989	4,247	4,458	4,574	4,537	4,406	4,174	3,837	3,471

Figure 127: Zone J Component of NYCA Heatwave Demand Shape



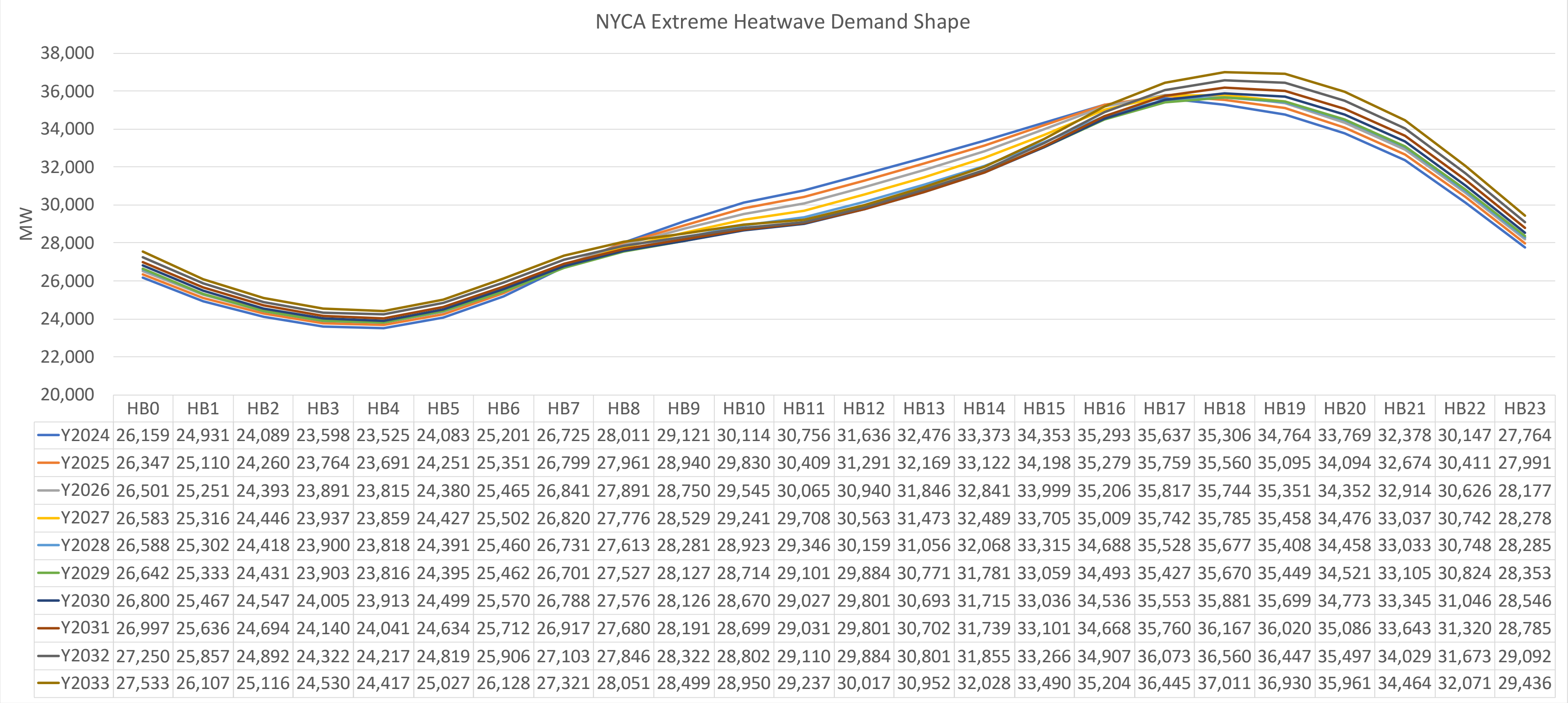
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	8,859	8,471	8,199	8,037	8,007	8,199	8,645	9,280	9,857	10,339	10,663	10,805	10,969	11,061	11,213	11,430	11,543	11,473	11,172	10,972	10,796	10,542	10,021	9,429
Y2025	8,918	8,521	8,243	8,079	8,049	8,247	8,703	9,346	9,933	10,421	10,750	10,893	11,063	11,140	11,281	11,489	11,588	11,494	11,190	10,988	10,825	10,585	10,071	9,483
Y2026	8,884	8,490	8,211	8,047	8,018	8,218	8,672	9,312	9,894	10,376	10,700	10,839	11,013	11,089	11,228	11,438	11,543	11,452	11,153	10,956	10,794	10,553	10,041	9,453
Y2027	8,996	8,597	8,320	8,154	8,126	8,330	8,785	9,420	9,996	10,471	10,789	10,924	11,092	11,192	11,358	11,597	11,734	11,678	11,390	11,198	11,011	10,747	10,208	9,592
Y2028	8,931	8,531	8,251	8,088	8,060	8,267	8,722	9,355	9,925	10,395	10,711	10,840	10,998	11,087	11,245	11,478	11,611	11,565	11,286	11,100	10,922	10,664	10,133	9,524
Y2029	8,902	8,498	8,216	8,050	8,023	8,235	8,694	9,324	9,895	10,362	10,676	10,804	10,951	11,034	11,182	11,413	11,543	11,504	11,234	11,050	10,881	10,628	10,102	9,494
Y2030	8,922	8,513	8,228	8,060	8,035	8,251	8,715	9,347	9,914	10,383	10,699	10,822	10,966	11,045	11,194	11,425	11,560	11,527	11,265	11,087	10,916	10,664	10,135	9,520
Y2031	9,005	8,588	8,296	8,129	8,103	8,324	8,797	9,436	10,006	10,476	10,793	10,917	11,061	11,136	11,286	11,520	11,661	11,585	11,379	11,203	11,032	10,777	10,241	9,615
Y2032	9,152	8,721	8,421	8,247	8,221	8,455	8,942	9,595	10,177	10,654	10,977	11,100	11,249	11,313	11,453	11,684	11,823	11,735	11,535	11,359	11,194	10,946	10,406	9,774
Y2033	9,291	8,849	8,540	8,364	8,339	8,581	9,080	9,743	10,331	10,815	11,139	11,264	11,413	11,481	11,623	11,860	12,009	11,926	11,732	11,558	11,389	11,135	10,583	9,933

Figure 128: Zone K Component of NYCA Heatwave Demand Shape



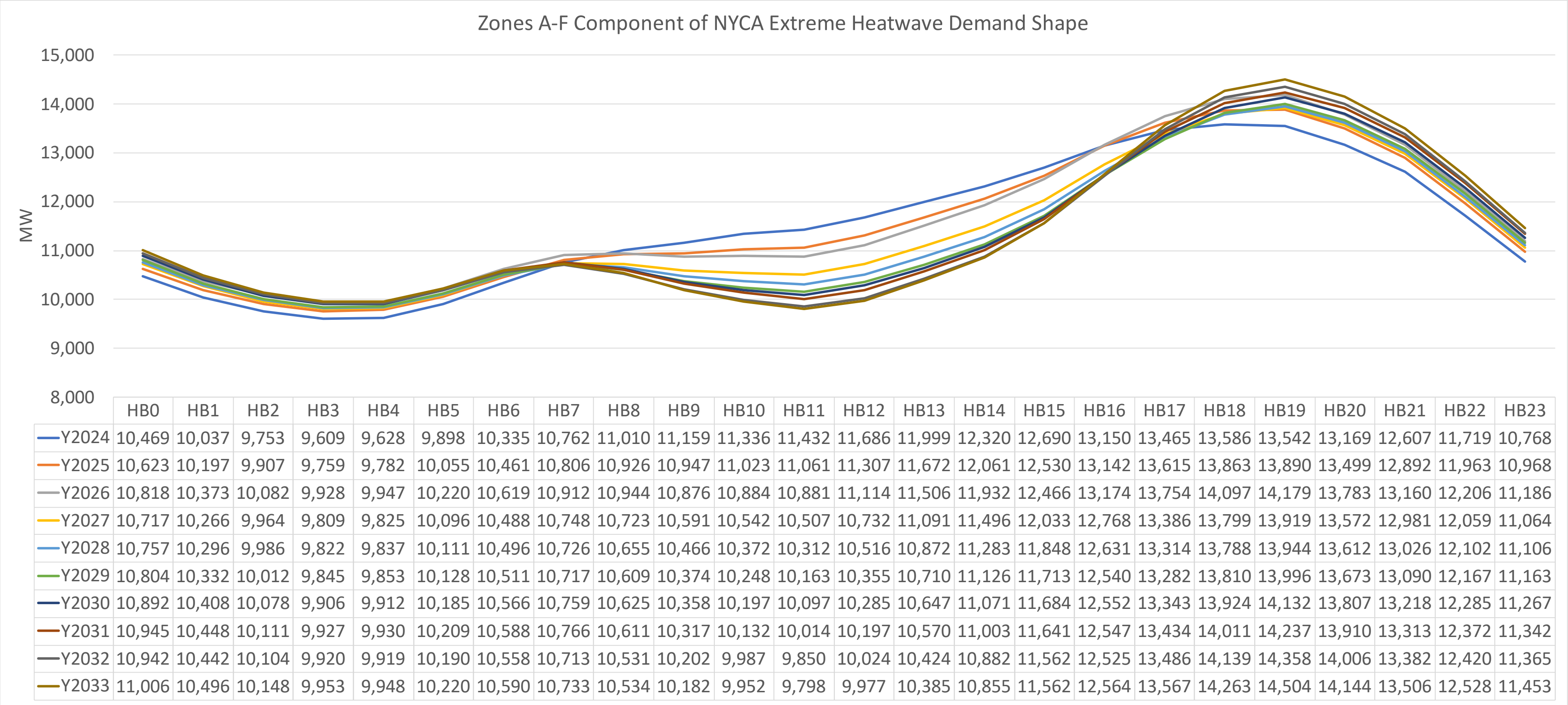
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	3,395	3,173	3,018	2,926	2,904	2,953	3,069	3,332	3,650	3,968	4,272	4,515	4,718	4,894	5,072	5,203	5,338	5,369	5,255	5,071	4,855	4,592	4,179	3,762
Y2025	3,389	3,162	3,007	2,915	2,889	2,939	3,054	3,320	3,641	3,959	4,265	4,507	4,715	4,887	5,061	5,192	5,323	5,350	5,238	5,056	4,842	4,579	4,169	3,753
Y2026	3,391	3,164	3,007	2,915	2,890	2,938	3,053	3,312	3,626	3,934	4,231	4,467	4,675	4,850	5,027	5,165	5,306	5,342	5,241	5,064	4,852	4,589	4,176	3,759
Y2027	3,450	3,220	3,061	2,968	2,941	2,991	3,105	3,354	3,653	3,945	4,232	4,462	4,667	4,852	5,040	5,194	5,359	5,422	5,338	5,171	4,952	4,681	4,257	3,829
Y2028	3,470	3,237	3,077	2,981	2,953	3,002	3,115	3,361	3,650	3,933	4,209	4,434	4,634	4,818	5,005	5,162	5,340	5,419	5,350	5,192	4,976	4,706	4,283	3,853
Y2029	3,490	3,252	3,088	2,989	2,963	3,012	3,125	3,366	3,646	3,921	4,188	4,408	4,604	4,786	4,974	5,137	5,322	5,414	5,362	5,211	4,998	4,727	4,305	3,872
Y2030	3,508	3,266	3,100	2,998	2,970	3,021	3,134	3,370	3,648	3,911	4,176	4,389	4,584	4,766	4,955	5,125	5,318	5,425	5,385	5,239	5,029	4,757	4,332	3,897
Y2031	3,526	3,281	3,113	3,009	2,979	3,028	3,141	3,375	3,648	3,907	4,164	4,372	4,567	4,749	4,940	5,115	5,318	5,435	5,407	5,270	5,057	4,783	4,356	3,918
Y2032	3,577	3,324	3,147	3,040	3,008	3,059	3,176	3,413	3,688	3,943	4,199	4,409	4,607	4,786	4,973	5,151	5,360	5,481	5,435	5,331	5,123	4,849	4,419	3,975
Y2033	3,599	3,341	3,162	3,053	3,019	3,070	3,186	3,420	3,694	3,946	4,194	4,400	4,597	4,778	4,969	5,151	5,373	5,505	5,473	5,375	5,163	4,885	4,454	4,004

Figure 129: NYCA Extreme Heatwave Demand Shape



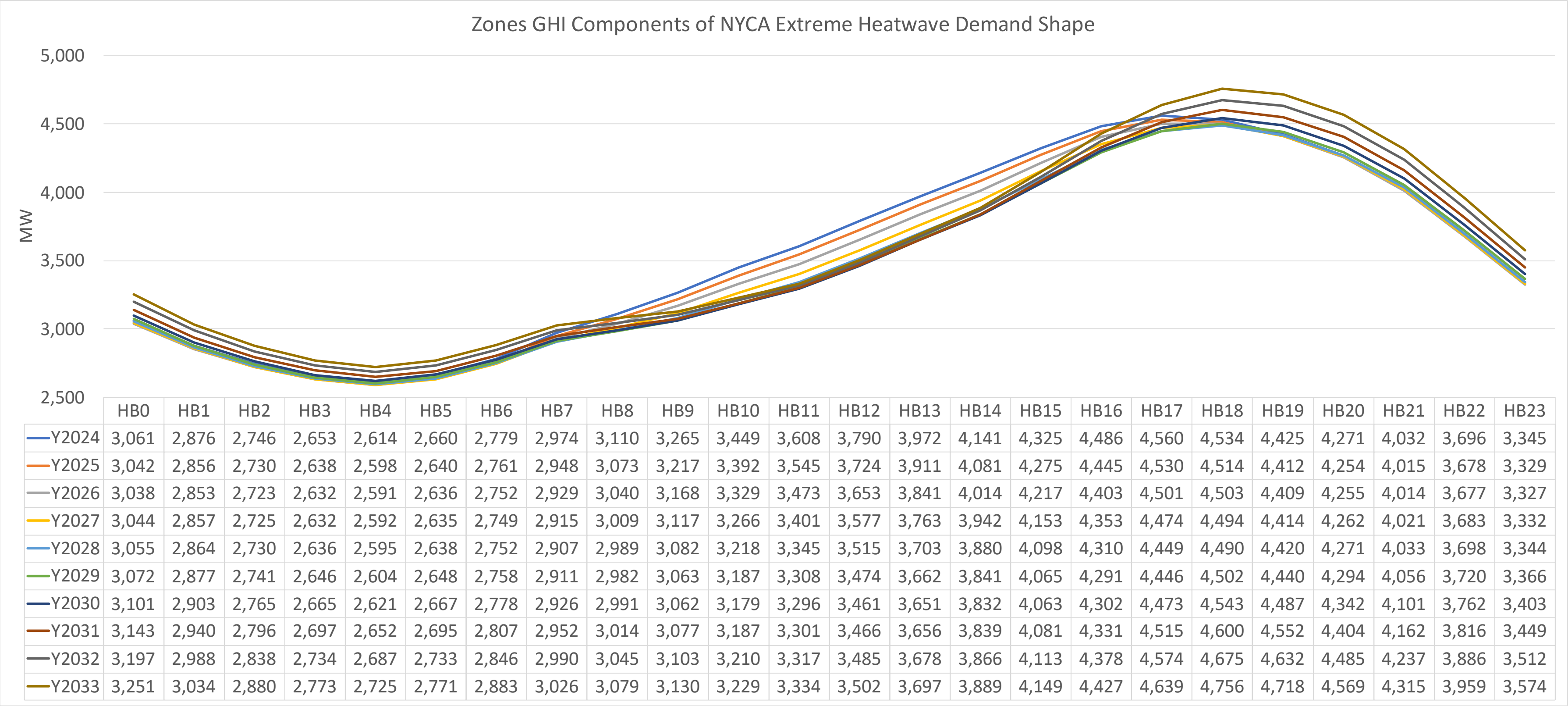
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	26,159	24,931	24,089	23,598	23,525	24,083	25,201	26,725	28,011	29,121	30,114	30,756	31,636	32,476	33,373	34,353	35,293	35,637	35,306	34,764	33,769	32,378	30,147	27,764
Y2025	26,347	25,110	24,260	23,764	23,691	24,251	25,351	26,799	27,961	28,940	29,830	30,409	31,291	32,169	33,122	34,198	35,279	35,759	35,560	35,095	34,094	32,674	30,411	27,991
Y2026	26,501	25,251	24,393	23,891	23,815	24,380	25,465	26,841	27,891	28,750	29,545	30,065	30,940	31,846	32,841	33,999	35,206	35,817	35,744	35,351	34,352	32,914	30,626	28,177
Y2027	26,583	25,316	24,446	23,937	23,859	24,427	25,502	26,820	27,776	28,529	29,241	29,708	30,563	31,473	32,489	33,705	35,009	35,742	35,785	35,458	34,476	33,037	30,742	28,278
Y2028	26,588	25,302	24,418	23,900	23,818	24,391	25,460	26,731	27,613	28,281	28,923	29,346	30,159	31,056	32,068	33,315	34,688	35,528	35,677	35,408	34,458	33,033	30,748	28,285
Y2029	26,642	25,333	24,431	23,903	23,816	24,395	25,462	26,701	27,527	28,127	28,714	29,101	29,884	30,771	31,781	33,059	34,493	35,427	35,670	35,449	34,521	33,105	30,824	28,353
Y2030	26,800	25,467	24,547	24,005	23,913	24,499	25,570	26,788	27,576	28,126	28,670	29,027	29,801	30,693	31,715	33,036	34,536	35,553	35,881	35,699	34,773	33,345	31,046	28,546
Y2031	26,997	25,636	24,694	24,140	24,041	24,634	25,712	26,917	27,680	28,191	28,699	29,031	29,801	30,702	31,739	33,101	34,668	35,760	36,167	36,020	35,086	33,643	31,320	28,785
Y2032	27,250	25,857	24,892	24,322	24,217	24,819	25,906	27,103	27,846	28,322	28,802	29,110	29,884	30,801	31,855	33,266	34,907	36,073	36,560	36,447	35,497	34,029	31,673	29,092
Y2033	27,533	26,107	25,116	24,530	24,417	25,027	26,128	27,321	28,051	28,499	28,950	29,237	30,017	30,952	32,028	33,490	35,204	36,445	37,011	36,930	35,961	34,464	32,071	29,436

Figure 130: Zones A-F Component of NYCA Extreme Heatwave Demand Shape



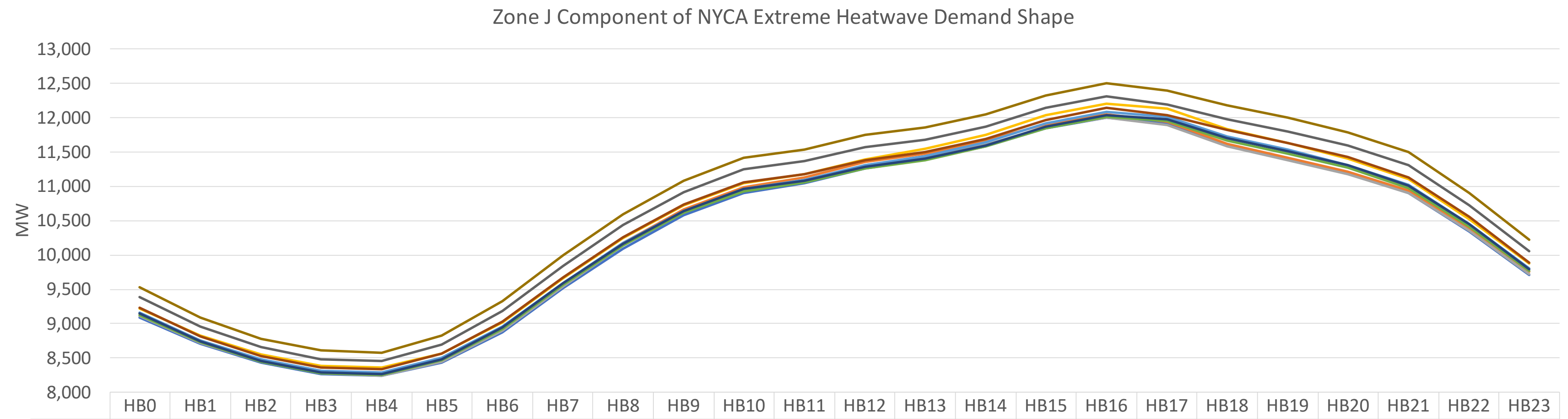
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	10,469	10,037	9,753	9,609	9,628	9,898	10,335	10,762	11,010	11,159	11,336	11,432	11,686	11,999	12,320	12,690	13,150	13,465	13,586	13,542	13,169	12,607	11,719	10,768
Y2025	10,623	10,197	9,907	9,759	9,782	10,055	10,461	10,806	10,926	10,947	11,023	11,061	11,307	11,672	12,061	12,530	13,142	13,615	13,863	13,890	13,499	12,892	11,963	10,968
Y2026	10,818	10,373	10,082	9,928	9,947	10,220	10,619	10,912	10,944	10,876	10,884	10,881	11,114	11,506	11,932	12,466	13,174	13,754	14,097	14,179	13,783	13,160	12,206	11,186
Y2027	10,717	10,266	9,964	9,809	9,825	10,096	10,488	10,748	10,723	10,591	10,542	10,507	10,732	11,091	11,496	12,033	12,768	13,386	13,799	13,919	13,572	12,981	12,059	11,064
Y2028	10,757	10,296	9,986	9,822	9,837	10,111	10,496	10,726	10,655	10,466	10,372	10,312	10,516	10,872	11,283	11,848	12,631	13,314	13,788	13,944	13,612	13,026	12,102	11,106
Y2029	10,804	10,332	10,012	9,845	9,853	10,128	10,511	10,717	10,609	10,374	10,248	10,163	10,355	10,710	11,126	11,713	12,540	13,282	13,810	13,996	13,673	13,090	12,167	11,163
Y2030	10,892	10,408	10,078	9,906	9,912	10,185	10,566	10,759	10,625	10,358	10,197	10,097	10,285	10,647	11,071	11,684	12,552	13,343	13,924	14,132	13,807	13,218	12,285	11,267
Y2031	10,945	10,448	10,111	9,927	9,930	10,209	10,588	10,766	10,611	10,317	10,132	10,014	10,197	10,570	11,003	11,641	12,547	13,434	14,011	14,237	13,910	13,313	12,372	11,342
Y2032	10,942	10,442	10,104	9,920	9,919	10,190	10,558	10,713	10,531	10,202	9,987	9,850	10,024	10,424	10,882	11,562	12,525	13,486	14,139	14,358	14,006	13,382	12,420	11,365
Y2033	11,006	10,496	10,148	9,953	9,948	10,220	10,590	10,733	10,534	10,182	9,952	9,798	9,977	10,385	10,855	11,562	12,564	13,567	14,263	14,504	14,144	13,506	12,528	11,453

Figure 131: Zones GHI Component of NYCA Extreme Heatwave Demand Shape



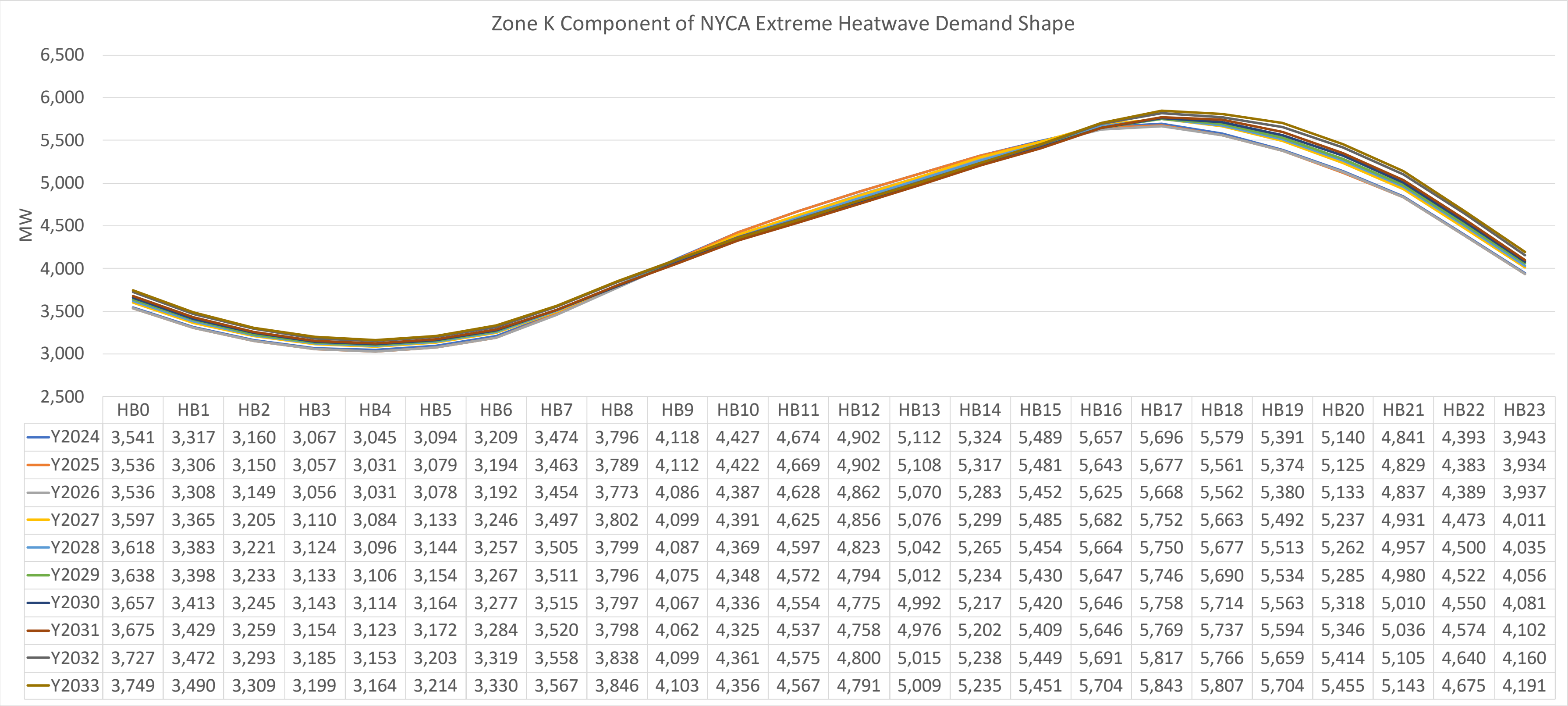
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	3,061	2,876	2,746	2,653	2,614	2,660	2,779	2,974	3,110	3,265	3,449	3,608	3,790	3,972	4,141	4,325	4,486	4,560	4,534	4,425	4,271	4,032	3,696	3,345
Y2025	3,042	2,856	2,730	2,638	2,598	2,640	2,761	2,948	3,073	3,217	3,392	3,545	3,724	3,911	4,081	4,275	4,445	4,530	4,514	4,412	4,254	4,015	3,678	3,329
Y2026	3,038	2,853	2,723	2,632	2,591	2,636	2,752	2,929	3,040	3,168	3,329	3,473	3,653	3,841	4,014	4,217	4,403	4,501	4,503	4,409	4,255	4,014	3,677	3,327
Y2027	3,044	2,857	2,725	2,632	2,592	2,635	2,749	2,915	3,009	3,117	3,266	3,401	3,577	3,763	3,942	4,153	4,353	4,474	4,494	4,414	4,262	4,021	3,683	3,332
Y2028	3,055	2,864	2,730	2,636	2,595	2,638	2,752	2,907	2,989	3,082	3,218	3,345	3,515	3,703	3,880	4,098	4,310	4,449	4,490	4,420	4,271	4,033	3,698	3,344
Y2029	3,072	2,877	2,741	2,646	2,604	2,648	2,758	2,911	2,982	3,063	3,187	3,308	3,474	3,662	3,841	4,065	4,291	4,446	4,502	4,440	4,294	4,056	3,720	3,366
Y2030	3,101	2,903	2,765	2,665	2,621	2,667	2,778	2,926	2,991	3,062	3,179	3,296	3,461	3,651	3,832	4,063	4,302	4,473	4,543	4,487	4,342	4,101	3,762	3,403
Y2031	3,143	2,940	2,796	2,697	2,652	2,695	2,807	2,952	3,014	3,077	3,187	3,301	3,466	3,656	3,839	4,081	4,331	4,515	4,600	4,552	4,404	4,162	3,816	3,449
Y2032	3,197	2,988	2,838	2,734	2,687	2,733	2,846	2,990	3,045	3,103	3,210	3,317	3,485	3,678	3,866	4,113	4,378	4,574	4,675	4,632	4,485	4,237	3,886	3,512
Y2033	3,251	3,034	2,880	2,773	2,725	2,771	2,883	3,026	3,079	3,130	3,229	3,334	3,502	3,697	3,889	4,149	4,427	4,639	4,756	4,718	4,569	4,315	3,959	3,574

Figure 132: Zone J Component of NYCA Extreme Heatwave Demand Shape



	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	9,088	8,701	8,430	8,269	8,238	8,431	8,878	9,515	10,095	10,579	10,902	11,042	11,258	11,393	11,588	11,849	12,000	11,916	11,607	11,406	11,189	10,898	10,339	9,708
Y2025	9,146	8,751	8,473	8,310	8,280	8,477	8,935	9,582	10,173	10,664	10,993	11,134	11,358	11,478	11,663	11,912	12,049	11,937	11,622	11,419	11,216	10,938	10,387	9,760
Y2026	9,109	8,717	8,439	8,275	8,246	8,446	8,902	9,546	10,134	10,620	10,945	11,083	11,311	11,429	11,612	11,864	12,004	11,894	11,582	11,383	11,181	10,903	10,354	9,727
Y2027	9,225	8,828	8,552	8,386	8,358	8,563	9,019	9,660	10,242	10,722	11,042	11,175	11,398	11,543	11,752	12,034	12,206	12,130	11,829	11,633	11,405	11,104	10,527	9,871
Y2028	9,158	8,759	8,481	8,318	8,290	8,498	8,955	9,593	10,170	10,646	10,964	11,092	11,305	11,439	11,640	11,915	12,083	12,015	11,722	11,531	11,313	11,017	10,448	9,800
Y2029	9,128	8,726	8,445	8,279	8,253	8,465	8,926	9,562	10,140	10,615	10,931	11,058	11,261	11,387	11,580	11,851	12,015	11,953	11,668	11,479	11,269	10,979	10,415	9,768
Y2030	9,150	8,743	8,459	8,291	8,266	8,483	8,949	9,588	10,163	10,639	10,958	11,080	11,280	11,403	11,595	11,869	12,036	11,979	11,700	11,517	11,306	11,016	10,449	9,795
Y2031	9,234	8,819	8,528	8,362	8,336	8,558	9,033	9,679	10,257	10,735	11,055	11,179	11,380	11,500	11,695	11,970	12,144	12,042	11,819	11,637	11,426	11,132	10,558	9,892
Y2032	9,384	8,955	8,657	8,483	8,458	8,693	9,183	9,842	10,432	10,918	11,244	11,368	11,575	11,684	11,869	12,142	12,313	12,196	11,980	11,798	11,592	11,305	10,727	10,055
Y2033	9,527	9,087	8,779	8,605	8,580	8,822	9,325	9,995	10,592	11,084	11,413	11,538	11,747	11,861	12,049	12,328	12,509	12,396	12,185	12,004	11,793	11,500	10,909	10,218

Figure 133: Zone K Component of NYCA Extreme Heatwave Demand Shape



	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	3,541	3,317	3,160	3,067	3,045	3,094	3,209	3,474	3,796	4,118	4,427	4,674	4,902	5,112	5,324	5,489	5,657	5,696	5,579	5,391	5,140	4,841	4,393	3,943
Y2025	3,536	3,306	3,150	3,057	3,031	3,079	3,194	3,463	3,789	4,112	4,422	4,669	4,902	5,108	5,317	5,481	5,643	5,677	5,561	5,374	5,125	4,829	4,383	3,934
Y2026	3,536	3,308	3,149	3,056	3,031	3,078	3,192	3,454	3,773	4,086	4,387	4,628	4,862	5,070	5,283	5,452	5,625	5,668	5,562	5,380	5,133	4,837	4,389	3,937
Y2027	3,597	3,365	3,205	3,110	3,084	3,133	3,246	3,497	3,802	4,099	4,391	4,625	4,856	5,076	5,299	5,485	5,682	5,752	5,663	5,492	5,237	4,931	4,473	4,011
Y2028	3,618	3,383	3,221	3,124	3,096	3,144	3,257	3,505	3,799	4,087	4,369	4,597	4,823	5,042	5,265	5,454	5,664	5,750	5,677	5,513	5,262	4,957	4,500	4,035
Y2029	3,638	3,398	3,233	3,133	3,106	3,154	3,267	3,511	3,796	4,075	4,348	4,572	4,794	5,012	5,234	5,430	5,647	5,746	5,690	5,534	5,285	4,980	4,522	4,056
Y2030	3,657	3,413	3,245	3,143	3,114	3,164	3,277	3,515	3,797	4,067	4,336	4,554	4,775	4,992	5,217	5,420	5,646	5,758	5,714	5,563	5,318	5,010	4,550	4,081
Y2031	3,675	3,429	3,259	3,154	3,123	3,172	3,284	3,520	3,798	4,062	4,325	4,537	4,758	4,976	5,202	5,409	5,646	5,769	5,737	5,594	5,346	5,036	4,574	4,102
Y2032	3,727	3,472	3,293	3,185	3,153	3,203	3,319	3,558	3,838	4,099	4,361	4,575	4,800	5,015	5,238	5,449	5,691	5,817	5,766	5,659	5,414	5,105	4,640	4,160
Y2033	3,749	3,490	3,309	3,199	3,164	3,214	3,330	3,567	3,846	4,103	4,356	4,567	4,791	5,009	5,235	5,451	5,704	5,843	5,807	5,704	5,455	5,143	4,675	4,191