New York ISO
Independent System Operator

Appendices

DRAFT 2023-2032

Comprehensive Reliability Plan

A Report from the
New York Independent
System Operator

Draft for October 25, 2023 MC

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Appendix A – Glossary

The following glossary offers definitions and explanations of terms used in the Comprehensive Reliability Plan it appends, as well as references to additional source information published by the NYISO and other energy industry entities.

Annual Transmission Reliability Assessment (ATRA): An assessment, conducted by the NYISO staff in cooperation with Market Participants, to determine the System Upgrade Facilities required for each generation project and Class Year Transmission Project to interconnect to the New York State Transmission System in compliance with Applicable Reliability Standards and the NYISO Minimum Interconnection Standard. See NYISO OATT

Area Transmission Review (ATR): An annual report provided to the Northeast Power Coordinating Council Compliance Committee by the NYISO, in its role as Planning Coordinator, in regard to its Area Transmission Review. See NPCC.org

Baseline Forecast: Prepared for the NYISO Gold Book, baseline forecasts report the expected New York Control Area load and includes the projected impacts of energy efficiency programs, building codes and standards, distributed energy resources, behind-the-meter energy storage, behind-the-meter solar photovoltaic power, electric vehicle usage, and electrification of heating and other end uses. The baseline forecasts are used in the Reliability Needs Assessment Base Cases for determining Bulk Power Transmission Facilities Reliability Needs for the Reliability Needs Assessment Study Period.

Best Technology Available (BTA): Performance goal established by the New York State Department of Environmental Conservation for cooling water intake structures at proposed and existing electric generating plants with intake capacity greater than 20 million gallons per day. See DEC.NY.gov

New York State Bulk Power Transmission Facility (BPTF): Facilities identified as the New York State Bulk Power Transmission Facilities in the annual Area Transmission Review submitted to the Northeast Power Coordinating Council by the NYISO. See NYISO OATT

Clean Energy Standard (CES): New York State initiative requiring 70% of electricity consumed in the State to be produced from renewable sources by 2030. See NYSERDA.NY.gov

Climate Leadership and Community Protection Act (CLCPA): New York State statute enacted in 2019 to address and mitigate the effects of climate change. Among other requirements, the law mandates that; (1) 70% of energy consumed in New York State be sourced from renewable resources by 2030, (2) greenhouse gas emissions must be reduced by 40% by 2030, (3) the electric generation sector must be zero greenhouse gas emissions by 2040, and (4) greenhouse gas emissions across all sectors of the economy must be reduced by 85% by 2050. See CLIMATE.NY.gov

Contingencies: Actual or potential unexpected failure or outage of a system component such as a generator, transmission line, circuit breaker, switch, or other electrical element. A contingency also may include multiple components, which are related by situations leading to simultaneous component outages. See NYSRC.org

Dependable Maximum Net Capability (DMNC): Sustained maximum net output of a Generator, as demonstrated by the performance of a test or through actual operation, averaged over a continuous time period. See NYISO OATT

Disturbance: Severe oscillations or severe step changes of current, voltage and/or frequency usually caused by faults. See NYSRC.org

Electric System Planning Work Group (ESPWG): The stakeholder forum that provides Market Participant input on the NYISO's comprehensive system planning processes. See Committees at NYISO.com

Emergency Transfer Criteria: In the event that adequate facilities are not available to supply firm load within Normal Transfer Criteria, emergency transfer criteria may be invoked. Under emergency transfer criteria, transfers may be increased up to, but not exceed, emergency ratings and limits, as follows:

> a. Pre-contingency line and equipment loadings may be operated up to LTE ratings for up to four (4) hours, provided the STE ratings are set appropriately. Otherwise, pre-contingency line and equipment loadings must be within normal ratings. Pre-contingency voltages and transmission interface flows must be within applicable pre-contingency voltage and stability limits.
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> b. Post-contingency line and equipment loadings within STE ratings. Post-contingency voltages and transmission interface flows within applicable post-contingency voltage and stability limits. See NYSRC.org

Fault: An electrical short circuit. See NYSRC.org

Federal Energy Regulatory Commission (FERC): The United States federal agency that regulates the transmission and wholesale sale of electricity and natural gas in interstate commerce.

FERC Form No. 715: Annual report by transmitting utilities on transmission planning, constraints, and available transmission capacity. See FERC.gov

Forced Outage: Unscheduled inability of a Market Participant's Generator to produce energy that does not meet the notification criteria to be classified as a scheduled outage or de-rate as established in NYISO Procedures. See NYISO.com

Gold Book: Annual NYISO publication, also known as the Load and Capacity Data Report. See Library/Reports at NYISO.com

Installed Capacity (ICAP): External or Internal Capacity that is made available pursuant to Tariff requirements and NYISO Procedures. See NYISO Services Tariff

Installed Capacity Requirement (ICR): The annual statewide requirement established by the New York State Reliability Council in order to provide resource adequacy in the New York Control Area. See NYSRC.org

Installed Reserve Margin (IRM): The amount of installed electric generation capacity above 100% of the forecasted peak electric demand that is required to meet New York State Reliability Council resource adequacy criteria.

Local Transmission Plan (LTP): The Local Transmission Owner Plan, developed by each Transmission Owner, which describes its respective plans that may be under consideration or finalized for its own Transmission District. See NYISO OATT

Local Transmission Planning Process (LTPP): The Local Planning Process conducted by each Transmission Owner for its own Transmission District. See NYISO OATT

Loss of Load Expectation (LOLE): A New York State Reliability Council resource adequacy criterion requiring that the probability (or risk) of the unplanned disconnecting of any firm load due to resource deficiencies shall be, on average, not more than once in ten years, expressed mathematically as 0.1 days per year. See NYSRC.org

- LOLE is generally defined as the expected (weighted average) number of days in a given period (e.g., one study year) when for at least one hour from that day the hourly demand is projected to exceed the zonal resources (event day). Within a day, if the zonal demand exceeds the resources in at least one hour of that day, this will be counted as one event day. The criterion is that the LOLE not exceed one day in 10 years, or LOLE < 0.1 days/year.
- LOLH is generally defined[1] as the expected number of hours per period (e.g., one study year) when a system's hourly demand is projected to exceed the zonal resources (event hour). Within an hour, if the zonal demand exceeds the resources, this will be counted as one event hour.
- EUE, also referred to as loss of energy expectation (LOEE), is generally defined[2] as the expected energy (MWh) per period (e.g., one study year) when the summation of the system's hourly demand is projected to exceed the zonal resources. Within an hour, if the zonal demand exceeds the resources, this deficit will be counted toward the system's EUE.

Market Monitoring Unit: The consulting or professional services firm, or other similar entity, responsible for carrying out the Core Market Monitoring Functions and other functions assigned to it in the NYISO's tariffs. See NYISO OATT Attachment O

Market Participant: An entity, excluding the NYISO, that produces, transmits, sells, and/or purchases for resale unforced capacity, energy, or ancillary services in the wholesale market, including entities that buy or sell Transmission Congestion Contracts. See NYISO Services Tariff

Market Administration and Control Area Services Tariff (NYISO Services Tariff): The document addressing the Market Services and the Control Area Services provided by the NYISO, and the terms and conditions, regulated by the FERC, under which those services are provided.

New York Control Area (NYCA): The area under the electrical control of the NYISO, including the entire state of New York, divided into eleven load zones. See NYISO.com

New York State Department of Environmental Conservation (NYSDEC): The agency that implements the New York State Environmental Conservation Law, with some programs also governed by federal law.

New York Independent System Operator (NYISO): A not-for-profit organization that operates New York's bulk electricity grid, wholesale electricity markets and conducts interconnection and transmission planning.

NYISO Procedures (Manuals, Guides, Technical Bulletins): NYISO Manuals specify and explain the procedures and policies used to operate the bulk power system of the New York Control Area and to conduct wholesale electricity markets, consistent with the NYISO Tariffs and Agreements. NYISO Guides serve to assist users with information needed to participate in NYISO Administered Markets. NYISO Technical Bulletins explain changes to, and provide instruction for, NYISO processes and procedures. See NYISO.com

New York State Department of Public Service (NYDPS): The New York State agency that supports the New York State Public Service Commission. See DPS.NY.gov

New York State Energy Research and Development Authority (NYSERDA): The New York State public authority charged with conducting a multifaceted energy and environmental research and development program to

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[1] NYSRC's "Resource Adequacy Metrics and their Application," available at https://www.nysrc.org/PDF/Reports/Resource%20Adequacy%20Metric%20Report%20Final%204-20-2020[6431].pdf.

[2] *Id.*

meet New York State's diverse economic needs, including administering the state System Benefits Charge, Renewable Portfolio Standard, energy efficiency programs, the Clean Energy Fund, and the NY-Sun Initiative. See NYSERDA.NY.gov

New York State Public Service Commission (NYPSC): The decision-making body of the New York State Department of Public Service, which regulates the state's electric, gas, steam, telecommunications, and water utilities, oversees the cable industry, has the responsibility for setting rates and overseeing that safe and adequate service is provided by New York's utilities, and exercises jurisdiction over the siting of major gas and electric transmission facilities.

NY-Sun Initiative: A program run by NYSERDA for the purpose of obtaining more than 6,000 MW-DC of behind-the-meter solar photovoltaic systems by the end of 2023. See NYSERDA.NY.gov

New York State Reliability Council (NYSRC): A not-for-profit entity the mission of which is to annually establish the Installed Reserve Margin, and to promote and preserve the reliability of electric service on the New York State Power System by developing, maintaining, and updating the Reliability Rules with which the NYISO and all entities engaging in electric transmission, ancillary services, energy, and power transactions on the New York State Power System must comply. See NYSRC.org

Normal Transfer Criteria: Measures established, in accordance with the North American Electric Reliability Corporation, Northeast Power Coordinating Council, and the New York State Reliability Council's Reliability Rules, to determine that adequate facilities are available to supply firm load in the bulk power transmission system within applicable normal ratings and limits. See NYSRC.org

Normal Transfer Limit: The lowest limit based on the most restrictive of three maximum allowable transfers, calculated based on thermal, voltage, and stability testing, considering contingencies, ratings, and limits specified for normal conditions. See NYSRC.org

North American Electric Reliability Corporation (NERC): A not-for-profit international regulatory authority the mission of which is to assure the effective and efficient reduction of risks to the reliability and security of the grid. See NERC.com

Northeast Power Coordinating Council (NPCC): The entity to whom the North American Electric Reliability Corporation has delegated Electric Reliability Organization functions in the New York Control Area. See NYISO OATT

Open Access Transmission Tariff (OATT): The document setting forth the rates, terms, and conditions, accepted or approved by the FERC, under which the NYISO provides transmission service and conducts interconnection and transmission system planning.

Order No. 890: Order issued by the FERC in 2007 that amended the regulations and the *pro forma* open access transmission tariff to provide that transmission services and planning are provided on a basis that is just, reasonable and not unduly discriminatory or preferential. See FERC.gov

Order No. 1000: Order issued by the FERC in 2011 that amended the transmission planning and cost allocation requirements established in Order No. 890 to provide that Commission-jurisdictional services, including transmission planning, are provided at just and reasonable rates and on a basis that is just and reasonable and not unduly discriminatory or preferential. See FERC.gov

Outage: The forced or scheduled removal of generating capacity or a transmission line from service.

Peak Demand: The maximum instantaneous power demand, measured in megawatts (MW), and known as peak load, is usually measured, and averaged over an hourly interval. The peak hour is the hour during which the coincident usage was the highest across the entire New York Control Area in a given time period.

Queue Position: The order, in the NYISO's Interconnection Queue, of a valid Interconnection Request, Study Request, or Transmission Interconnection Application relative to all other pending Requests.
See NYISO OATT

Rating: The operational limits of an electric system, facility, or element under a set of specified conditions. Rating categories include Normal Rating, Long-Term Emergency (LTE) Rating, and Short-Term Emergency (STE) Rating, as follows:

1. **Normal Rating:** The capacity rating of a transmission facility that may be carried through consecutive twenty- four (24) hour load cycles.
2. **Long-Time Emergency (LTE) Rating:** The capacity rating of a transmission facility that can be carried through infrequent, non- consecutive four (4) hour periods.
3. **Short-Time Emergency (STE) Rating:** The capacity rating of a transmission facility that may be carried during very infrequent contingencies of fifteen (15) minutes or less duration.
(Source: NYSRC Reliability Rules). See NYSRC.org

Reasonably Available Control Technology for Major Facilities of Oxides of Nitrogen (NOx RACT): New York State Department of Environmental Conservation regulations for the control of emissions of nitrogen oxides (NOx) from fossil fuel-fired power plants. See DEC.ny.gov

Reactive Power: The portion of electric power that establishes and sustains the electric and magnetic fields of alternating-current equipment.

Reactive Power Resources: Facilities such as generators, high voltage transmission lines, synchronous condensers, capacitor banks, and static var compensators that provide reactive power.

Regional Greenhouse Gas Initiative (RGGI): A cooperative effort by a group of Northeast and Mid-Atlantic states to limit power sector greenhouse gas emissions using a market-based cap-and-trade approach. See RGGI.org

Reliability: The degree of performance of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired, which can be addressed by considering the adequacy and security of the electric system:

1. **Adequacy:** The ability of the electric systems to supply the aggregate electrical demand and energy requirements of their customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements. Note: Adequacy encompasses both generation and transmission.
2. **Security:** The ability of the electric system to withstand disturbances such as electric short circuits or unanticipated loss of system elements. The ability of the power system to withstand the loss of one or more elements without involuntarily disconnecting firm load. See NYSRC.org

Reliability Criteria: The electric power system planning and operating policies, standards, criteria, guidelines, procedures, and rules promulgated by the North American Electric Reliability Corporation, Northeast Power Coordinating Council, and the New York State Reliability Council. See NYISO OATT Attachment Y

Reliability Need: A condition identified by the NYISO as a violation or potential violation of one or more Reliability Criteria. See NYISO OATT Attachment Y

Reliability Needs Assessment (RNA): A report that evaluates resource adequacy and transmission system security over years four through ten of a 10-year planning horizon and identifies future needs of the New York electricity grid. It is the first step in the NYISO's reliability planning process.
See NYISO OATT Attachment Y

Reliability Needs Assessment (RNA) Study Period: The seven-year time period encompassing years four through ten following the year in which the RNA is conducted, which is used in the RNA and the Comprehensive Reliability Plan. See NYISO OATT Attachment Y

Reliability Planning Process (RPP): The process by which the NYISO determines, in the Reliability Needs Assessment, whether any Reliability Need(s) on the New York State Bulk Power Transmission Facilities will arise in the Study Period and addresses any identified Reliability Need(s) in the Comprehensive Reliability Plan. See NYISO OATT Attachment Y

Reliability Solutions: Potential solutions to reliability needs include the following:

1. **Alternative Regulated Solutions (ARS):** Regulated solutions submitted by a Transmission Owner or other developer in response to a solicitation for solutions to a Reliability Need identified in a Reliability Needs Assessment.

2. **Gap Solution:** A solution to a Reliability Need that is designed to be temporary and to strive to be compatible with permanent market-based proposals. The NYISO may call for a Gap Solution to an imminent threat to reliability of the Bulk Power Transmission Facilities if no market-based solutions, regulated backstop solutions, or alternative regulated solutions can meet the Reliability Needs in a timely manner.

3. **Market-Based Solution:** Investor-proposed project driven by market needs to meet future reliability requirements of the bulk electricity grid as outlined in the Reliability Needs Assessment. These can include generation, transmission, and demand response Programs.

4. **Regulated Backstop Solution:** Proposals are required of certain Transmission Owners to meet Reliability Needs as outlined in the Reliability Needs Assessment.

Those solutions can include generation, transmission, or demand response. Non-Transmission Owner developers may also submit regulated solutions. See NYISO OATT Attachment Y

Resource Adequacy: The ability of the electric systems to supply the aggregate electrical demand and energy requirements of their customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements. Note: Adequacy encompasses both generation and transmission. See definition of Reliability.

Responsible Transmission Owner (Responsible TO): The Transmission Owner(s) designated by the NYISO to prepare a proposal for a regulated backstop solution to a Reliability Need or to proceed with a regulated solution to a Reliability Need. The Responsible Transmission Owner will normally be the Transmission Owner in whose Transmission District the ISO identifies a Reliability Need and/or that owns a transmission facility on which a Reliability Need arises. See NYISO OATT Attachment Y

Short-Term Assessment of Reliability (STAR): The NYISO's quarterly assessment, in coordination with the Responsible Transmission Owner(s), of whether a Short-Term Reliability Process Need will result from a Generator becoming Retired, entering into a Mothball Outage, or being unavailable due to an Installed Capacity Ineligible Forced Outage, or from other changes to the availability of Resources or to the New York State Transmission System. See NYISO OATT Attachment FF

Short-Term Reliability Process: The process by which the NYISO evaluates and addresses the reliability impacts resulting from both: (1) Generator Deactivation Reliability Need(s), and/or (2) other Reliability Needs on or affecting the Bulk Power Transmission Facilities that are identified in a Short-Term Assessment of Reliability. The Short-Term Reliability Process evaluates reliability needs in years one through five of the ten-year Study Period, with a focus on needs in years one through three. See NYISO OATT Attachment FF

Short-Term Reliability Process Need: A Generator Deactivation Reliability Need or a condition identified by the NYISO in a Short-Term Assessment of Reliability as a violation or potential violation of one or more Reliability Criteria on the Bulk Power Transmission Facilities. See NYISO OATT Attachment FF

Short-Term Reliability Process Solution: A solution to address a Short-Term Reliability Process Need, which may include (1) an Initiating Generator, (2) a solution proposed pursuant to the NYISO Services Tariff, or (3) a Generator identified by the NYISO pursuant to the NYISO Services Tariff. See NYISO OATT and NYISO Services Tariff

Short-Term Assessment of Reliability (STAR) Start Date: The date on which the NYISO next commences a STAR after issuing a written notice to a Market Participant indicating that the Generator Deactivation Notice for its Generator is complete. See NYISO OATT Attachment FF

Special Case Resource (SCR): Demand Side Resources the Load of which is capable of being interrupted upon demand at the direction of the NYISO, and/or Demand Side Resources that have a Local Generator, which is not visible to the NYISO's Market Information System and is rated 100 kW or higher, that can be operated to reduce Load from the New York State Transmission System or the distribution system at the direction of the NYISO. See NYISO Services Tariff

Stability: The ability of an electric system to maintain a state of equilibrium during normal and abnormal system conditions or disturbances. See NYSRC.org

System & Resource Outlook (The Outlook): Formerly known as the CARIS report, this biennial report is produced by the NYISO, through which it summarizes the current assessments, evaluations, and plans in the biennial Comprehensive System Planning Process, produces a twenty-year projection of congestion on the New York State Transmission System, identifies, ranks, and groups congested elements, and assesses the potential benefits of addressing the identified congestion.

System Benefits Charge (SBC): An amount of money, charged to ratepayers on their electric bills, which is administered and allocated by the New York State Energy Research and Development Authority towards energy-efficiency programs, research and development initiatives, low-income energy programs, and environmental disclosure activities.

Transfer Capability: The measure of the ability of interconnected electrical systems to reliably move or transfer power from one area to another over all transmission facilities (or paths) between those areas under specified system conditions.

Transmission Constraints: Limitations on the ability of a transmission system to transfer electricity during normal or emergency system conditions.

Transmission Owner (TO): A public utility or authority that owns transmission facilities and provides Transmission Service under the NYISO Tariffs.

Transmission Security: The ability of the electric system to withstand disturbances such as electric short circuits or unanticipated loss of system elements. The ability of the power system to withstand the loss of one or more elements without involuntarily disconnecting firm load. See definition of Reliability.

Unforced Capacity: The measure by which Installed Capacity Suppliers will be rated to quantify the extent of their contribution to satisfy the New York Control Area Installed Capacity Requirement.
See NYISO Services Tariff

Unforced Capacity Deliverability Rights (UDRs): Rights, as measured in MWs, associated with (1) new incremental controllable transmission projects, and (2) new projects to increase the capability of existing controllable transmission projects that have UDRs, that provide a transmission interface to a Locality. which, under certain conditions, allow such Unforced Capacity to be treated as if it were located in the Locality, thereby contributing to an LSE's Locational Minimum Installed Capacity Requirement. When combined with Unforced Capacity which is located in an External Control Area or non-constrained NYCA region either by contract or ownership, and which is deliverable to the NYCA interface in the Locality in which the UDR transmission facility is electrically located, UDRs allow such Unforced Capacity to be treated as if it were located in the Locality, thereby contributing to an LSE's Locational Minimum Installed Capacity Requirement. To the extent the NYCA interface is with an External Control Area the Unforced Capacity associated with UDRs must be deliverable to the Interconnection Point. See NYISO Services Tariff

Weather Normalized: Adjustments made to normalize the impact of weather when making energy and peak demand forecasts. Using historical weather data, energy analysts can account for the influence of extreme weather conditions and adjust actual energy use and peak demand to estimate what would have happened if the hottest day or the coldest day had been the typical, or "normal," weather conditions. "Normal" is usually calculated by taking the average of the previous 20 years of weather data.

Zone: One of the eleven regions in the New York Control Area connected to each other by identified transmission interfaces and designated as Load Zones A-K.

Appendix B – Planned Projects and Assumptions

The CRP conclusions are based on certain base case assumptions, which are summarized below, as well as in the 2022 RNA[3] and the 2023 Q2 STAR.[4] A key approach to the NYISO's reliability process is to apply conservative inclusion rules so that the assessment only plans for those projects and system changes that have a high level of certainty of being completed or occurring. In determining the inclusion of planned projects, the NYISO reviews of their regulatory, financial, and construction status.

Figure 1: List of Planned Additional Generating Resources (Nameplate MW)

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	04/2022	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	

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[3] 2022 RNA Report and Appendices, available at https://www.nyiso.com/documents/20142/2248793/2022-RNA-Report.pdf and https://www.nyiso.com/documents/20142/34651464/2022-RNA-Appendices.pdf.

[4] 2023 Quarter 2 STAR Report, available at https://www.nyiso.com/documents/20142/16004172/2023-Q2-STAR-Report-Final.pdf; *see also* 2023 Quarter 2 STAR solution solicitation letter, available at https://www.nyiso.com/documents/20142/15930765/STRP-Q2-2023-Solicitation-Letter-Draft-vFinal.pdf.

NYISO Interconnection Queue #	Project Name/(Owner)	Zone	Point of Interconnection	Type	COD or I/S Date	Summer Peak MW	Notes
666	Martin Solar (Martin Solar LLC)	A	Arcade - Five Mile 115kV	S	10/2022	20	1
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
730	Darby Solar (Darby Solar, LLC)	F	Mohican - Schaghticoke 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	
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	

NYISO Interconnection Queue #	Project Name/(Owner)	Zone	Point of Interconnection	Type	COD or I/S Date	Summer Peak MW	Notes
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

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.

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
Astoria Generating Company, L.P.	Astoria GT 01	J	16.0	15.7	20.5	13.4	19.1	5/1/2023	2022 Q4
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	
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		1,190.3	1,081.7	1,369.3	949.1	1,249.6		
	Prior to Summer 2025		709.1	640.6	836.6	590.3	765.7		
	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

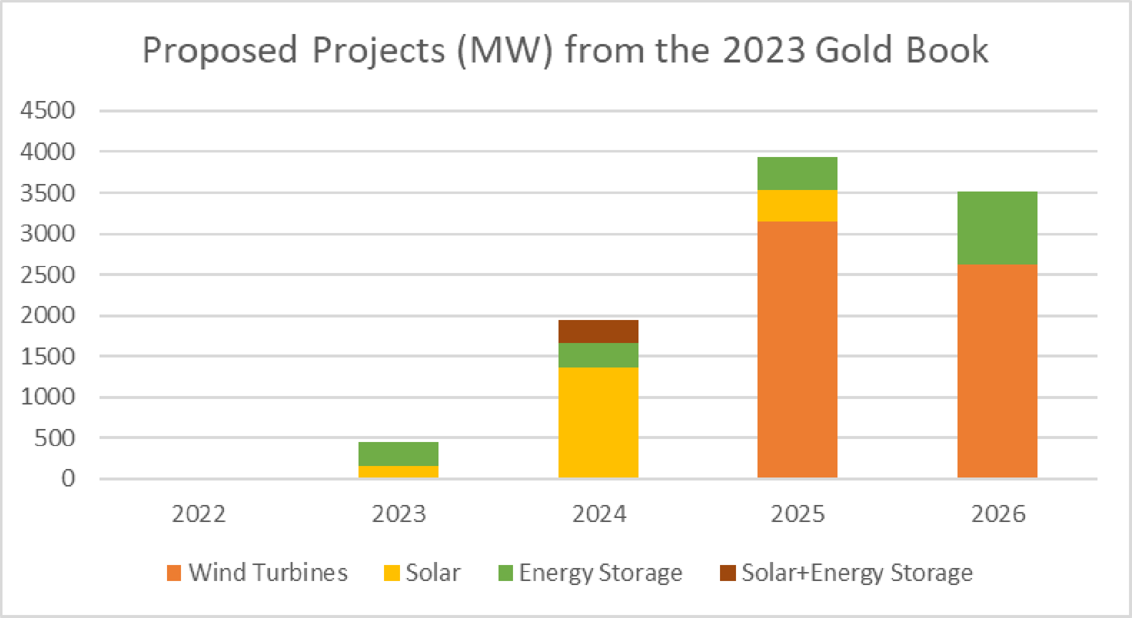
8. Central Hudson submitted notification to the DEC per part 227-3 of the peaker rule stating these units are needed for reliability. The most recent LTP update from Central Hudson notes the planned retirement of South Cairo and Coxsakie generators in December 2024. https://www.nyiso.com/documents/20142/26630522/Local-Transmission-Plan-2021.pdf/

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.

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

In addition to the projects that met the reliability planning base case inclusion rules, a number of other projects are progressing through the NYISO's interconnection process but have not yet met the applicable inclusion rules. Some of these additional generation resources have (a) accepted their cost allocation as part of a completed Class Year Interconnection Facilities Study, (b) are included in the ongoing 2023 Class Year Interconnection Facilities Study, or (c) are candidates for future interconnection facilities studies. The most recent list of these more advanced projects is contained in Table IV-1 of the 2023 *Load and Capacity Data Report* (Gold Book),[5] and a summary is below:

Figure 3: Total MW Nameplate of Proposed Projects not yet Included in the Reliability Planning Models



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[5] 2023 Load and Capacity Date Report (Gold Book), available at: https://www.nyiso.com/documents/20142/2226333/2023-Gold-Book-Public.pdf.

Appendix C – 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. In June 23, 2022, the Operating Committee approved revisions to the Reliability Planning Process Manual that, among other things, included this assessment that would use 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; modeling intermittent resources according to their expected availability coincident with the represented system condition; and accounting for the availability of thermal generation based on NERC class average five-year outage rate data in transmission security assessments.[6]

Under this transmission security margins assessment, the NYISO evaluates the margins statewide, as well as Lower Hudson Valley, New York City, and Long Island localities. 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. The NYISO identifies a BPTF reliability need when the transmission security margin under expected weather conditions (a) in the Lower Hudson Valley, New York City, and Long Island localities is less than zero or (b) 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.

In this CRP, the NYISO performed this assessment using input from the 2023 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.

New York Control Area Statewide System Margins

The statewide system margin for the New York Control Area (NYCA) 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

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[6] NYISO Reliability Planning Manual at pp 27-29, available (here).

(*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.[7] 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,[8] 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 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.

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[7] NERC five-year class average EFORd data

[8] 2020 Reliability Needs Assessment

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.

As shown in **Figure 4**, under summer peak demand with expected weather with normal transfer criteria, the statewide system margin (line-item I) ranges between 428 MW in 2024 to 531 MW in 2033. The annual fluctuations are driven by the decreases in NYCA generation (line-item A) and in the demand forecast (line-item F). The narrowest statewide system margin is 95 MW in summer 2025. The impact of the large load queue project forecast ranges from 480 MW in 2024 to 589 MW in 2033 (line-item G). The NYISO performed an additional sensitivity evaluation for informational purposes shown in **Figure 4**, 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 first few years (2023 through 2025) under summer peak conditions until the Champlain Hudson Power Express (CHPE) project enters service by summer 2026.[9]

Utilizing the demand shapes for the baseline summer peak demand day with expected weather (**Figure 92**), the statewide system margin for each hour utilizing normal transfer criteria is shown in **Figure 5**. The statewide system margin for each hour is created by using the demand forecast for each hour in the margin calculation (*e.g.*, **Figure 4** line-item F) 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 4** 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 6**. 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. For all years in the 10-year study horizon, there are no observed deficiencies considering the statewide coincident peak day demand shape.

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

It is possible for other combinations of events, such as a 1-in-10-year heatwave[10] ("heatwave") or 1-in-100-year extreme heatwave[11] ("extreme heatwave") to result in a deficient statewide system margin. **Figure 7** 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 7** shows that insufficient margin exists for in the first few years (2024 and 2025) under summer peak conditions until the CHPE project is in service (line-item K). In 2024, the system is deficient by 745 MW, which worsens to 1,062 MW in 2025. The larger deficiency is primarily due to the reduction in NYCA generation along with demand growth. In 2026, with CHPE in service, the margin returns positive to 327 MW. However, by 2032 the margin again becomes deficient at 237 MW and worsens to a deficiency of 667 MW by 2033. Additionally, **Figure 7** 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 98**), the statewide system margin for each hour utilizing emergency transfer criteria is shown in **Figure 8**. Under the 1-in-10-year heatwave conditions, the deficiency for the 1-in-10-year heatwave peak day in 2024, shown in **Figure 7** at the statewide coincident peak hour, is 1,062 MW. **Figure 8** shows that the system is deficient in nine hours with a total deficiency in the 24-hour period of 8,033 MWh. For years 2026 through 2030, the margin curve for each hour remains sufficient. **Figure 9** 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 10** shows that there is insufficient statewide system margin as early as 2024 by 2,453 MW (line-item K). The margin improves in summer 2026 with the CHPE project in service; however, the margin remains deficient for the entire study period. In 2026, the deficiency is 1,359 MW. By 2033, the deficiency worsens to 2,396 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 103**), the statewide system margin for each hour utilizing emergency transfer criteria is shown in **Figure 11**. Under the 1-in-100-year extreme heatwave conditions, the deficiency for the extreme heatwave day in summer 2025 shown in **Figure 10** as 2,756 MW is seen over 12 hours (23,840 MWh). With the in-service status of CHPE by summer 2026, the deficiency observed for the extreme heatwave day in summer 2026 improves to eight hours (8,897 MWh). By 2033, the extreme heatwave days deficiency extends to nine hours (13,321 MWh).

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[10] The load forecast utilized for the heatwave condition is the 90th percentile (or 90/10) expected load forecast.
[11] The load forecast utilized for the extreme heatwave condition is the 99th percentile (or 99/1) expected load forecast.

Figure 12 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 13** 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 9,668 MW in winter 2024-25 to 1,676 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 13**, 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 14 shows the statewide system margin in a 1-in-10-year cold snap ("cold snap") utilizing emergency transfer criteria.[12] Under this condition, the margin is sufficient for all study years (line-item K) and ranges from 9,132 MW in winter 2024-25 to 805 MW in winter 2033-34. Additionally, **Figure 14** shows the statewide system margin with full operating reserve, which is also sufficient for all study years until 2033-34 which is deficient by 505 MW.

Figure 15 shows the statewide system margin in a 1-in-100-year extreme cold snap ("extreme cold snap") utilizing emergency transfer criteria.[13] Under this condition the margin is sufficient for all study years (line-item K) until winter 2033-34 which is deficient by 1,572 MW. Additionally, **Figure 15** shows the statewide system margin with full operating reserve which is also sufficient for all study years (line-item M) through winter 2031-32. In winter 2032-33, the margin is deficient by 1,267 MW and worsens to 2,882 MW in the following winter.

Figure 16 provides a summary of the summer peak statewide system margins under expected weather, heatwave, and extreme heatwave conditions. **Figure 17** Provides a summary of the winter peak statewide system margins under expected weather, cold snap, and extreme cold snap conditions. **Figure 18** 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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[12] The load forecast utilized for the cold snap condition is the winter 90th percentile (or 90/10) expected load forecast.
[13] The load forecast utilized for the extreme cold snap condition is the winter 99th percentile (or 99/1) expected load forecast.

Figure 4: 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)	38,041	38,266	38,266	38,266	38,266	38,266	38,266	38,266	38,266	38,266
B	NYCA Generation Derates (2)	(5,903)	(6,554)	(6,568)	(6,581)	(6,594)	(6,607)	(6,607)	(6,621)	(6,634)	(6,634)
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)**	33,981	33,555	34,792	34,779	34,766	34,752	34,752	34,739	34,726	34,726
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)	(480)	(524)	(569)	(589)	(589)	(589)	(589)	(589)	(589)	(589)
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)**	(33,553)	(33,460)	(33,315)	(33,191)	(33,063)	(33,025)	(33,165)	(33,425)	(33,785)	(34,195)
J	**Statewide System Margin (E+I)**	428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
K	SCRs (7)	860	860	860	860	860	860	860	860	860	860
L	**Statewide System Margin with SCR (J+K)**	1,289	956	2,337	2,448	2,563	2,588	2,448	2,175	1,801	1,391
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)**	(21)	(354)	1,027	1,138	1,253	1,278	1,138	865	491	81

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).
7. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
8. Includes a derate of 364 MW for SCRs.

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Lockport CC1, CC2, and CC3	207.3	(8.42)	229	(104)	1,278	1,389	1,504	1,528	1,388	1,115	742	332
Lockport CC1	69.1	(2.81)	362	29	1,411	1,521	1,636	1,661	1,521	1,248	875	465
Lockport CC2	69.1	(2.81)	362	29	1,411	1,521	1,636	1,661	1,521	1,248	875	465
Lockport CC3	69.1	(2.81)	362	29	1,411	1,521	1,636	1,661	1,521	1,248	875	465
American Ref-Fuel 1 & 2	35.8	(3.54)	396	63	1,445	1,555	1,670	1,695	1,555	1,282	909	499
American Ref-Fuel 1	17.9	(1.77)	412	79	1,461	1,572	1,686	1,711	1,571	1,298	925	515
American Ref-Fuel 2	17.9	(1.77)	412	79	1,461	1,572	1,686	1,711	1,571	1,298	925	515
Fortistar - N.Tonawanda	57.3	(2.33)	373	40	1,422	1,533	1,648	1,672	1,532	1,259	886	476
Chaffee	6.4	(0.62)	423	89	1,471	1,582	1,697	1,722	1,582	1,308	935	525
Indeck-Olean	77.2	(3.13)	354	21	1,403	1,514	1,628	1,653	1,513	1,240	867	457
Indeck-Yerkes	45.8	(1.86)	384	51	1,433	1,544	1,659	1,683	1,543	1,270	897	487
Chautauqua LFGE	0.0	0.00	428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Jamestown 5, 6 & 7	82.3	(8.22)	354	21	1,403	1,514	1,628	1,653	1,513	1,240	867	457
Jamestown 7	40.4	(4.07)	392	59	1,441	1,551	1,666	1,691	1,551	1,278	905	495
Jamestown 5	22.4	(2.22)	408	75	1,457	1,568	1,682	1,707	1,567	1,294	921	511
Jamestown 6	19.5	(1.93)	411	78	1,459	1,570	1,685	1,710	1,570	1,296	923	513
Model City Energy	5.6	(0.54)	423	90	1,472	1,583	1,697	1,722	1,582	1,309	936	526
Modern LF	6.4	(0.62)	423	89	1,471	1,582	1,697	1,722	1,582	1,308	935	525
Mill Seat	6.4	(0.62)	423	89	1,471	1,582	1,697	1,722	1,582	1,308	935	525
Synergy Biogas	0.0	0.00	428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Hyland LFGE	4.8	(0.46)	424	91	1,473	1,583	1,698	1,723	1,583	1,310	936	526
R. E. Ginna	580.3	(11.08)	(141)	(474)	908	1,019	1,133	1,158	1,018	745	372	(38)
Red Rochester (BTM:NG)	12.5	(1.24)	417	84	1,466	1,576	1,691	1,716	1,576	1,303	930	520
Allegany	62.2	(2.53)	369	36	1,417	1,528	1,643	1,668	1,528	1,254	881	471

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Batavia	47.8	(1.94)	383	49	1,431	1,542	1,657	1,681	1,541	1,268	895	485
Carr St.-E. Syr	86.5	(3.51)	345	12	1,394	1,505	1,620	1,644	1,504	1,231	858	448
Syracuse	87.1	(3.54)	345	12	1,393	1,504	1,619	1,644	1,504	1,230	857	447
Broome LFGE	2.4	(0.23)	426	93	1,475	1,586	1,700	1,725	1,585	1,312	939	529
Broome 2 LFGE	2.1	(0.20)	426	93	1,475	1,586	1,701	1,725	1,585	1,312	939	529
Independence GS1, GS2, GS3, & GS4	958.8	(38.93)	(491)	(825)	557	668	783	807	667	394	21	(389)
Independence GS1	239.7	(9.73)	198	(135)	1,247	1,358	1,473	1,497	1,357	1,084	711	301
Independence GS2	239.7	(9.73)	198	(135)	1,247	1,358	1,473	1,497	1,357	1,084	711	301
Independence GS3	239.7	(9.73)	198	(135)	1,247	1,358	1,473	1,497	1,357	1,084	711	301
Independence GS4	239.7	(9.73)	198	(135)	1,247	1,358	1,473	1,497	1,357	1,084	711	301
Greenidge 4 (BTM:NG)	24.0	(2.38)	407	74	1,455	1,566	1,681	1,706	1,566	1,292	919	509
James A. FitzPatrick	831.3	(18.04)	(385)	(718)	664	774	889	914	774	501	128	(282)
High Acres	9.6	(0.93)	420	87	1,468	1,579	1,694	1,719	1,579	1,305	932	522
Indeck-Silver Springs	52.6	(2.14)	378	45	1,427	1,537	1,652	1,677	1,537	1,264	890	480
Indeck-Oswego	52.7	(2.14)	378	45	1,426	1,537	1,652	1,677	1,537	1,263	890	480
Nine Mile Point 2	1,272.1	(27.60)	(816)	(1,149)	232	343	458	483	343	70	(304)	(714)
Nine Mile Point 1	620.9	(13.47)	(179)	(512)	870	980	1,095	1,120	980	707	333	(77)
Oswego 6	823.4	(81.52)	(314)	(647)	735	846	961	985	845	572	199	(211)
Oswego 5	798.1	(79.01)	(291)	(624)	758	869	983	1,008	868	595	222	(188)
Seneca Energy 1 & 2	17.6	(1.70)	412	79	1,461	1,572	1,687	1,711	1,571	1,298	925	515
Ontario LFGE	11.2	(1.08)	418	85	1,467	1,578	1,692	1,717	1,577	1,304	931	521
Seneca Energy 1	8.8	(0.85)	420	87	1,469	1,580	1,695	1,719	1,579	1,306	933	523
Seneca Energy 2	8.8	(0.85)	420	87	1,469	1,580	1,695	1,719	1,579	1,306	933	523
Clinton LFGE	6.4	(0.62)	423	89	1,471	1,582	1,697	1,722	1,582	1,308	935	525

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Massena	79.9	(3.24)	352	19	1,400	1,511	1,626	1,651	1,511	1,237	864	454
Saranac Energy CC1 & CC2	235.5	(9.56)	202	(131)	1,251	1,362	1,477	1,501	1,361	1,088	715	305
Saranac Energy CC2	124.9	(5.07)	309	(25)	1,357	1,468	1,583	1,607	1,467	1,194	821	411
Saranac Energy CC1	110.6	(4.49)	322	(11)	1,371	1,482	1,596	1,621	1,481	1,208	835	425
Beaver Falls	80.3	(3.26)	351	18	1,400	1,511	1,625	1,650	1,510	1,237	864	454
Oneida-Herkimer LFGE	3.2	(0.31)	425	92	1,474	1,585	1,700	1,724	1,584	1,311	938	528
DANC LFGE	6.4	(0.62)	423	89	1,471	1,582	1,697	1,722	1,582	1,308	935	525
Carthage Energy	55.6	(2.26)	375	42	1,424	1,534	1,649	1,674	1,534	1,261	887	477
Sterling	48.3	(1.96)	382	49	1,431	1,541	1,656	1,681	1,541	1,268	894	484
Albany LFGE	5.6	(0.54)	423	90	1,472	1,583	1,697	1,722	1,582	1,309	936	526
Castleton Energy Center	66.1	(2.68)	365	32	1,414	1,524	1,639	1,664	1,524	1,251	877	467
Selkirk I & II	350.6	(14.23)	92	(241)	1,141	1,251	1,366	1,391	1,251	978	604	194
Selkirk-II	275.9	(11.20)	164	(169)	1,212	1,323	1,438	1,463	1,323	1,049	676	266
Rensselaer	77.0	(3.13)	355	21	1,403	1,514	1,629	1,653	1,513	1,240	867	457
Selkirk-I	74.7	(3.03)	357	24	1,405	1,516	1,631	1,656	1,516	1,242	869	459
Empire CC1 & CC2	586.6	(23.82)	(134)	(468)	914	1,025	1,140	1,165	1,025	751	378	(32)
Empire CC1	293.3	(11.91)	147	(186)	1,196	1,306	1,421	1,446	1,306	1,033	659	249
Empire CC2	293.3	(11.91)	147	(186)	1,196	1,306	1,421	1,446	1,306	1,033	659	249
Indeck-Corinth	128.4	(5.21)	305	(28)	1,354	1,465	1,579	1,604	1,464	1,191	818	408
Colonie LFGTE	6.4	(0.62)	423	89	1,471	1,582	1,697	1,722	1,582	1,308	935	525
Fulton LFGE	3.2	(0.31)	425	92	1,474	1,585	1,700	1,724	1,584	1,311	938	528
Athens 1, 2, and 3	990.5	(40.21)	(522)	(855)	527	637	752	777	637	364	(9)	(419)
Athens 3	331.3	(13.45)	111	(223)	1,159	1,270	1,385	1,409	1,269	996	623	213
Athens 1	329.6	(13.38)	112	(221)	1,161	1,272	1,386	1,411	1,271	998	625	215

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Athens 2	329.6	(13.38)	112	(221)	1,161	1,272	1,386	1,411	1,271	998	625	215
Bethlehem GS1, GS2, GS3	818.7	(33.24)	(357)	(690)	692	802	917	942	802	529	155	(255)
Bethlehem GS1	272.9	(11.08)	167	(167)	1,215	1,326	1,441	1,465	1,325	1,052	679	269
Bethlehem GS2	272.9	(11.08)	167	(167)	1,215	1,326	1,441	1,465	1,325	1,052	679	269
Bethlehem GS3	272.9	(11.08)	167	(167)	1,215	1,326	1,441	1,465	1,325	1,052	679	269
Wheelabrator Hudson Falls	10.4	(1.03)	419	86	1,468	1,578	1,693	1,718	1,578	1,305	931	521
DCRRA	6.2	(0.61)	423	90	1,471	1,582	1,697	1,722	1,582	1,308	935	525
Roseton 1 & 2	1,188.7	(117.68)	(643)	(976)	406	517	631	656	516	243	(130)	(540)
Roseton 2	612.5	(60.64)	(123)	(457)	925	1,036	1,151	1,175	1,035	762	389	(21)
Roseton 1	576.2	(57.04)	(91)	(424)	958	1,069	1,183	1,208	1,068	795	422	12
Danskammer 1, 2, 3, & 4	496.2	(49.12)	(19)	(352)	1,030	1,141	1,255	1,280	1,140	867	494	84
Danskammer 4	222.1	(21.99)	228	(105)	1,277	1,388	1,502	1,527	1,387	1,114	741	331
Danskammer 3	139.7	(13.83)	303	(31)	1,351	1,462	1,577	1,601	1,461	1,188	815	405
Danskammer 1	70.2	(6.95)	365	32	1,414	1,524	1,639	1,664	1,524	1,251	878	468
Danskammer 2	64.2	(6.36)	371	37	1,419	1,530	1,645	1,669	1,529	1,256	883	473
CPV Valley CC1 & CC2	651.8	(26.46)	(197)	(530)	852	962	1,077	1,102	962	689	315	(95)
CPV Valley CC1	325.9	(13.23)	116	(217)	1,164	1,275	1,390	1,415	1,275	1,001	628	218
CPV Valley CC2	325.9	(13.23)	116	(217)	1,164	1,275	1,390	1,415	1,275	1,001	628	218
Cricket Valley CC1, CC2, & CC3	1,029.3	(41.79)	(559)	(892)	489	600	715	740	600	327	(47)	(457)
Cricket Valley CC2	343.6	(13.95)	99	(234)	1,147	1,258	1,373	1,398	1,258	984	611	201
Cricket Valley CC3	343.3	(13.94)	99	(234)	1,148	1,258	1,373	1,398	1,258	985	611	201
Cricket Valley CC1	342.4	(13.90)	100	(233)	1,148	1,259	1,374	1,399	1,259	986	612	202
Bowline 1 & 2	1,139.0	(112.76)	(598)	(931)	451	562	676	701	561	288	(85)	(495)
Bowline 1	582.0	(57.62)	(96)	(429)	953	1,063	1,178	1,203	1,063	790	416	6

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	Summer DMNC (MW)	NERC 5-Year Class Average De-Rate (MW)	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Bowline 2	557.0	(55.14)	(73)	(407)	975	1,086	1,201	1,225	1,085	812	439	29
Hillburn GT	35.7	(3.20)	396	63	1,444	1,555	1,670	1,695	1,555	1,282	908	498
Shoemaker GT	32.7	(2.93)	399	65	1,447	1,558	1,673	1,698	1,558	1,284	911	501
Wheelabrator Westchester	52.1	(5.16)	381	48	1,430	1,541	1,656	1,680	1,540	1,267	894	484
Astoria Energy 2 - CC3 & CC4	570.2	(23.15)	(119)	(452)	930	1,041	1,155	1,180	1,040	767	394	(16)
Astoria Energy 2 - CC3	285.1	(11.58)	155	(178)	1,203	1,314	1,429	1,454	1,314	1,041	667	257
Astoria Energy 2 - CC4	285.1	(11.58)	155	(178)	1,203	1,314	1,429	1,454	1,314	1,041	667	257
Astoria East Energy CC1 & CC2	583.8	(23.70)	(132)	(465)	917	1,028	1,142	1,167	1,027	754	381	(29)
Astoria East Energy - CC1	291.9	(11.85)	148	(185)	1,197	1,308	1,422	1,447	1,307	1,034	661	251
Astoria East Energy - CC2	291.9	(11.85)	148	(185)	1,197	1,308	1,422	1,447	1,307	1,034	661	251
Astoria 2, 3, & 5	917.4	(90.82)	(398)	(731)	650	761	876	901	761	487	114	(296)
Astoria 5	374.7	(37.10)	91	(242)	1,139	1,250	1,365	1,390	1,250	976	603	193
Astoria 3	372.2	(36.85)	93	(240)	1,142	1,252	1,367	1,392	1,252	979	605	195
Astoria 2	170.5	(16.88)	275	(58)	1,323	1,434	1,549	1,574	1,434	1,160	787	377
Bayonne EC CT G1 through G10	601.6	(53.90)	(119)	(452)	929	1,040	1,155	1,180	1,040	766	393	(17)
Bayonne EC CTG1	61.8	(5.54)	372	39	1,421	1,531	1,646	1,671	1,531	1,258	885	475
Bayonne EC CTG4	60.9	(5.46)	373	40	1,422	1,532	1,647	1,672	1,532	1,259	885	475
Bayonne EC CTG9	60.5	(5.42)	373	40	1,422	1,533	1,647	1,672	1,532	1,259	886	476
Bayonne EC CTG10	60.5	(5.42)	373	40	1,422	1,533	1,647	1,672	1,532	1,259	886	476
Bayonne EC CTG8	60.3	(5.40)	373	40	1,422	1,533	1,648	1,672	1,532	1,259	886	476
Bayonne EC CTG2	60.2	(5.39)	374	40	1,422	1,533	1,648	1,672	1,532	1,259	886	476
Bayonne EC CTG7	60.0	(5.38)	374	41	1,422	1,533	1,648	1,673	1,533	1,259	886	476
Bayonne EC CTG5	59.7	(5.35)	374	41	1,423	1,533	1,648	1,673	1,533	1,260	886	476
Bayonne EC CTG6	59.6	(5.34)	374	41	1,423	1,533	1,648	1,673	1,533	1,260	887	477

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Bayonne EC CTG3	58.1	(5.21)	375	42	1,424	1,535	1,650	1,674	1,534	1,261	888	478
KIAC_JFK (BTM:NG)	98.7	(4.01)	334	1	1,382	1,493	1,608	1,633	1,493	1,219	846	436
East River 1, 2, 6, & 7	636.5	(44.86)	(163)	(496)	885	996	1,111	1,136	996	722	349	(61)
Brooklyn Navy Yard	244.6	(9.93)	194	(139)	1,242	1,353	1,468	1,493	1,353	1,079	706	296
East River 7	184.2	(18.24)	262	(71)	1,311	1,422	1,537	1,561	1,421	1,148	775	365
East River 2	155.8	(6.33)	279	(54)	1,328	1,438	1,553	1,578	1,438	1,165	791	381
East River 1	155.1	(6.30)	280	(54)	1,328	1,439	1,554	1,578	1,438	1,165	792	382
East River 6	141.4	(14.00)	301	(32)	1,350	1,460	1,575	1,600	1,460	1,187	813	403
Arthur Kill Cogen	11.1	(1.32)	419	85	1,467	1,578	1,693	1,718	1,578	1,304	931	521
Linden Cogen	789.5	(32.05)	(329)	(662)	720	830	945	970	830	557	183	(227)
Ravenswood ST 01, 02, & 03	1,730.3	(171.30)	(1,131)	(1,464)	(82)	29	144	168	28	(245)	(618)	(1,028)
Ravenswood ST 03	987.3	(97.74)	(461)	(794)	587	698	813	838	698	425	51	(359)
Ravenswood ST 02	374.5	(37.08)	91	(242)	1,140	1,250	1,365	1,390	1,250	977	603	193
Ravenswood ST 01	368.5	(36.48)	96	(237)	1,145	1,256	1,370	1,395	1,255	982	609	199
Ravenswood CC 04	223.2	(9.06)	214	(119)	1,263	1,374	1,488	1,513	1,373	1,100	727	317
Astoria CC 1 & 2	476.0	(19.33)	(28)	(361)	1,020	1,131	1,246	1,271	1,131	857	484	74
Astoria CC 1	238.0	(9.66)	200	(133)	1,249	1,359	1,474	1,499	1,359	1,086	712	302
Astoria CC 2	238.0	(9.66)	200	(133)	1,249	1,359	1,474	1,499	1,359	1,086	712	302
Gowanus 5 & 6	79.9	(8.05)	357	23	1,405	1,516	1,631	1,655	1,515	1,242	869	459
Hellgate 1 & 2	79.9	(8.05)	357	23	1,405	1,516	1,631	1,655	1,515	1,242	869	459
Harlem River 1 & 2	79.9	(8.05)	357	23	1,405	1,516	1,631	1,655	1,515	1,242	869	459
Vernon Blvd 2 & 3	79.9	(8.05)	357	23	1,405	1,516	1,631	1,655	1,515	1,242	869	459
Kent	45.8	(4.62)	387	54	1,436	1,547	1,661	1,686	1,546	1,273	900	490
Pouch	45.1	(4.55)	388	55	1,436	1,547	1,662	1,687	1,547	1,274	900	490

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Gowanus 5	40.0	(4.03)	392	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Hellgate 2	40.0	(4.03)	392	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Harlem River 2	40.0	(4.03)	392	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Vernon Blvd 2	40.0	(4.03)	392	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Gowanus 6	39.9	(4.02)	393	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Hellgate 1	39.9	(4.02)	393	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Harlem River 1	39.9	(4.02)	393	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Vernon Blvd 3	39.9	(4.02)	393	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Arthur Kill ST 2 & 3	865.3	(85.66)	(351)	(684)	697	808	923	948	808	534	161	(249)
Arthur Kill ST 3	519.0	(51.38)	(39)	(372)	1,009	1,120	1,235	1,260	1,120	846	473	63
Arthur Kill ST 2	346.3	(34.28)	116	(217)	1,165	1,276	1,391	1,415	1,275	1,002	629	219
Bethpage GT4	44.4	(4.48)	388	55	1,437	1,548	1,663	1,687	1,547	1,274	901	491
Bethpage	23.2	(0.94)	406	73	1,455	1,565	1,680	1,705	1,565	1,292	919	509
Stony Brook (BTM:NG)	0.0	0.00	428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Freeport CT 2	40.0	(4.03)	392	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Freeport 1-2, 1-3, & 2-3	16.8	(1.80)	413	80	1,462	1,573	1,688	1,712	1,572	1,299	926	516
Freeport 2-3	12.5	(1.26)	417	84	1,466	1,577	1,691	1,716	1,576	1,303	930	520
Freeport 1-3	2.3	(0.29)	426	93	1,475	1,586	1,701	1,725	1,585	1,312	939	529
Freeport 1-2	2.0	(0.25)	427	93	1,475	1,586	1,701	1,726	1,586	1,312	939	529
Northport 1, 2, 3, and 4	1,518.6	(150.34)	(940)	(1,273)	109	219	334	359	219	(54)	(427)	(837)
Holtsville 01 through 10	525.9	(47.12)	(50)	(384)	998	1,109	1,224	1,249	1,109	835	462	52
Northport 2	397.5	(39.35)	70	(263)	1,119	1,230	1,344	1,369	1,229	956	583	173
Northport 3	396.5	(39.25)	71	(262)	1,120	1,230	1,345	1,370	1,230	957	584	174
Northport 1	396.2	(39.22)	71	(262)	1,120	1,231	1,346	1,370	1,230	957	584	174

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Port Jefferson 3 & 4	383.5	(37.97)	83	(250)	1,131	1,242	1,357	1,382	1,242	969	595	185
Barrett ST 01 & 02	372.0	(36.83)	93	(240)	1,142	1,253	1,367	1,392	1,252	979	606	196
Northport 4	328.4	(32.51)	132	(201)	1,181	1,292	1,407	1,431	1,291	1,018	645	235
Caithness_CC_1	302.4	(12.28)	138	(195)	1,187	1,298	1,412	1,437	1,297	1,024	651	241
Barrett GT 01 through 12	256.5	(24.12)	196	(137)	1,245	1,355	1,470	1,495	1,355	1,082	708	298
Wading River 1, 2, & 3	227.0	(22.88)	224	(109)	1,273	1,384	1,498	1,523	1,383	1,110	737	327
Barrett ST 01	193.7	(19.18)	254	(79)	1,302	1,413	1,528	1,553	1,413	1,140	766	356
Port Jefferson 3	192.0	(19.01)	255	(78)	1,304	1,415	1,530	1,554	1,414	1,141	768	358
Port Jefferson 4	191.5	(18.96)	256	(77)	1,304	1,415	1,530	1,555	1,415	1,142	768	358
Barrett ST 02	178.3	(17.65)	268	(65)	1,316	1,427	1,542	1,567	1,427	1,153	780	370
Glenwood GT 02, 04, & 05	132.4	(13.35)	309	(24)	1,358	1,469	1,583	1,608	1,468	1,195	822	412
Far Rockaway GT1 & GT2	108.6	(9.73)	330	(4)	1,378	1,489	1,604	1,628	1,488	1,215	842	432
Shoreham GT 3 & 4	85.9	(8.66)	351	18	1,400	1,511	1,625	1,650	1,510	1,237	864	454
Pilgrim GT1 & GT2	83.2	(8.39)	354	20	1,402	1,513	1,628	1,652	1,512	1,239	866	456
Port Jefferson GT 02 & 03	82.2	(8.29)	354	21	1,403	1,514	1,629	1,653	1,513	1,240	867	457
Wading River 1	76.8	(7.74)	359	26	1,408	1,519	1,633	1,658	1,518	1,245	872	462
Wading River 2	75.7	(7.63)	360	27	1,409	1,520	1,634	1,659	1,519	1,246	873	463
Bethpage 3	74.8	(3.04)	357	23	1,405	1,516	1,631	1,656	1,516	1,242	869	459
Wading River 3	74.5	(7.51)	361	28	1,410	1,521	1,636	1,660	1,520	1,247	874	464
Hempstead (RR)	73.0	(7.23)	363	29	1,411	1,522	1,637	1,662	1,522	1,248	875	465
Pinelawn Power 1	73.0	(2.96)	358	25	1,407	1,518	1,632	1,657	1,517	1,244	871	461
Holtsville 09	57.2	(5.13)	376	43	1,425	1,536	1,650	1,675	1,535	1,262	889	479
Holtsville 01	56.3	(5.04)	377	44	1,426	1,536	1,651	1,676	1,536	1,263	890	480
Far Rockaway GT2	55.8	(5.00)	378	44	1,426	1,537	1,652	1,676	1,536	1,263	890	480

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Holtsville 02	55.0	(4.93)	378	45	1,427	1,538	1,652	1,677	1,537	1,264	891	481
Holtsville 04	54.1	(4.85)	379	46	1,428	1,538	1,653	1,678	1,538	1,265	892	482
Holtsville 05	52.8	(4.73)	380	47	1,429	1,540	1,654	1,679	1,539	1,266	893	483
Far Rockaway GT1	52.8	(4.73)	380	47	1,429	1,540	1,654	1,679	1,539	1,266	893	483
Greenport GT1	52.6	(4.71)	380	47	1,429	1,540	1,655	1,679	1,539	1,266	893	483
Holtsville 07	51.6	(4.62)	381	48	1,430	1,541	1,656	1,680	1,540	1,267	894	484
Holtsville 10	50.3	(4.51)	383	49	1,431	1,542	1,657	1,681	1,541	1,268	895	485
Holtsville 03	50.2	(4.50)	383	50	1,431	1,542	1,657	1,682	1,542	1,268	895	485
Glenwood GT 02	49.9	(5.03)	384	50	1,432	1,543	1,658	1,682	1,542	1,269	896	486
Holtsville 06	49.8	(4.46)	383	50	1,432	1,542	1,657	1,682	1,542	1,269	895	485
Holtsville 08	48.6	(4.35)	384	51	1,433	1,544	1,658	1,683	1,543	1,270	897	487
Shoreham GT4	43.1	(4.34)	390	56	1,438	1,549	1,664	1,689	1,549	1,275	902	492
Shoreham GT3	42.8	(4.31)	390	57	1,438	1,549	1,664	1,689	1,549	1,276	902	492
Glenwood GT 05	42.7	(4.30)	390	57	1,439	1,549	1,664	1,689	1,549	1,276	902	492
Pilgrim GT2	41.7	(4.20)	391	58	1,439	1,550	1,665	1,690	1,550	1,277	903	493
Port Jefferson GT 02	41.5	(4.18)	391	58	1,440	1,550	1,665	1,690	1,550	1,277	904	494
Pilgrim GT1	41.5	(4.18)	391	58	1,440	1,550	1,665	1,690	1,550	1,277	904	494
Port Jefferson GT 03	40.7	(4.10)	392	59	1,440	1,551	1,666	1,691	1,551	1,277	904	494
Glenwood GT 04	39.8	(4.01)	393	59	1,441	1,552	1,667	1,691	1,551	1,278	905	495
Barrett 12	39.7	(3.56)	392	59	1,441	1,552	1,666	1,691	1,551	1,278	905	495
Barrett 09	38.5	(3.45)	393	60	1,442	1,553	1,667	1,692	1,552	1,279	906	496
Barrett 10	38.5	(3.45)	393	60	1,442	1,553	1,667	1,692	1,552	1,279	906	496
Barrett 11	38.5	(3.45)	393	60	1,442	1,553	1,667	1,692	1,552	1,279	906	496
Huntington (RR)	24.5	(2.43)	406	73	1,455	1,566	1,680	1,705	1,565	1,292	919	509

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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
East Hampton GT 01, 2, 3, & 4	24.2	(2.38)	407	73	1,455	1,566	1,681	1,705	1,565	1,292	919	509
East Hampton GT 01	18.5	(1.66)	412	78	1,460	1,571	1,686	1,710	1,570	1,297	924	514
Babylon (RR)	16.0	(1.58)	414	81	1,463	1,573	1,688	1,713	1,573	1,300	926	516
Barrett GT 02	15.6	(1.57)	414	81	1,463	1,574	1,688	1,713	1,573	1,300	927	517
Barrett 03	15.0	(1.51)	415	82	1,463	1,574	1,689	1,714	1,574	1,301	927	517
Barrett 06	15.0	(1.51)	415	82	1,463	1,574	1,689	1,714	1,574	1,301	927	517
Barrett GT 01	14.9	(1.50)	415	82	1,464	1,574	1,689	1,714	1,574	1,301	927	517
Barrett 08	14.4	(1.45)	415	82	1,464	1,575	1,690	1,714	1,574	1,301	928	518
Barrett 04	13.3	(1.34)	416	83	1,465	1,576	1,691	1,715	1,575	1,302	929	519
Barrett 05	13.1	(1.32)	417	83	1,465	1,576	1,691	1,716	1,576	1,302	929	519
Southold 1	9.4	(0.95)	420	87	1,469	1,579	1,694	1,719	1,579	1,306	932	522
S Hampton 1	8.6	(0.87)	421	87	1,469	1,580	1,695	1,720	1,580	1,306	933	523
Islip (RR)	8.0	(0.79)	421	88	1,470	1,581	1,695	1,720	1,580	1,307	934	524
East Hampton 2	1.9	(0.24)	427	94	1,475	1,586	1,701	1,726	1,586	1,312	939	529
East Hampton 3	1.9	(0.24)	427	94	1,475	1,586	1,701	1,726	1,586	1,312	939	529
East Hampton 4	1.9	(0.24)	427	94	1,475	1,586	1,701	1,726	1,586	1,312	939	529
Flynn	139.0	(5.64)	295	(38)	1,344	1,454	1,569	1,594	1,454	1,181	807	397
Brentwood	45.5	(4.59)	387	54	1,436	1,547	1,662	1,686	1,546	1,273	900	490
Greenport IC 4, 5, & 6	5.6	(0.71)	423	90	1,472	1,583	1,698	1,722	1,582	1,309	936	526
Greenport IC 6	3.1	(0.39)	426	92	1,474	1,585	1,700	1,725	1,585	1,311	938	528
Greenport IC 5	1.5	(0.19)	427	94	1,476	1,586	1,701	1,726	1,586	1,313	940	530
Greenport IC 4	1.0	(0.13)	428	94	1,476	1,587	1,702	1,726	1,586	1,313	940	530
Charles P Killer 09 through 14	15.1	(1.79)	415	82	1,464	1,574	1,689	1,714	1,574	1,301	928	518
Charles P Keller 14	3.2	(0.38)	426	92	1,474	1,585	1,700	1,724	1,584	1,311	938	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)			428	95	1,477	1,588	1,703	1,727	1,587	1,314	941	531
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Charles P Keller 12	2.8	(0.33)	426	93	1,475	1,585	1,700	1,725	1,585	1,312	938	528
Charles P Keller 13	2.8	(0.33)	426	93	1,475	1,585	1,700	1,725	1,585	1,312	938	528
Charles P Keller 11	2.7	(0.32)	426	93	1,475	1,585	1,700	1,725	1,585	1,312	938	528
Charles P Keller 09	1.8	(0.21)	427	94	1,475	1,586	1,701	1,726	1,586	1,312	939	529
Charles P Keller 10	1.8	(0.21)	427	94	1,475	1,586	1,701	1,726	1,586	1,312	939	529
Freeport CT 1 & 2	85.4	(8.61)	352	18	1,400	1,511	1,626	1,650	1,510	1,237	864	454
Freeport CT 1	45.4	(4.58)	388	54	1,436	1,547	1,662	1,686	1,546	1,273	900	490

Notes

1. Utilizes the Statewide System Margin for Summer Peak with Expected Weather.

Figure 5: 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	6,296	5,735	7,078	7,147	7,216	7,232	7,139	6,951	6,702	6,438
HB1	6,300	5,757	7,115	7,198	7,277	7,309	7,238	7,078	6,862	6,633
HB2	7,118	6,589	7,956	8,047	8,134	8,180	8,125	7,986	7,795	7,595
HB3	7,561	7,041	8,414	8,510	8,604	8,656	8,615	8,488	8,314	8,130
HB4	7,525	7,004	8,379	8,478	8,575	8,633	8,597	8,477	8,309	8,133
HB5	6,859	6,331	7,702	7,801	7,898	7,954	7,913	7,786	7,607	7,422
HB6	5,675	5,179	6,566	6,682	6,796	6,864	6,824	6,694	6,509	6,312
HB7	5,392	5,031	6,497	6,687	6,868	6,985	6,978	6,873	6,706	6,524
HB8	4,555	4,422	6,012	6,314	6,590	6,785	6,832	6,769	6,642	6,493
HB9	3,865	3,971	5,695	6,122	6,504	6,785	6,901	6,896	6,822	6,721
HB10	2,921	3,210	5,039	5,564	6,033	6,387	6,559	6,604	6,572	6,517
HB11	2,105	2,504	4,399	4,985	5,512	5,913	6,124	6,202	6,203	6,178
HB12	1,493	1,929	3,847	4,454	5,005	5,421	5,641	5,727	5,734	5,718
HB13	678	1,082	2,987	3,586	4,128	4,538	4,749	4,825	4,820	4,797
HB14	999	1,341	3,217	3,551	4,072	4,463	3,855	3,913	3,895	3,854
HB15	598	808	2,609	3,110	3,572	3,910	3,574	3,582	3,511	3,421
HB16	984	396	1,493	1,881	2,243	2,492	2,550	2,478	2,322	2,153
HB17	428	111	1,633	1,873	2,107	2,237	2,197	2,032	1,783	1,516
HB18	555	95	1,477	1,588	1,703	1,727	1,587	1,314	954	588
HB19	365	326	1,642	1,690	1,749	1,728	1,539	1,235	941	531
HB20	820	165	2,044	2,311	2,357	2,328	2,137	1,838	1,451	1,045
HB21	1,116	473	1,771	1,806	1,854	1,830	2,128	1,842	1,474	1,085
HB22	2,239	1,617	2,926	2,967	3,017	2,998	3,640	3,376	3,036	2,676
HB23	3,960	3,366	4,689	4,743	4,803	4,801	4,672	4,443	4,144	3,828

Figure 6: Statewide System Margin Hourly Curve (Summer Peak - Expected Weather, Normal Transfer Criteria)

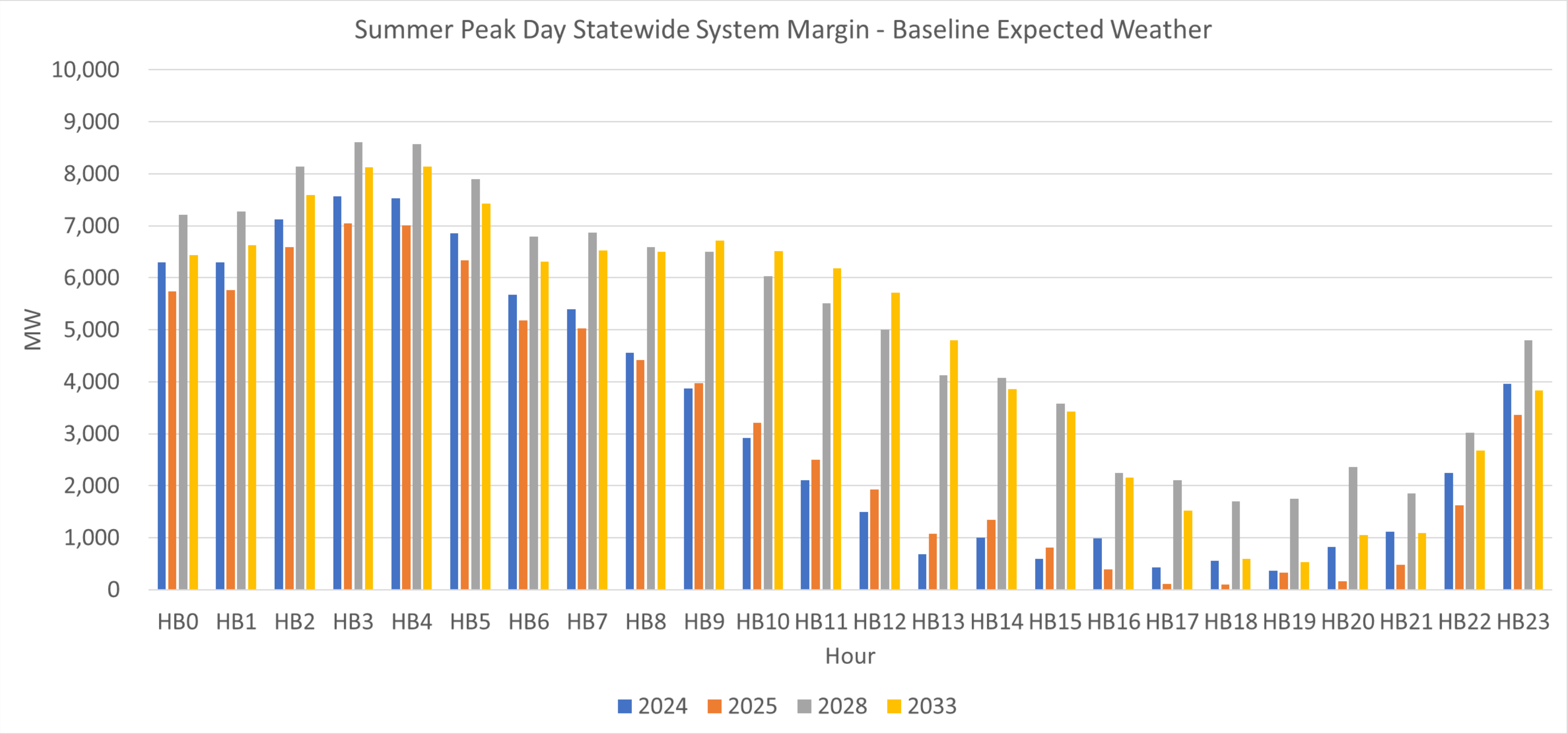


Figure 7: Statewide System Margin (1-in-10-Year Heatwave, Emergency Transfer Criteria)

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)	38,041	38,266	38,266	38,266	38,266	38,266	38,266	38,266	38,266	38,266
B	NYCA Generation Derates (2)	(5,903)	(6,554)	(6,568)	(6,581)	(6,594)	(6,607)	(6,607)	(6,621)	(6,634)	(6,634)
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)	860	860	860	860	860	860	860	860	860	860
F	**Total Resources (A+B+C+D+E)**	34,657	34,240	35,477	35,463	35,450	35,437	35,437	35,424	35,410	35,410
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)	(513)	(560)	(608)	(629)	(629)	(629)	(629)	(629)	(629)	(629)
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)**	(35,401)	(35,302)	(35,149)	(35,018)	(34,882)	(34,844)	(34,992)	(35,268)	(35,648)	(36,078)
K	**Statewide System Margin (F+J)**	(745)	(1,062)	327	445	568	593	445	156	(237)	(667)
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)**	(2,055)	(2,372)	(983)	(865)	(742)	(717)	(865)	(1,154)	(1,547)	(1,977)

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 364 MW for SCRs.
6. Reflects the final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG without the inclusion of the large load queue projects.
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).

Figure 8: 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	4,025	3,540	4,846	4,863	4,887	4,864	4,764	4,572	4,325	4,052
HB1	4,086	3,609	4,928	4,963	5,006	5,006	4,930	4,766	4,551	4,311
HB2	4,928	4,459	5,786	5,833	5,890	5,908	5,850	5,708	5,516	5,302
HB3	5,419	4,955	6,288	6,342	6,408	6,436	6,392	6,262	6,086	5,888
HB4	5,492	5,028	6,364	6,420	6,490	6,523	6,484	6,361	6,191	6,001
HB5	4,935	4,471	5,802	5,855	5,919	5,946	5,901	5,771	5,592	5,394
HB6	3,834	3,407	4,753	4,815	4,886	4,915	4,865	4,728	4,540	4,328
HB7	3,534	3,246	4,665	4,785	4,903	4,964	4,935	4,811	4,631	4,423
HB8	2,636	2,571	4,101	4,316	4,507	4,624	4,634	4,535	4,375	4,180
HB9	1,856	2,022	3,673	3,993	4,270	4,455	4,514	4,454	4,329	4,162
HB10	933	1,281	3,026	3,429	3,776	4,016	4,118	4,094	3,997	3,859
HB11	333	790	2,594	3,051	3,442	3,718	3,850	3,851	3,778	3,661
HB12	(236)	237	2,049	2,526	2,958	3,264	3,406	3,411	3,337	3,216
HB13	(935)	(510)	1,274	1,746	2,192	2,508	2,646	2,643	2,554	2,418
HB14	(812)	(464)	1,277	1,493	1,942	2,260	1,587	1,572	1,466	1,310
HB15	(1,447)	(1,245)	414	807	1,226	1,513	1,123	1,067	914	709
HB16	(280)	(884)	66	362	711	77	97	(25)	(251)	(527)
HB17	(745)	(1,062)	327	488	717	836	773	576	276	(75)
HB18	(414)	(863)	400	445	568	593	445	156	(237)	(667)
HB19	(552)	(575)	629	622	699	689	503	192	(124)	(586)
HB20	(819)	(1,437)	348	558	605	1,433	1,244	940	541	96
HB21	(402)	(993)	227	203	235	194	489	200	(176)	(594)
HB22	878	318	1,563	1,546	1,569	1,524	2,162	1,894	1,551	1,168
HB23	2,811	2,287	3,561	3,560	3,581	3,544	3,410	3,176	2,878	2,546

Figure 9: Statewide System Margin Hourly Curve (1-in-10-Year Heatwave, Emergency Transfer Criteria)

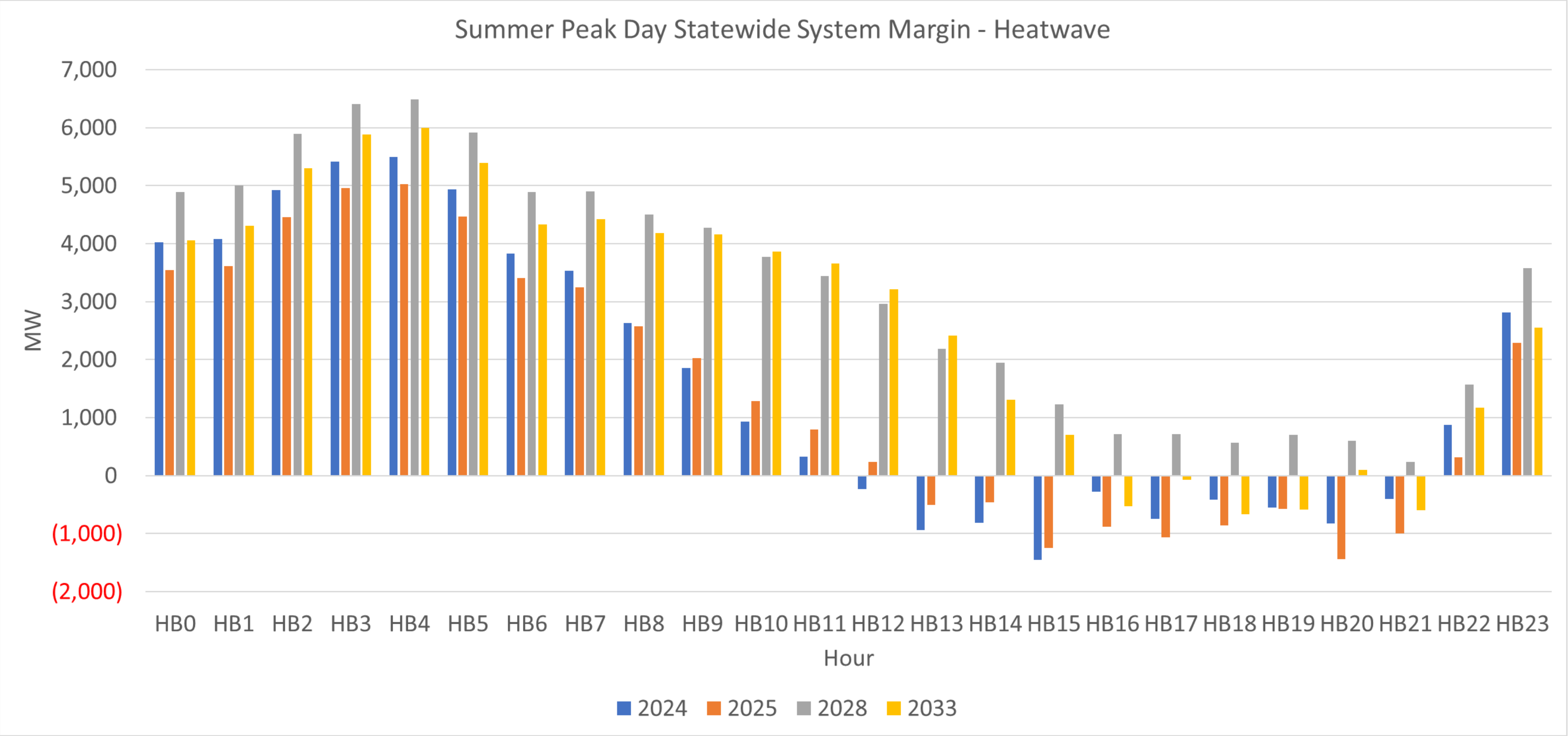


Figure 10: Statewide System Margin (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

		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	NYCA Generation (1)	38,041	38,266	38,266	38,266	38,266	38,266	38,266	38,266	38,266	38,266
B	NYCA Generation Derates (2)	(5,903)	(6,554)	(6,568)	(6,581)	(6,594)	(6,607)	(6,607)	(6,621)	(6,634)	(6,634)
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)	860	860	860	860	860	860	860	860	860	860
F	**Total Resources (A+B+C+D+E)**	34,453	34,045	35,282	35,269	35,256	35,243	35,243	35,229	35,216	35,216
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)	(536)	(585)	(635)	(657)	(657)	(657)	(657)	(657)	(657)	(657)
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)**	(36,906)	(36,801)	(36,642)	(36,505)	(36,366)	(36,327)	(36,483)	(36,769)	(37,161)	(37,613)
K	**Statewide System Margin (F+J)**	(2,453)	(2,756)	(1,359)	(1,236)	(1,110)	(1,085)	(1,240)	(1,539)	(1,945)	(2,396)
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)**	(3,763)	(4,066)	(2,669)	(2,546)	(2,420)	(2,395)	(2,550)	(2,849)	(3,255)	(3,706)

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 364 MW for SCRs.
6. Reflects the final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG without the inclusion of the large load queue projects.
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).

Figure 11: 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	3,070	2,602	3,915	3,938	3,964	3,942	3,839	3,642	3,390	3,106
HB1	3,131	2,671	3,998	4,038	4,083	4,083	4,005	3,836	3,615	3,365
HB2	3,973	3,521	4,856	4,908	4,967	4,985	4,925	4,778	4,580	4,356
HB3	4,464	4,017	5,358	5,417	5,485	5,513	5,467	5,332	5,150	4,942
HB4	4,537	4,090	5,434	5,495	5,567	5,600	5,559	5,431	5,255	5,055
HB5	3,980	3,533	4,872	4,929	4,997	5,024	4,976	4,841	4,656	4,448
HB6	2,879	2,469	3,822	3,890	3,963	3,993	3,940	3,798	3,604	3,382
HB7	2,579	2,308	3,734	3,860	3,980	4,041	4,010	3,881	3,695	3,477
HB8	1,681	1,633	3,171	3,390	3,585	3,702	3,709	3,605	3,439	3,234
HB9	901	1,084	2,742	3,068	3,347	3,532	3,589	3,524	3,393	3,216
HB10	(22)	343	2,095	2,504	2,853	3,094	3,193	3,164	3,061	2,913
HB11	(622)	(148)	1,664	2,126	2,519	2,795	2,925	2,921	2,842	2,715
HB12	(1,342)	(852)	967	1,449	1,884	2,190	2,329	2,329	2,246	2,113
HB13	(2,191)	(1,750)	41	519	967	1,283	1,417	1,408	1,309	1,158
HB14	(2,219)	(1,856)	(108)	114	567	885	207	183	67	(106)
HB15	(3,004)	(2,787)	(1,121)	(722)	(301)	(13)	(410)	(475)	(640)	(864)
HB16	(1,988)	(2,578)	(1,621)	(1,319)	(967)	(1,601)	(1,588)	(1,720)	(1,959)	(2,256)
HB17	(2,453)	(2,756)	(1,359)	(1,193)	(961)	(842)	(912)	(1,119)	(1,432)	(1,804)
HB18	(2,122)	(2,557)	(1,286)	(1,236)	(1,110)	(1,085)	(1,240)	(1,539)	(1,945)	(2,396)
HB19	(2,260)	(2,269)	(1,057)	(1,060)	(978)	(988)	(1,182)	(1,503)	(1,832)	(2,315)
HB20	(2,376)	(2,980)	(1,187)	(971)	(922)	(93)	(289)	(602)	(1,013)	(1,477)
HB21	(1,809)	(2,385)	(1,158)	(1,176)	(1,141)	(1,181)	(891)	(1,189)	(1,574)	(2,010)
HB22	(378)	(922)	330	319	344	300	933	659	307	(92)
HB23	1,705	1,198	2,479	2,483	2,507	2,471	2,333	2,094	1,788	1,443

Figure 12: Statewide System Margin Hourly Curve (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

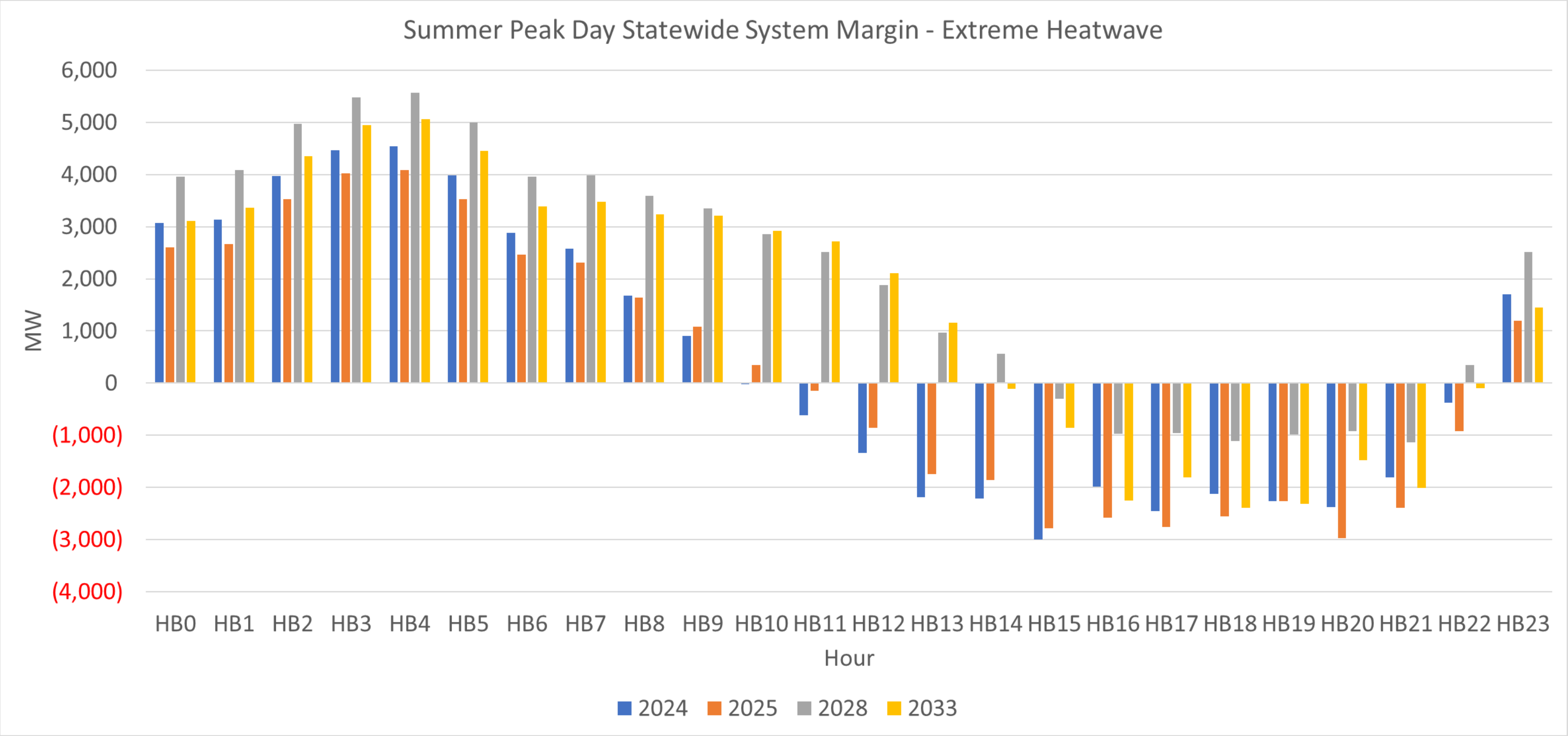


Figure 13: Statewide System Margin (Winter Peak - Expected Weather, Normal Transfer Criteria)

		Winter Peak - Baseline Expected Winter 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	NYCA Generation (1)	40,941	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226
B	NYCA Generation Derates (2)	(6,846)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)
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)**	35,363	35,331	35,331	35,331	35,331	35,331	35,331	35,331	35,331	35,331
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)	(490)	(559)	(579)	(589)	(589)	(589)	(589)	(589)	(589)	(589)
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)**	(25,695)	(26,065)	(26,545)	(27,081)	(27,743)	(28,615)	(29,645)	(30,835)	(32,205)	(33,655)
J	**Statewide System Margin (E+I)**	9,668	9,266	8,786	8,250	7,588	6,716	5,686	4,496	3,126	1,676
K	SCRs (7)(8)	486	486	486	486	486	486	486	486	486	486
L	**Statewide System Margin with SCR (J+K)**	10,154	9,752	9,272	8,736	8,074	7,202	6,172	4,982	3,612	2,162
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)**	8,844	8,442	7,962	7,426	6,764	5,892	4,862	3,672	2,302	852

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 final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG without the inclusion of the large load queue projects.
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).
7. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
8. Includes a derate of 211 MW for SCRs.

Figure 14: 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)	40,941	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226
B	NYCA Generation Derates (2)	(6,846)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)
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)	486	486	486	486	486	486	486	486	486	486
F	**Total Resources (A+B+C+D+E)**	35,849	35,817	35,817	35,817	35,817	35,817	35,817	35,817	35,817	35,817
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)	(510)	(582)	(603)	(614)	(614)	(614)	(614)	(614)	(614)	(614)
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)**	(26,717)	(27,104)	(27,604)	(28,163)	(28,852)	(29,760)	(30,833)	(32,074)	(33,502)	(35,012)
K	**Statewide System Margin (F+J)**	9,132	8,714	8,214	7,654	6,965	6,057	4,984	3,743	2,315	805
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)**	7,822	7,404	6,904	6,344	5,655	4,747	3,674	2,433	1,005	(505)

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 211 MW for SCRs.
6. Reflects the final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG without the inclusion of the large load queue projects.
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).

Figure 15: Statewide System Margin (1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria)

Line	Item	Winter Peak - 1-in-100-Year Extreme 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)	40,941	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226
B	NYCA Generation Derates (2)	(6,846)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)	(7,163)
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)	486	486	486	486	486	486	486	486	486	486
F	**Total Resources (A+B+C+D+E)**	35,849	35,818	35,819	35,820	35,821	35,822	35,823	35,824	35,825	35,826
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)	(547)	(624)	(646)	(657)	(657)	(657)	(657)	(657)	(657)	(657)
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)**	(28,518)	(28,929)	(29,466)	(30,064)	(30,803)	(31,777)	(32,925)	(34,255)	(35,783)	(37,398)
K	**Statewide System Margin (F+J)**	7,330	6,889	6,353	5,756	5,019	4,045	2,899	1,570	43	(1,572)
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)**	6,020	5,579	5,043	4,446	3,709	2,735	1,589	260	(1,267)	(2,882)

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 211 MW for SCRs.
6. Reflects the final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG without the inclusion of the large load queue projects.
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).

Figure 16: Summary of Statewide System Margin – Summer

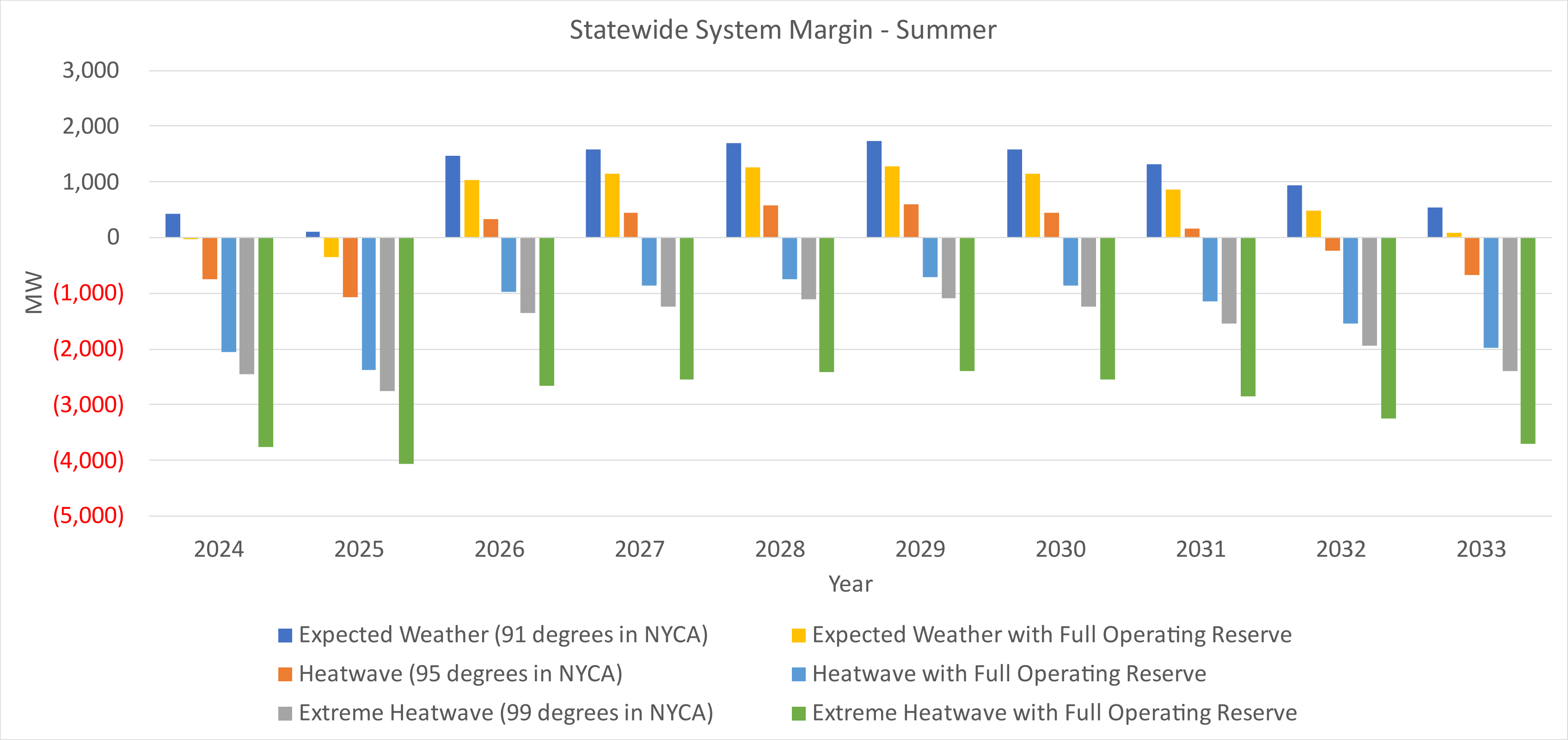


Figure 17: Summary of Statewide System Margin – Winter

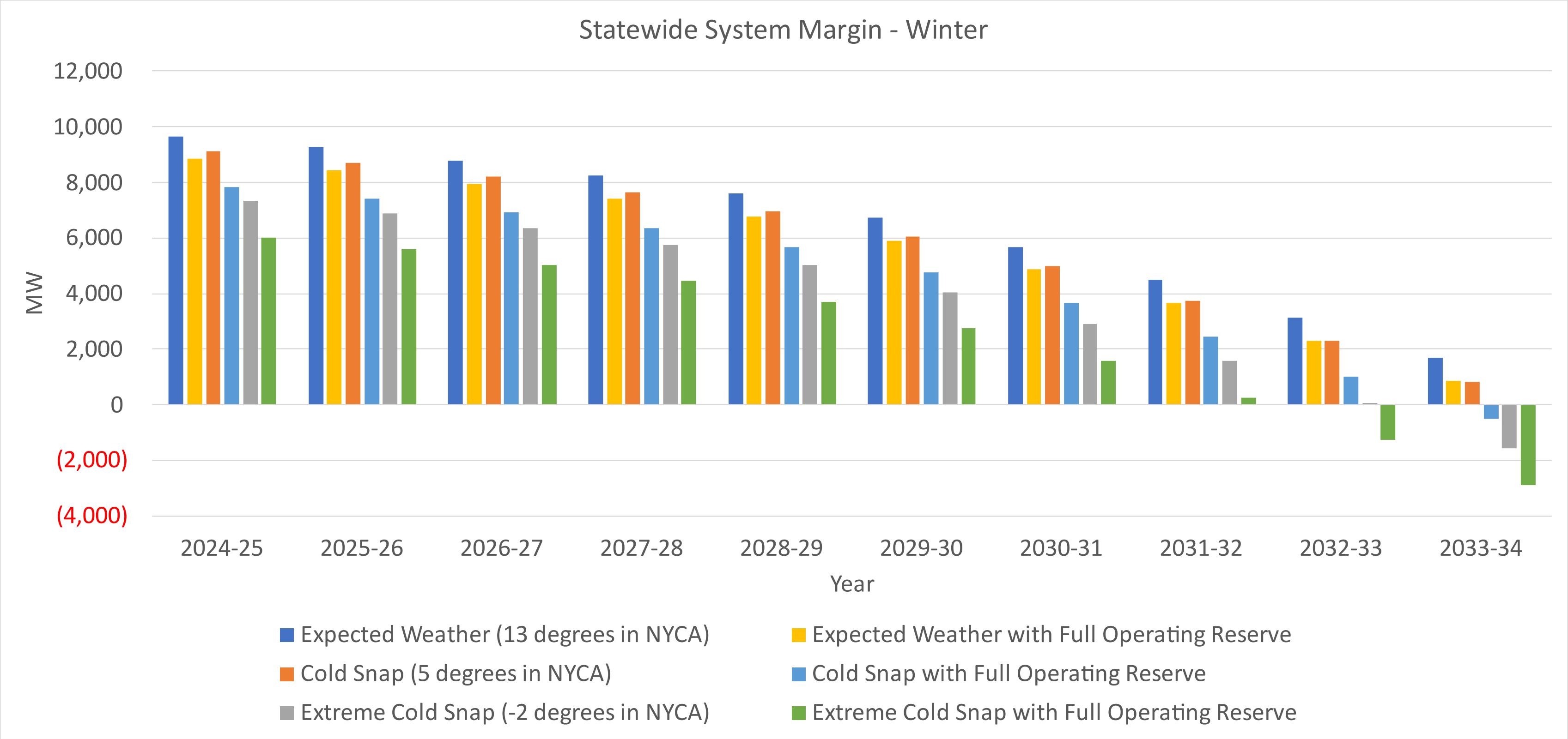
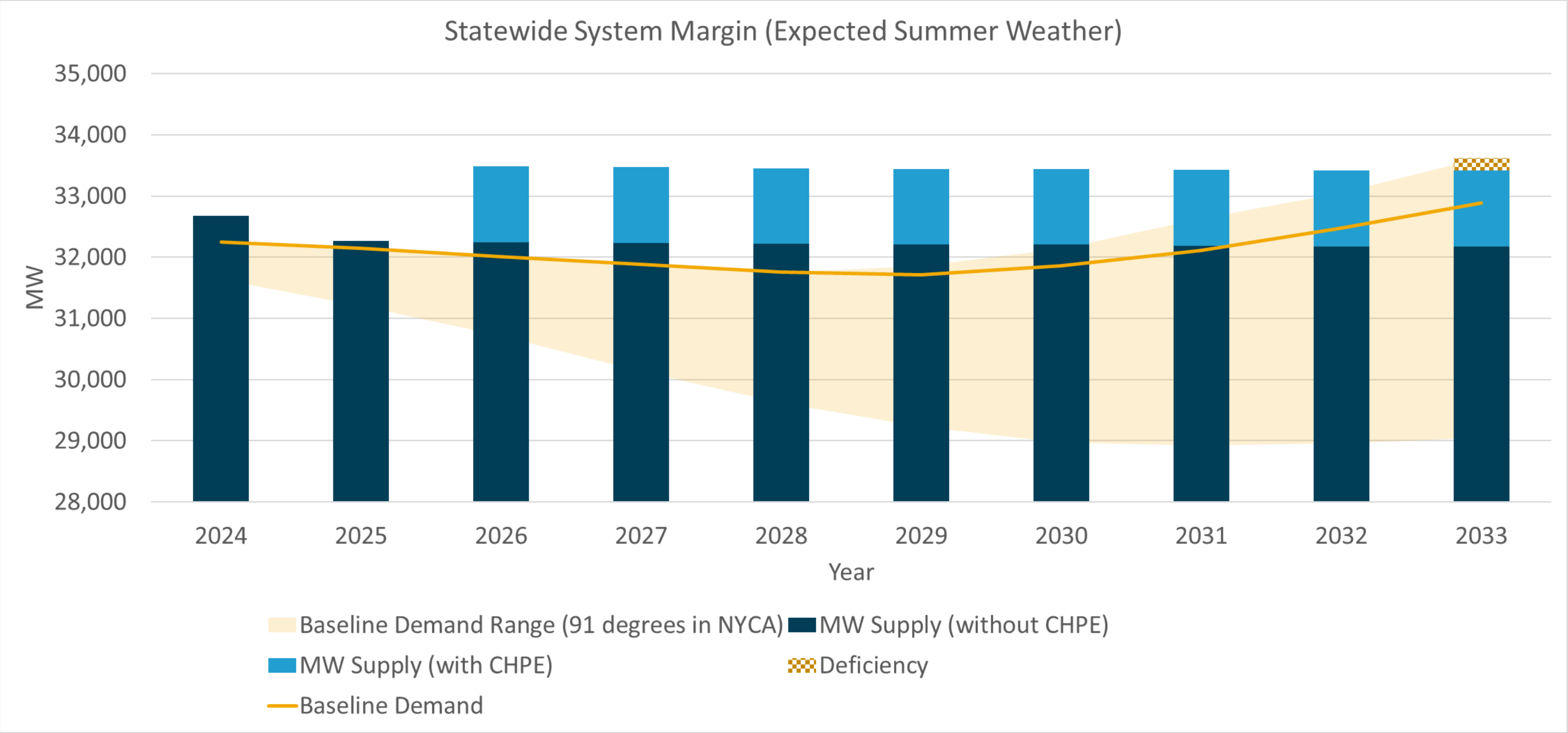


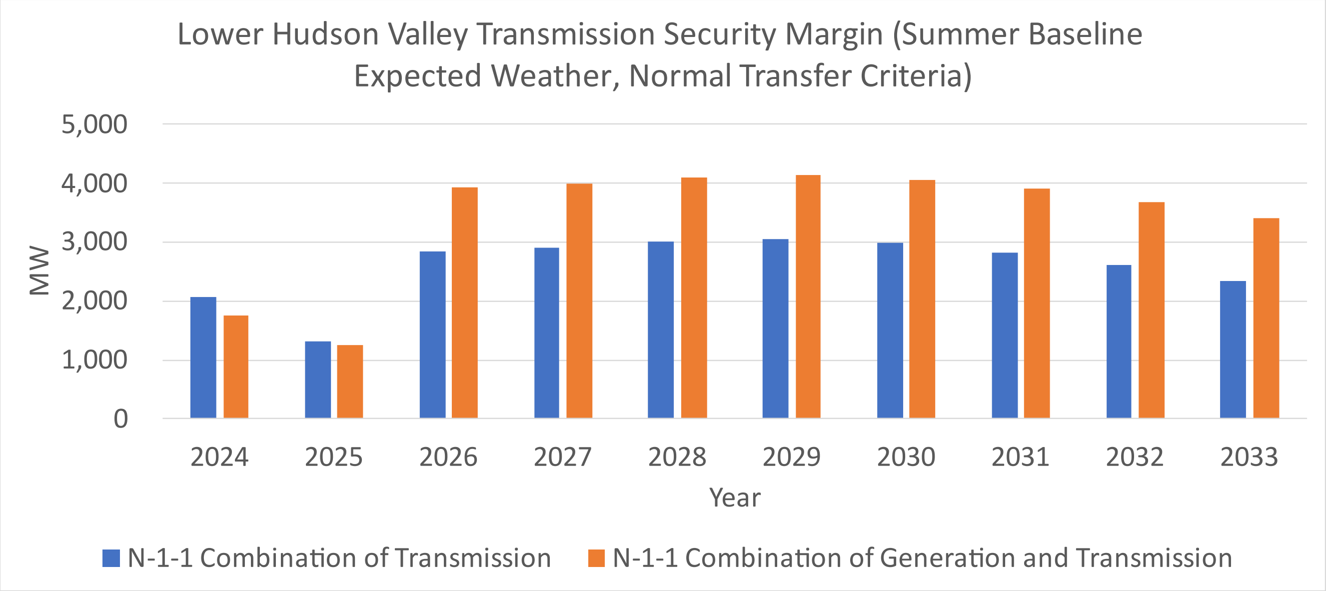
Figure 18: Statewide System Margin (Expected Weather, With and Without CHPE)



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 19** 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 19: 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 for the Zones 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 20 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 1,752 MW in summer 2024 to 2,337 MW in summer 2033. The narrowest margin is in summer 2025 with 1,245 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.

The demand shapes for the Lower Hudson Valley show the contributions of Zones G, H, I, (**Figure 94**) and J (**Figure 95**) 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 21**. 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 20** 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 20** 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 22**. 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.

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 23** 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 1,749 MW in summer 2024 to 2,128 MW in summer 2033. The demand shapes for the Lower

Hudson Valley under heatwave conditions are shown in **Figure 100** (Zones G, H, and I) and **Figure 101** (Zone J). Utilizing the Lower Hudson Valley demand-duration heatwave shapes, the transmission security margin for each hour under emergency transfer criteria is shown in **Figure 24**. 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 under heatwave, emergency transfer criteria conditions is provided in **Figure 25**.

Under a 1-in-100-year extreme heatwave, which also assumes the use of emergency transfer criteria, the margin is sufficient for all years as shown in **Figure 26**. The margin ranges from 657 MW in summer 2024 to 1,020 in Summer 2033. The demand shapes for the Lower Hudson Valley under extreme heatwave conditions are shown in **Figure 105** (Zones G, H, I, and J) and **Figure 106** (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 27**. **Figure 28** provides a graphical representation of the hourly transmission security margin for the peak day in years 2024, 2025, 2028, and 2033.

Figure 29 shows the Lower Hudson Valley transmission security margin under winter peak demand with expected weather. For winter peak demand, the margin is sufficient for all years and ranges from 7,505 MW in winter 2024-25 to 4,303 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 30 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 7,905 MW in winter 2024-25 to 4,570 MW in winter 2033-33 (line-item P). The 1-in-100-year extreme cold snap shown in **Figure 31** (also assuming emergency transfer criteria) shows sufficient margin for all study years ranging from 7,120 MW in winter 2024-25 to 3,552 in winter 2033-34 (line-item P).

Figure 32 provides are summary of the summer peak demand Lower Hudson Valley transmission security margins under expected summer weather, heatwave, and extreme heatwave conditions. **Figure 33** 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 34** 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 20: 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)	5,725	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)	13,481	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991
K	G-J Generation Derates (2)	(1,086)	(1,110)	(1,113)	(1,114)	(1,115)	(1,116)	(1,118)	(1,118)	(1,119)	(1,120)
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)**	12,711	12,196	13,444	13,442	13,441	13,440	13,438	13,438	13,437	13,436
O	**Transmission Security Margin (I+N)**	1,752	1,245	2,846	2,912	3,014	3,053	2,984	2,822	2,602	2,337

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 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).

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)			1,752	1,245	2,846	2,912	3,014	3,053	2,984	2,822	2,602	2,337
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Ravenswood ST 01, 02, & 03 (2)	1,730.3	(171.30)	505	(252)	1,287	1,353	1,455	1,494	1,425	1,263	1,043	778
Roseton 1 & 2	1,188.7	(117.68)	681	174	1,775	1,841	1,943	1,982	1,913	1,751	1,531	1,266
Bowline 1 & 2	1,139.0	(112.76)	725	219	1,819	1,886	1,988	2,026	1,958	1,796	1,576	1,311
Cricket Valley CC1, CC2, & CC3	1,029.3	(41.79)	764	257	1,858	1,925	2,026	2,065	1,997	1,835	1,615	1,349
Ravenswood ST 03 (2)	987.3	(97.74)	1,174	418	1,956	2,023	2,124	2,163	2,095	1,933	1,712	1,447
Astoria 2, 3, & 5	917.4	(90.82)	925	418	2,019	2,086	2,187	2,226	2,158	1,996	1,775	1,510
Arthur Kill ST 2 & 3	865.3	(85.66)	972	465	2,066	2,133	2,234	2,273	2,205	2,043	1,822	1,557
Linden Cogen	789.5	(32.05)	994	488	2,088	2,155	2,257	2,295	2,227	2,065	1,845	1,579
CPV Valley CC1 & CC2	651.8	(26.46)	1,126	620	2,220	2,287	2,389	2,427	2,359	2,197	1,977	1,711
East River 1, 2, 6, & 7	636.5	(44.86)	1,160	653	2,254	2,321	2,422	2,461	2,393	2,231	2,010	1,745
Roseton 2	612.5	(60.64)	1,200	693	2,294	2,360	2,462	2,501	2,432	2,270	2,050	1,785
Bayonne EC CT G1 through G10	601.6	(53.90)	1,204	697	2,298	2,365	2,466	2,505	2,437	2,275	2,054	1,789
Astoria East Energy CC1 & CC2	583.8	(23.70)	1,191	685	2,285	2,352	2,454	2,493	2,424	2,262	2,042	1,777
Bowline 1	582.0	(57.62)	1,227	721	2,321	2,388	2,490	2,528	2,460	2,298	2,078	1,812
Roseton 1	576.2	(57.04)	1,232	726	2,326	2,393	2,495	2,533	2,465	2,303	2,083	1,818
Astoria Energy 2 - CC3 & CC4	570.2	(23.15)	1,205	698	2,299	2,365	2,467	2,506	2,437	2,275	2,055	1,790
Bowline 2	557.0	(55.14)	1,250	743	2,344	2,410	2,512	2,551	2,482	2,320	2,100	1,835
Arthur Kill ST 3	519.0	(51.38)	1,284	777	2,378	2,445	2,546	2,585	2,517	2,355	2,134	1,869
Danskammer 1, 2, 3, & 4	496.2	(49.12)	1,304	798	2,398	2,465	2,567	2,606	2,537	2,375	2,155	1,890
Astoria CC 1 & 2	476.0	(19.33)	1,295	788	2,389	2,456	2,557	2,596	2,528	2,366	2,145	1,880
Astoria 5	374.7	(37.10)	1,414	907	2,508	2,575	2,676	2,715	2,647	2,485	2,264	1,999
Ravenswood ST 02	374.5	(37.08)	1,414	908	2,508	2,575	2,677	2,715	2,647	2,485	2,265	1,999
Astoria 3	372.2	(36.85)	1,416	910	2,510	2,577	2,679	2,717	2,649	2,487	2,267	2,001
Ravenswood ST 01	368.5	(36.48)	1,420	913	2,514	2,580	2,682	2,721	2,652	2,490	2,270	2,005

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)			1,752	1,245	2,846	2,912	3,014	3,053	2,984	2,822	2,602	2,337
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Arthur Kill ST 2	346.3	(34.28)	1,440	933	2,534	2,600	2,702	2,741	2,672	2,510	2,290	2,025
Cricket Valley CC2	343.6	(13.95)	1,422	915	2,516	2,583	2,684	2,723	2,655	2,493	2,272	2,007
Cricket Valley CC3	343.3	(13.94)	1,422	916	2,516	2,583	2,685	2,723	2,655	2,493	2,273	2,007
Cricket Valley CC1	342.4	(13.90)	1,423	916	2,517	2,584	2,685	2,724	2,656	2,494	2,274	2,008
CPV Valley CC1	325.9	(13.23)	1,439	932	2,533	2,600	2,701	2,740	2,672	2,510	2,289	2,024
CPV Valley CC2	325.9	(13.23)	1,439	932	2,533	2,600	2,701	2,740	2,672	2,510	2,289	2,024
Astoria East Energy - CC1	291.9	(11.85)	1,472	965	2,566	2,632	2,734	2,773	2,704	2,542	2,322	2,057
Astoria East Energy - CC2	291.9	(11.85)	1,472	965	2,566	2,632	2,734	2,773	2,704	2,542	2,322	2,057
Astoria Energy 2 - CC3	285.1	(11.58)	1,478	971	2,572	2,639	2,740	2,779	2,711	2,549	2,329	2,063
Astoria Energy 2 - CC4	285.1	(11.58)	1,478	971	2,572	2,639	2,740	2,779	2,711	2,549	2,329	2,063
Brooklyn Navy Yard	244.6	(9.93)	1,517	1,010	2,611	2,678	2,779	2,818	2,750	2,588	2,367	2,102
Astoria CC 1	238.0	(9.66)	1,523	1,017	2,617	2,684	2,786	2,824	2,756	2,594	2,374	2,108
Astoria CC 2	238.0	(9.66)	1,523	1,017	2,617	2,684	2,786	2,824	2,756	2,594	2,374	2,108
Ravenswood CC 04	223.2	(9.06)	1,537	1,031	2,631	2,698	2,800	2,839	2,770	2,608	2,388	2,123
Danskammer 4	222.1	(21.99)	1,551	1,045	2,645	2,712	2,814	2,853	2,784	2,622	2,402	2,137
East River 7	184.2	(18.24)	1,586	1,079	2,680	2,746	2,848	2,887	2,818	2,656	2,436	2,171
Astoria 2	170.5	(16.88)	1,598	1,091	2,692	2,759	2,860	2,899	2,831	2,669	2,448	2,183
East River 2	155.8	(6.33)	1,602	1,095	2,696	2,763	2,864	2,903	2,835	2,673	2,453	2,187
East River 1	155.1	(6.30)	1,603	1,096	2,697	2,763	2,865	2,904	2,836	2,674	2,453	2,188
East River 6	141.4	(14.00)	1,624	1,118	2,718	2,785	2,887	2,925	2,857	2,695	2,475	2,209
Danskammer 3	139.7	(13.83)	1,626	1,119	2,720	2,786	2,888	2,927	2,858	2,696	2,476	2,211
KIAC_JFK (BTM:NG)	98.7	(4.01)	1,657	1,150	2,751	2,818	2,919	2,958	2,890	2,728	2,507	2,242
Gowanus 5 & 6	79.9	(8.05)	1,680	1,173	2,774	2,840	2,942	2,981	2,913	2,751	2,530	2,265
Hellgate 1 & 2	79.9	(8.05)	1,680	1,173	2,774	2,840	2,942	2,981	2,913	2,751	2,530	2,265

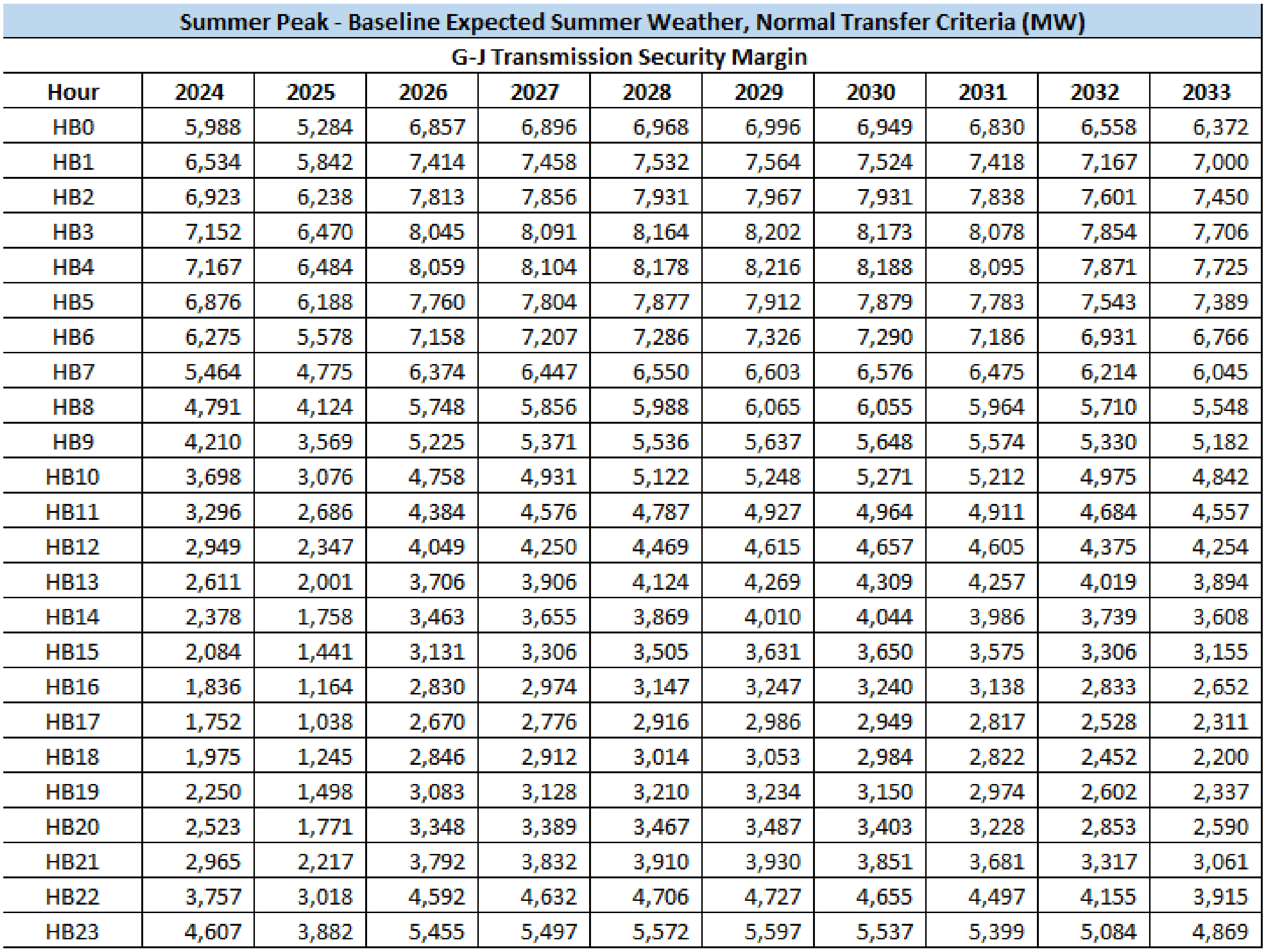
Lower Hudson Valley												
Year			**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Lower Hudson Valley Transmission Security Margin, Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW) (1)			1,752	1,245	2,846	2,912	3,014	3,053	2,984	2,822	2,602	2,337
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Harlem River 1 & 2	79.9	(8.05)	1,680	1,173	2,774	2,840	2,942	2,981	2,913	2,751	2,530	2,265
Vernon Blvd 2 & 3	79.9	(8.05)	1,680	1,173	2,774	2,840	2,942	2,981	2,913	2,751	2,530	2,265
Danskammer 1	70.2	(6.95)	1,688	1,182	2,782	2,849	2,951	2,989	2,921	2,759	2,539	2,273
Danskammer 2	64.2	(6.36)	1,694	1,187	2,788	2,854	2,956	2,995	2,927	2,765	2,544	2,279
Bayonne EC CTG1	61.8	(5.54)	1,695	1,189	2,789	2,856	2,958	2,996	2,928	2,766	2,546	2,280
Bayonne EC CTG4	60.9	(5.46)	1,696	1,190	2,790	2,857	2,959	2,997	2,929	2,767	2,547	2,281
Bayonne EC CTG9	60.5	(5.42)	1,696	1,190	2,790	2,857	2,959	2,998	2,929	2,767	2,547	2,282
Bayonne EC CTG10	60.5	(5.42)	1,696	1,190	2,790	2,857	2,959	2,998	2,929	2,767	2,547	2,282
Bayonne EC CTG8	60.3	(5.40)	1,697	1,190	2,791	2,857	2,959	2,998	2,929	2,767	2,547	2,282
Bayonne EC CTG2	60.2	(5.39)	1,697	1,190	2,791	2,857	2,959	2,998	2,930	2,768	2,547	2,282
Bayonne EC CTG7	60.0	(5.38)	1,697	1,190	2,791	2,858	2,959	2,998	2,930	2,768	2,547	2,282
Bayonne EC CTG5	59.7	(5.35)	1,697	1,191	2,791	2,858	2,960	2,998	2,930	2,768	2,548	2,282
Bayonne EC CTG6	59.6	(5.34)	1,697	1,191	2,791	2,858	2,960	2,998	2,930	2,768	2,548	2,282
Bayonne EC CTG3	58.1	(5.21)	1,699	1,192	2,793	2,859	2,961	3,000	2,931	2,769	2,549	2,284
Wheelabrator Westchester	52.1	(5.16)	1,705	1,198	2,799	2,865	2,967	3,006	2,937	2,775	2,555	2,290
Kent	45.8	(4.62)	1,710	1,204	2,804	2,871	2,973	3,011	2,943	2,781	2,561	2,296
Pouch	45.1	(4.55)	1,711	1,204	2,805	2,872	2,973	3,012	2,944	2,782	2,561	2,296
Gowanus 5	40.0	(4.03)	1,716	1,209	2,810	2,876	2,978	3,017	2,948	2,786	2,566	2,301
Hellgate 2	40.0	(4.03)	1,716	1,209	2,810	2,876	2,978	3,017	2,948	2,786	2,566	2,301
Harlem River 2	40.0	(4.03)	1,716	1,209	2,810	2,876	2,978	3,017	2,948	2,786	2,566	2,301
Vernon Blvd 2	40.0	(4.03)	1,716	1,209	2,810	2,876	2,978	3,017	2,948	2,786	2,566	2,301
Gowanus 6	39.9	(4.02)	1,716	1,209	2,810	2,876	2,978	3,017	2,948	2,786	2,566	2,301
Hellgate 1	39.9	(4.02)	1,716	1,209	2,810	2,876	2,978	3,017	2,948	2,786	2,566	2,301
Harlem River 1	39.9	(4.02)	1,716	1,209	2,810	2,876	2,978	3,017	2,948	2,786	2,566	2,301

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)			1,752	1,245	2,846	2,912	3,014	3,053	2,984	2,822	2,602	2,337
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Vernon Blvd 3	39.9	(4.02)	1,716	1,209	2,810	2,876	2,978	3,017	2,948	2,786	2,566	2,301
Hillburn GT	35.7	(3.20)	1,719	1,212	2,813	2,880	2,981	3,020	2,952	2,790	2,570	2,304
Shoemaker GT	32.7	(2.93)	1,722	1,215	2,816	2,882	2,984	3,023	2,955	2,793	2,572	2,307
Arthur Kill Cogen	11.1	(1.32)	1,742	1,235	2,836	2,902	3,004	3,043	2,975	2,813	2,592	2,327
DCRRA	6.2	(0.61)	1,746	1,239	2,840	2,907	3,008	3,047	2,979	2,817	2,596	2,331

Notes

1. Utilizes the Transmission Security Margin for Summer Peak (Baseline Demand) with Expected Weather.
1. In 2024 and 2025 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 21: 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	5,988	5,284	6,857	6,896	6,968	6,996	6,949	6,830	6,558	6,372
HB1	6,534	5,842	7,414	7,458	7,532	7,564	7,524	7,418	7,167	7,000
HB2	6,923	6,238	7,813	7,856	7,931	7,967	7,931	7,838	7,601	7,450
HB3	7,152	6,470	8,045	8,091	8,164	8,202	8,173	8,078	7,854	7,706
HB4	7,167	6,484	8,059	8,104	8,178	8,216	8,188	8,095	7,871	7,725
HB5	6,876	6,188	7,760	7,804	7,877	7,912	7,879	7,783	7,543	7,389
HB6	6,275	5,578	7,158	7,207	7,286	7,326	7,290	7,186	6,931	6,766
HB7	5,464	4,775	6,374	6,447	6,550	6,603	6,576	6,475	6,214	6,045
HB8	4,791	4,124	5,748	5,856	5,988	6,065	6,055	5,964	5,710	5,548
HB9	4,210	3,569	5,225	5,371	5,536	5,637	5,648	5,574	5,330	5,182
HB10	3,698	3,076	4,758	4,931	5,122	5,248	5,271	5,212	4,975	4,842
HB11	3,296	2,686	4,384	4,576	4,787	4,927	4,964	4,911	4,684	4,557
HB12	2,949	2,347	4,049	4,250	4,469	4,615	4,657	4,605	4,375	4,254
HB13	2,611	2,001	3,706	3,906	4,124	4,269	4,309	4,257	4,019	3,894
HB14	2,378	1,758	3,463	3,655	3,869	4,010	4,044	3,986	3,739	3,608
HB15	2,084	1,441	3,131	3,306	3,505	3,631	3,650	3,575	3,306	3,155
HB16	1,836	1,164	2,830	2,974	3,147	3,247	3,240	3,138	2,833	2,652
HB17	1,752	1,038	2,670	2,776	2,916	2,986	2,949	2,817	2,528	2,311
HB18	1,975	1,245	2,846	2,912	3,014	3,053	2,984	2,822	2,452	2,200
HB19	2,250	1,498	3,083	3,128	3,210	3,234	3,150	2,974	2,602	2,337
HB20	2,523	1,771	3,348	3,389	3,467	3,487	3,403	3,228	2,853	2,590
HB21	2,965	2,217	3,792	3,832	3,910	3,930	3,851	3,681	3,317	3,061
HB22	3,757	3,018	4,592	4,632	4,706	4,727	4,655	4,497	4,155	3,915
HB23	4,607	3,882	5,455	5,497	5,572	5,597	5,537	5,399	5,084	4,869

Figure 22: Lower Hudson Valley Transmission Security Margin Hourly Curve (Summer Peak – Expected Weather, Normal Transfer Criteria)

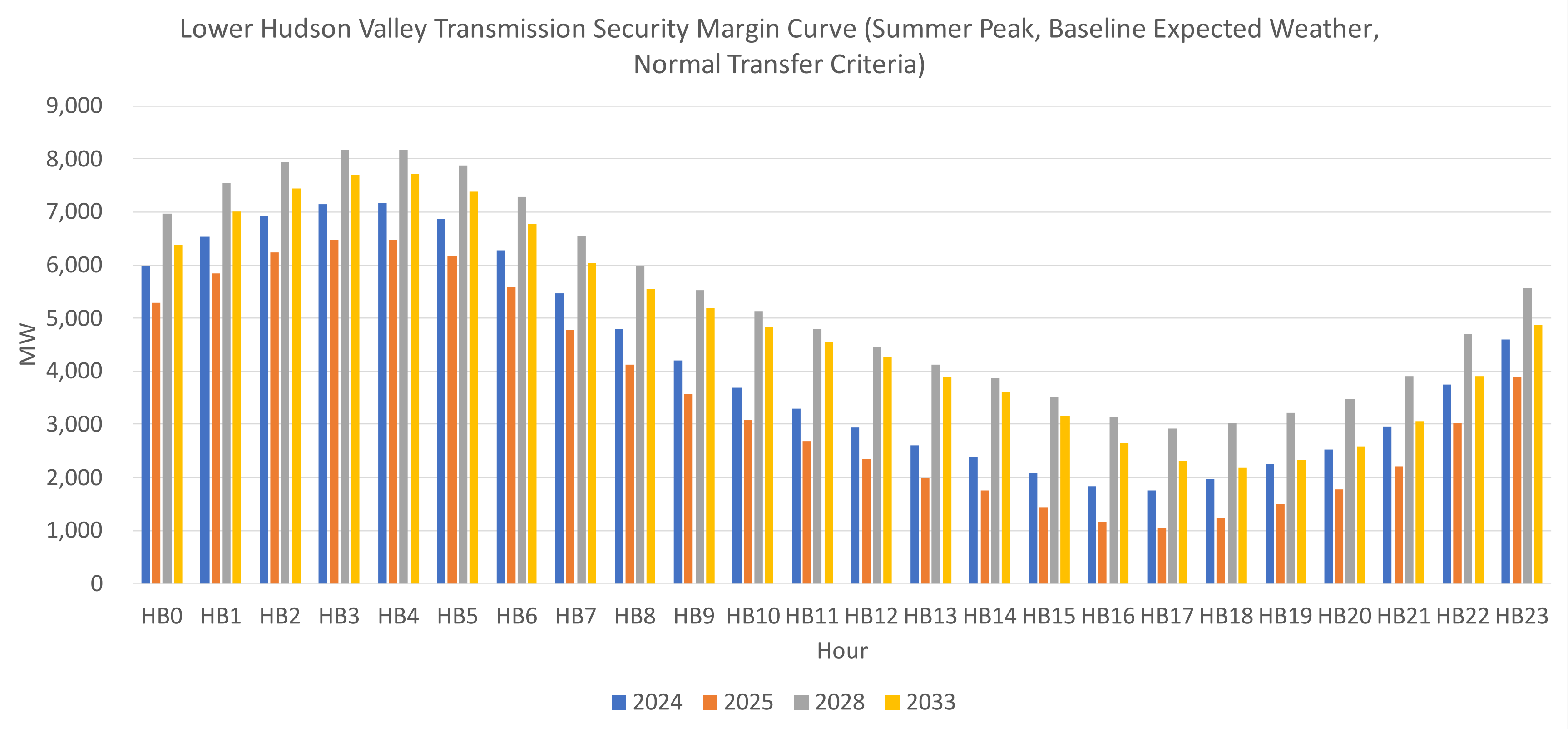


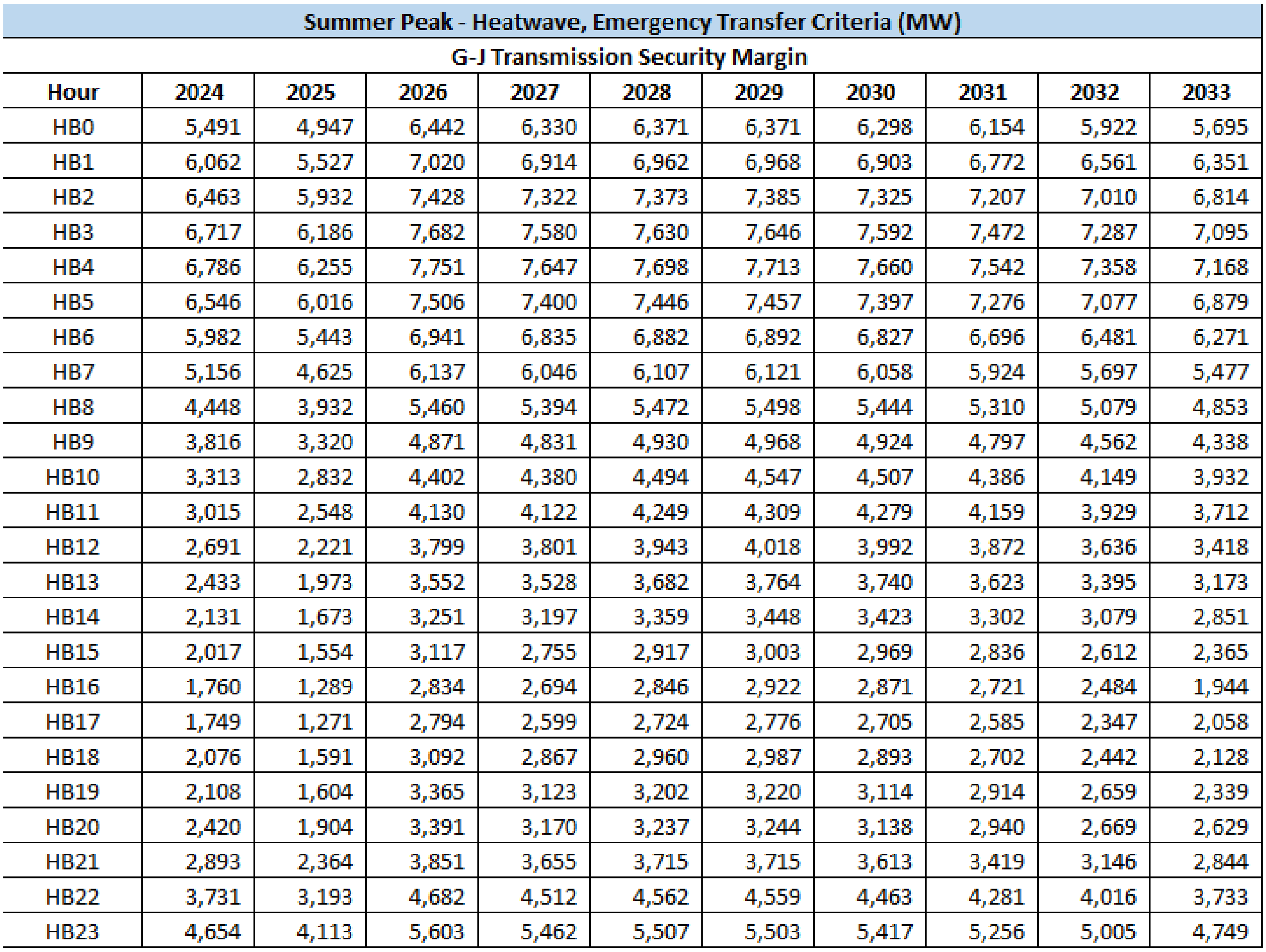
Figure 23: Lower Hudson Valley Transmission Security Margin (1-in-10-Year Heatwave, Emergency Transfer Criteria)

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	(313)	(295)	(288)	(285)	(297)	(310)	(333)	(355)	(384)	(423)
G	**Total SENY AC Import (D+E+F)**	5,126	5,144	5,351	5,354	5,342	5,329	5,306	5,284	5,255	5,216
H	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
I	**Resource Need (C+G+H)**	(11,146)	(11,118)	(10,842)	(10,768)	(10,674)	(10,645)	(10,739)	(10,930)	(11,188)	(11,501)
J	G-J Generation (1)	13,481	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991
K	G-J Generation Derates (2)	(1,086)	(1,110)	(1,113)	(1,114)	(1,115)	(1,116)	(1,118)	(1,118)	(1,119)	(1,120)
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)	271	271	271	271	271	271	271	271	271	271
O	**Total Resources Available (J+K+L+M+N)**	12,895	12,389	13,636	13,635	13,634	13,633	13,631	13,631	13,630	13,629
P	**Transmission Security Margin (I+O)**	1,749	1,271	2,794	2,867	2,960	2,987	2,893	2,702	2,442	2,128

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 226 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 represenations evalauted in the 2022 RNA.
6. Reflects the 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 24: 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	5,491	4,947	6,442	6,330	6,371	6,371	6,298	6,154	5,922	5,695
HB1	6,062	5,527	7,020	6,914	6,962	6,968	6,903	6,772	6,561	6,351
HB2	6,463	5,932	7,428	7,322	7,373	7,385	7,325	7,207	7,010	6,814
HB3	6,717	6,186	7,682	7,580	7,630	7,646	7,592	7,472	7,287	7,095
HB4	6,786	6,255	7,751	7,647	7,698	7,713	7,660	7,542	7,358	7,168
HB5	6,546	6,016	7,506	7,400	7,446	7,457	7,397	7,276	7,077	6,879
HB6	5,982	5,443	6,941	6,835	6,882	6,892	6,827	6,696	6,481	6,271
HB7	5,156	4,625	6,137	6,046	6,107	6,121	6,058	5,924	5,697	5,477
HB8	4,448	3,932	5,460	5,394	5,472	5,498	5,444	5,310	5,079	4,853
HB9	3,816	3,320	4,871	4,831	4,930	4,968	4,924	4,797	4,562	4,338
HB10	3,313	2,832	4,402	4,380	4,494	4,547	4,507	4,386	4,149	3,932
HB11	3,015	2,548	4,130	4,122	4,249	4,309	4,279	4,159	3,929	3,712
HB12	2,691	2,221	3,799	3,801	3,943	4,018	3,992	3,872	3,636	3,418
HB13	2,433	1,973	3,552	3,528	3,682	3,764	3,740	3,623	3,395	3,173
HB14	2,131	1,673	3,251	3,197	3,359	3,448	3,423	3,302	3,079	2,851
HB15	2,017	1,554	3,117	2,755	2,917	3,003	2,969	2,836	2,612	2,365
HB16	1,760	1,289	2,834	2,694	2,846	2,922	2,871	2,721	2,484	1,944
HB17	1,749	1,271	2,794	2,599	2,724	2,776	2,705	2,585	2,347	2,058
HB18	2,076	1,591	3,092	2,867	2,960	2,987	2,893	2,702	2,442	2,128
HB19	2,108	1,604	3,365	3,123	3,202	3,220	3,114	2,914	2,659	2,339
HB20	2,420	1,904	3,391	3,170	3,237	3,244	3,138	2,940	2,669	2,629
HB21	2,893	2,364	3,851	3,655	3,715	3,715	3,613	3,419	3,146	2,844
HB22	3,731	3,193	4,682	4,512	4,562	4,559	4,463	4,281	4,016	3,733
HB23	4,654	4,113	5,603	5,462	5,507	5,503	5,417	5,256	5,005	4,749

Figure 25: Lower Hudson Valley Transmission Security Margin Hourly Curve (1-in-10-Year Heatwave, Emergency Transfer Criteria)

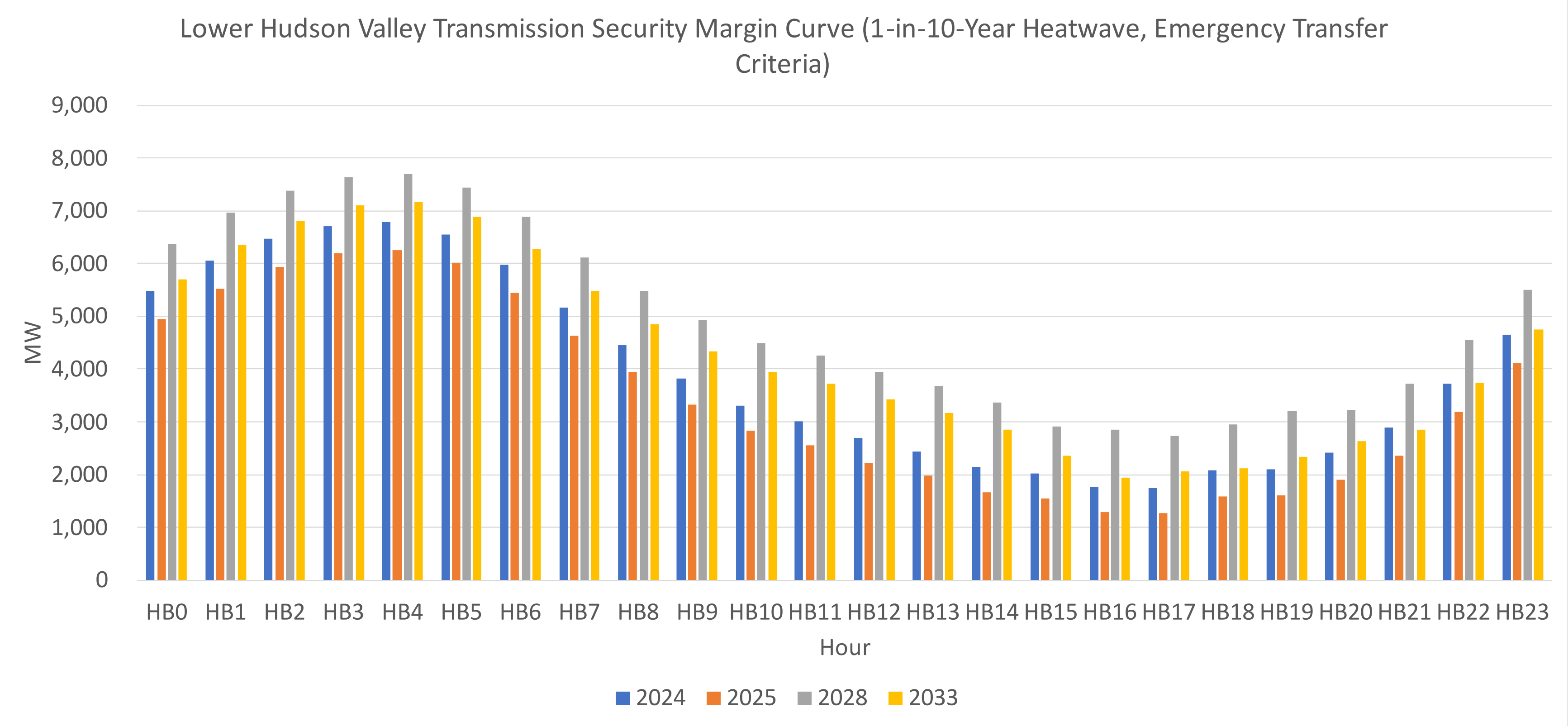


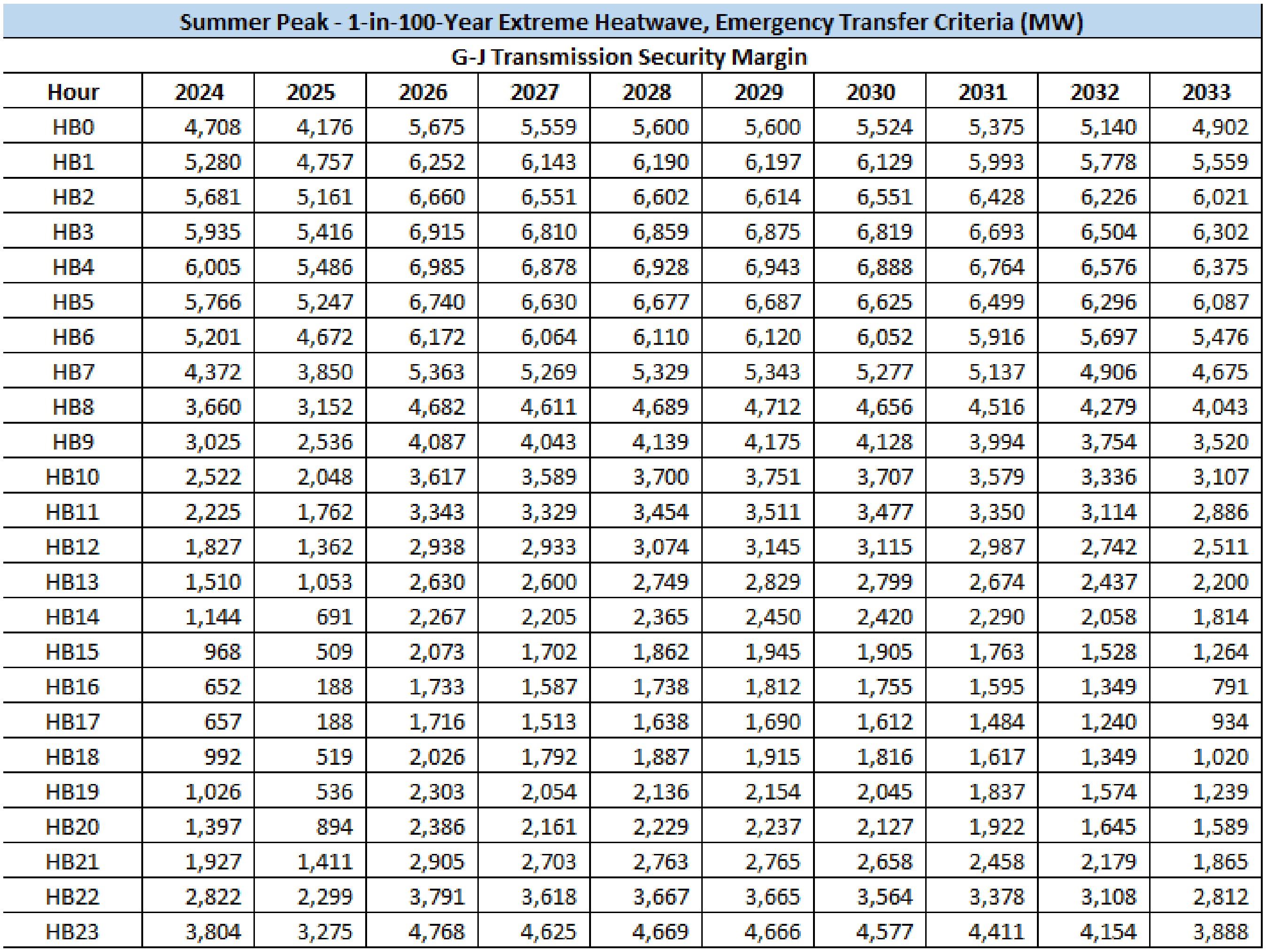
Figure 26: Lower Hudson Valley Transmission Security Margin (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

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	(676)	(658)	(650)	(646)	(660)	(674)	(698)	(721)	(751)	(793)
G	**Total SENY AC Import (D+E+F)**	4,763	4,781	4,989	4,993	4,979	4,965	4,941	4,918	4,888	4,846
H	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
I	**Resource Need (C+G+H)**	(12,142)	(12,114)	(11,834)	(11,756)	(11,660)	(11,631)	(11,729)	(11,928)	(12,194)	(12,522)
J	G-J Generation (1)	13,481	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991	12,991
K	G-J Generation Derates (2)	(1,086)	(1,110)	(1,113)	(1,114)	(1,115)	(1,116)	(1,118)	(1,118)	(1,119)	(1,120)
L	Temperature Based Generation Derates	(183)	(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)	271	271	271	271	271	271	271	271	271	271
O	**Total Resources Available (J+K+L+M+N)**	12,798	12,302	13,550	13,549	13,547	13,546	13,545	13,545	13,543	13,542
P	**Transmission Security Margin (I+O)**	657	188	1,716	1,792	1,887	1,915	1,816	1,617	1,349	1,020

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 226 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 represenations evalauted in the 2022 RNA.
6. Reflects the 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 27: 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	4,708	4,176	5,675	5,559	5,600	5,600	5,524	5,375	5,140	4,902
HB1	5,280	4,757	6,252	6,143	6,190	6,197	6,129	5,993	5,778	5,559
HB2	5,681	5,161	6,660	6,551	6,602	6,614	6,551	6,428	6,226	6,021
HB3	5,935	5,416	6,915	6,810	6,859	6,875	6,819	6,693	6,504	6,302
HB4	6,005	5,486	6,985	6,878	6,928	6,943	6,888	6,764	6,576	6,375
HB5	5,766	5,247	6,740	6,630	6,677	6,687	6,625	6,499	6,296	6,087
HB6	5,201	4,672	6,172	6,064	6,110	6,120	6,052	5,916	5,697	5,476
HB7	4,372	3,850	5,363	5,269	5,329	5,343	5,277	5,137	4,906	4,675
HB8	3,660	3,152	4,682	4,611	4,689	4,712	4,656	4,516	4,279	4,043
HB9	3,025	2,536	4,087	4,043	4,139	4,175	4,128	3,994	3,754	3,520
HB10	2,522	2,048	3,617	3,589	3,700	3,751	3,707	3,579	3,336	3,107
HB11	2,225	1,762	3,343	3,329	3,454	3,511	3,477	3,350	3,114	2,886
HB12	1,827	1,362	2,938	2,933	3,074	3,145	3,115	2,987	2,742	2,511
HB13	1,510	1,053	2,630	2,600	2,749	2,829	2,799	2,674	2,437	2,200
HB14	1,144	691	2,267	2,205	2,365	2,450	2,420	2,290	2,058	1,814
HB15	968	509	2,073	1,702	1,862	1,945	1,905	1,763	1,528	1,264
HB16	652	188	1,733	1,587	1,738	1,812	1,755	1,595	1,349	791
HB17	657	188	1,716	1,513	1,638	1,690	1,612	1,484	1,240	934
HB18	992	519	2,026	1,792	1,887	1,915	1,816	1,617	1,349	1,020
HB19	1,026	536	2,303	2,054	2,136	2,154	2,045	1,837	1,574	1,239
HB20	1,397	894	2,386	2,161	2,229	2,237	2,127	1,922	1,645	1,589
HB21	1,927	1,411	2,905	2,703	2,763	2,765	2,658	2,458	2,179	1,865
HB22	2,822	2,299	3,791	3,618	3,667	3,665	3,564	3,378	3,108	2,812
HB23	3,804	3,275	4,768	4,625	4,669	4,666	4,577	4,411	4,154	3,888

Figure 28: Lower Hudson Valley Transmission Security Margin Hourly Curve (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

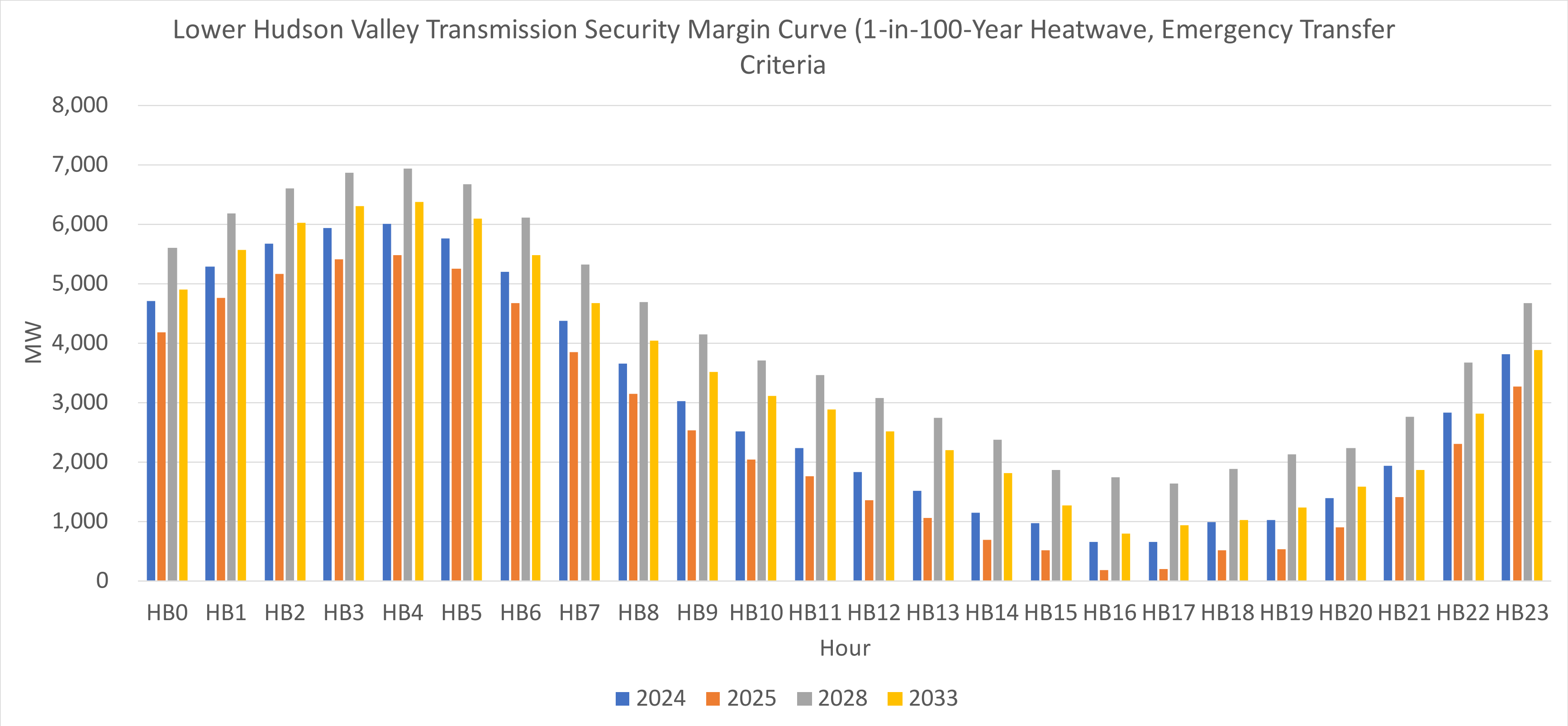


Figure 29: Lower Hudson Valley Transmission Security Margin (Winter Peak – Expected Weather, Normal Transfer Criteria)

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)	14,510	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,253)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)
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)**	13,571	13,540	13,540	13,540	13,540	13,540	13,540	13,540	13,540	13,540
O	**Transmission Security Margin (I+N)**	7,505	7,377	7,194	6,999	6,748	6,400	5,982	5,485	4,907	4,303

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 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 30: 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)	14,510	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,253)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)
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)	160	160	160	160	160	160	160	160	160	160
O	**Total Resources Available (J+K+L+M+N)**	13,731	13,700	13,700	13,700	13,700	13,700	13,700	13,700	13,700	13,700
P	**Transmission Security Margin (I+O)**	7,905	7,773	7,583	7,379	7,118	6,755	6,320	5,801	5,199	4,570

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 133 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 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 31: 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)	14,510	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,253)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)	(1,250)
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)	160	160	160	160	160	160	160	160	160	160
O	**Total Resources Available (J+K+L+M+N)**	13,731	13,700	13,700	13,700	13,700	13,700	13,700	13,700	13,700	13,700
P	**Transmission Security Margin (I+O)**	7,120	6,982	6,777	6,560	6,280	5,892	5,426	4,870	4,225	3,552

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 133 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 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 32: Summary of Lower Hudson Valley Summer Transmission Security Margin – Summer

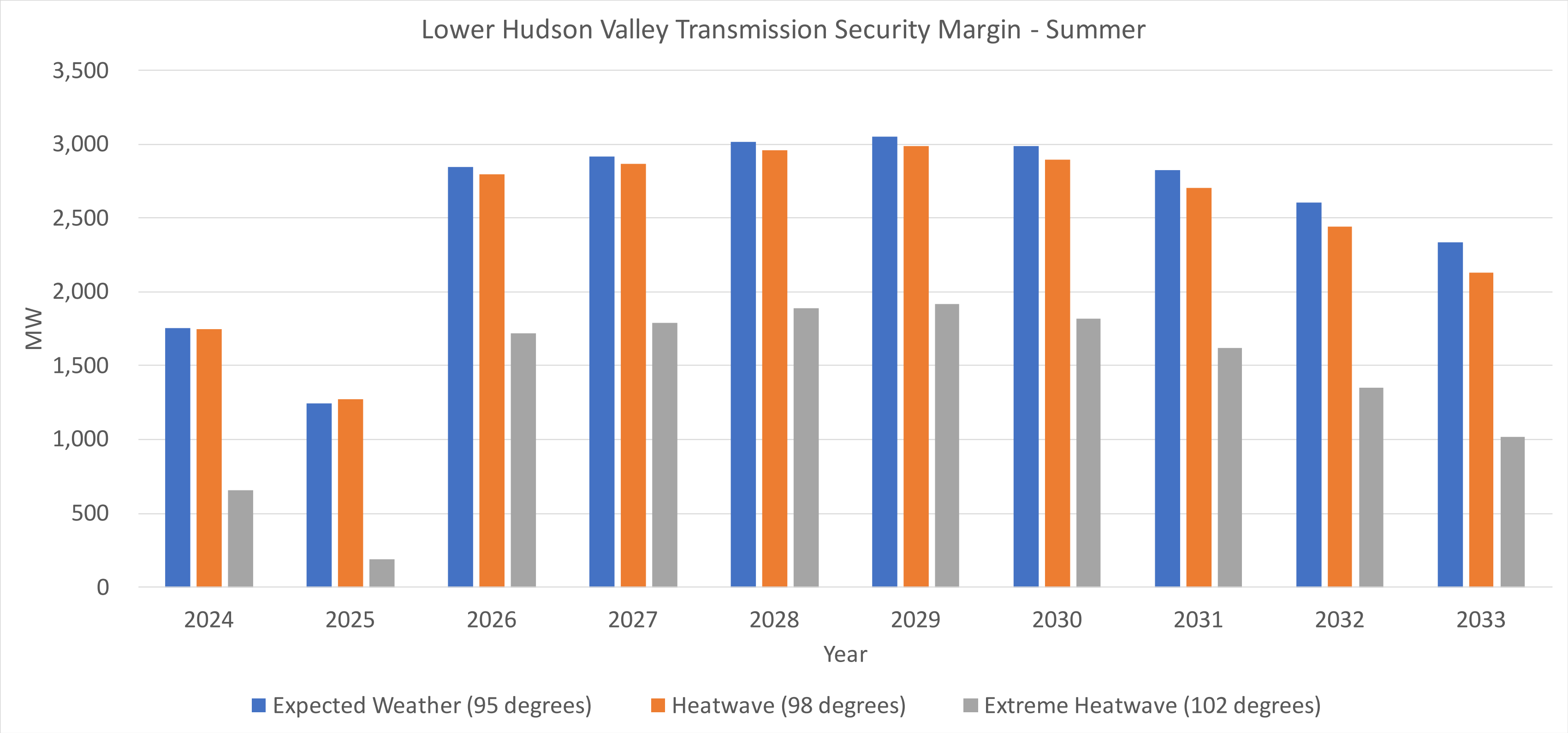


Figure 33: Summary of Lower Hudson Valley Summer Transmission Security Margin – Winter

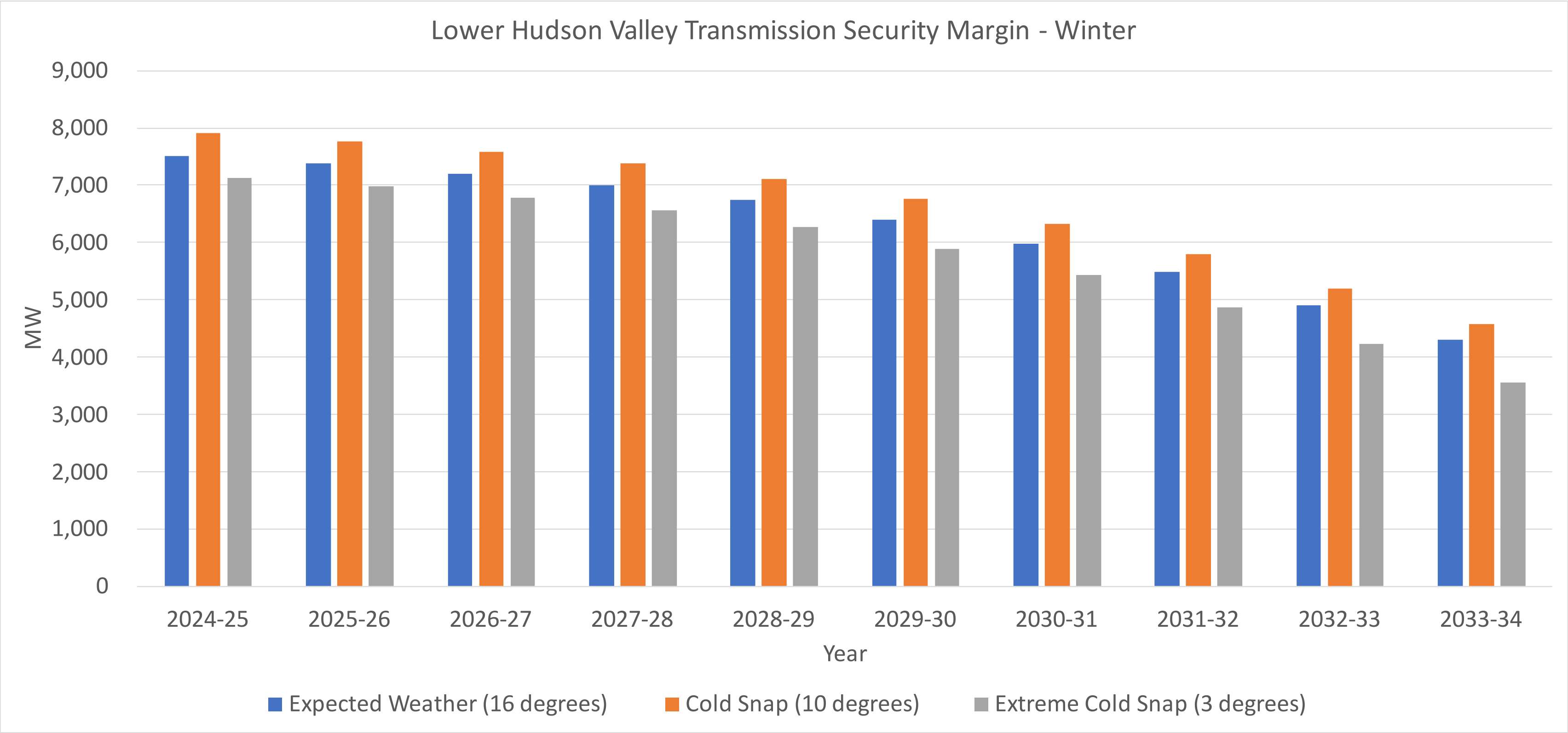
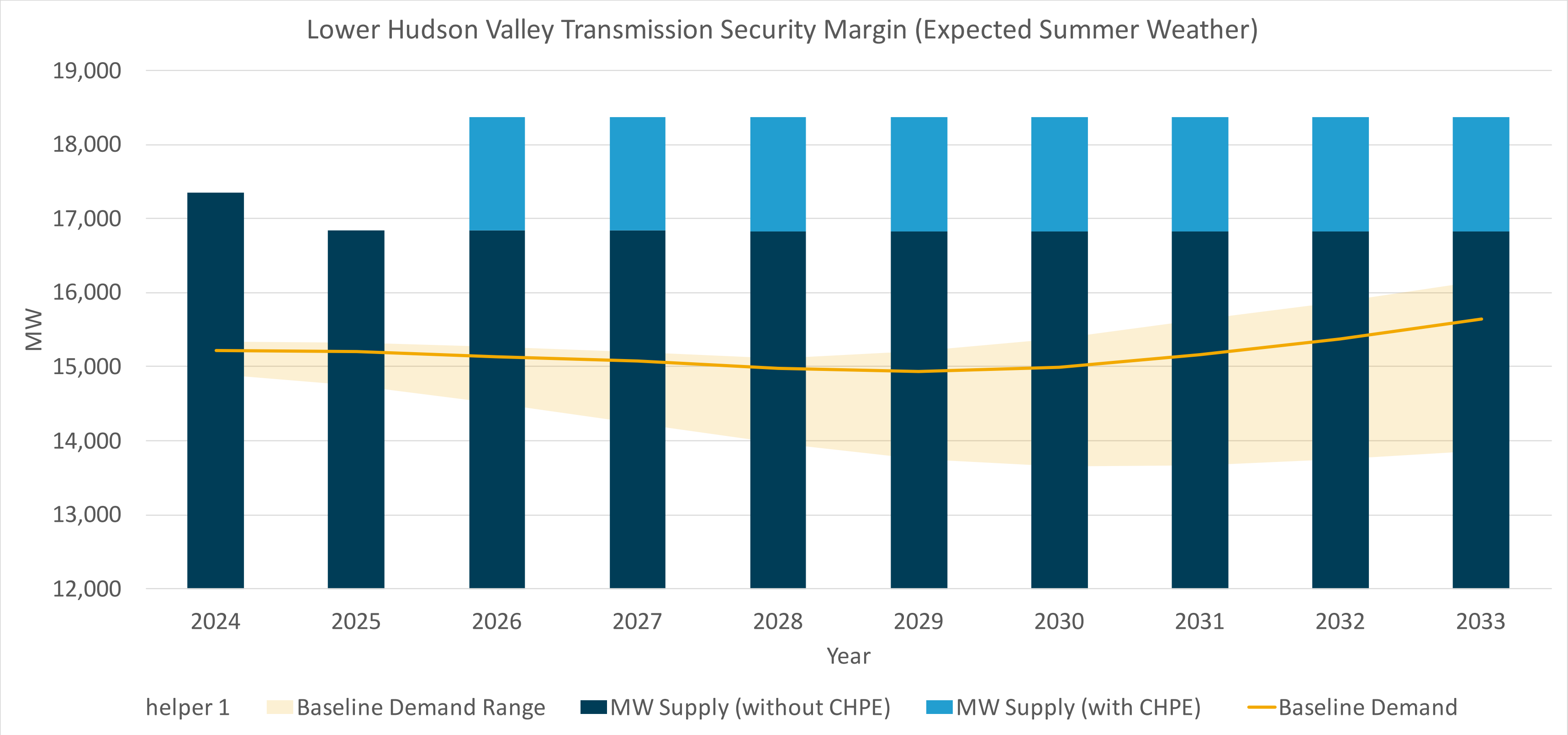


Figure 34: Lower Hudson Valley Transmission Security Margin (Expected Weather, With and Without CHPE)



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).[14] 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 35 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 35** 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 35**, 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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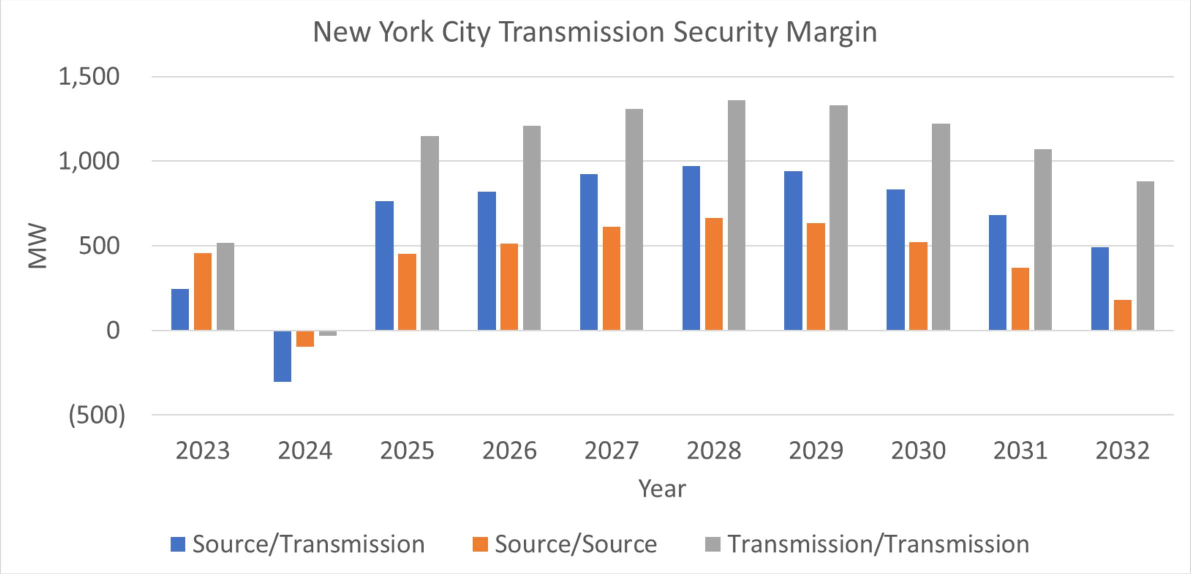
[14] Con Edison, TP-7100-18 Transmission Planning Criteria, dated August 2019.

Figure 35: 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 39 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 having a deficient margin of 306 MW (line-item L). Additionally, **Figure 39** shows the impact on the transmission security margin with the higher demand policy forecast, resulting in a deficiency of 446 MW in 2025. 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 the addition of the CHPE project as the baseline demand grows in New York City. For the higher demand policy forecast with the addition of the CHPE project, the margin is deficient by 88 MW by 2032 worsening to a deficiency of 268 MW by 2033 (line-item N). **Figure 41** provides a summary of the results for the baseline demand transmission security margin with the CHPE project in service by summer 2026. **Figure 42** provides a summary of the results with a delay in the CHPE project.

The demand shapes for New York City show the contribution of Zone J (**Figure 95**) 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 43**. The hourly margin is created by using the demand forecast for each hour in the margin calculation (*i.e.*, **Figure 39** 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 39** line-item H). All other values in the margin calculations are held constant. For all years in the 10-year study horizon, **Figure 43** 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, the hourly margin within New York city is as narrow as 9 MW during a non-coincident peak hour by 2033. 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 44**.

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 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 36** 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 37.** Based on the lower demand policy forecast, the transmission security in New York City is 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 39**, line-item N). For the higher demand policy forecast, the transmission security margin is sufficient following the inclusion of the CHPE project in year 2026; however, the transmission security margin becomes deficient again in year 2032 by 88 MW worsening to 268 MW by 2033. **Figure 45** provides the hourly transmission security margin with the higher demand policy forecast. As shown in **Figure 46**, the margin with the higher demand policy forecast is deficient for 9 hours.

Figure 36: Summary of New York City Summer Demand Forecasts

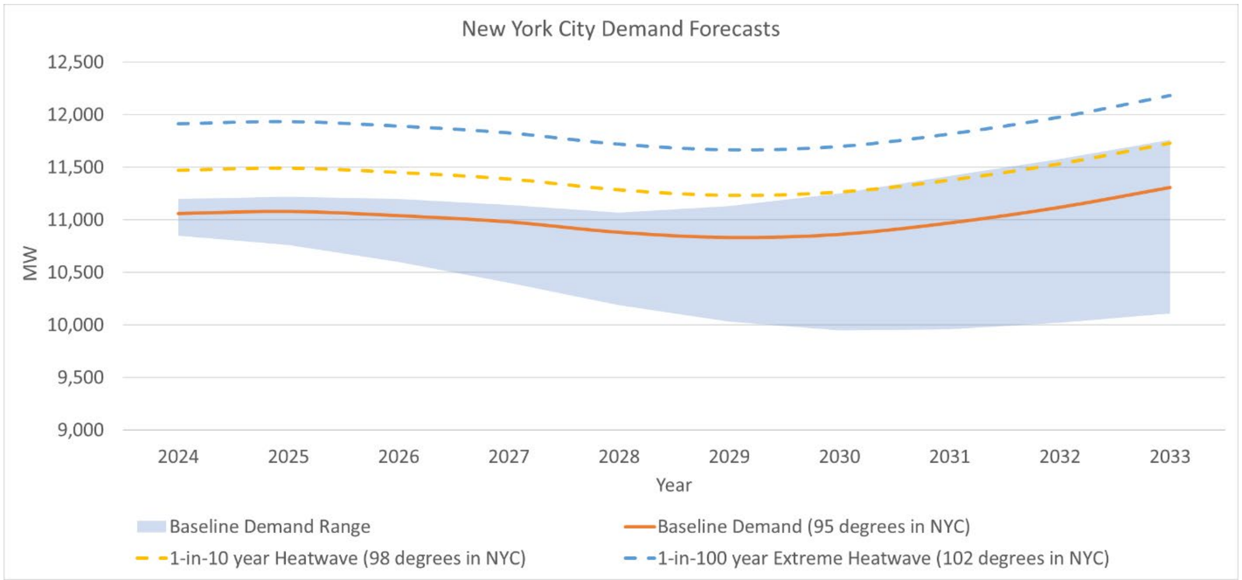
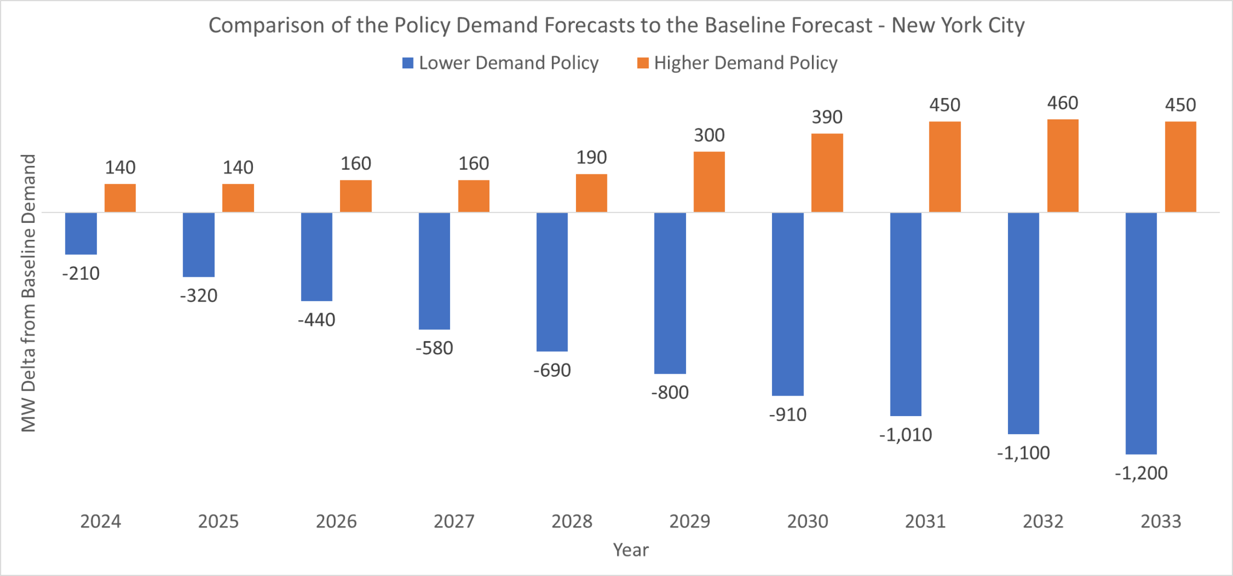


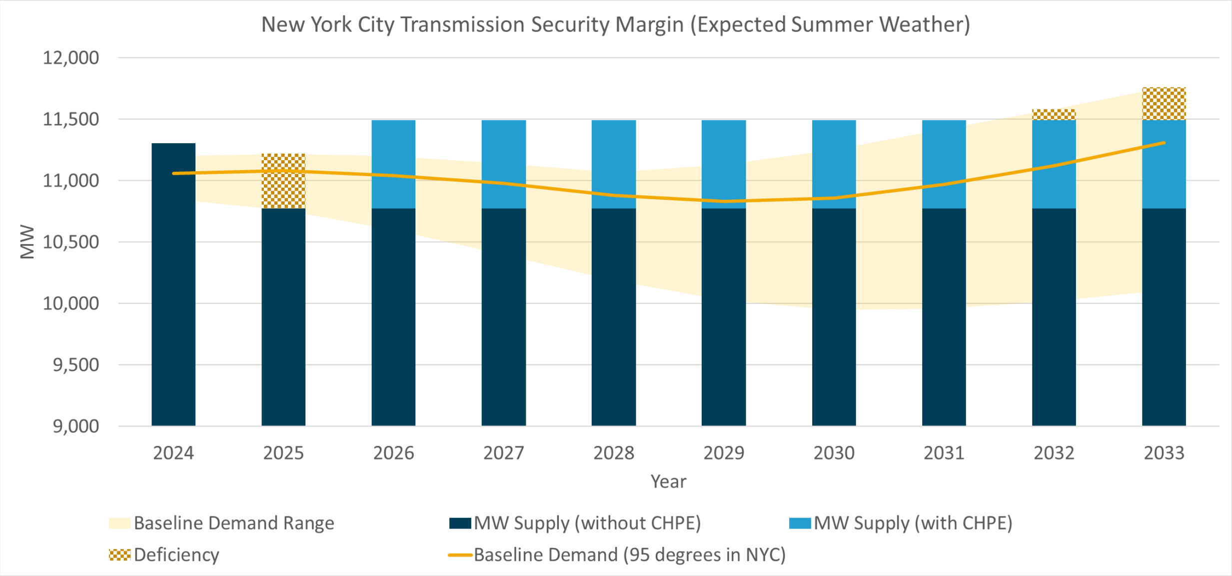
Figure 37: Summary of New York City Summer Coincident Peak Demand Range



Overall, the New York City transmission security margin improves in 2026 when the CHPE project enters service (currently scheduled in spring 2026). However, the margin gradually erodes through time as demand grows. As shown in **Figure 38**, 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 the

CHPE project 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 the CHPE project are provided in **Figure 40** with a graphical summary provided in **Figure 42**.

Figure 38: 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 47** 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 47**, the margin is deficient for summers 2024, 2025, and 2033; however, the margin is sufficient beginning in 2026 through 2032 due to the inclusion of the CHPE project, as well as the demand forecast (line-item M). The demand shapes for Zone J under a heatwave is provided in **Figure 101**. Utilizing the New York City demand-duration heatwave shape, the transmission security margin for each hour utilizing emergency transfer criteria is shown in **Figure 48**. As shown in **Figure 48**, the deficiency in summer 2025 is observed over 11 hours (3,910 MWh). While **Figure 47** does not show the system to be deficient in year 2032, the demand shape results in a four-hour deficiency (288 MWh) as seen in **Figure 48**. In 2033, the MWh deficiency is observed over seven hours (1,250 MWh). **Figure 49** 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 50** shows that the transmission security margin is deficient for all years in the 10-year horizon (line-item M). As shown in **Figure 51**, the minimum deficiency for any year is projected to be over seven hours in year 2026 (1,260

MWh) with a maximum deficiency of 12 hours in year 2033 (5,936 MWh). **Figure 52** 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 53 shows the New York City transmission security margin under winter peak demand with expected weather conditions and with normal transfer criteria. For winter peak demand, the margins are sufficient for all years and range from 4,363 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 54 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 4,174 MW in winter 2024-25 to 1,903 MW in winter 2033-34. Similarly, **Figure 55** 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 3,615 MW in winter 2024-25 to 1,185 MW in winter 2033-34.

Figure 56 provides a summary of the summer peak New York City transmission security margins under expected summer weather, heatwave, and extreme heatwave conditions. **Figure 57** 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 39: 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 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 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).

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 Impact of Generator Outage (Retire, Mothball, IIFO)									
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)

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)
East River 7	184.2	(18.24)	(49)	(612)	126	186	256	196	76	(94)	(254)	(434)
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)	1,309	(395)	(515)	(685)	(845)	(1,025)
Ravenswood ST 01, 02, & 03 (2)	1,730.3	(171.30)	(1,040)	(1,591)	(798)	(738)	(638)	(588)	(618)	(728)	(878)	(1,068)
Ravenswood ST 03 (2)	987.3	(97.74)	(371)	(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)
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 Transmission Security Margin for Summer Peak (High Policy Demand) with Expected Weather.
1. In all years the most limiting contingency includes the loss of Ravenswood 3. For this calculation the margin, the loss of two transmission elements is utilized. Other combinations with loss of generation may be more limiting.

Figure 40: 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 final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG with adjustments for large load queue projects included in this STAR (Q0580 – WNY STAMP, Q0776 – Greenidge, Q0849 – Somerset, Q0580 – Cayuga, Q0979 – North Country Data Center).

Figure 41: Summary of New York City Summer Transmission Security Margin Demand Policy Impact – Summer (with CHPE)

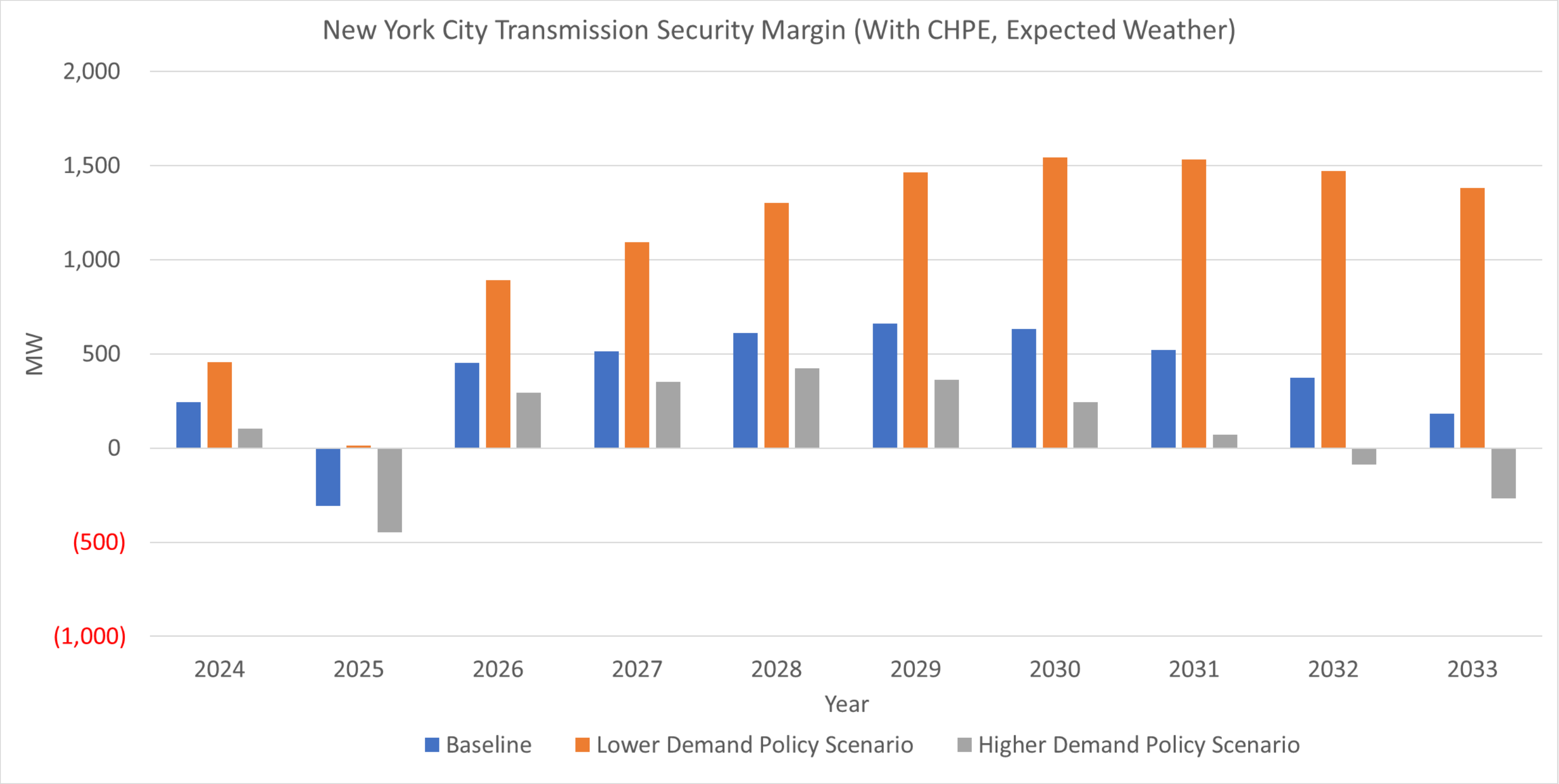


Figure 42: Summary of New York City Summer Transmission Security Margin Demand Policy Impact – Summer (without CHPE)

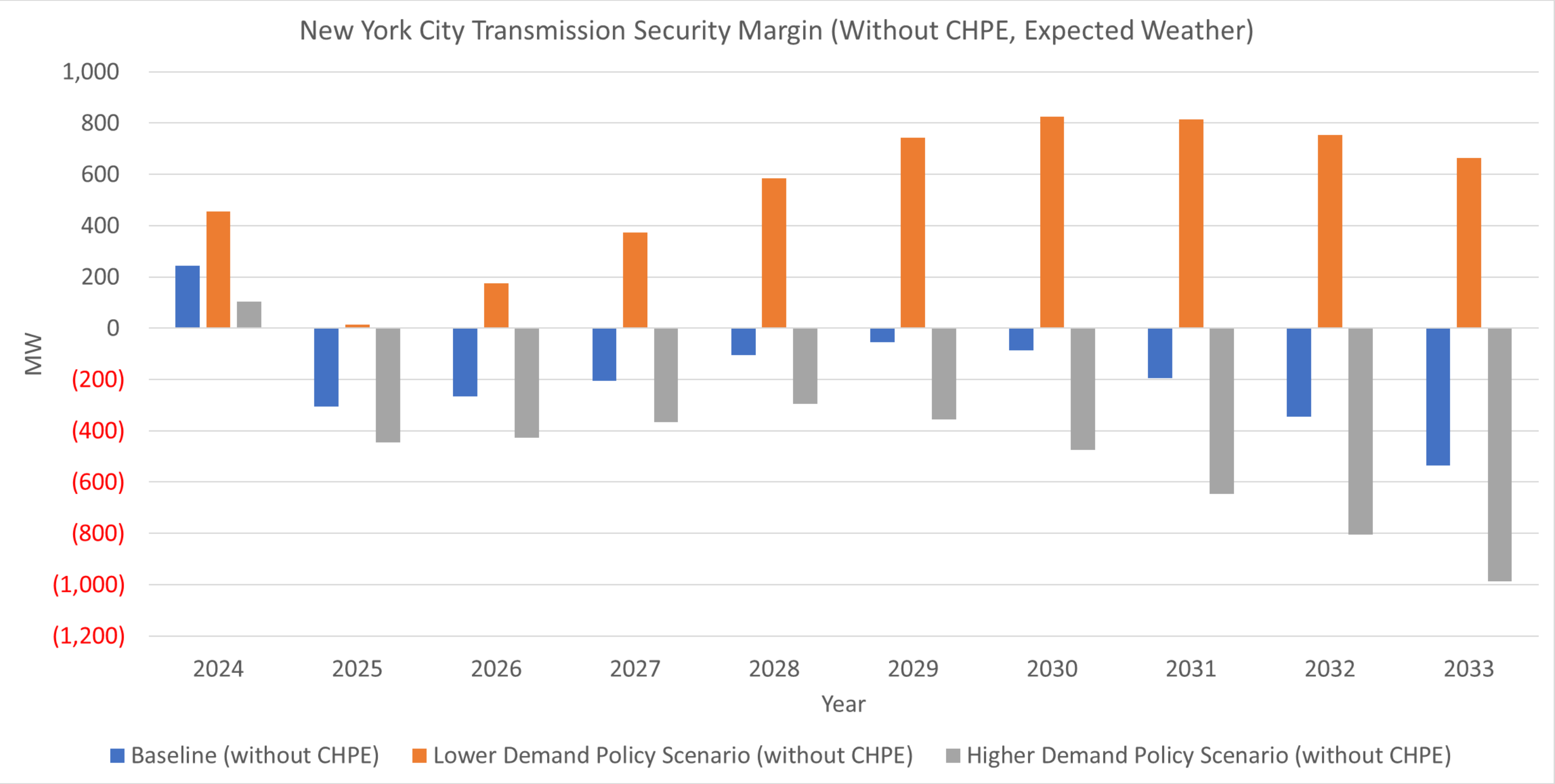


Figure 43: New York City Transmission Security Margin (Hourly) (Summer Peak – Baseline Demand Expected Weather, Normal Transfer Criteria)

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

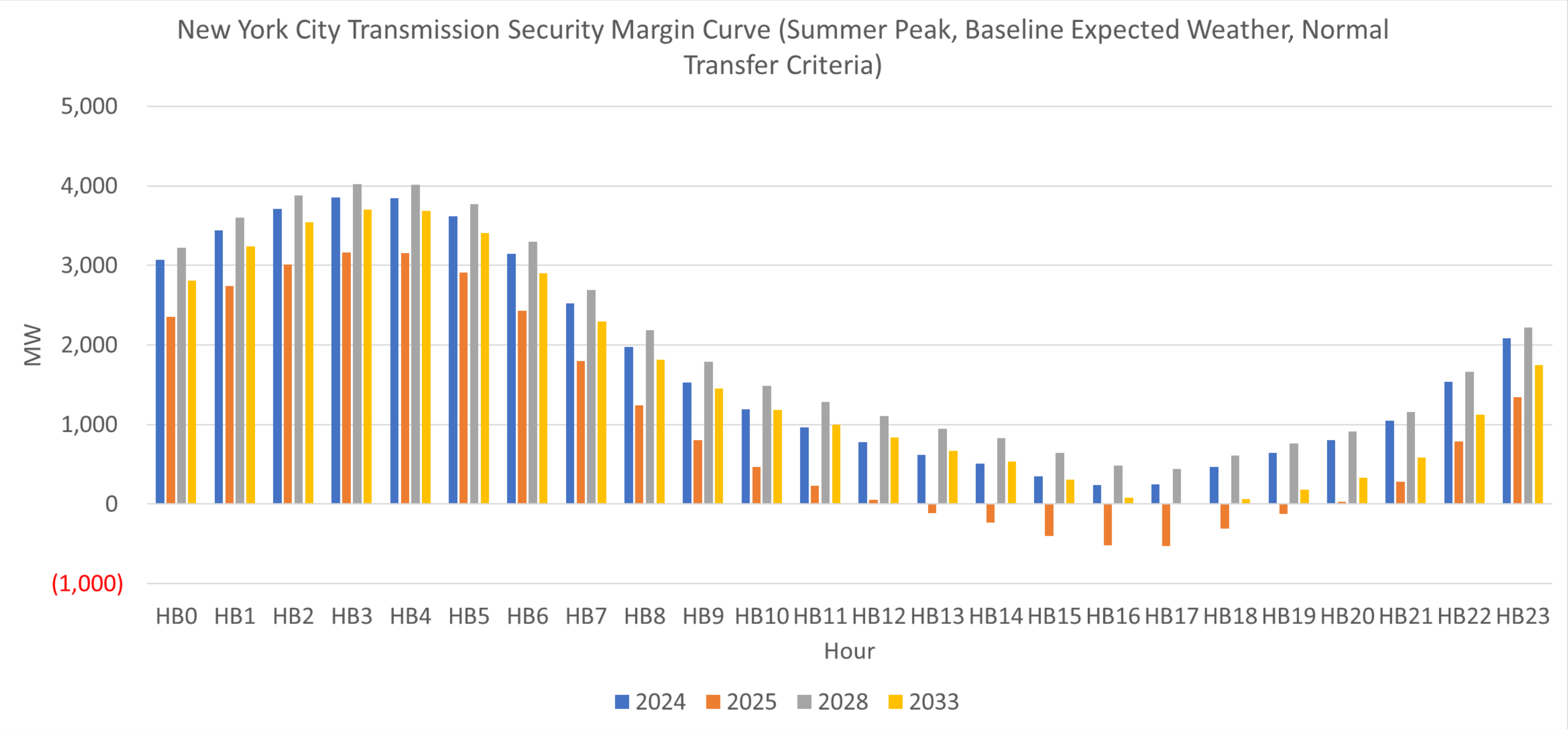


Figure 45: New York City Transmission Security Margin (Hourly) (Summer Peak – Higher Policy with Expected Weather, Normal Transfer Criteria)

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

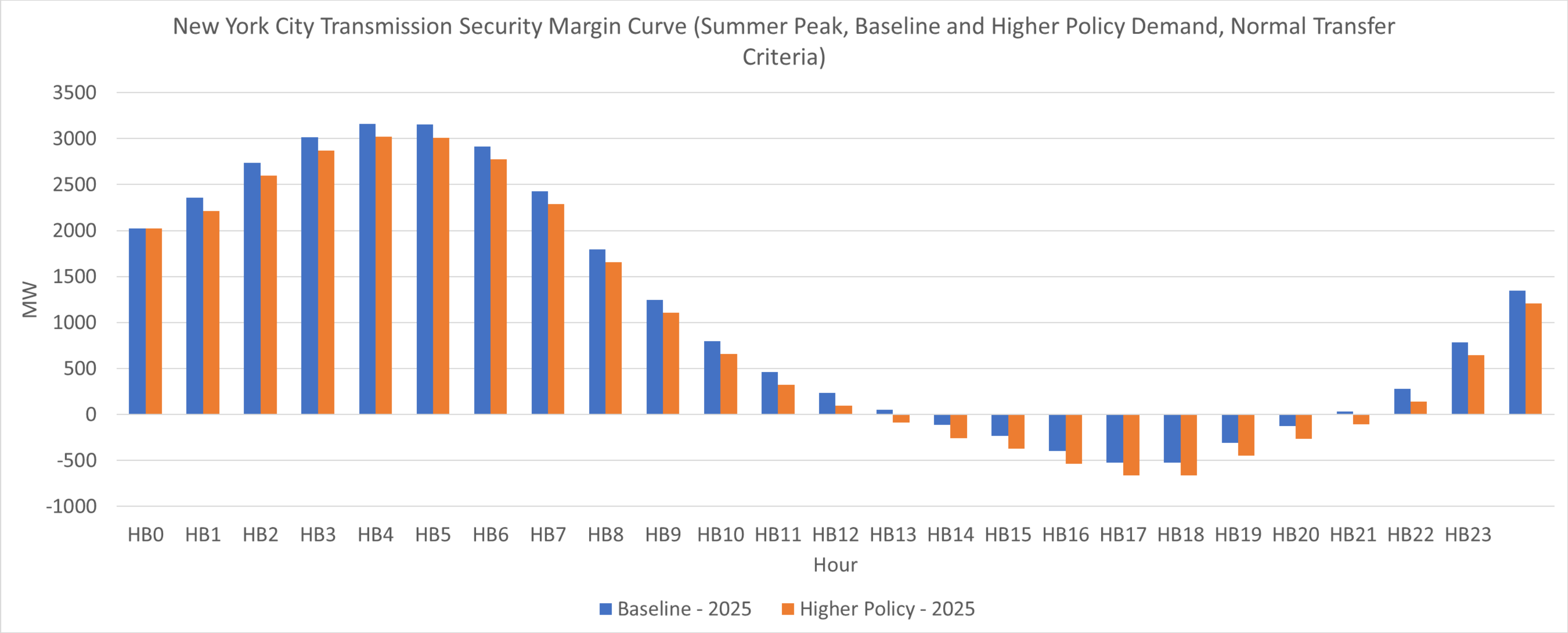
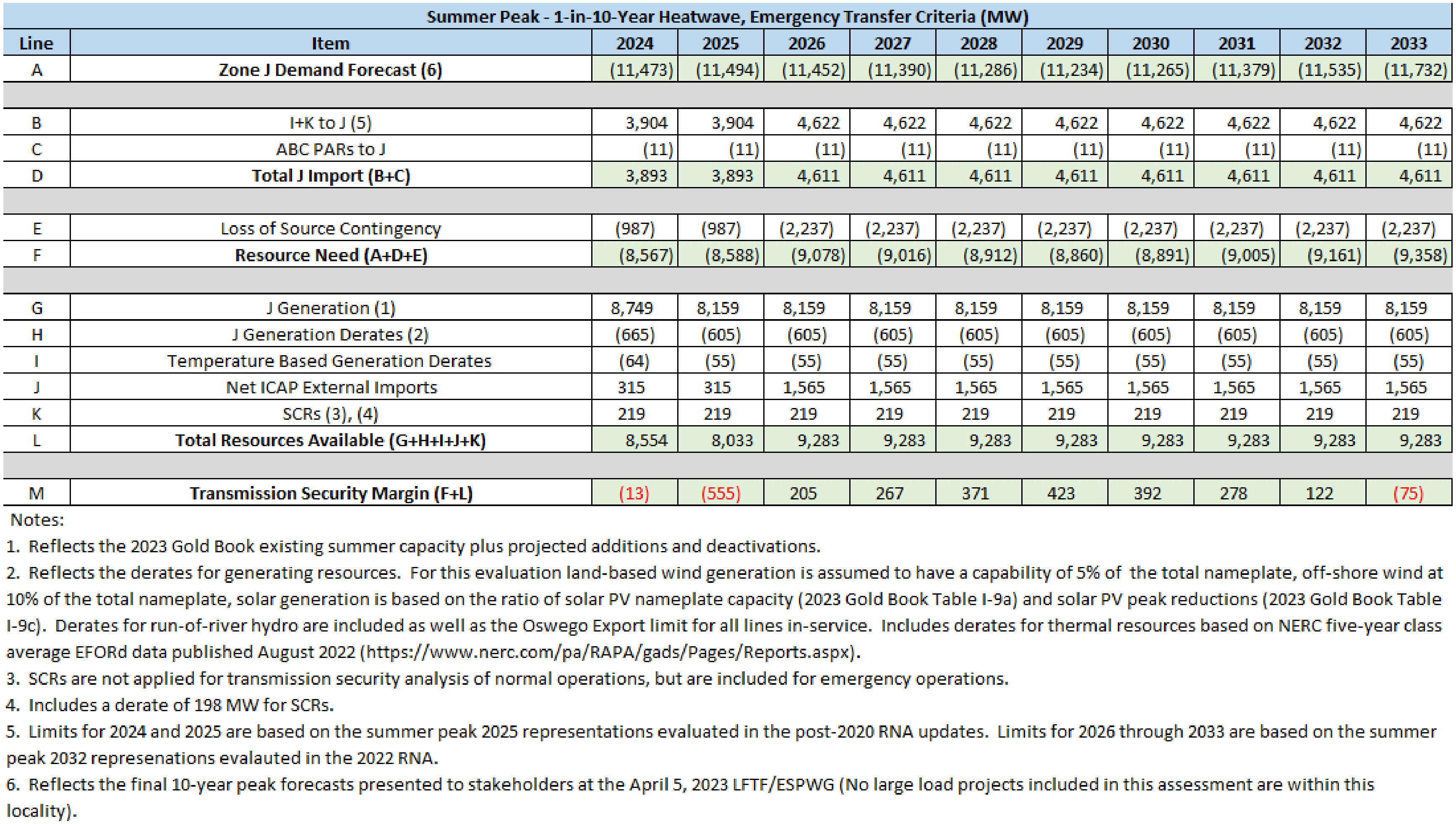


Figure 47: New York City Transmission Security Margin (1-in-10-Year Heatwave, Emergency Transfer Criteria)



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)	8,749	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	(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)	219	219	219	219	219	219	219	219	219	219
L	**Total Resources Available (G+H+I+J+K)**	8,554	8,033	9,283	9,283	9,283	9,283	9,283	9,283	9,283	9,283
M	**Transmission Security Margin (F+L)**	(13)	(555)	205	267	371	423	392	278	122	(75)

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 198 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 represenations evalauted in the 2022 RNA.
6. Reflects the 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 48: 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	2,382	1,801	2,553	2,441	2,506	2,535	2,515	2,432	2,285	2,146
HB1	2,770	2,198	2,947	2,840	2,906	2,939	2,924	2,849	2,716	2,588
HB2	3,042	2,476	3,226	3,117	3,186	3,221	3,209	3,141	3,016	2,897
HB3	3,204	2,640	3,390	3,283	3,349	3,387	3,377	3,308	3,190	3,073
HB4	3,234	2,670	3,419	3,311	3,377	3,414	3,402	3,334	3,216	3,098
HB5	3,042	2,472	3,219	3,107	3,170	3,202	3,186	3,113	2,982	2,856
HB6	2,596	2,016	2,765	2,652	2,715	2,743	2,722	2,640	2,495	2,357
HB7	1,961	1,373	2,125	2,017	2,082	2,113	2,090	2,001	1,842	1,694
HB8	1,384	786	1,543	1,441	1,512	1,542	1,523	1,431	1,260	1,106
HB9	902	298	1,061	966	1,042	1,075	1,054	961	783	622
HB10	578	(31)	737	648	726	761	738	644	460	298
HB11	436	(174)	598	513	597	633	615	520	337	173
HB12	272	(344)	424	345	439	486	471	376	188	24
HB13	180	(421)	348	245	350	403	392	301	124	(44)
HB14	247	(342)	429	79	192	255	243	151	(16)	(186)
HB15	30	(550)	219	60	179	244	232	137	(27)	(203)
HB16	(83)	(649)	114	(77)	46	114	97	(4)	(166)	(352)
HB17	(13)	(555)	205	(21)	92	153	130	72	(78)	(269)
HB18	69	(471)	284	267	371	423	392	278	122	(75)
HB19	269	(269)	481	239	337	387	350	234	78	(121)
HB20	445	(106)	643	426	515	556	521	405	243	48
HB21	699	134	884	690	773	809	773	660	491	302
HB22	1,220	648	1,396	1,229	1,304	1,335	1,302	1,196	1,031	854
HB23	1,812	1,236	1,984	1,845	1,913	1,943	1,917	1,822	1,663	1,504

Figure 49: New York City Transmission Security Margin Hourly Curve (1-in-10-Year Heatwave, Emergency Transfer Criteria)

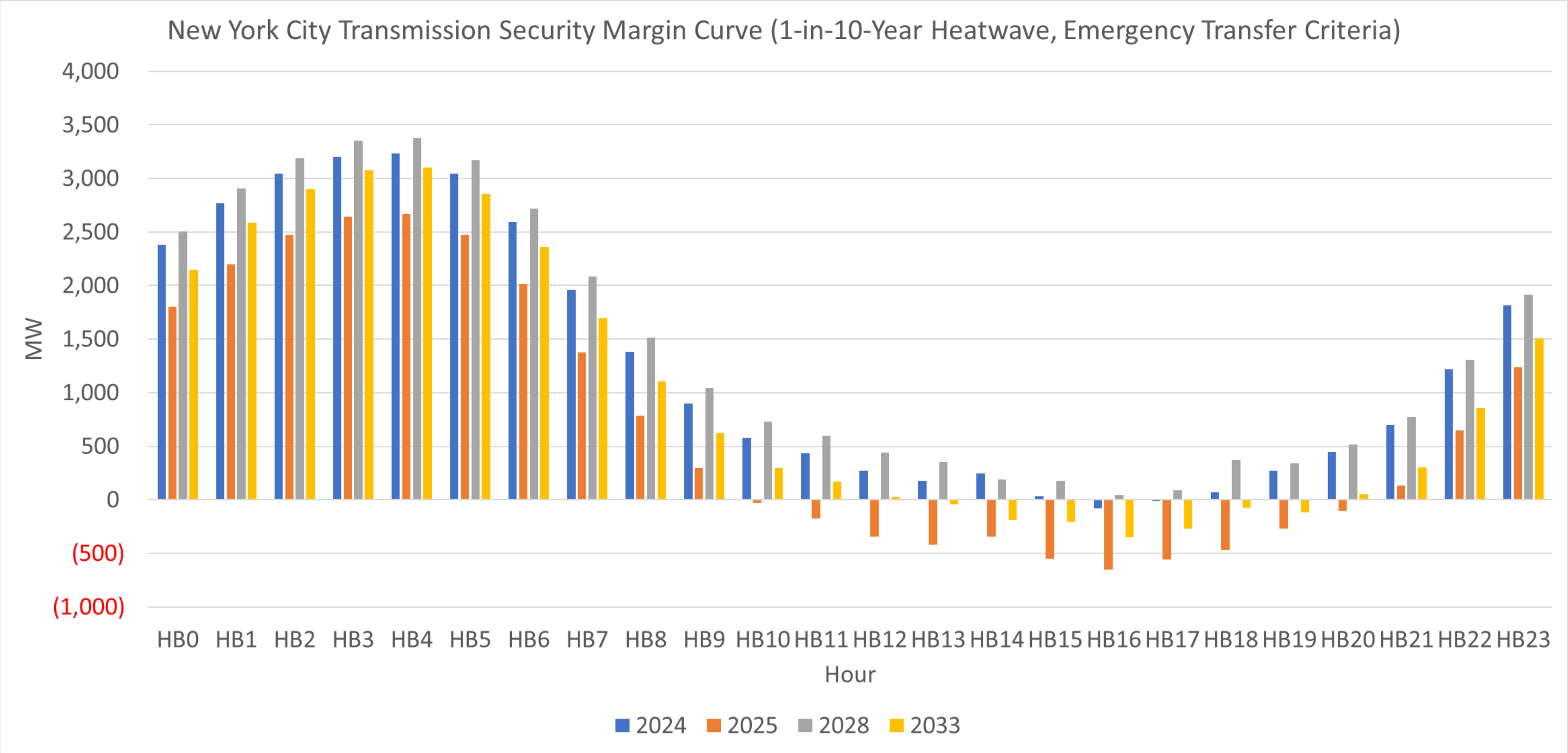


Figure 50: New York City Transmission Security Margin (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

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)	8,749	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	(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)	219	219	219	219	219	219	219	219	219	219
L	Total Resources Available (G+H+I+J+K)	8,483	7,971	9,221	9,221	9,221	9,221	9,221	9,221	9,221	9,221
M	Transmission Security Margin (F+L)	(527)	(1,060)	(299)	(234)	(127)	(73)	(105)	(224)	(385)	(590)

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 198 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 represenations evalauted in the 2022 RNA.
6. Reflects the 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 51: 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	2,081	1,512	2,267	2,151	2,218	2,248	2,226	2,142	1,992	1,849
HB1	2,468	1,907	2,659	2,548	2,617	2,650	2,633	2,557	2,421	2,289
HB2	2,739	2,185	2,937	2,824	2,895	2,931	2,917	2,848	2,719	2,597
HB3	2,900	2,348	3,101	2,990	3,058	3,097	3,085	3,014	2,893	2,771
HB4	2,931	2,378	3,130	3,018	3,086	3,123	3,110	3,040	2,918	2,796
HB5	2,738	2,181	2,930	2,813	2,878	2,911	2,893	2,818	2,683	2,554
HB6	2,291	1,723	2,474	2,357	2,421	2,450	2,427	2,343	2,193	2,051
HB7	1,654	1,076	1,830	1,716	1,783	1,814	1,788	1,697	1,534	1,381
HB8	1,074	485	1,242	1,134	1,206	1,236	1,213	1,119	944	784
HB9	590	(6)	756	654	730	761	737	641	458	292
HB10	267	(335)	431	334	412	445	418	321	132	(37)
HB11	127	(476)	293	201	284	318	296	197	8	(162)
HB12	(89)	(700)	65	(22)	71	115	96	(4)	(199)	(371)
HB13	(224)	(820)	(53)	(167)	(63)	(11)	(27)	(124)	(308)	(485)
HB14	(199)	(786)	(17)	(376)	(264)	(204)	(219)	(319)	(493)	(673)
HB15	(460)	(1,035)	(269)	(439)	(320)	(256)	(274)	(375)	(547)	(733)
HB16	(611)	(1,172)	(409)	(611)	(488)	(420)	(441)	(549)	(718)	(914)
HB17	(527)	(1,060)	(299)	(535)	(420)	(358)	(384)	(447)	(601)	(801)
HB18	(438)	(964)	(206)	(234)	(127)	(73)	(105)	(224)	(385)	(590)
HB19	(237)	(761)	(7)	(257)	(155)	(103)	(141)	(261)	(422)	(628)
HB20	(20)	(558)	195	(29)	63	107	70	(50)	(216)	(417)
HB21	271	(280)	473	272	359	397	360	244	71	(124)
HB22	830	271	1,022	849	928	961	927	818	649	467
HB23	1,461	898	1,649	1,505	1,576	1,608	1,581	1,484	1,321	1,158

Figure 52: New York City Transmission Security Margin Hourly Curve (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

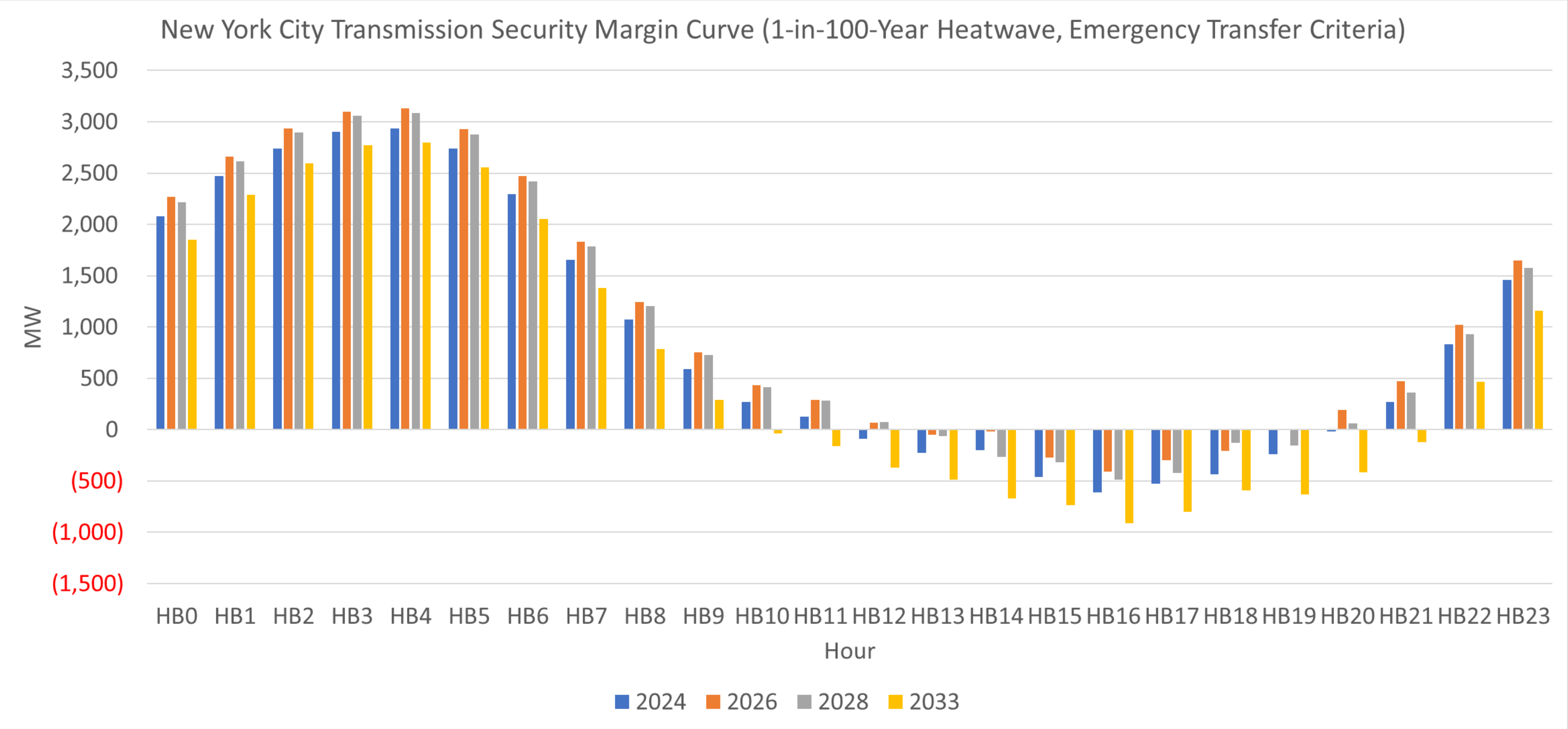


Figure 53: New York City Transmission Security Margin (Winter Peak – Expected Weather, Normal Transfer Criteria)

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)	9,414	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(710)	(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)**	9,019	8,988	8,988	8,988	8,988	8,988	8,988	8,988	8,988	8,988
L	**Transmission Security Margin (F+K)**	4,363	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 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 54: 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)	9,414	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(710)	(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)	128	128	128	128	128	128	128	128	128	128
L	**Total Resources Available (G+H+I+J+K)**	9,147	9,116	9,116	9,116	9,116	9,116	9,116	9,116	9,116	9,116
M	**Transmission Security Margin (F+L)**	4,174	4,049	3,924	3,789	3,622	3,382	3,091	2,736	2,330	1,903

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 116 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 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 55: 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)	9,414	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(710)	(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)	128	128	128	128	128	128	128	128	128	128
L	**Total Resources Available (G+H+I+J+K)**	9,147	9,116	9,116	9,116	9,116	9,116	9,116	9,116	9,116	9,116
M	**Transmission Security Margin (F+L)**	3,615	3,483	3,349	3,204	3,026	2,769	2,457	2,077	1,642	1,185

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 116 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 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 56: Summary of New York City Summer Transmission Security Margin – Summer

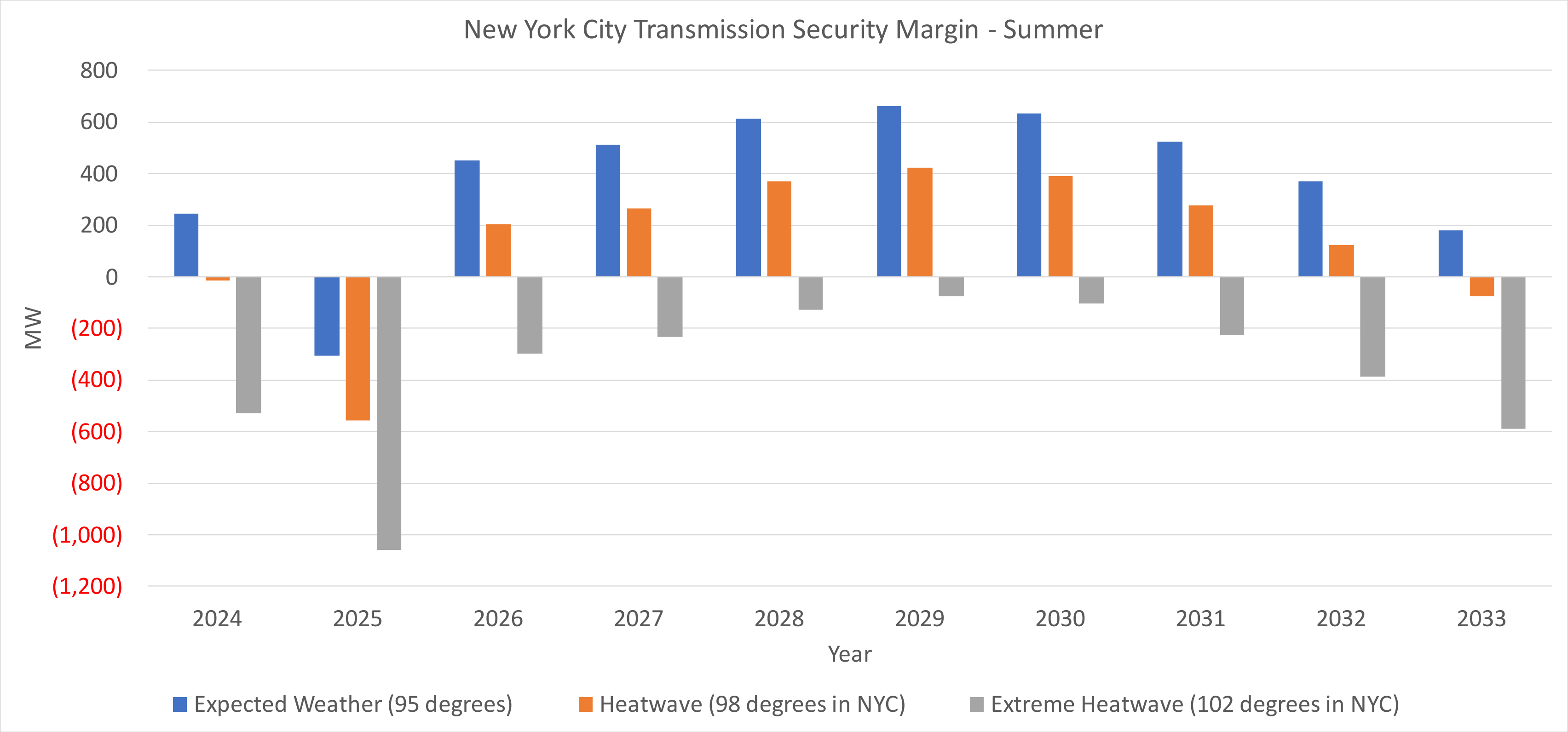
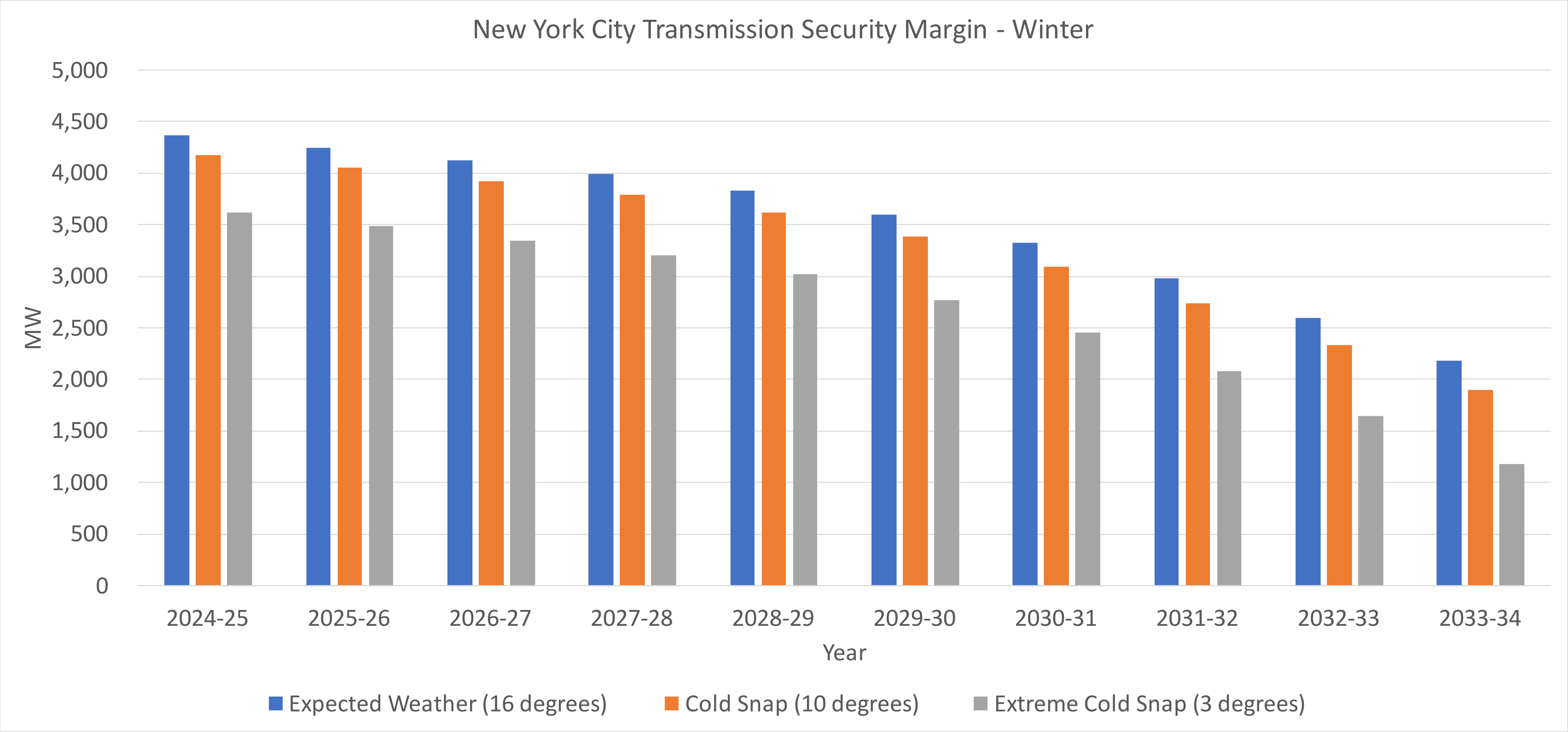


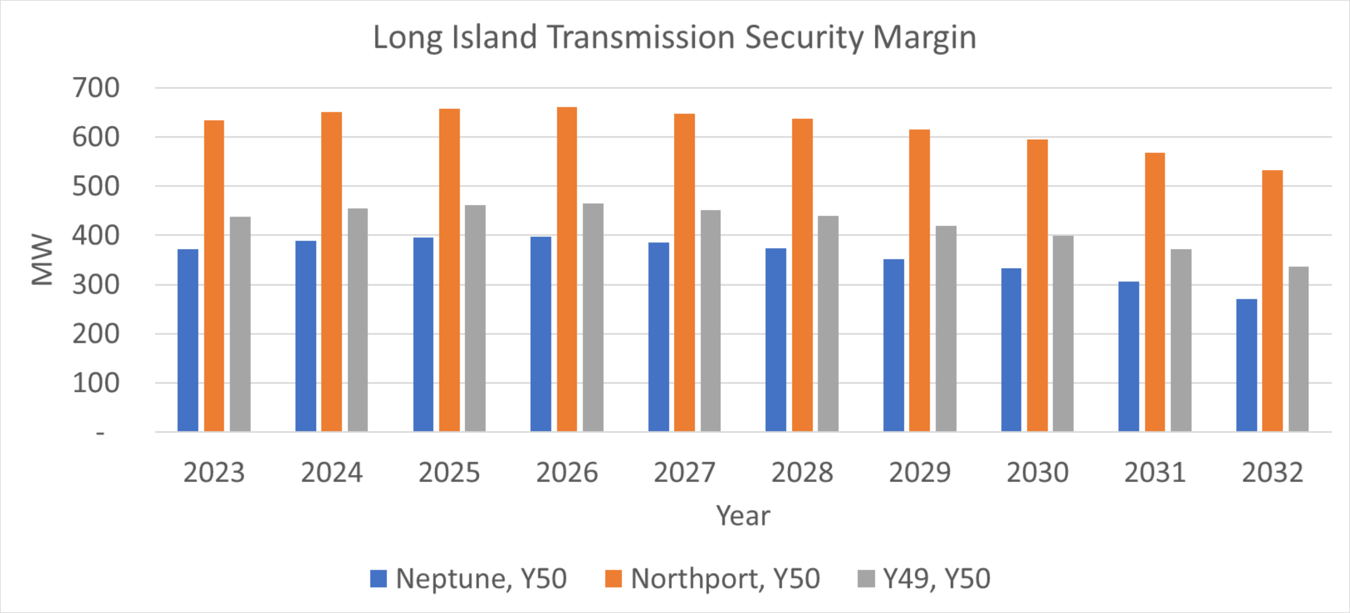
Figure 57: Summary of New York City Summer Transmission Security Margin – Winter



Long Island (Zone K) Transmission Security Margins

Within the Long Island Power Authority service territory, the BPTF system (primarily comprised of 138 kV transmission) is designed for N-1-1. As shown in **Figure 58,** 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 58: 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 59 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 372 MW in summer 2024 to 270 MW in summer 2033 (see line-item L). The demand shapes for Long Island show the contribution of Zone K (**Figure 97**) 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 60**. The hourly margin is created by using the demand forecast for each hour in the margin calculation (*i.e.*, placing each hour into **Figure 59** 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 59** line-item H). All other values in the margin calculations are held constant. For all years in the 10-year study horizon, **Figure 60** shows that there are no observed 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 61**.

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 62**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 62**, the system is sufficient under these conditions within the 10-year study horizon and ranges from 574 MW in summer 2024 to 464 MW in summer 2033 (*see* line-item M). The demand shapes for Zone K under heatwave conditions is provided in **Figure 102**. Additionally, **Figure 63** shows 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 64**.

The 1-in-100-year extreme heatwave transmission security margin is shown in **Figure 65**. 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 211 MW in summer 2024 to 94 MW in summer 2033 (*see* line-item M). Additionally, the hourly margin in **Figure 66** 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 107**. 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 67**.

Figure 68 shows the Long Island transmission security margin under winter peak demand and expected weather conditions. For winter peak, the margin ranges from 2,489 MW in winter 2024-25 to 1,006 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 69 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 2,980 MW in winter 2024-25 to 1,435 MW in winter 2033-34. Similarly, **Figure 70** 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 2,736 MW in winter 2024-25 to 1,082 MW in winter 2033-34.

Figure 71 provides a summary of the summer peak Long Island transmission security margins under expected summer weather, heatwave, and extreme heatwave conditions. **Figure 72** provides a summary of the winter peak Long Island transmission security margins under expected winter weather, cold snap, and extreme cold snap conditions. **Figure 73** 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 59: 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 (4)	929	929	929	929	929	929	929	929	929	929
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	929	929	929	929	929	929	929	929	929	929
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(4,698)	(4,681)	(4,673)	(4,669)	(4,681)	(4,692)	(4,713)	(4,733)	(4,759)	(4,794)
G	K Generation (1)	5,013	5,013	5,013	5,013	5,013	5,013	5,013	5,013	5,013	5,013
H	K Generation Derates (2)	(603)	(604)	(605)	(606)	(606)	(607)	(607)	(607)	(608)	(608)
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)**	5,070	5,069	5,068	5,067	5,066	5,066	5,065	5,065	5,065	5,064
L	**Transmission Security Margin (F+K)**	372	388	395	398	385	374	352	332	306	270

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 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).
4. These limits do not reflect the selected Long Island Public Policy Transmission project planned to come into service in 2030.

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)			372	388	395	398	385	374	352	332	306	270
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Bethpage GT4	44.4	(4.48)	332	348	355	358	346	334	312	292	266	230
Bethpage	23.2	(0.94)	349	366	373	376	363	352	330	310	284	248
Stony Brook (BTM:NG)	0.0	0.00	372	388	395	398	385	374	352	332	306	270
Freeport CT 2	40.0	(4.03)	336	352	359	362	349	338	316	296	270	234
Freeport 1-2, 1-3, & 2-3	16.8	(1.80)	357	373	380	383	370	359	337	317	291	255
Freeport 2-3	12.5	(1.26)	360	377	384	387	374	363	341	321	295	259
Freeport 1-3	2.3	(0.29)	370	386	393	396	383	372	350	330	304	268
Freeport 1-2	2.0	(0.25)	370	386	393	396	384	372	351	331	304	269
Northport 1, 2, 3, and 4	1,518.6	(150.34)	(997)	(980)	(973)	(970)	(983)	(994)	(1,016)	(1,036)	(1,062)	(1,098)
Holtsville 01 through 10	525.9	(47.12)	(107)	(91)	(84)	(81)	(93)	(105)	(126)	(146)	(173)	(209)
Northport 2	397.5	(39.35)	14	30	37	40	27	16	(6)	(26)	(52)	(88)
Northport 3	396.5	(39.25)	14	31	38	41	28	17	(5)	(25)	(51)	(87)
Northport 1	396.2	(39.22)	15	31	38	41	28	17	(5)	(25)	(51)	(87)
Port Jefferson 3 & 4	383.5	(37.97)	26	43	50	52	40	28	7	(13)	(40)	(75)
Barrett ST 01 & 02	372.0	(36.83)	37	53	60	63	50	39	17	(3)	(29)	(65)
Northport 4	328.4	(32.51)	76	92	99	102	90	78	56	36	10	(26)
Caithness_CC_1	302.4	(12.28)	82	98	105	108	95	84	62	42	16	(20)
Barrett GT 01 through 12	256.5	(24.12)	139	156	163	166	153	142	120	100	73	38
Wading River 1, 2, & 3	227.0	(22.88)	168	184	191	194	181	170	148	128	102	66
Barrett ST 01	193.7	(19.18)	197	214	221	223	211	199	178	158	131	96
Port Jefferson 3	192.0	(19.01)	199	215	222	225	212	201	179	159	133	97
Port Jefferson 4	191.5	(18.96)	199	216	223	225	213	201	180	160	133	98

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)			372	388	395	398	385	374	352	332	306	270
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Barrett ST 02	178.3	(17.65)	211	227	234	237	225	213	192	172	145	110
Glenwood GT 02, 04, & 05	132.4	(13.35)	253	269	276	279	266	255	233	213	187	151
Far Rockaway GT1 & GT2	108.6	(9.73)	273	289	296	299	287	275	253	233	207	171
Shoreham GT 3 & 4	85.9	(8.66)	294	311	318	321	308	297	275	255	229	193
Pilgrim GT1 & GT2	83.2	(8.39)	297	313	320	323	311	299	278	258	231	195
Port Jefferson GT 02 & 03	82.2	(8.29)	298	314	321	324	312	300	278	258	232	196
Wading River 1	76.8	(7.74)	303	319	326	329	316	305	283	263	237	201
Wading River 2	75.7	(7.63)	304	320	327	330	317	306	284	264	238	202
Bethpage 3	74.8	(3.04)	300	316	323	326	314	302	281	261	234	198
Wading River 3	74.5	(7.51)	305	321	328	331	318	307	285	265	239	203
Hempstead (RR)	73.0	(7.23)	306	322	329	332	320	308	287	267	240	204
Pinelawn Power 1	73.0	(2.96)	302	318	325	328	315	304	282	262	236	200
Holtsville 09	57.2	(5.13)	320	336	343	346	333	322	300	280	254	218
Holtsville 01	56.3	(5.04)	320	337	344	347	334	323	301	281	255	219
Far Rockaway GT2	55.8	(5.00)	321	337	344	347	335	323	302	282	255	219
Holtsville 02	55.0	(4.93)	322	338	345	348	335	324	302	282	256	220
Holtsville 04	54.1	(4.85)	322	339	346	349	336	325	303	283	257	221
Holtsville 05	52.8	(4.73)	324	340	347	350	337	326	304	284	258	222
Far Rockaway GT1	52.8	(4.73)	324	340	347	350	337	326	304	284	258	222
Greenport GT1	52.6	(4.71)	324	340	347	350	338	326	304	284	258	222
Holtsville 07	51.6	(4.62)	325	341	348	351	338	327	305	285	259	223
Holtsville 10	50.3	(4.51)	326	342	349	352	340	328	307	287	260	224

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)			372	388	395	398	385	374	352	332	306	270
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Holtsville 03	50.2	(4.50)	326	342	349	352	340	328	307	287	260	225
Glenwood GT 02	49.9	(5.03)	327	343	350	353	341	329	307	287	261	225
Holtsville 06	49.8	(4.46)	326	343	350	353	340	329	307	287	260	225
Holtsville 08	48.6	(4.35)	327	344	351	354	341	330	308	288	262	226
Shoreham GT4	43.1	(4.34)	333	349	356	359	347	335	314	294	267	231
Shoreham GT3	42.8	(4.31)	333	350	357	359	347	335	314	294	267	232
Glenwood GT 05	42.7	(4.30)	333	350	357	360	347	335	314	294	267	232
Pilgrim GT2	41.7	(4.20)	334	351	358	360	348	336	315	295	268	233
Port Jefferson GT 02	41.5	(4.18)	334	351	358	361	348	337	315	295	268	233
Pilgrim GT1	41.5	(4.18)	334	351	358	361	348	337	315	295	268	233
Port Jefferson GT 03	40.7	(4.10)	335	352	358	361	349	337	316	296	269	234
Glenwood GT 04	39.8	(4.01)	336	352	359	362	350	338	317	297	270	234
Barrett 12	39.7	(3.56)	336	352	359	362	349	338	316	296	270	234
Barrett 09	38.5	(3.45)	337	353	360	363	350	339	317	297	271	235
Barrett 10	38.5	(3.45)	337	353	360	363	350	339	317	297	271	235
Barrett 11	38.5	(3.45)	337	353	360	363	350	339	317	297	271	235
Huntington (RR)	24.5	(2.43)	350	366	373	376	363	352	330	310	284	248
East Hampton GT 01, 2, 3, & 4	24.2	(2.38)	350	366	373	376	364	352	331	311	284	248
East Hampton GT 01	18.5	(1.66)	355	371	378	381	369	357	335	315	289	253
Babylon (RR)	16.0	(1.58)	357	374	381	384	371	359	338	318	291	256
Barrett GT 02	15.6	(1.57)	358	374	381	384	371	360	338	318	292	256
Barrett 03	15.0	(1.51)	358	375	382	384	372	360	339	319	292	257

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)			372	388	395	398	385	374	352	332	306	270
Unit Name	Summer DMNC (MW)	NERC 5-Year Class Average De-Rate (MW)	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Barrett 06	15.0	(1.51)	358	375	382	384	372	360	339	319	292	257
Barrett GT 01	14.9	(1.50)	358	375	382	385	372	360	339	319	292	257
Barrett 08	14.4	(1.45)	359	375	382	385	372	361	339	319	293	257
Barrett 04	13.3	(1.34)	360	376	383	386	373	362	340	320	294	258
Barrett 05	13.1	(1.32)	360	376	383	386	374	362	341	321	294	258
Southold 1	9.4	(0.95)	363	380	387	390	377	365	344	324	297	262
S Hampton 1	8.6	(0.87)	364	380	387	390	378	366	345	325	298	263
Islip (RR)	8.0	(0.79)	364	381	388	391	378	367	345	325	299	263
East Hampton 2	1.9	(0.24)	370	386	393	396	384	372	351	331	304	269
East Hampton 3	1.9	(0.24)	370	386	393	396	384	372	351	331	304	269
East Hampton 4	1.9	(0.24)	370	386	393	396	384	372	351	331	304	269
Flynn	139.0	(5.64)	238	255	262	265	252	241	219	199	172	137
Brentwood	45.5	(4.59)	331	347	354	357	345	333	311	291	265	229
Greenport IC 4, 5, & 6	5.6	(0.71)	367	383	390	393	381	369	347	327	301	265
Greenport IC 6	3.1	(0.39)	369	385	392	395	383	371	350	330	303	268
Greenport IC 5	1.5	(0.19)	370	387	394	397	384	373	351	331	304	269
Greenport IC 4	1.0	(0.13)	371	387	394	397	385	373	351	331	305	269
Charles P Killer 09 through 14	15.1	(1.79)	358	375	382	385	372	361	339	319	292	257
Charles P Keller 14	3.2	(0.38)	369	385	392	395	383	371	350	330	303	267
Charles P Keller 12	2.8	(0.33)	369	386	393	396	383	371	350	330	303	268
Charles P Keller 13	2.8	(0.33)	369	386	393	396	383	371	350	330	303	268
Charles P Keller 11	2.7	(0.32)	369	386	393	396	383	372	350	330	303	268

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)			372	388	395	398	385	374	352	332	306	270
Unit Name	**Summer DMNC (MW)**	**NERC 5-Year Class Average De-Rate (MW)**	Transmission Security Margin Impact of Generator Outage (Retire, Mothball, IIFO)									
Charles P Keller 09	1.8	(0.21)	370	387	393	396	384	372	351	331	304	269
Charles P Keller 10	1.8	(0.21)	370	387	393	396	384	372	351	331	304	269
Freeport CT 1 & 2	85.4	(8.61)	295	311	318	321	309	297	276	256	229	193
Freeport CT 1	45.4	(4.58)	331	347	354	357	345	333	312	292	265	229

Notes

1. Utilizes the Transmission Security Margin for Summer Peak (Baseline Demand) with Expected Weather.

Figure 60: 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	2,267	2,225	2,225	2,219	2,206	2,193	2,176	2,159	2,070	2,049
HB1	2,477	2,441	2,440	2,437	2,426	2,417	2,403	2,389	2,308	2,292
HB2	2,625	2,590	2,591	2,589	2,579	2,572	2,561	2,549	2,477	2,463
HB3	2,708	2,674	2,675	2,674	2,666	2,662	2,653	2,643	2,574	2,563
HB4	2,715	2,684	2,685	2,685	2,678	2,673	2,666	2,658	2,590	2,581
HB5	2,651	2,619	2,621	2,620	2,614	2,609	2,601	2,594	2,524	2,515
HB6	2,525	2,493	2,496	2,497	2,493	2,489	2,481	2,475	2,402	2,393
HB7	2,274	2,239	2,250	2,263	2,265	2,268	2,267	2,265	2,190	2,185
HB8	1,982	1,945	1,966	1,996	2,012	2,027	2,031	2,035	1,962	1,961
HB9	1,695	1,660	1,694	1,743	1,772	1,799	1,816	1,828	1,761	1,767
HB10	1,404	1,369	1,414	1,476	1,519	1,558	1,581	1,602	1,539	1,555
HB11	1,142	1,107	1,160	1,231	1,282	1,328	1,359	1,387	1,324	1,346
HB12	938	902	957	1,032	1,086	1,134	1,166	1,196	1,131	1,156
HB13	758	719	774	847	899	946	978	1,007	937	962
HB14	623	583	635	705	754	798	827	854	780	802
HB15	535	489	535	596	637	671	692	712	626	643
HB16	417	367	402	445	469	492	501	509	407	411
HB17	372	313	334	357	363	370	364	358	240	229
HB18	451	388	395	398	385	374	352	332	226	197
HB19	613	548	549	541	519	499	471	442	306	270
HB20	792	730	727	717	695	674	643	616	479	445
HB21	1,024	966	962	952	931	912	884	858	728	696
HB22	1,398	1,345	1,342	1,333	1,312	1,295	1,269	1,246	1,126	1,095
HB23	1,770	1,723	1,721	1,713	1,696	1,681	1,658	1,638	1,532	1,506

Figure 61: Long Island Transmission Security Margin Hourly Curve (Summer Peak – Expected Weather, Normal Transfer Criteria)

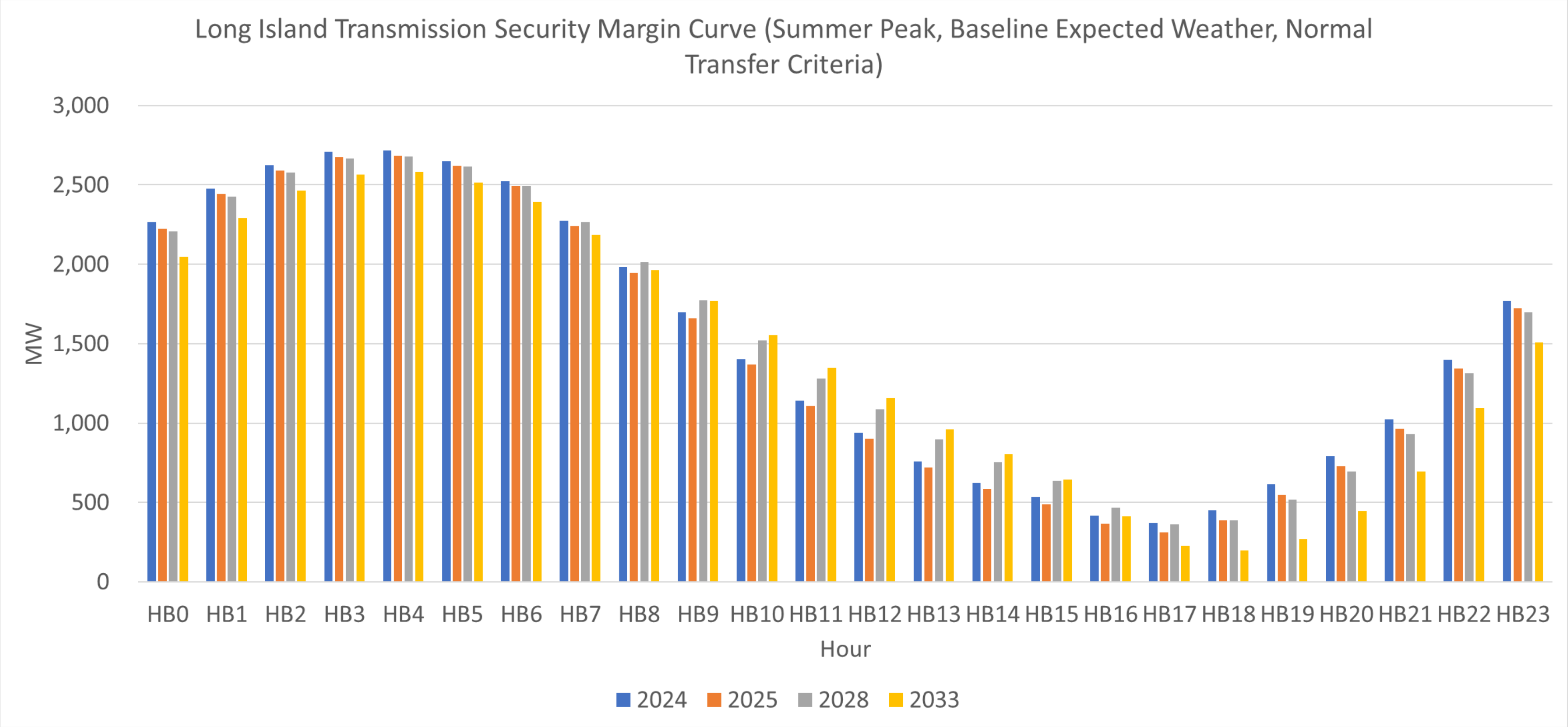


Figure 62: Long Island Transmission Security Margin (1-in-10-Year Heatwave, Emergency Transfer Criteria)

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 (6)	887	887	887	887	887	887	887	887	887	887
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	887	887	887	887	887	887	887	887	887	887
E	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
F	**Resource Need (A+D+E)**	(4,482)	(4,463)	(4,455)	(4,451)	(4,463)	(4,475)	(4,498)	(4,520)	(4,548)	(4,586)
G	K Generation (1)	5,013	5,013	5,013	5,013	5,013	5,013	5,013	5,013	5,013	5,013
H	K Generation Derates (2)	(603)	(604)	(605)	(606)	(606)	(607)	(607)	(607)	(608)	(608)
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)	18	18	18	18	18	18	18	18	18	18
L	**Total Resources Available (G+H+I+J+K)**	5,056	5,055	5,054	5,053	5,053	5,052	5,052	5,052	5,051	5,050
M	**Transmission Security Margin (F+L)**	574	592	599	602	590	577	554	532	503	464

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 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).
6. These limits do not reflect the selected Long Island Public Policy Transmission project planned to come into service in 2030.

Figure 63: 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	2,520	2,526	2,524	2,465	2,445	2,425	2,407	2,389	2,338	2,316
HB1	2,742	2,753	2,751	2,695	2,678	2,663	2,649	2,634	2,591	2,574
HB2	2,897	2,908	2,908	2,854	2,838	2,827	2,815	2,802	2,768	2,753
HB3	2,989	3,000	3,000	2,947	2,934	2,926	2,917	2,906	2,875	2,862
HB4	3,011	3,026	3,025	2,974	2,962	2,952	2,945	2,936	2,907	2,896
HB5	2,962	2,976	2,977	2,924	2,913	2,903	2,894	2,887	2,856	2,845
HB6	2,848	2,863	2,864	2,812	2,802	2,792	2,783	2,776	2,741	2,731
HB7	2,590	2,602	2,610	2,568	2,561	2,556	2,552	2,547	2,509	2,502
HB8	2,280	2,289	2,304	2,277	2,280	2,284	2,282	2,282	2,242	2,236
HB9	1,970	1,979	2,004	1,993	2,005	2,017	2,027	2,031	1,995	1,992
HB10	1,672	1,679	1,713	1,712	1,735	1,756	1,768	1,780	1,745	1,750
HB11	1,433	1,441	1,481	1,486	1,514	1,540	1,559	1,576	1,539	1,548
HB12	1,231	1,234	1,274	1,282	1,315	1,345	1,365	1,382	1,342	1,352
HB13	1,054	1,061	1,098	1,096	1,130	1,162	1,182	1,199	1,162	1,170
HB14	875	886	920	907	942	973	992	1,007	974	978
HB15	757	768	795	766	781	806	818	828	792	792
HB16	615	630	647	594	613	631	635	635	593	580
HB17	574	592	599	519	522	527	516	506	460	436
HB18	688	704	700	602	590	577	554	532	503	464
HB19	845	860	852	745	742	723	695	664	607	562
HB20	1,060	1,073	1,063	963	939	917	886	858	792	752
HB21	1,323	1,336	1,326	1,234	1,209	1,188	1,158	1,132	1,066	1,030
HB22	1,736	1,746	1,739	1,658	1,632	1,610	1,583	1,559	1,496	1,461
HB23	2,153	2,162	2,156	2,086	2,062	2,043	2,018	1,997	1,940	1,911

Figure 64: Long Island Transmission Security Margin Hourly Curve (1-in-10-Year Heatwave, Emergency Transfer Criteria)

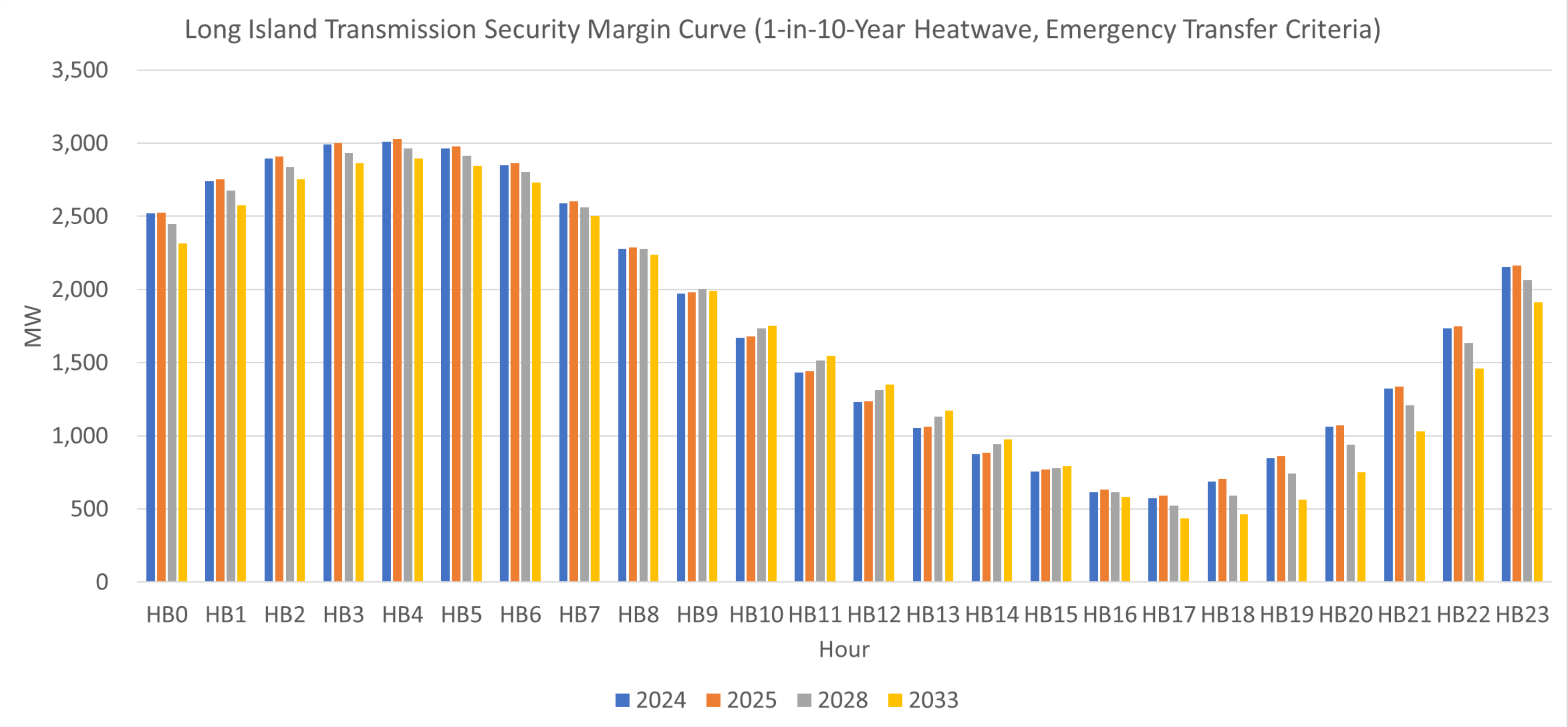


Figure 65: Long Island Transmission Security Margin (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

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 (6)	887	887	887	887	887	887	887	887	887	887
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	887	887	887	887	887	887	887	887	887	887
E	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
F	**Resource Need (A+D+E)**	(4,809)	(4,790)	(4,781)	(4,776)	(4,790)	(4,803)	(4,827)	(4,850)	(4,879)	(4,920)
G	K Generation (1)	5,013	5,013	5,013	5,013	5,013	5,013	5,013	5,013	5,013	5,013
H	K Generation Derates (2)	(603)	(604)	(605)	(606)	(606)	(607)	(607)	(607)	(608)	(608)
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)	18	18	18	18	18	18	18	18	18	18
L	**Total Resources Available (G+H+I+J+K)**	5,020	5,019	5,018	5,017	5,017	5,016	5,016	5,016	5,015	5,014
M	**Transmission Security Margin (F+L)**	211	229	237	241	227	213	189	166	136	94

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 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).
6. These limits do not reflect the selected Long Island Public Policy Transmission project planned to come into service in 2030.

Figure 66: 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	2,338	2,343	2,343	2,282	2,261	2,241	2,222	2,204	2,152	2,130
HB1	2,562	2,573	2,571	2,514	2,496	2,481	2,466	2,450	2,407	2,389
HB2	2,719	2,729	2,730	2,674	2,658	2,646	2,634	2,620	2,586	2,570
HB3	2,812	2,822	2,823	2,769	2,755	2,746	2,736	2,725	2,694	2,680
HB4	2,834	2,848	2,848	2,795	2,783	2,773	2,765	2,756	2,726	2,715
HB5	2,785	2,800	2,801	2,746	2,735	2,725	2,715	2,707	2,676	2,665
HB6	2,672	2,687	2,689	2,635	2,624	2,614	2,604	2,597	2,562	2,551
HB7	2,412	2,423	2,432	2,389	2,381	2,375	2,371	2,366	2,328	2,319
HB8	2,098	2,105	2,121	2,092	2,095	2,098	2,097	2,096	2,056	2,048
HB9	1,784	1,790	1,816	1,803	1,815	1,827	1,835	1,840	1,803	1,799
HB10	1,481	1,486	1,521	1,517	1,539	1,560	1,572	1,583	1,547	1,552
HB11	1,238	1,243	1,284	1,287	1,315	1,340	1,358	1,375	1,337	1,345
HB12	1,011	1,011	1,051	1,057	1,090	1,119	1,138	1,155	1,113	1,122
HB13	800	804	842	836	870	900	920	936	897	903
HB14	587	594	628	612	646	677	694	709	673	676
HB15	435	443	455	422	453	477	487	498	458	456
HB16	260	274	292	235	253	270	271	271	226	213
HB17	211	229	237	153	155	159	147	136	88	62
HB18	328	345	343	241	227	213	189	166	136	94
HB19	489	506	518	406	385	364	335	304	243	197
HB20	739	754	746	642	617	594	561	533	465	424
HB21	1,038	1,050	1,042	948	922	899	869	843	774	736
HB22	1,486	1,496	1,490	1,406	1,379	1,357	1,329	1,305	1,239	1,204
HB23	1,936	1,945	1,942	1,868	1,844	1,823	1,798	1,777	1,719	1,688

Figure 67: Long Island Transmission Security Margin Hourly Curve (1-in-100-Year Extreme Heatwave, Emergency Transfer Criteria)

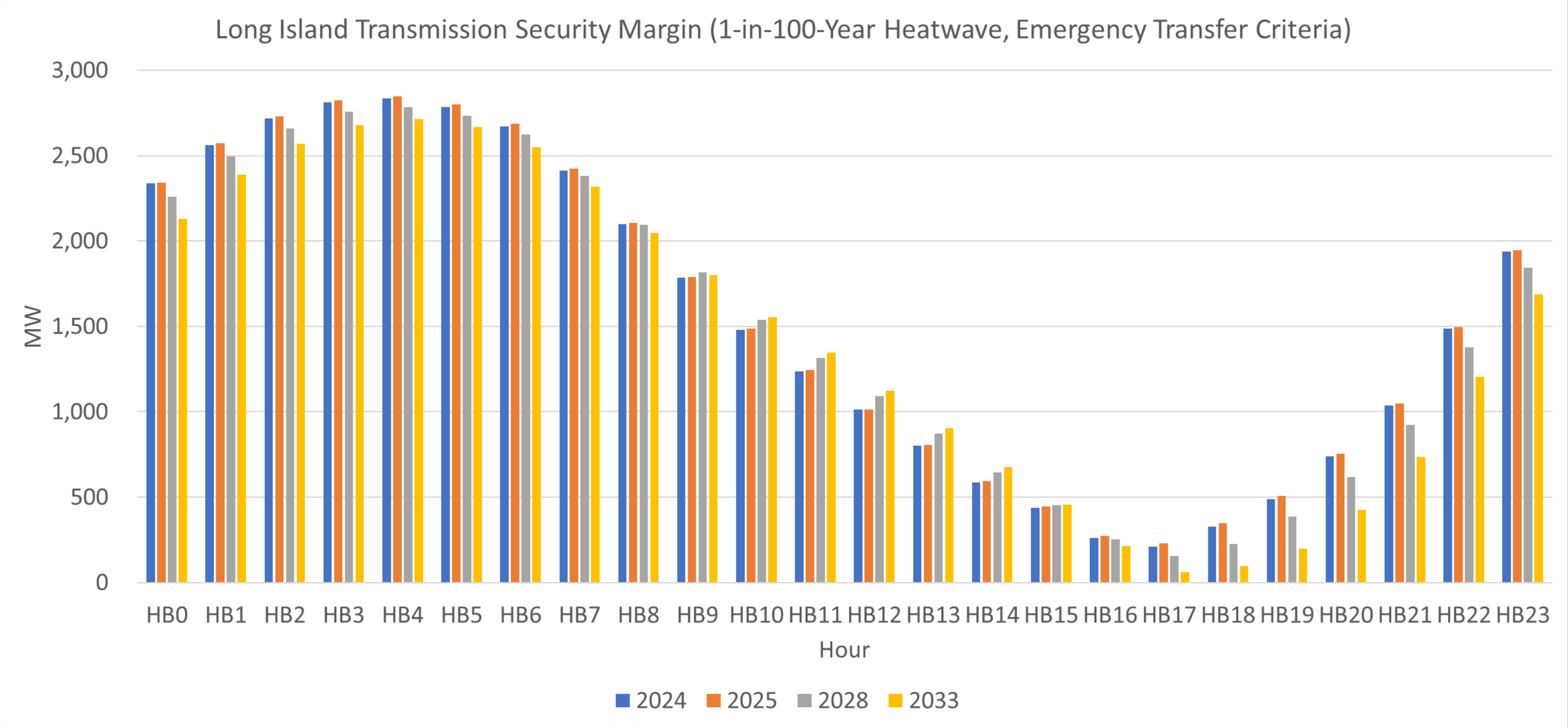
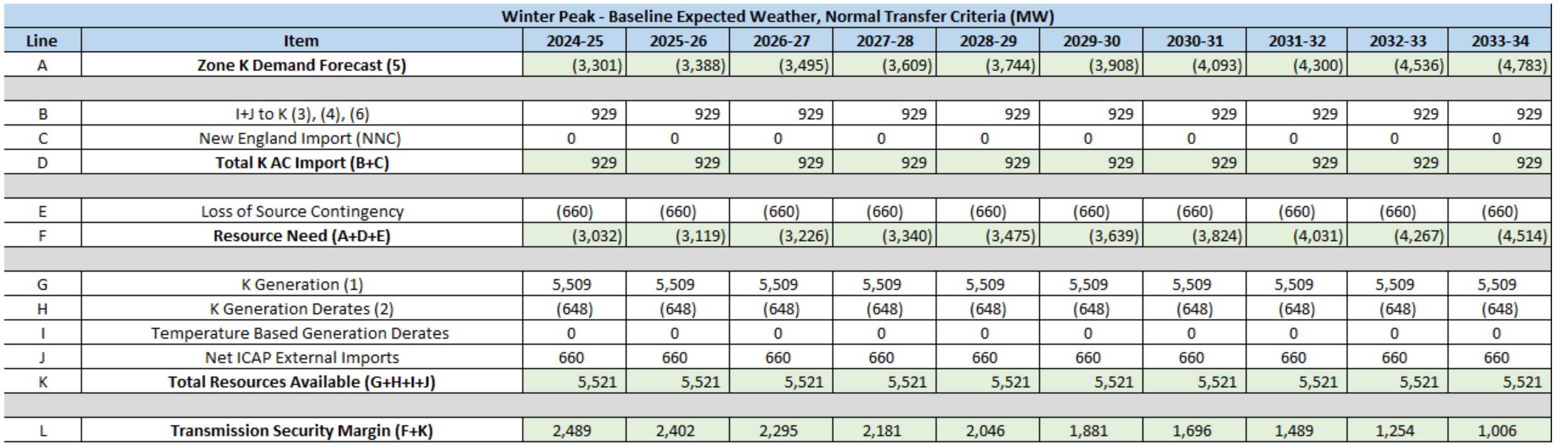


Figure 68: Long Island Transmission Security Margin (Winter Peak – Expected Weather, Normal Transfer Criteria)



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), (6)	929	929	929	929	929	929	929	929	929	929
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	929	929	929	929	929	929	929	929	929	929
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(3,032)	(3,119)	(3,226)	(3,340)	(3,475)	(3,639)	(3,824)	(4,031)	(4,267)	(4,514)
G	K Generation (1)	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509
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)**	5,521	5,521	5,521	5,521	5,521	5,521	5,521	5,521	5,521	5,521
L	**Transmission Security Margin (F+K)**	2,489	2,402	2,295	2,181	2,046	1,881	1,696	1,489	1,254	1,006

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 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).
6. These limits do not reflect the selected Long Island Public Policy Transmission project planned to come into service in 2030.

Figure 69: 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), (8)	887	887	887	887	887	887	887	887	887	887
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	887	887	887	887	887	887	887	887	887	887
E	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
F	**Resource Need (A+D+E)**	(2,552)	(2,643)	(2,754)	(2,873)	(3,014)	(3,185)	(3,378)	(3,594)	(3,839)	(4,097)
G	K Generation (1)	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509
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)	12	12	12	12	12	12	12	12	12	12
L	**Total Resources Available (G+H+I+J+K)**	5,532	5,532	5,532	5,532	5,532	5,532	5,532	5,532	5,532	5,532
M	**Transmission Security Margin (F+L)**	2,980	2,889	2,778	2,659	2,518	2,347	2,154	1,938	1,693	1,435

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 10 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 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).
8. These limits do not reflect the selected Long Island Public Policy Transmission project planned to come into service in 2030.

Figure 70: 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), (8)	887	887	887	887	887	887	887	887	887	887
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	887	887	887	887	887	887	887	887	887	887
E	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
F	**Resource Need (A+D+E)**	(2,796)	(2,893)	(3,012)	(3,140)	(3,290)	(3,474)	(3,680)	(3,911)	(4,174)	(4,450)
G	K Generation (1)	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509
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)	12	12	12	12	12	12	12	12	12	12
L	**Total Resources Available (G+H+I+J+K)**	5,532	5,532	5,532	5,532	5,532	5,532	5,532	5,532	5,532	5,532
M	**Transmission Security Margin (F+L)**	2,736	2,639	2,520	2,392	2,242	2,058	1,852	1,621	1,358	1,082

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 10 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 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).
8. These limits do not reflect the selected Long Island Public Policy Transmission project planned to come into service in 2030.

Figure 71: Summary of Long Island Summer Transmission Security Margin – Summer

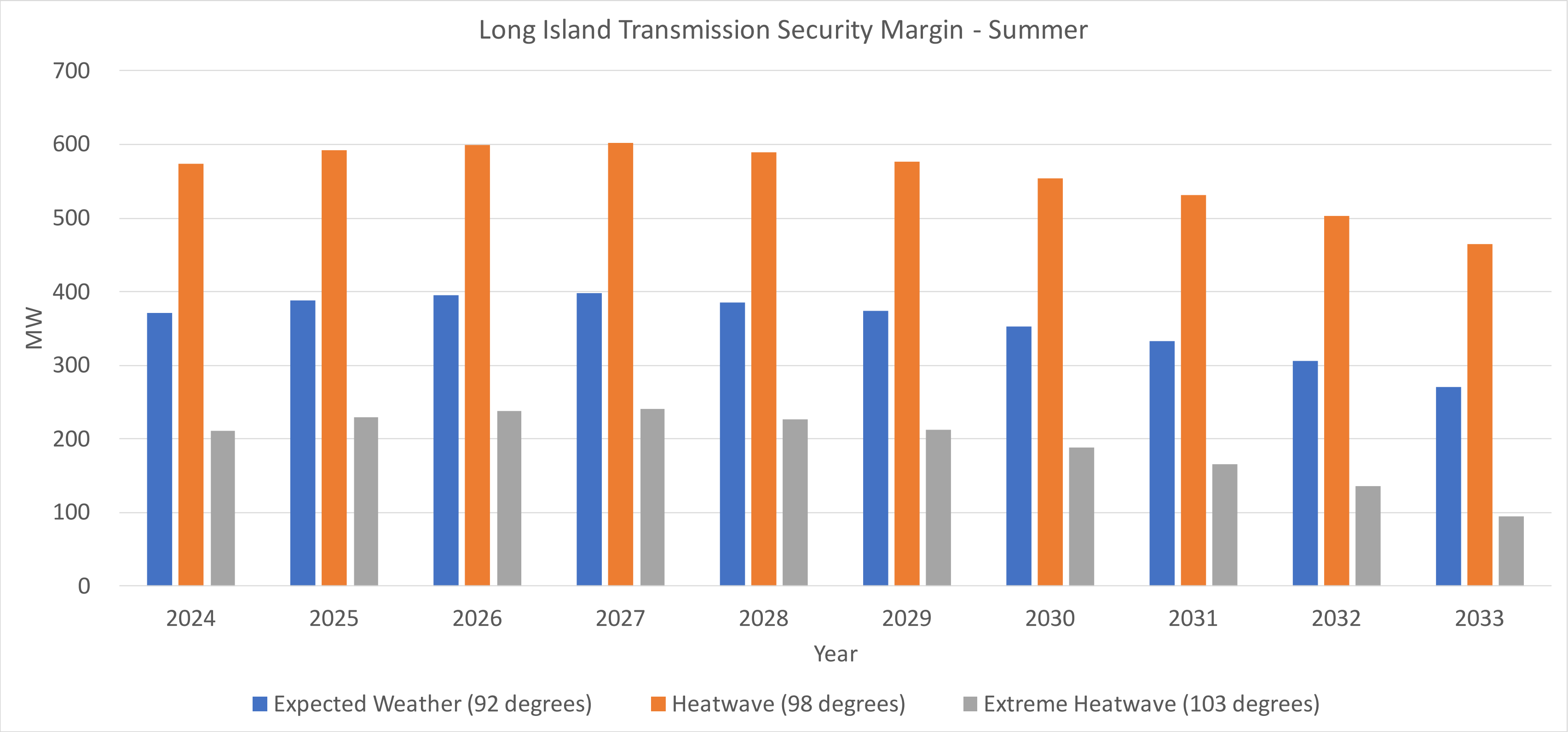


Figure 72: Summary of Long Island Summer Transmission Security Margin – Winter

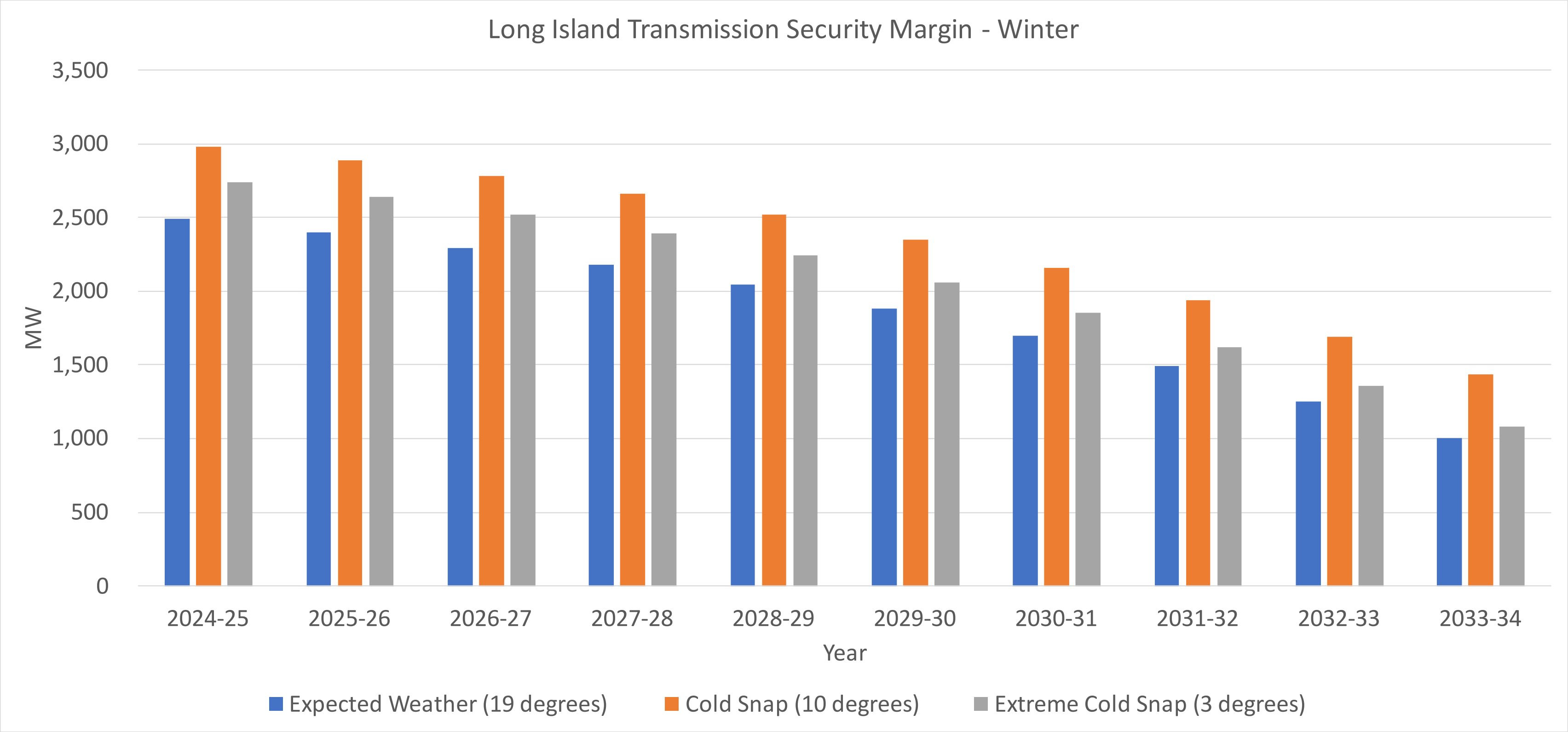
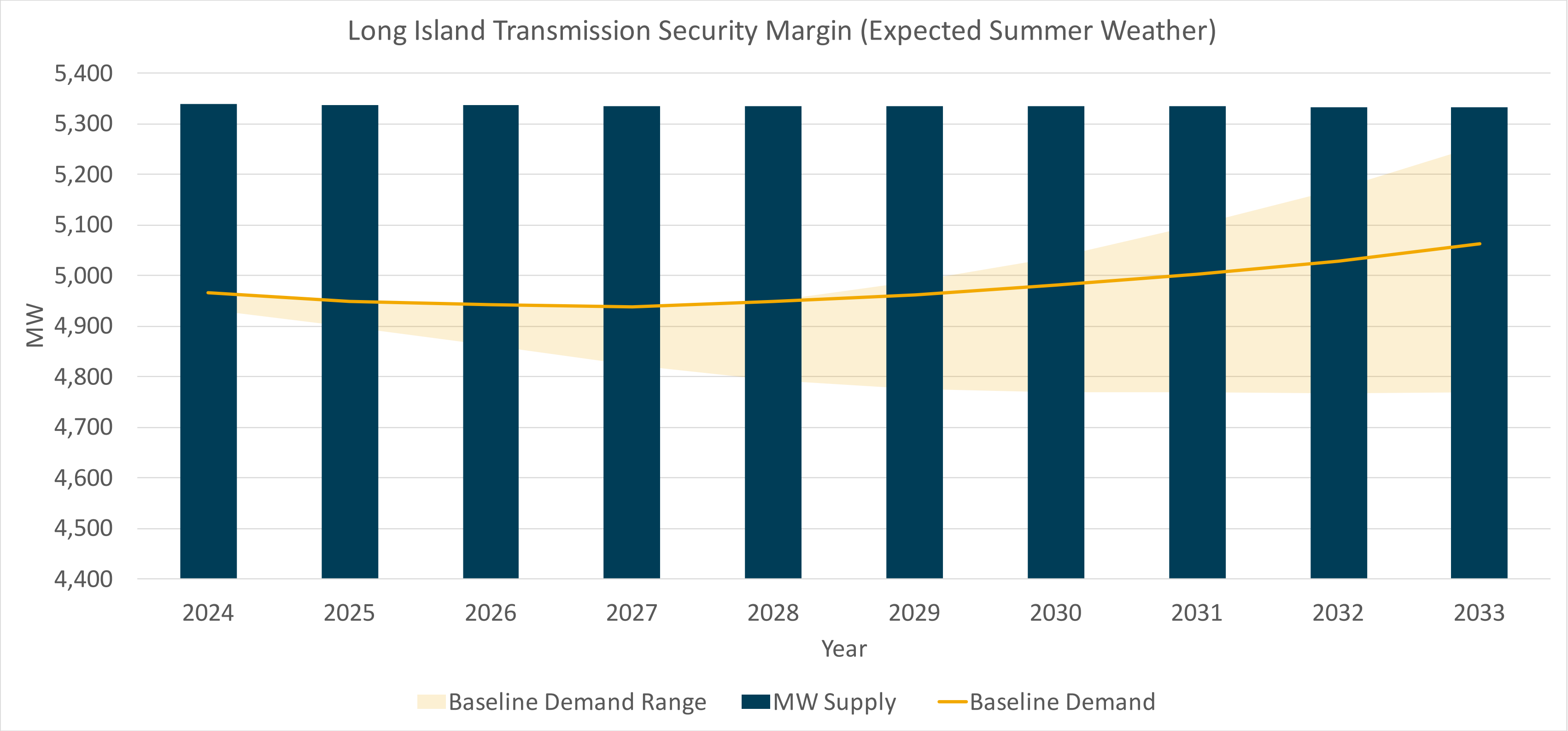


Figure 73: Summary of Long Island Summer Transmission Security Margin Demand Policy Impact – Summer



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."[15] 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.[16] Locally, the NYSRC has established goals to identify actions to preserve NYCA reliability for extreme weather events and other extreme system conditions.[17]

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.[18] 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.[19] 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.[20] 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

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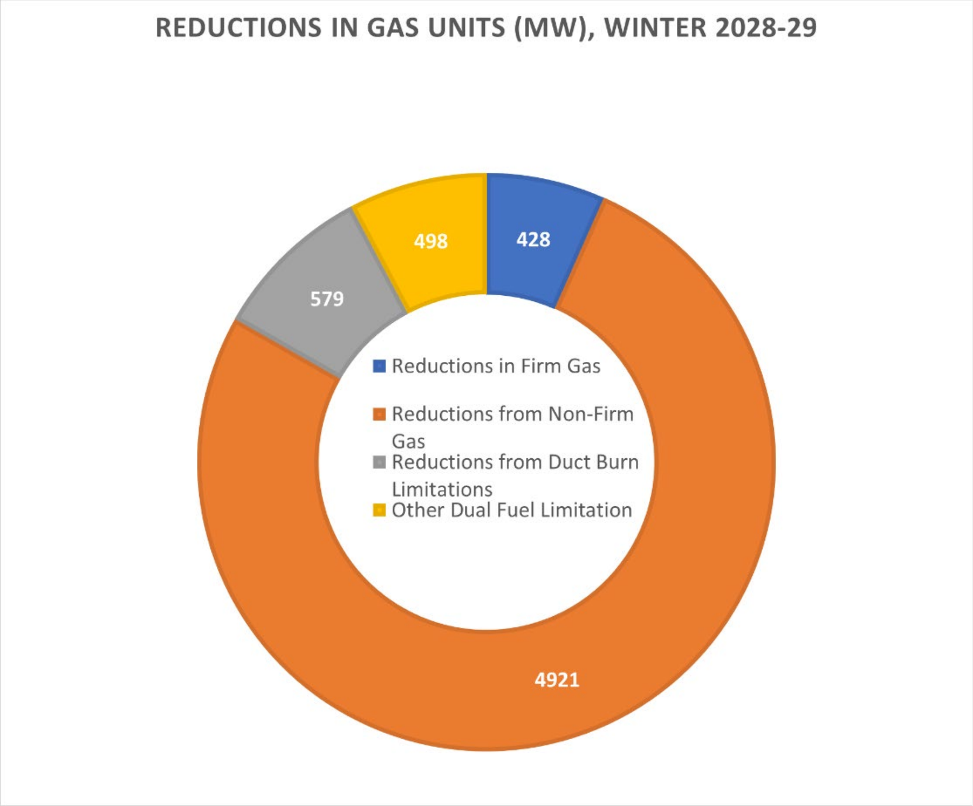
[15] Transmission System Planning Performance Requirements for Extreme Weather, *Notice of Proposed Rulemaking,* Docket No. RM22-10-000 (June 16, 2022).
[16] NYISO comments to RM22-10-000 are found here
[17] A copy of the NYSRC 2022 goals is available here.
[18] Analysis Group, Final Report on Fuel and Energy Security In New York State, An Assessment of Winter Operational Risks for a Power System in Transition (November 2019), which is available here.
[19] 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.
[20] 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).

operations and planning time horizons.[21]

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 74** 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.[22]

Figure 74: NYCA Reductions in Gas Units



In the Area Transmission Review (ATR) assessments conducted by the NYISO, an evaluation of

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

[22] 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.

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 shortage using the winter baseline expected weather forecast with normal transfer criteria.[23] 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 75** shows that the statewide system margin is only sufficient through winter 2029-30. Beginning in winter 2030-31 the statewide system margin is deficient by 405 MW which worsens to a deficiency of 4,415 MW by winter 2033-34 (line-item K). In comparison to the summer peak statewide system margin (shown in **Figure 4**), the winter peak with a shortage of gas fuel supply leads the potential for system deficiencies.

Figure 76 shows that under a cold snap the system is deficient as early as winter 2029-30 by 34 MW which worsens to 5,287 MW winter 2033-34 (line-item L). **Figure 77**shows that under an extreme cold snap, the system is deficient starting in winter 2027-28 by 338 MW which worsens to 7,673 MW by winter 2033-34 (line-item L). **Figure 78** 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 13**) along with the impact of a shortage of gas fuel supply.

Figure 79 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 80** shows the margins under cold snap conditions with **Figure 81** 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 82** provides a

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

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 29**) along with the impact of a shortage of gas fuel supply.

Figure 83 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 (see **Figure 84**, line-item N). In winter 2033-34 the margin is deficient by 79 MW. As shown in **Figure 85**, under an extreme cold snap the margins are deficient beginning in winter 2032-33 by 340 which worsen to 797 MW the next winter.

Figure 86 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 53**) along with the impact of a shortage of gas fuel supply.

Figure 87 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 88** shows the margins under cold snap conditions with **Figure 89** showing the results under an extreme cold snap. Within the Long Island locality (Zone K), gas unavailability impacts 394 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 90 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 68**) along with the impact of the shortage of gas fuel supply.

Figure 75: 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)	40,941	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226
B	NYCA Generation Derates (2)	(6,510)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)
C	Shortage of Gas Fuel Supply (6)	(6,441)	(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)**	29,257	29,240	29,240	29,240	29,240	29,240	29,240	29,240	29,240	29,240
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)	(490)	(559)	(579)	(589)	(589)	(589)	(589)	(589)	(589)	(589)
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)**	(25,695)	(26,065)	(26,545)	(27,081)	(27,743)	(28,615)	(29,645)	(30,835)	(32,205)	(33,655)
K	**Statewide System Margin (F+J)**	3,562	3,175	2,695	2,159	1,497	625	(405)	(1,595)	(2,965)	(4,415)
L	SCRs (8)(9)	486	486	486	486	486	486	486	486	486	486
M	**Statewide System Margin with SCR (K+L)**	4,048	3,661	3,181	2,645	1,983	1,111	81	(1,109)	(2,479)	(3,929)
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)**	2,738	2,351	1,871	1,335	673	(199)	(1,229)	(2,419)	(3,789)	(5,239)

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 final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG without the inclusion of the large load queue projects.

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).

9. Includes a derate of 211 MW for SCRs

Figure 76: Extreme System Condition – Winter Peak Statewide System Margin (1-in-10-Year Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply

Line	Item	Winter Peak - 1-in-10-Year 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)	40,941	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226
B	Shortage of Gas Fuel Supply (7)	(6,510)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)
C	NYCA Generation Derates (2)	(6,441)	(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)	486	486	486	486	486	486	486	486	486	486
G	**Total Resources (A+B+C+D+E+F)**	29,743	29,726	29,726	29,726	29,726	29,726	29,726	29,726	29,726	29,726
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)	(510)	(582)	(603)	(614)	(614)	(614)	(614)	(614)	(614)	(614)
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)**	(26,717)	(27,104)	(27,604)	(28,163)	(28,852)	(29,760)	(30,833)	(32,074)	(33,502)	(35,012)
L	**Statewide System Margin (G+K)**	3,026	2,622	2,122	1,563	874	(34)	(1,108)	(2,349)	(3,777)	(5,287)
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)**	1,716	1,312	812	253	(436)	(1,344)	(2,418)	(3,659)	(5,087)	(6,597)

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 211 MW for SCRs.
6. Reflects the Reflects the final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG without the inclusion of the large load queue projects.
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).

Figure 77: 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)	40,941	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226	41,226
B	Shortage of Gas Fuel Supply (7)	(6,510)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)	(6,829)
C	NYCA Generation Derates (2)	(6,441)	(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)	486	486	486	486	486	486	486	486	486	486
G	**Total Resources (A+B+C+D+E+F)**	29,743	29,726	29,726	29,726	29,726	29,726	29,726	29,726	29,726	29,726
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)	(547)	(624)	(646)	(657)	(657)	(657)	(657)	(657)	(657)	(657)
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)**	(28,518)	(28,929)	(29,466)	(30,064)	(30,803)	(31,777)	(32,925)	(34,255)	(35,783)	(37,398)
L	**Statewide System Margin (G+K)**	1,225	797	260	(338)	(1,077)	(2,051)	(3,199)	(4,529)	(6,057)	(7,673)
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)**	(85)	(513)	(1,050)	(1,648)	(2,387)	(3,361)	(4,509)	(5,839)	(7,367)	(8,983)

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 211 MW for SCRs.
6. Reflects the final 10-year peak forecasts presented to stakeholders at the April 5, 2023 LFTF/ESPWG without the inclusion of the large load queue projects.
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).

Figure 78: Extreme System Condition – Summary of Winter Peak Statewide System Margin with A Shortage of Gas Fuel Supply

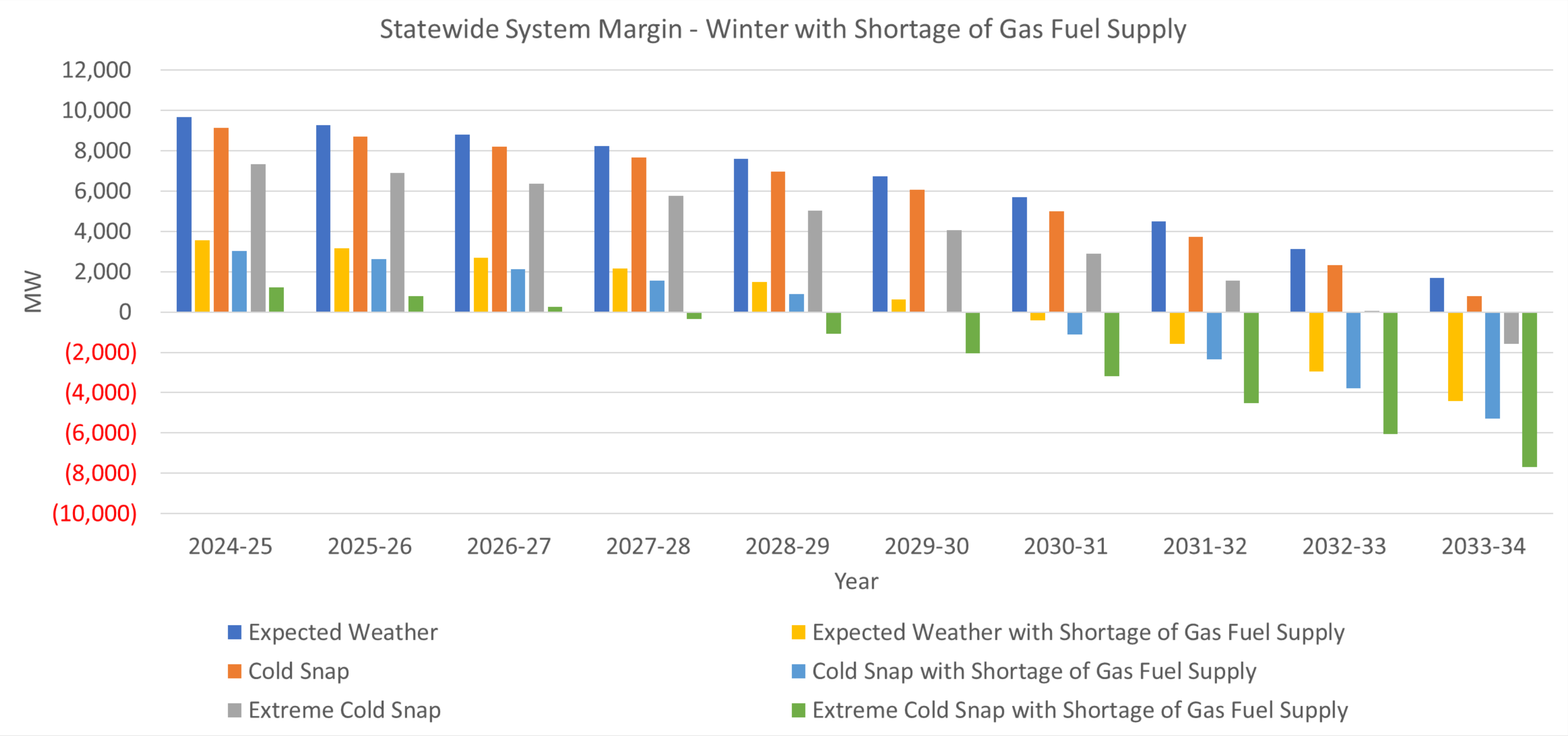


Figure 79: Extreme System Condition – Winter Peak Lower Hudson Valley Transmission Security Margin with A Shortage of Gas Fuel Supply

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)	14,510	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,069)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)
L	Shortage of Gas Fuel Supply (6)	(2,705)	(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)**	11,051	11,034	11,034	11,034	11,034	11,034	11,034	11,034	11,034	11,034
P	**Transmission Security Margin (I+O)**	4,985	4,872	4,689	4,494	4,243	3,895	3,477	2,980	2,402	1,798

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 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).
6. Includes all gas only units that do not have a firm gas contract.

Figure 80: 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)	14,510	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,069)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)
L	Shortage of Gas Fuel Supply (8)	(2,705)	(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)	160	160	160	160	160	160	160	160	160	160
P	**Total Resources Available (J+K+L+M+N+O)**	11,211	11,194	11,194	11,194	11,194	11,194	11,194	11,194	11,194	11,194
Q	**Transmission Security Margin (I+P)**	5,386	5,267	5,077	4,873	4,612	4,249	3,814	3,295	2,694	2,065

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 133 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 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).
8. Includes all gas only units that do not have a firm gas contract.

Figure 81: 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)	14,510	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475	14,475
K	G-J Generation Derates (2)	(1,069)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)	(1,067)
	Shortage of Gas Fuel Supply (8)	(2,705)	(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)	160	160	160	160	160	160	160	160	160	160
O	**Total Resources Available (J+K+L+M+N)**	11,211	11,194	11,194	11,194	11,194	11,194	11,194	11,194	11,194	11,194
P	**Transmission Security Margin (I+O)**	4,600	4,477	4,272	4,054	3,774	3,386	2,920	2,364	1,720	1,047

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 133 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 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).
8. Includes all gas only units that do not have a firm gas contract.

Figure 82: Extreme System Condition – Summary of Winter Peak Lower Hudson Valley Transmission Security Margin with A Shortage of Gas Fuel Supply

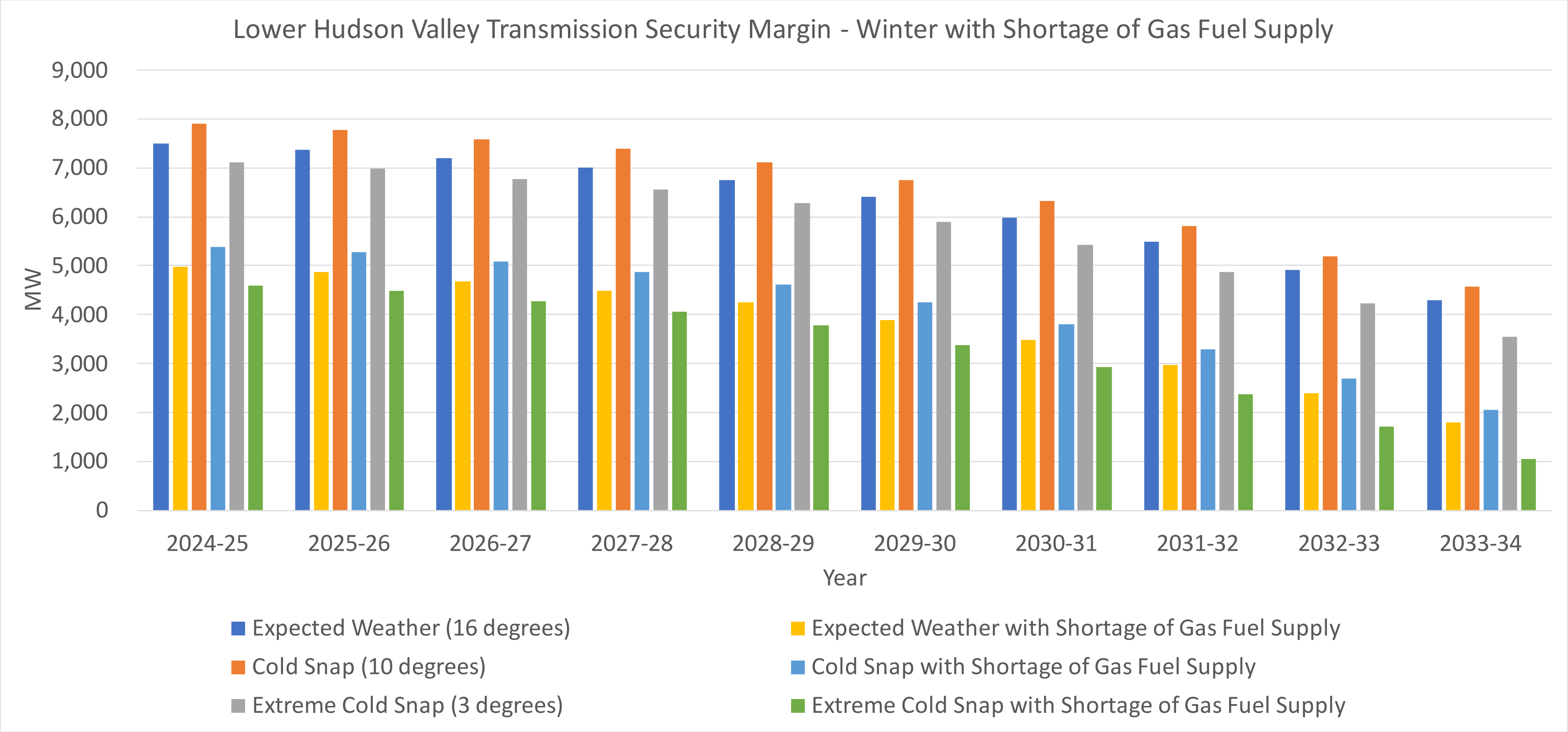


Figure 83: Extreme System Condition – Winter Peak New York City Transmission Security Margin with A Shortage of Gas Fuel Supply

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)	9,414	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(561)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)
I	Shortage of Gas Fuel Supply (6)	(2,145)	(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 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).
6. Includes all gas only units that do not have a firm gas contract.

Figure 84: 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)	9,414	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(561)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)
I	Shortage of Gas Fuel Supply (8)	(2,145)	(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)	128	128	128	128	128	128	128	128	128	128
M	**Total Resources Available (G+H+I+J+K)**	7,151	7,134	7,134	7,134	7,134	7,134	7,134	7,134	7,134	7,134
N	**Transmission Security Margin (F+L)**	2,177	2,067	1,942	1,807	1,640	1,400	1,109	754	348	(79)

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 116 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 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).
8. Includes all gas only units that do not have a firm gas contract.

Figure 85: 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)	9,414	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379	9,379
H	J Generation Derates (2)	(561)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)	(559)
I	Shortage of Gas Fuel Supply (8)	(2,145)	(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)	128	128	128	128	128	128	128	128	128	128
L	**Total Resources Available (G+H+I+J+K)**	7,151	7,134	7,134	7,134	7,134	7,134	7,134	7,134	7,134	7,134
M	**Transmission Security Margin (F+L)**	1,618	1,501	1,367	1,222	1,044	787	475	95	(340)	(797)

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 116 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 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).
8. Includes all gas only units that do not have a firm gas contract.

Figure 86: Extreme System Condition – Summary of Winter Peak New York City Transmission Security Margin with A Shortage of Gas Fuel Supply

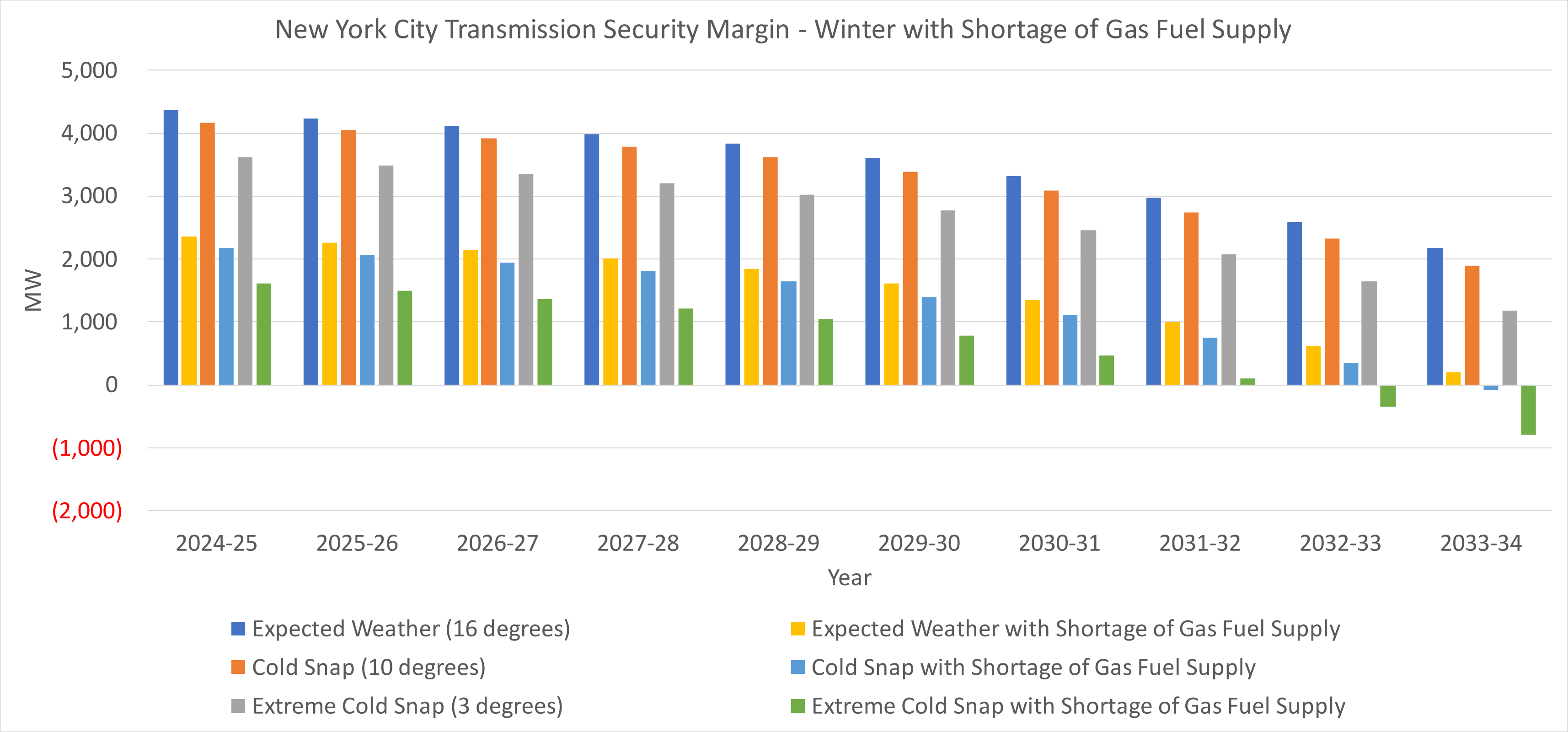
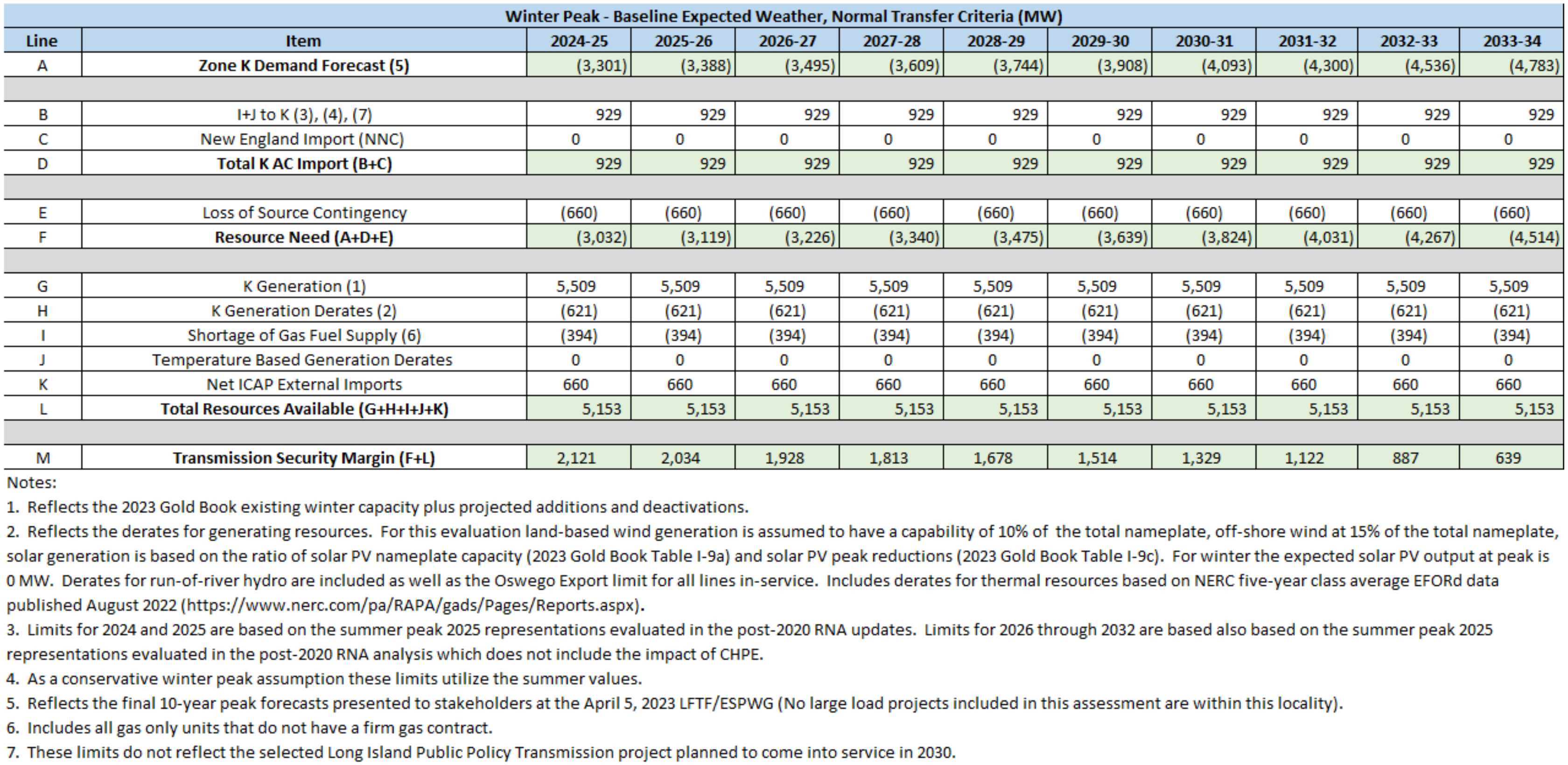


Figure 87: Extreme System Condition – Winter Peak Long Island Transmission Security Margin with A Shortage of Gas Fuel Supply

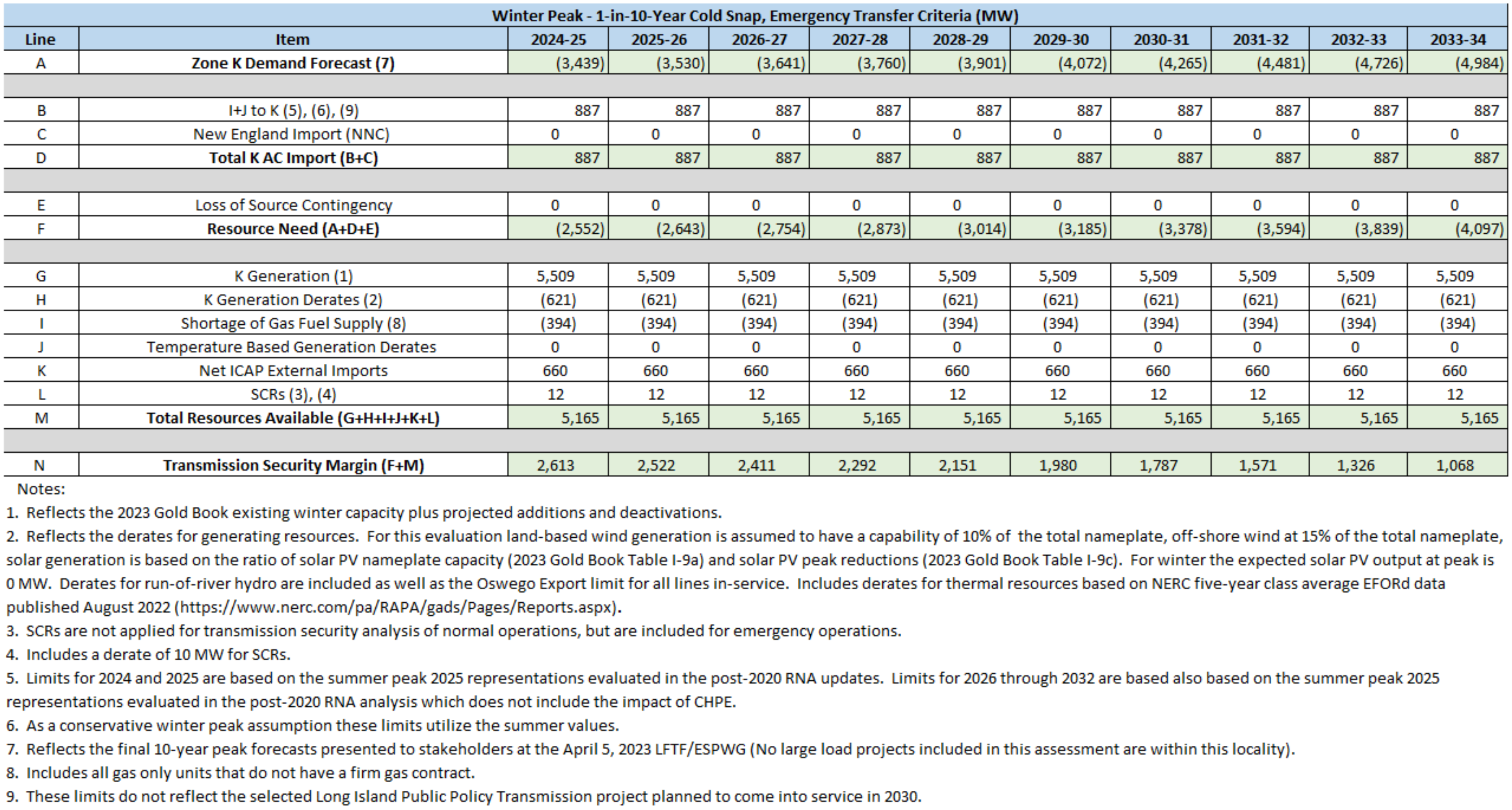


Winter Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)											
Line	**Item**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**	**2033-34**
A	**Zone K Demand Forecast (5)**	(3,301)	(3,388)	(3,495)	(3,609)	(3,744)	(3,908)	(4,093)	(4,300)	(4,536)	(4,783)
B	I+J to K (3), (4), (7)	929	929	929	929	929	929	929	929	929	929
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	929	929	929	929	929	929	929	929	929	929
E	Loss of Source Contingency	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)	(660)
F	**Resource Need (A+D+E)**	(3,032)	(3,119)	(3,226)	(3,340)	(3,475)	(3,639)	(3,824)	(4,031)	(4,267)	(4,514)
G	K Generation (1)	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509
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)**	5,153	5,153	5,153	5,153	5,153	5,153	5,153	5,153	5,153	5,153
M	**Transmission Security Margin (F+L)**	2,121	2,034	1,928	1,813	1,678	1,514	1,329	1,122	887	639

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 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).
6. Includes all gas only units that do not have a firm gas contract.
7. These limits do not reflect the selected Long Island Public Policy Transmission project planned to come into service in 2030.

Figure 88: 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), (9)	887	887	887	887	887	887	887	887	887	887
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	887	887	887	887	887	887	887	887	887	887
E	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
F	**Resource Need (A+D+E)**	(2,552)	(2,643)	(2,754)	(2,873)	(3,014)	(3,185)	(3,378)	(3,594)	(3,839)	(4,097)
G	K Generation (1)	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509
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)	12	12	12	12	12	12	12	12	12	12
M	**Total Resources Available (G+H+I+J+K+L)**	5,165	5,165	5,165	5,165	5,165	5,165	5,165	5,165	5,165	5,165
N	**Transmission Security Margin (F+M)**	2,613	2,522	2,411	2,292	2,151	1,980	1,787	1,571	1,326	1,068

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 10 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 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).
8. Includes all gas only units that do not have a firm gas contract.
9. These limits do not reflect the selected Long Island Public Policy Transmission project planned to come into service in 2030.

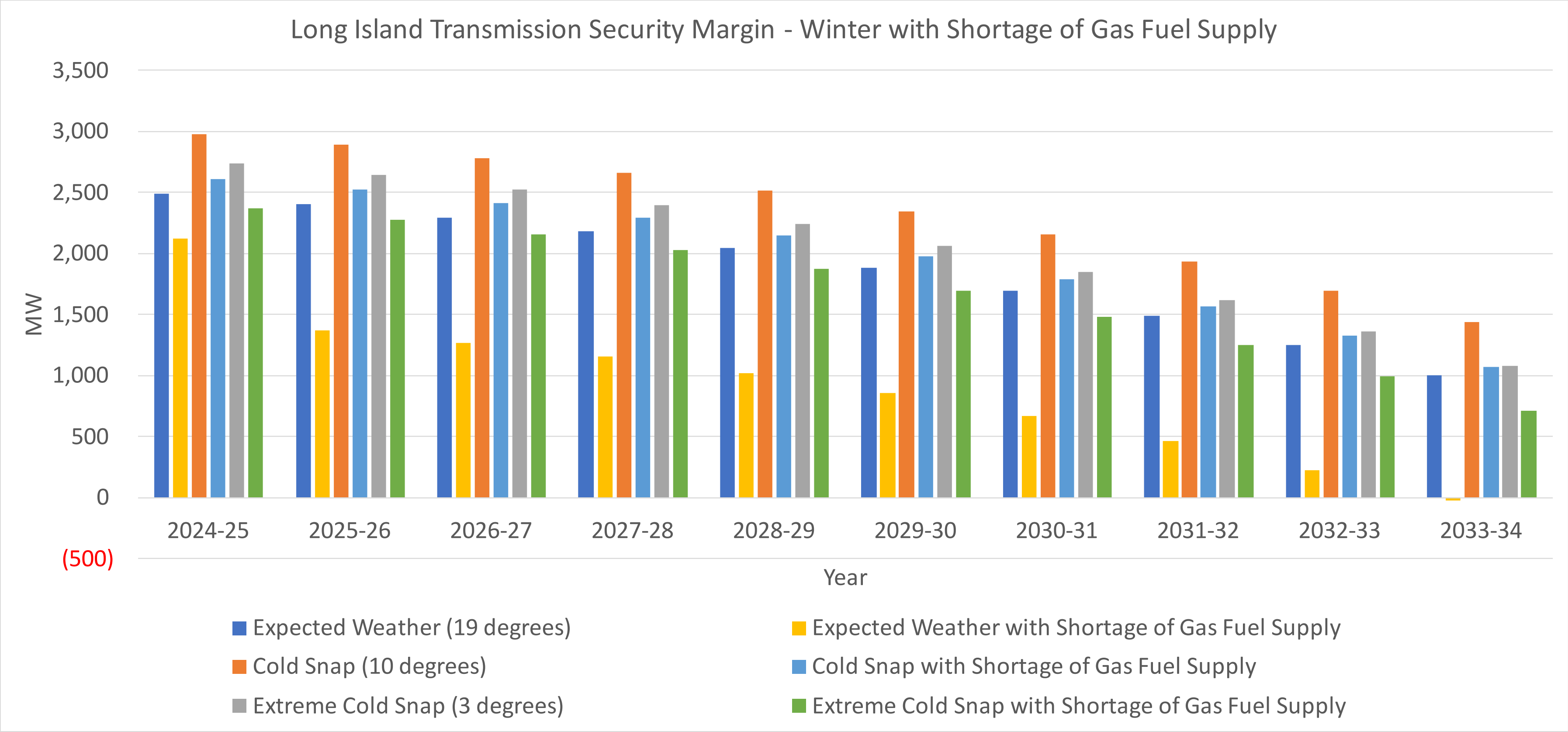
Figure 89: Extreme System Condition – Winter Peak Long Island Transmission Security Margin (1-in-100-Year Extreme Cold Snap, Emergency Transfer Criteria) with A Shortage of Gas Fuel Supply

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), (9)	887	887	887	887	887	887	887	887	887	887
C	New England Import (NNC)	0	0	0	0	0	0	0	0	0	0
D	**Total K AC Import (B+C)**	887	887	887	887	887	887	887	887	887	887
E	Loss of Source Contingency	0	0	0	0	0	0	0	0	0	0
F	**Resource Need (A+D+E)**	(2,796)	(2,893)	(3,012)	(3,140)	(3,290)	(3,474)	(3,680)	(3,911)	(4,174)	(4,450)
G	K Generation (1)	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509
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)	12	12	12	12	12	12	12	12	12	12
M	**Total Resources Available (G+H+I+J+K+L)**	5,165	5,165	5,165	5,165	5,165	5,165	5,165	5,165	5,165	5,165
N	**Transmission Security Margin (F+M)**	2,369	2,272	2,153	2,025	1,875	1,691	1,485	1,254	991	715

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 10 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 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).
8. Includes all gas only units that do not have a firm gas contract.
9. These limits do not reflect the selected Long Island Public Policy Transmission project planned to come into service in 2030.

Figure 90: 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.[24] 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 91**, 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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[24] The 2023 Long-Term Forecast Load Shape Projections are available here.

Figure 91: 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	9,247	8,987	2,740	2,916	8,232	8,680	3,062	3,280	23,281	23,863
HB1	8,831	8,496	2,566	2,713	7,860	8,255	2,852	3,037	22,109	22,501
HB2	8,550	8,155	2,443	2,566	7,594	7,952	2,704	2,866	21,291	21,539
HB3	8,419	7,976	2,360	2,470	7,448	7,792	2,621	2,766	20,848	21,004
HB4	8,477	8,010	2,336	2,438	7,457	7,805	2,614	2,748	20,884	21,001
HB5	8,788	8,320	2,396	2,498	7,689	8,082	2,678	2,814	21,551	21,714
HB6	9,260	8,715	2,525	2,617	8,161	8,590	2,806	2,938	22,752	22,860
HB7	9,698	8,845	2,716	2,746	8,784	9,194	3,062	3,151	24,260	23,936
HB8	9,946	8,615	2,845	2,778	9,332	9,677	3,362	3,383	25,485	24,453
HB9	10,084	8,231	2,987	2,801	9,776	10,039	3,657	3,585	26,504	24,656
HB10	10,286	8,010	3,168	2,884	10,110	10,311	3,954	3,803	27,518	25,008
HB11	10,474	7,931	3,345	2,997	10,337	10,492	4,220	4,016	28,376	25,436
HB12	10,694	8,072	3,508	3,140	10,522	10,655	4,425	4,207	29,149	26,074
HB13	10,983	8,423	3,683	3,327	10,684	10,825	4,604	4,400	29,954	26,975
HB14	11,167	8,739	3,806	3,478	10,793	10,954	4,737	4,558	30,503	27,729
HB15	11,387	9,279	3,939	3,693	10,952	11,182	4,821	4,713	31,099	28,867
HB16	11,741	10,155	4,068	3,953	11,067	11,411	4,932	4,938	31,808	30,457
HB17	12,062	11,142	4,154	4,193	11,060	11,483	4,967	5,108	32,243	31,926
HB18	12,237	11,913	4,153	4,349	10,838	11,430	4,888	5,136	32,116	32,828
HB19	12,199	12,180	4,054	4,332	10,657	11,310	4,717	5,063	31,627	32,885
HB20	11,947	11,978	3,936	4,221	10,501	11,157	4,537	4,884	30,921	32,240
HB21	11,501	11,491	3,735	4,004	10,260	10,903	4,305	4,633	29,801	31,031
HB22	10,744	10,678	3,439	3,689	9,764	10,364	3,931	4,234	27,878	28,965
HB23	9,945	9,791	3,135	3,351	9,218	9,748	3,559	3,823	25,857	26,713

Figure 92 shows the demand shapes for the expected weather summer peak conditions. The statewide behavior can be broken down further into groups of zones. **Figure 93** shows the Zones A-F component of the NYCA expected weather forecast for the summer peak day. As seen in **Figure 93,** 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.[25] **Figure 94** shows the Zones G-I component of the NYCA expected weather forecast for the summer peak day. As seen in **Figure 94,** the increased BtM-PV results in a slight flattening of the demand and a shifting of the peak hour.[26] **Figure 95** shows the Zone J component of the NYCA expected weather forecast for the

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[25] 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).

[26] 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).

summer peak day. As seen in **Figure 95,** the BtM-PV primarily reduces the demand from year to year but has negligible impact on the shifting of the peak hour.[27] **Figure 97** shows the Zone K component of the NYCA expected weather forecast for the summer peak day. As seen in **Figure 97,** BtM-PV has some impact on the Zone K shape over time.[28] Similar shapes were developed for the heatwave (**Figure 98** through **Figure 102**) and extreme heatwave conditions (**Figure 103** through **Figure 107**).

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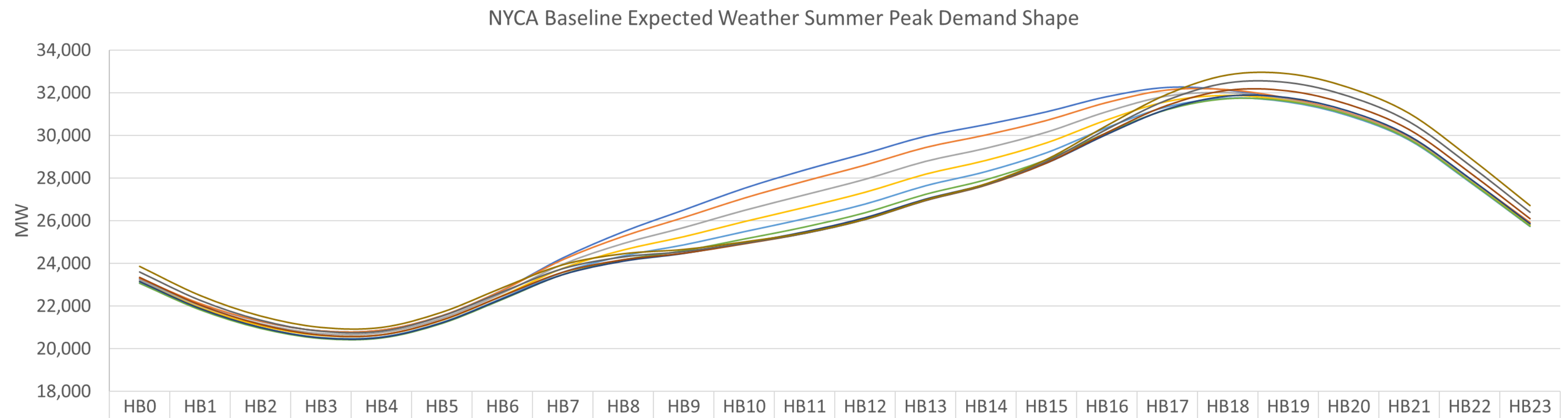
[27] In 2024, Zone J has 476 MW (nameplate) of the 6,186 MW of BtM-PV (nameplate) statewide (approximately 8% of the statewide BtM-PV). In 2033, the forecast for BtM-PV in Zone J increases to 858 MW (nameplate) (approximately 8% of the statewide BtM-PV in Zone J).

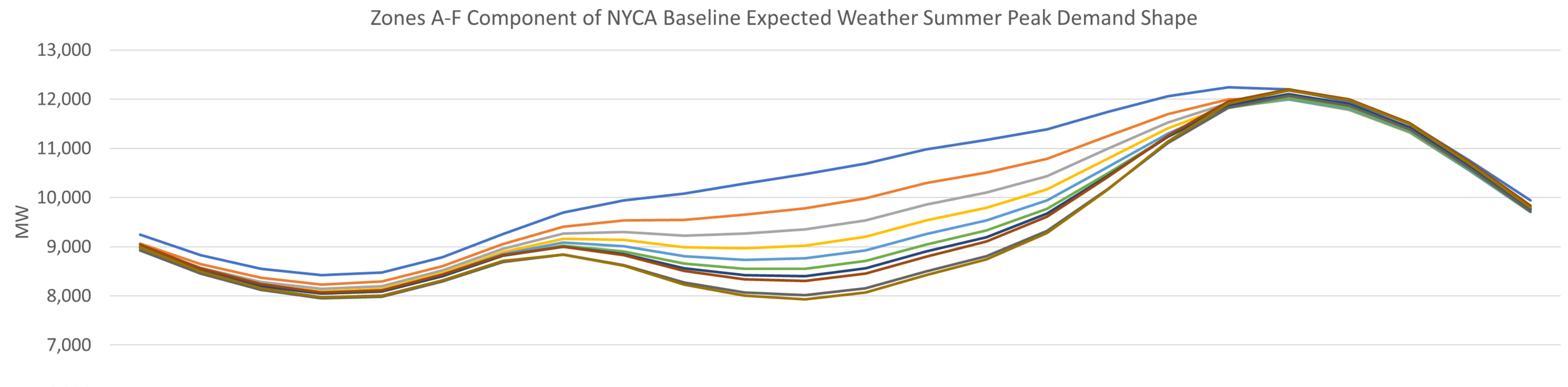
[28] In 2024, Zone K has 925 MW (nameplate) of the 6,186 MW of BtM-PV (nameplate) statewide (approximately 15% of the statewide BtM-PV). In 2033, the forecast for BtM-PV in Zone K increases to 1,552 MW (nameplate) (approximately 14% of the statewide BtM-PV in Zone K).

Figure 92: NYCA Baseline Expected Weather Summer Peak Demand Shape



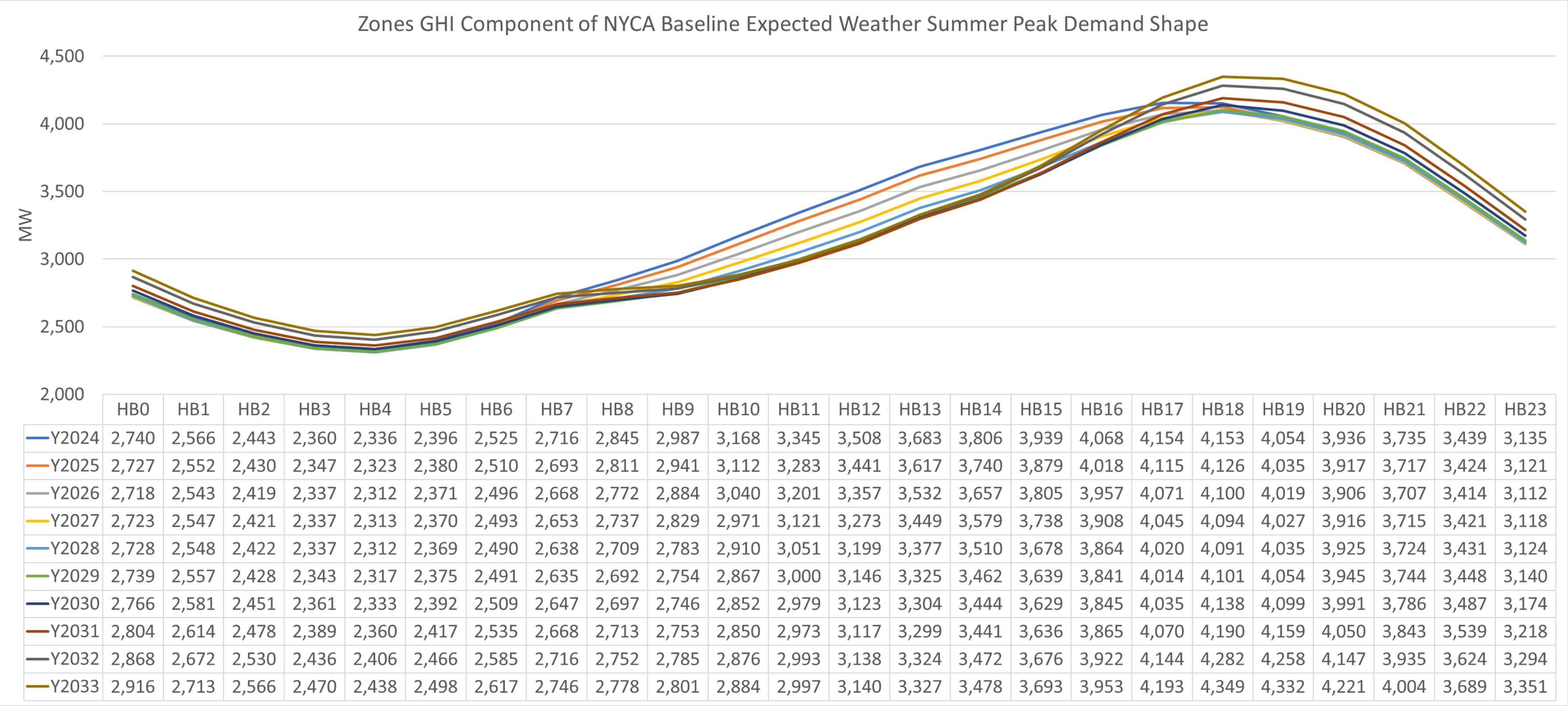
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	23,281	22,109	21,291	20,848	20,884	21,551	22,752	24,260	25,485	26,504	27,518	28,376	29,149	29,954	30,503	31,099	31,808	32,243	32,116	31,627	30,921	29,801	27,878	25,857
Y2025	23,316	22,127	21,295	20,843	20,880	21,555	22,743	24,179	25,274	26,156	27,065	27,860	28,613	29,440	30,027	30,705	31,547	32,134	32,150	31,742	31,051	29,918	27,974	25,925
Y2026	23,223	22,019	21,178	20,720	20,755	21,434	22,606	23,963	24,934	25,682	26,486	27,215	27,945	28,785	29,401	30,154	31,117	31,849	32,005	31,676	31,006	29,870	27,915	25,852
Y2027	23,154	21,936	21,087	20,624	20,656	21,335	22,490	23,773	24,632	25,255	25,961	26,629	27,338	28,186	28,832	29,653	30,729	31,596	31,881	31,628	30,974	29,835	27,874	25,798
Y2028	23,085	21,857	21,000	20,530	20,559	21,238	22,376	23,592	24,356	24,873	25,492	26,102	26,787	27,644	28,311	29,191	30,367	31,349	31,753	31,569	30,928	29,787	27,824	25,738
Y2029	23,069	21,825	20,954	20,478	20,501	21,182	22,308	23,475	24,161	24,592	25,138	25,701	26,371	27,234	27,920	28,853	30,118	31,205	31,715	31,590	30,957	29,811	27,843	25,740
Y2030	23,162	21,896	21,009	20,519	20,537	21,223	22,348	23,482	24,114	24,476	24,966	25,490	26,151	27,023	27,728	28,714	30,060	31,245	31,855	31,779	31,148	29,988	28,001	25,869
Y2031	23,350	22,056	21,148	20,646	20,657	21,350	22,478	23,587	24,177	24,481	24,921	25,412	26,065	26,947	27,670	28,706	30,132	31,410	32,115	32,083	31,447	30,274	28,265	26,098
Y2032	23,599	22,272	21,339	20,820	20,825	21,529	22,663	23,754	24,304	24,555	24,953	25,411	26,058	26,952	27,688	28,777	30,288	31,659	32,462	32,475	31,834	30,642	28,605	26,397
Y2033	23,863	22,501	21,539	21,004	21,001	21,714	22,860	23,936	24,453	24,656	25,008	25,436	26,074	26,975	27,729	28,867	30,457	31,926	32,828	32,885	32,240	31,031	28,965	26,713

Figure 93: Zones A-F Component of NYCA Baseline Expected Weather Summer Peak Demand Shape



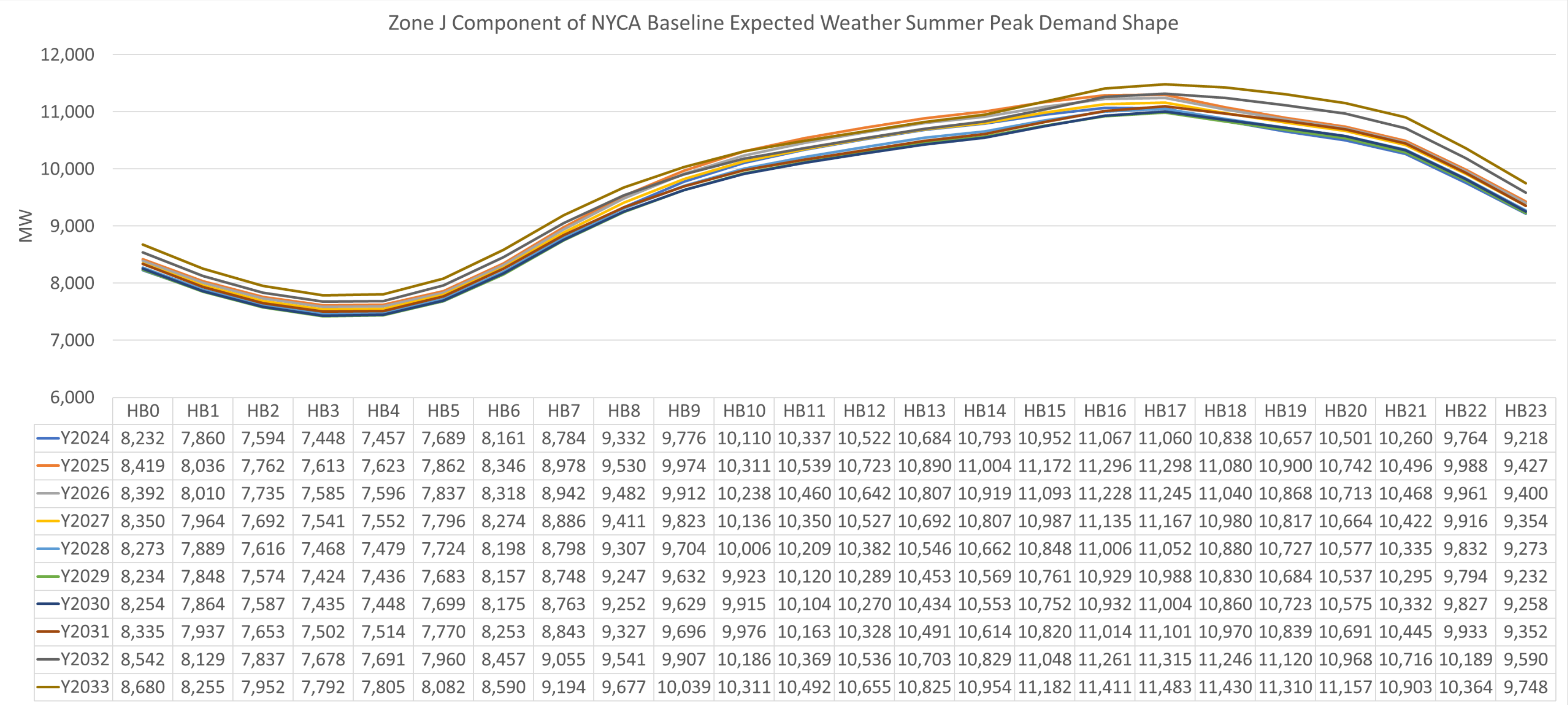
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	9,247	8,831	8,550	8,419	8,477	8,788	9,260	9,698	9,946	10,084	10,286	10,474	10,694	10,983	11,167	11,387	11,741	12,062	12,237	12,199	11,947	11,501	10,744	9,945
Y2025	9,066	8,651	8,364	8,228	8,289	8,603	9,049	9,411	9,534	9,549	9,653	9,783	9,988	10,290	10,506	10,787	11,251	11,696	11,994	12,025	11,793	11,342	10,578	9,771
Y2026	9,009	8,577	8,286	8,144	8,203	8,518	8,957	9,267	9,302	9,228	9,264	9,352	9,540	9,858	10,100	10,435	10,985	11,530	11,923	12,008	11,785	11,328	10,553	9,732
Y2027	8,971	8,533	8,234	8,091	8,147	8,460	8,889	9,161	9,136	8,994	8,972	9,027	9,207	9,530	9,791	10,168	10,782	11,404	11,869	11,995	11,782	11,321	10,541	9,710
Y2028	8,961	8,517	8,212	8,062	8,117	8,430	8,850	9,085	9,008	8,806	8,737	8,762	8,929	9,258	9,533	9,946	10,617	11,303	11,832	11,996	11,792	11,330	10,544	9,708
Y2029	8,960	8,508	8,195	8,044	8,092	8,404	8,818	9,024	8,905	8,653	8,548	8,547	8,707	9,040	9,327	9,768	10,491	11,236	11,823	12,021	11,820	11,355	10,567	9,720
Y2030	8,989	8,525	8,203	8,047	8,093	8,404	8,814	9,003	8,852	8,565	8,422	8,404	8,561	8,901	9,198	9,669	10,435	11,233	11,875	12,098	11,896	11,425	10,627	9,766
Y2031	9,041	8,565	8,237	8,069	8,112	8,428	8,834	9,005	8,828	8,508	8,339	8,301	8,453	8,802	9,109	9,606	10,413	11,260	11,953	12,197	11,993	11,515	10,710	9,837
Y2032	8,930	8,450	8,120	7,951	7,989	8,298	8,692	8,837	8,629	8,272	8,072	8,011	8,152	8,500	8,807	9,323	10,163	11,103	11,826	12,069	11,869	11,390	10,589	9,716
Y2033	8,987	8,496	8,155	7,976	8,010	8,320	8,715	8,845	8,615	8,231	8,010	7,931	8,072	8,423	8,739	9,279	10,155	11,142	11,913	12,180	11,978	11,491	10,678	9,791

Figure 94: Zones GHI Component of NYCA Baseline Expected Weather Summer Peak Demand Shape



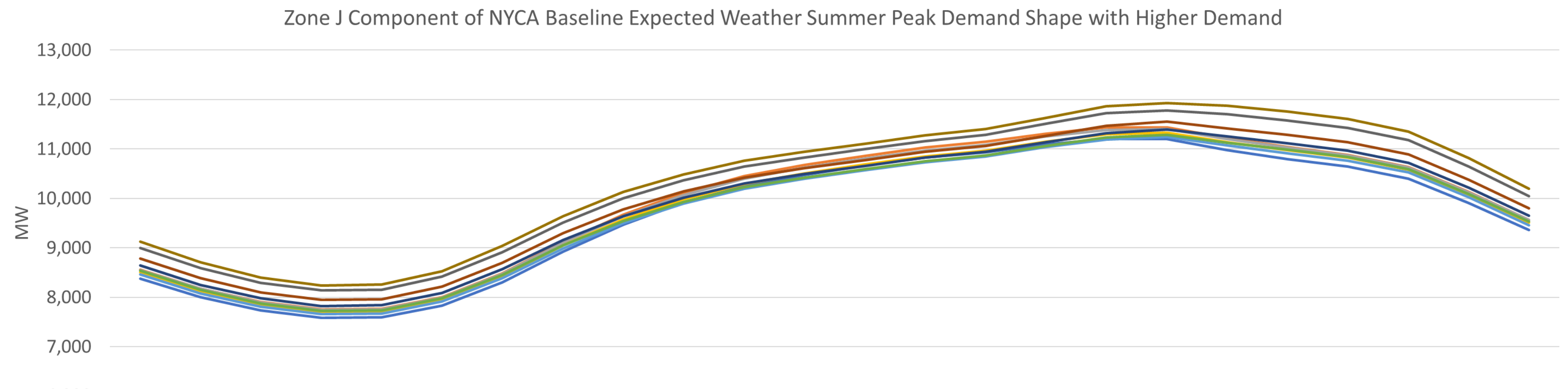
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	2,740	2,566	2,443	2,360	2,336	2,396	2,525	2,716	2,845	2,987	3,168	3,345	3,508	3,683	3,806	3,939	4,068	4,154	4,153	4,054	3,936	3,735	3,439	3,135
Y2025	2,727	2,552	2,430	2,347	2,323	2,380	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 95: Zone J Component of NYCA Baseline Expected Weather Summer Peak Demand Shape



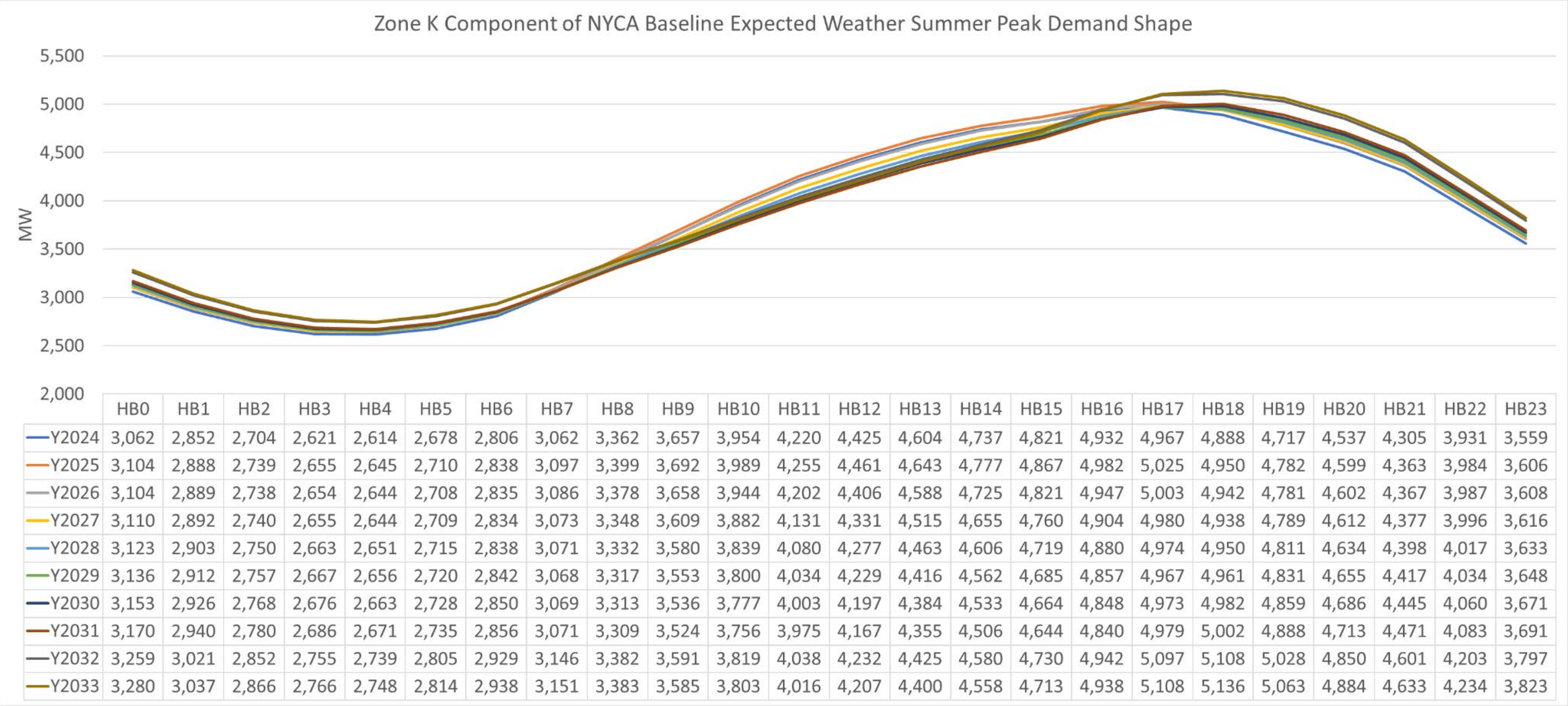
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	8,232	7,860	7,594	7,448	7,457	7,689	8,161	8,784	9,332	9,776	10,110	10,337	10,522	10,684	10,793	10,952	11,067	11,060	10,838	10,657	10,501	10,260	9,764	9,218
Y2025	8,419	8,036	7,762	7,613	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 96: Zone J Component of NYCA Higher Policy Expected Weather Summer Peak Demand Shape



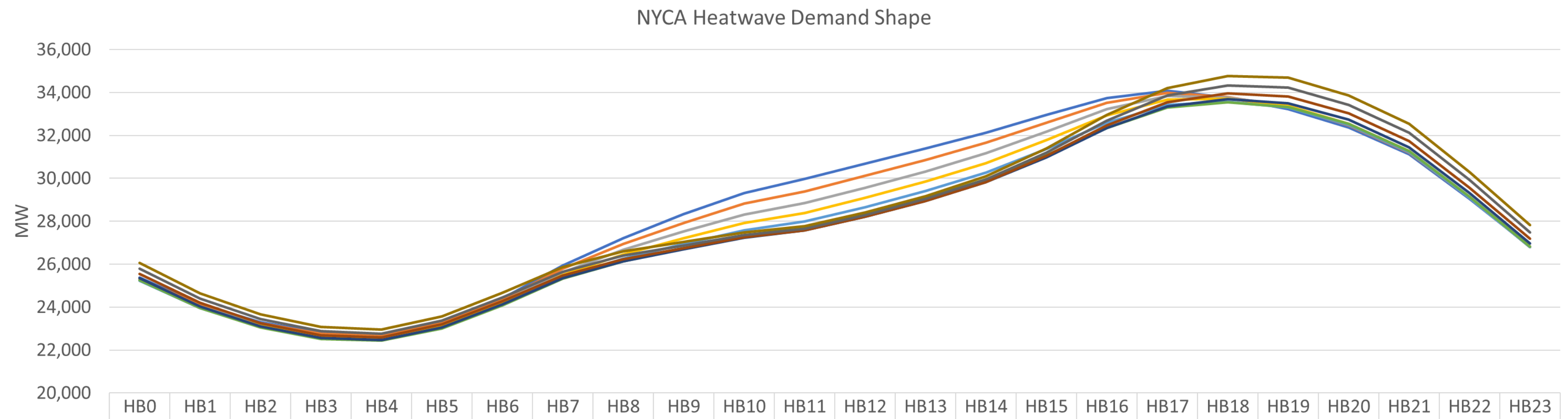
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	8,372	8,000	7,734	7,588	7,597	7,829	8,301	8,924	9,472	9,916	10,250	10,477	10,662	10,824	10,933	11,092	11,207	11,200	10,978	10,797	10,641	10,400	9,904	9,358
Y2025	8,559	8,176	7,902	7,753	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 97: Zone K Component of NYCA Baseline Expected Weather Summer Peak Demand Shape



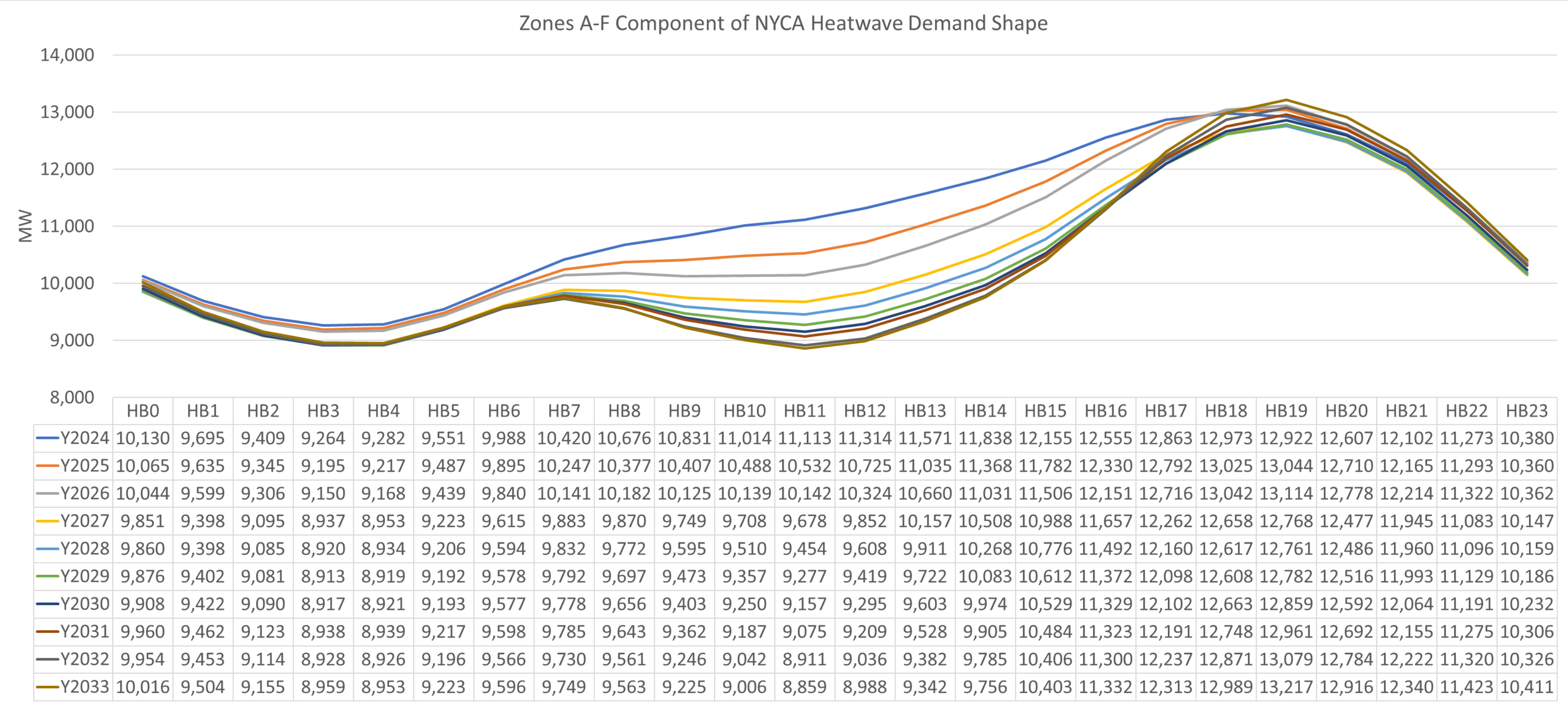
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	3,062	2,852	2,704	2,621	2,614	2,678	2,806	3,062	3,362	3,657	3,954	4,220	4,425	4,604	4,737	4,821	4,932	4,967	4,888	4,717	4,537	4,305	3,931	3,559
Y2025	3,104	2,888	2,739	2,655	2,645	2,710	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 98: NYCA Heatwave Demand Shape



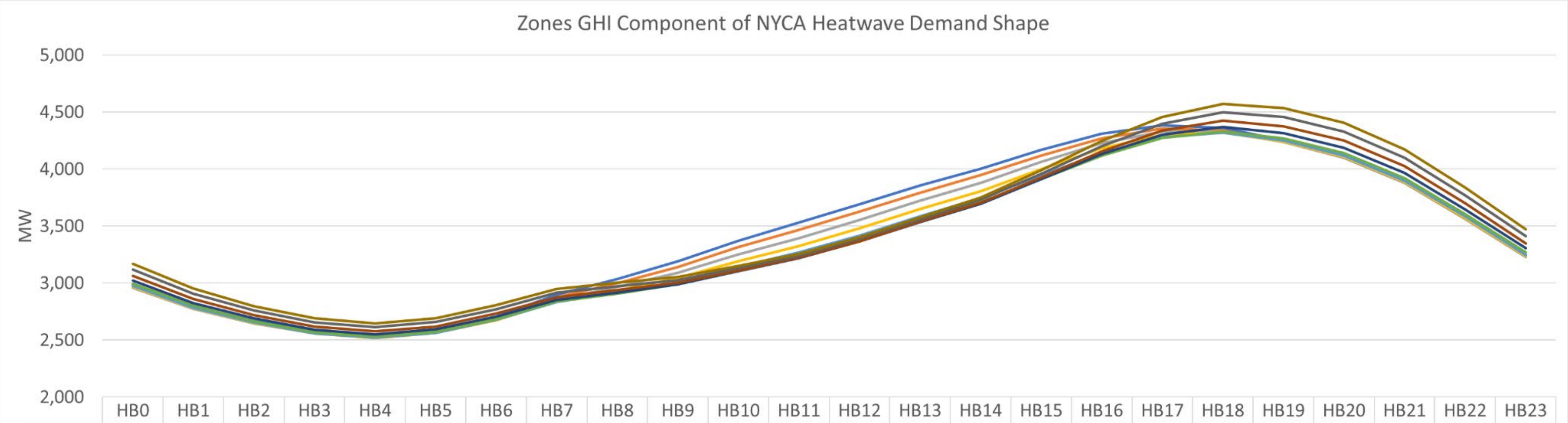
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	25,366	24,138	23,296	22,805	22,732	23,290	24,408	25,932	27,218	28,328	29,321	29,963	30,692	31,382	32,128	32,958	33,747	34,091	33,760	33,218	32,374	31,133	29,053	26,820
Y2025	25,336	24,099	23,249	22,753	22,680	23,240	24,340	25,788	26,950	27,929	28,819	29,398	30,129	30,856	31,657	32,582	33,512	33,992	33,793	33,328	32,478	31,209	29,098	26,829
Y2026	25,279	24,029	23,171	22,669	22,593	23,158	24,243	25,619	26,669	27,528	28,323	28,843	29,567	30,322	31,165	32,173	33,228	33,839	33,766	33,373	32,526	31,238	29,102	26,804
Y2027	25,262	23,995	23,125	22,616	22,538	23,106	24,181	25,499	26,455	27,208	27,920	28,387	29,090	29,850	30,714	31,780	32,932	33,665	33,708	33,381	32,551	31,262	29,119	26,805
Y2028	25,238	23,952	23,068	22,550	22,468	23,041	24,110	25,381	26,263	26,931	27,573	27,996	28,658	29,404	30,265	31,361	32,583	33,423	33,572	33,303	32,504	31,230	29,096	26,784
Y2029	25,261	23,952	23,050	22,522	22,435	23,014	24,081	25,320	26,146	26,746	27,333	27,720	28,352	29,088	29,947	31,074	32,357	33,291	33,534	33,313	32,536	31,271	29,141	26,821
Y2030	25,361	24,028	23,108	22,566	22,474	23,060	24,131	25,349	26,137	26,687	27,231	27,588	28,210	28,950	29,821	30,989	32,337	33,354	33,682	33,500	32,726	31,451	29,303	26,955
Y2031	25,553	24,192	23,250	22,696	22,597	23,190	24,268	25,473	26,236	26,747	27,255	27,587	28,205	28,953	29,836	31,045	32,459	33,551	33,958	33,811	33,030	31,740	29,571	27,189
Y2032	25,800	24,407	23,442	22,872	22,767	23,369	24,456	25,653	26,396	26,872	27,352	27,660	28,279	29,042	29,942	31,198	32,685	33,851	34,338	34,225	33,429	32,116	29,914	27,487
Y2033	26,073	24,647	23,656	23,070	22,957	23,567	24,668	25,861	26,591	27,039	27,490	27,777	28,400	29,178	30,098	31,403	32,961	34,202	34,768	34,687	33,874	32,534	30,297	27,819

Figure 99: Zones A-F Component of NYCA Heatwave Demand Shape



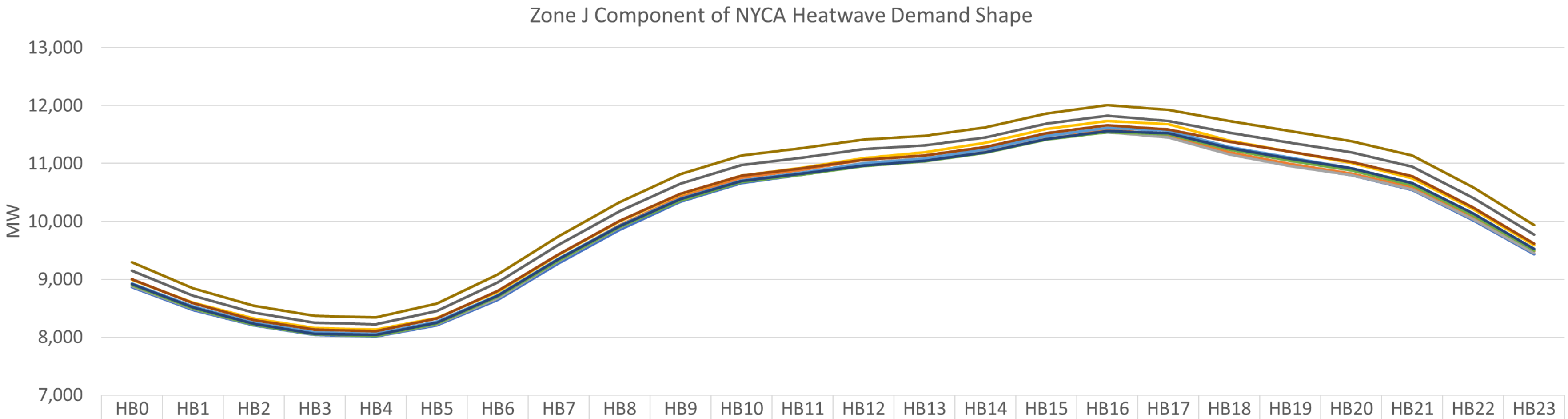
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
—Y2024	10,130	9,695	9,409	9,264	9,282	9,551	9,988	10,420	10,676	10,831	11,014	11,113	11,314	11,571	11,838	12,155	12,555	12,863	12,973	12,922	12,607	12,102	11,273	10,380
—Y2025	10,065	9,635	9,345	9,195	9,217	9,487	9,895	10,247	10,377	10,407	10,488	10,532	10,725	11,035	11,368	11,782	12,330	12,792	13,025	13,044	12,710	12,165	11,293	10,360
—Y2026	10,044	9,599	9,306	9,150	9,168	9,439	9,840	10,141	10,182	10,125	10,139	10,142	10,324	10,660	11,031	11,506	12,151	12,716	13,042	13,114	12,778	12,214	11,322	10,362
—Y2027	9,851	9,398	9,095	8,937	8,953	9,223	9,615	9,883	9,870	9,749	9,708	9,678	9,852	10,157	10,508	10,988	11,657	12,262	12,658	12,768	12,477	11,945	11,083	10,147
—Y2028	9,860	9,398	9,085	8,920	8,934	9,206	9,594	9,832	9,772	9,595	9,510	9,454	9,608	9,911	10,268	10,776	11,492	12,160	12,617	12,761	12,486	11,960	11,096	10,159
—Y2029	9,876	9,402	9,081	8,913	8,919	9,192	9,578	9,792	9,697	9,473	9,357	9,277	9,419	9,722	10,083	10,612	11,372	12,098	12,608	12,782	12,516	11,993	11,129	10,186
—Y2030	9,908	9,422	9,090	8,917	8,921	9,193	9,577	9,778	9,656	9,403	9,250	9,157	9,295	9,603	9,974	10,529	11,329	12,102	12,663	12,859	12,592	12,064	11,191	10,232
—Y2031	9,960	9,462	9,123	8,938	8,939	9,217	9,598	9,785	9,643	9,362	9,187	9,075	9,209	9,528	9,905	10,484	11,323	12,191	12,748	12,961	12,692	12,155	11,275	10,306
—Y2032	9,954	9,453	9,114	8,928	8,926	9,196	9,566	9,730	9,561	9,246	9,042	8,911	9,036	9,382	9,785	10,406	11,300	12,237	12,871	13,079	12,784	12,222	11,320	10,326
—Y2033	10,016	9,504	9,155	8,959	8,953	9,223	9,596	9,749	9,563	9,225	9,006	8,859	8,988	9,342	9,756	10,403	11,332	12,313	12,989	13,217	12,916	12,340	11,423	10,411

Figure 100: Zones GHI Component of NYCA Heatwave Demand Shape



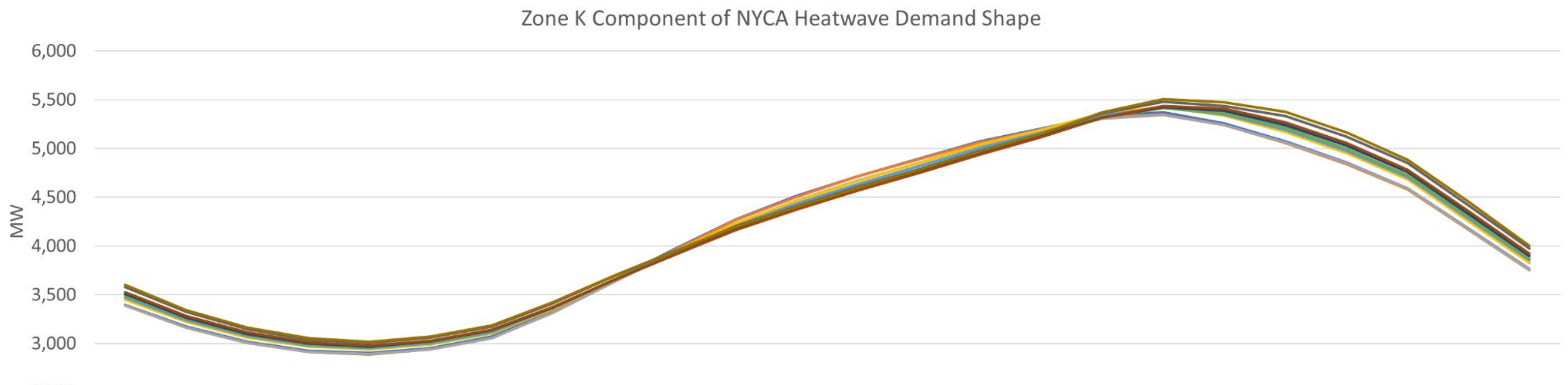
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	2,982	2,799	2,670	2,578	2,539	2,587	2,706	2,900	3,035	3,190	3,372	3,530	3,691	3,856	4,005	4,170	4,311	4,386	4,360	4,253	4,116	3,897	3,580	3,249
Y2025	2,964	2,781	2,654	2,564	2,525	2,567	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 101: Zone J Component of NYCA Heatwave Demand Shape



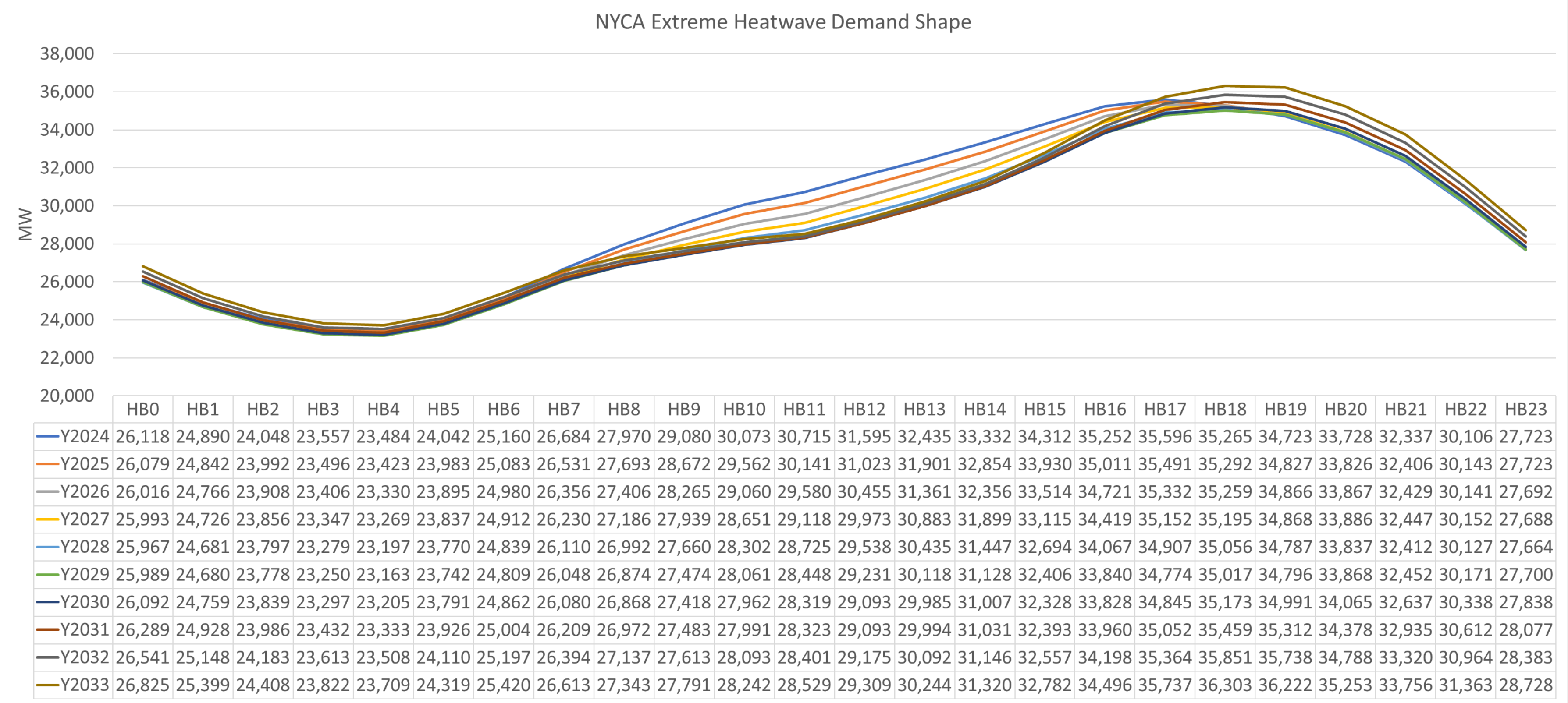
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
—Y2024	8,859	8,471	8,199	8,037	8,007	8,199	8,645	9,280	9,857	10,339	10,663	10,805	10,969	11,061	11,213	11,430	11,543	11,473	11,172	10,972	10,796	10,542	10,021	9,429
—Y2025	8,918	8,521	8,243	8,079	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 102: Zone K Component of NYCA Heatwave Demand Shape



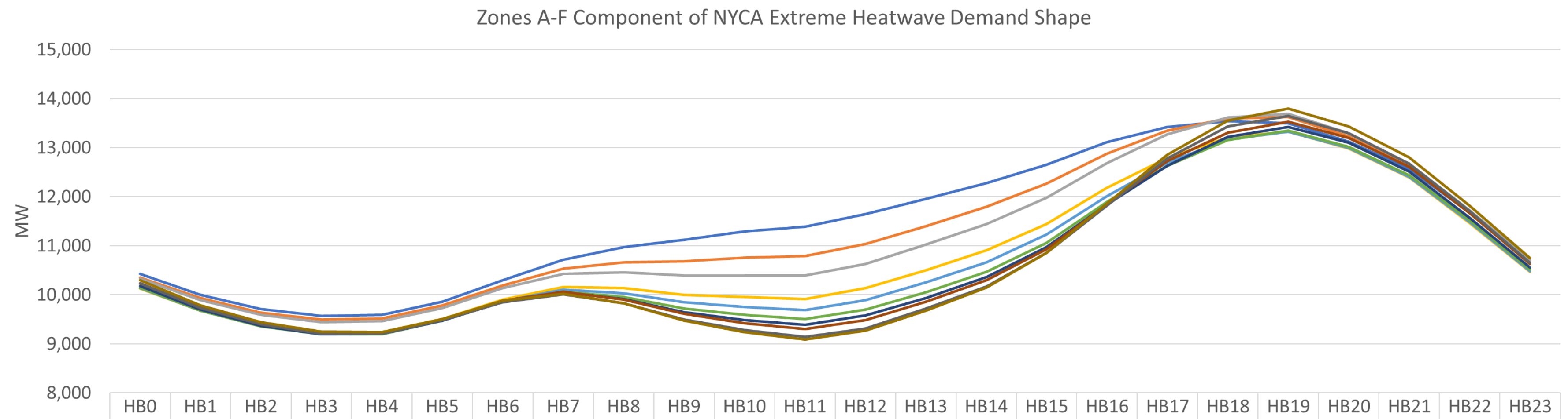
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
—Y2024	3,395	3,173	3,018	2,926	2,904	2,953	3,069	3,332	3,650	3,968	4,272	4,515	4,718	4,894	5,072	5,203	5,338	5,369	5,255	5,071	4,855	4,592	4,179	3,762
—Y2025	3,389	3,162	3,007	2,915	2,889	2,939	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 103: NYCA Extreme Heatwave Demand Shape



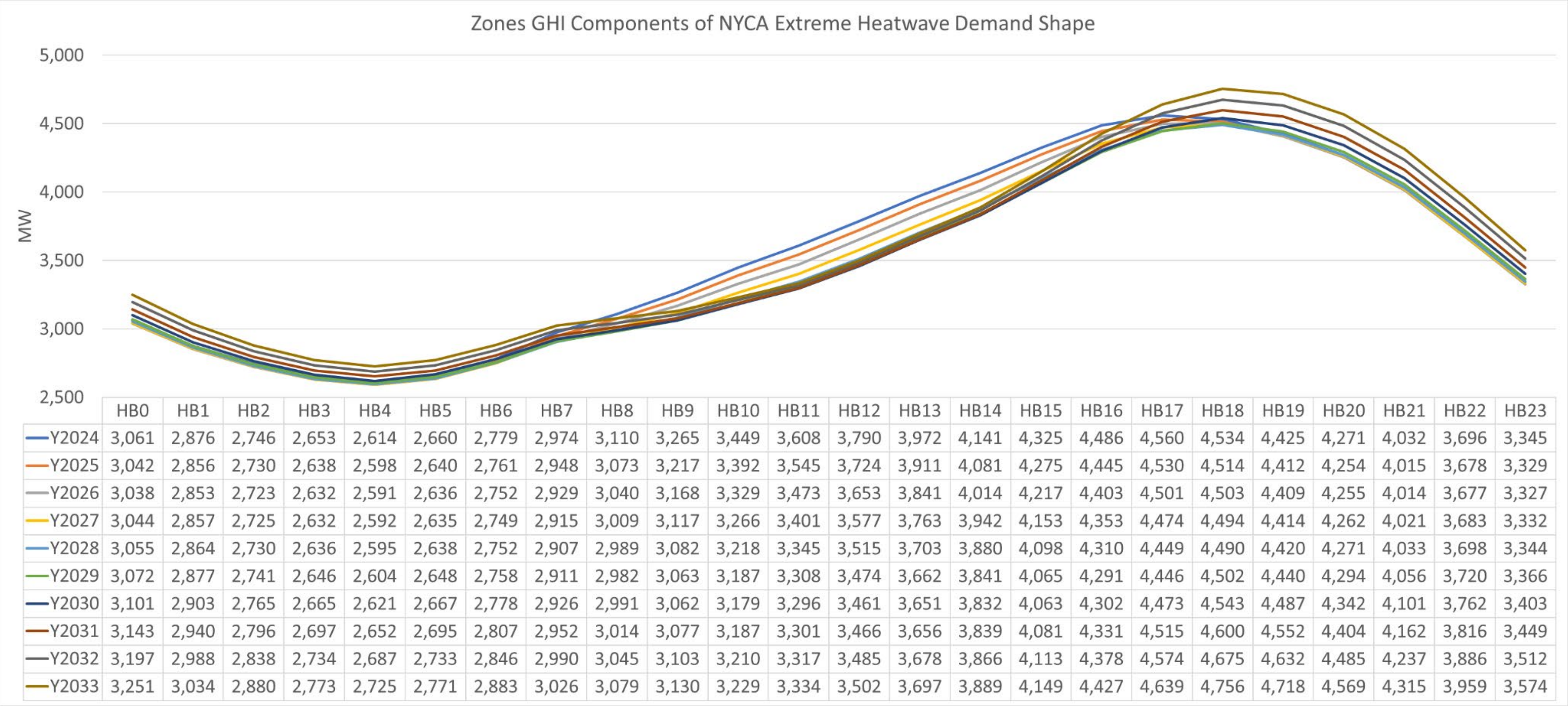
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	26,118	24,890	24,048	23,557	23,484	24,042	25,160	26,684	27,970	29,080	30,073	30,715	31,595	32,435	33,332	34,312	35,252	35,596	35,265	34,723	33,728	32,337	30,106	27,723
Y2025	26,079	24,842	23,992	23,496	23,423	23,983	25,083	26,531	27,693	28,672	29,562	30,141	31,023	31,901	32,854	33,930	35,011	35,491	35,292	34,827	33,826	32,406	30,143	27,723
Y2026	26,016	24,766	23,908	23,406	23,330	23,895	24,980	26,356	27,406	28,265	29,060	29,580	30,455	31,361	32,356	33,514	34,721	35,332	35,259	34,866	33,867	32,429	30,141	27,692
Y2027	25,993	24,726	23,856	23,347	23,269	23,837	24,912	26,230	27,186	27,939	28,651	29,118	29,973	30,883	31,899	33,115	34,419	35,152	35,195	34,868	33,886	32,447	30,152	27,688
Y2028	25,967	24,681	23,797	23,279	23,197	23,770	24,839	26,110	26,992	27,660	28,302	28,725	29,538	30,435	31,447	32,694	34,067	34,907	35,056	34,787	33,837	32,412	30,127	27,664
Y2029	25,989	24,680	23,778	23,250	23,163	23,742	24,809	26,048	26,874	27,474	28,061	28,448	29,231	30,118	31,128	32,406	33,840	34,774	35,017	34,796	33,868	32,452	30,171	27,700
Y2030	26,092	24,759	23,839	23,297	23,205	23,791	24,862	26,080	26,868	27,418	27,962	28,319	29,093	29,985	31,007	32,328	33,828	34,845	35,173	34,991	34,065	32,637	30,338	27,838
Y2031	26,289	24,928	23,986	23,432	23,333	23,926	25,004	26,209	26,972	27,483	27,991	28,323	29,093	29,994	31,031	32,393	33,960	35,052	35,459	35,312	34,378	32,935	30,612	28,077
Y2032	26,541	25,148	24,183	23,613	23,508	24,110	25,197	26,394	27,137	27,613	28,093	28,401	29,175	30,092	31,146	32,557	34,198	35,364	35,851	35,738	34,788	33,320	30,964	28,383
Y2033	26,825	25,399	24,408	23,822	23,709	24,319	25,420	26,613	27,343	27,791	28,242	28,529	29,309	30,244	31,320	32,782	34,496	35,737	36,303	36,222	35,253	33,756	31,363	28,728

Figure 104: Zones A-F Component of NYCA Extreme Heatwave Demand Shape



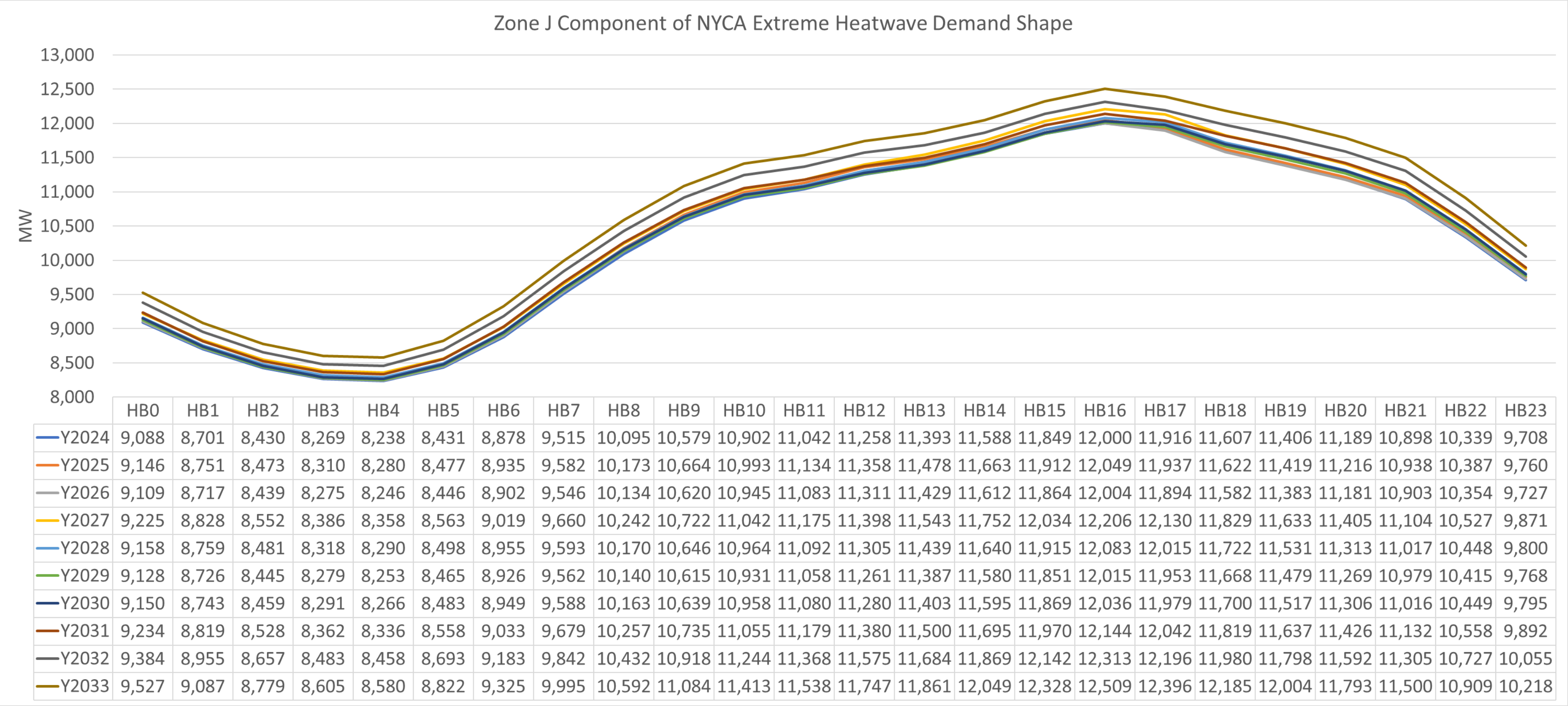
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
Y2024	10,428	9,996	9,712	9,568	9,587	9,857	10,294	10,721	10,969	11,118	11,295	11,391	11,645	11,958	12,279	12,649	13,109	13,424	13,545	13,501	13,128	12,566	11,678	10,727
Y2025	10,355	9,929	9,639	9,491	9,514	9,787	10,193	10,538	10,658	10,679	10,755	10,793	11,039	11,404	11,793	12,262	12,874	13,347	13,595	13,622	13,231	12,624	11,695	10,700
Y2026	10,333	9,888	9,597	9,443	9,462	9,735	10,134	10,427	10,459	10,391	10,399	10,396	10,629	11,021	11,447	11,981	12,689	13,269	13,612	13,694	13,298	12,675	11,721	10,701
Y2027	10,127	9,676	9,374	9,219	9,235	9,506	9,898	10,158	10,133	10,001	9,952	9,917	10,142	10,501	10,906	11,443	12,178	12,796	13,209	13,329	12,982	12,391	11,469	10,474
Y2028	10,136	9,675	9,365	9,201	9,216	9,490	9,875	10,105	10,034	9,845	9,751	9,691	9,895	10,251	10,662	11,227	12,010	12,693	13,167	13,323	12,991	12,405	11,481	10,485
Y2029	10,151	9,679	9,359	9,192	9,200	9,475	9,858	10,064	9,956	9,721	9,595	9,510	9,702	10,057	10,473	11,060	11,887	12,629	13,157	13,343	13,020	12,437	11,514	10,510
Y2030	10,184	9,700	9,370	9,198	9,204	9,477	9,858	10,051	9,917	9,650	9,489	9,389	9,577	9,939	10,363	10,976	11,844	12,635	13,216	13,424	13,099	12,510	11,577	10,559
Y2031	10,237	9,740	9,403	9,219	9,222	9,501	9,880	10,058	9,903	9,609	9,424	9,306	9,489	9,862	10,295	10,933	11,839	12,726	13,303	13,529	13,202	12,605	11,664	10,634
Y2032	10,233	9,733	9,395	9,211	9,210	9,481	9,849	10,004	9,822	9,493	9,278	9,141	9,315	9,715	10,173	10,853	11,816	12,777	13,430	13,649	13,297	12,673	11,711	10,656
Y2033	10,298	9,788	9,440	9,245	9,240	9,512	9,882	10,025	9,826	9,474	9,244	9,090	9,269	9,677	10,147	10,854	11,856	12,859	13,555	13,796	13,436	12,798	11,820	10,745

Figure 105: Zones GHI Component of NYCA Extreme Heatwave Demand Shape



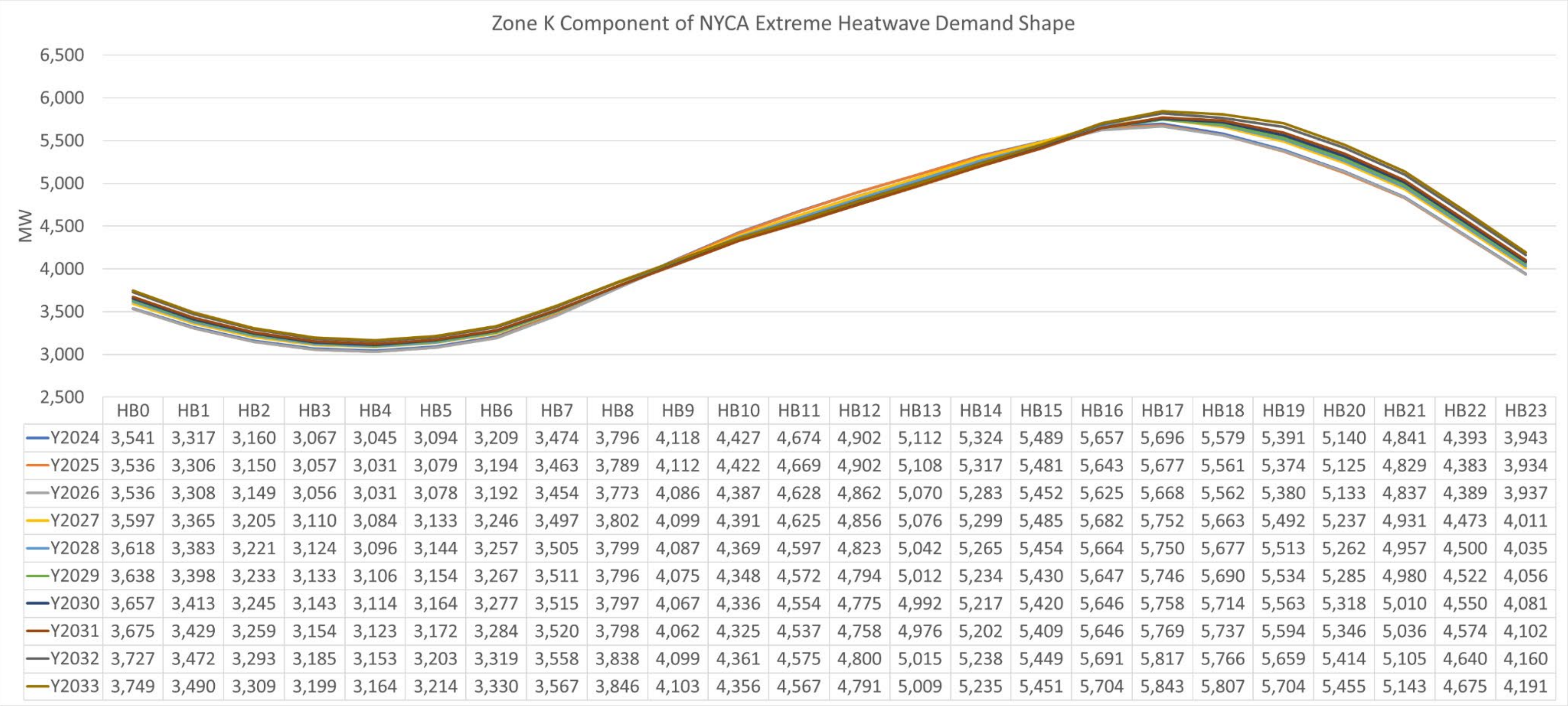
	HB0	HB1	HB2	HB3	HB4	HB5	HB6	HB7	HB8	HB9	HB10	HB11	HB12	HB13	HB14	HB15	HB16	HB17	HB18	HB19	HB20	HB21	HB22	HB23
—Y2024	3,061	2,876	2,746	2,653	2,614	2,660	2,779	2,974	3,110	3,265	3,449	3,608	3,790	3,972	4,141	4,325	4,486	4,560	4,534	4,425	4,271	4,032	3,696	3,345
—Y2025	3,042	2,856	2,730	2,638	2,598	2,640	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 106: 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 107: 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

Appendix D - Reliability Compliance Obligations and Activities

The Reliability Needs Assessment and the Comprehensive Reliability Plan are not the only NYISO work product or activity related to reliability planning. The purpose of this section is to discuss the NERC Planning Coordinator and Transmission Planner obligations fulfilled by the NYISO, as well as the other NPCC and NYSRC planning compliance obligations. The NYISO has various compliance obligations under NERC, NPCC, and the NYSRC. The periodicity of these requirements varies amongst the standards and requirements. While achieving compliance with all NERC, NPCC, and NYSRC obligations is critical to ensuring the continued reliability of the transmission system, this section primarily discusses in some detail the planning compliance requirements that closely align with this Reliability Needs Assessment. The full details of the compliance obligations are found within the reliability standards and requirements themselves. Publicly available results for the compliance activities listed below are found on the NYISO website under Planning – Reliability Compliance[29].

The purpose of the NERC Reliability Standards is to "define the reliability requirements for planning and operating the North American bulk power system and are developed using a results-based approach that focuses on performance, risk management, and entity capabilities." The objective of NPCC Directory #1 and the NYSRC Reliability Rules and Compliance Manual are to provide a "design-based approach" to design and operate the bulk power system to a level of reliability that will not result in the loss or unintentional separation of a major portion of the system from any of the planning and operations contingencies with the intent of avoiding instability, voltage collapse and widespread cascading outages. **Figure 108** shows the various NERC Standards with requirements applicable to the NYISO as a NERC registered Planning Coordinator and/or Transmission Planner. The NPCC planning compliance obligations are primarily located in NPCC Regional Reliability Reference Directory #1 Design and Operation of the Bulk Power System. The NYSRC planning compliance obligations are located in the Reliability Rules and Compliance Manual.

Fundamental to any reliability study is the accuracy modeling data provided by the entities responsible for providing the data. The data requirements for the development of the steady state, dynamics, and short circuit models are provided in the NYISO Reliability Analysis Data Manual (RAD Manual).[30] This data primarily comes from compliance with NERC MOD standards. Much of this data is collected through the annual database update process outlined in the RAD Manual and the annual FERC

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[29] https://www.nyiso.com/planning-reliability-compliance

[30] https://www.nyiso.com/documents/20142/2924447/rel-anl-data-mnl.pdf

Form 715 filing to which the transmitting utilities certify, to the best of their knowledge, the accuracy of the data. Additional compliance obligations provide for the accuracy of the modeling data through comparison to actual system events (*e.g.,* MOD-026, MOD-026, and MOD-033).

Following the completion of the annual database update, these databases are used for study work such as the Reliability Planning Process and for many other compliance obligations, such as those listed in **Figure 108**. Planning studies similar to the Reliability Planning Process include the NPCC/NYSRC Area Transmission Reviews (ATRs) and the NERC TPL-001 assessments.

Figure 108: List of NERC Standards for Planning Coordinators and Transmission Planners

Standard Name	Title	Purpose
FAC-002	Facility Interconnection Studies	To study the impact of interconnecting new or materially modified Facilities to the Bulk Electric System.
FAC-010	System Operating Limits Methodology for the Planning Horizon	To ensure that System Operating Limits (SOLs) used in the reliable planning of the Bulk Electric System (BES) are determined based on an established methodology or methodologies.
FAC-014	Establish and Communicate System Operating Limits	To ensure that System Operating Limits (SOLs) used in the reliable planning and operation of the Bulk Electric System (BES) are determined based on an established methodology or methodologies.
IRO-017	Outage Coordination	To ensure that outages are properly coordinated in the Operations Planning time horizon and Near-Term Transmission Planning Horizon.
MOD-026	Verification of Models and Data for Generator Excitation Control System or Plant Volt/VAR Control Functions	To verify that the generator excitation control system or plant volt/var control function model (including the power system stabilizer model and the impedance compensator model) and the model parameters used in dynamic simulations accurately represent the generator excitation control system or plant volt/var control function behavior when assessing Bulk Electric System (BES) reliability.
MOD-027	Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions	To verify that the turbine/governor and load control or active power/frequency control model and the model parameters, used in dynamic simulations that assess Bulk Electric System (BES) reliability, accurately represent generator unit real power response to system frequency variations.
MOD-031	Demand and Energy Data	To provide authority for applicable entities to collect Data, energy and related data to support reliability studies and assessments to enumerate the responsibilities and obligations of requestors and respondents of that data.
MOD-032	Data for Power System Modeling and Analysis	To establish consistent modeling data requirements and reporting procedures for development of planning horizon cases necessary to support analysis of the reliability of the interconnected transmission system.
MOD-033	Steady State and Dynamic System Model Validation	To establish consistent validation requirements to facilitate the collection of accurate data and building of planning models to analyze the reliability of the interconnected transmission system.

Standard Name	Title	Purpose
PRC-002	**Disturbance Monitoring and Reporting Requirements**	To have adequate data available to facilitate analysis of Bulk Electric System (BES) Disturbances
PRC-006	**Automatic Underfrequency Load Shedding**	To establish design and documentation requirements for automatic underfrequency load shedding (UFLS) programs to arrest declining frequency, assist recovery of frequency following underfrequency events and provide last resort system preservation measures.
PRC-006-NPCC	**Automatic Underfrequency Load Shedding**	The NPCC Automatic Underfrequency Load Shedding (UFLS) regional Reliability Standard establishes more stringent and specific NPCC UFLS program requirements than the NERC continent-wide PRC-006 standard. The program is designed such that declining frequency is arrested and recovered in accordance with established NPCC performance requirements stipulated in this document.
PRC-010	**Undervoltage Load Shedding**	To establish an integrated and coordinated approach to the design, evaluation, and reliable operation of Undervoltage Load Shedding Programs (UVLS Programs).
PRC-012	**Remedial Action Schemes**	To ensure that Remedial Action Schemes (RAS) do not introduce unintentional or unacceptable reliability risks to the Bulk Electric System (BES).
PRC-023	**Transmission Relay Loadability**	Protective relay settings shall not limit transmission loadability; not interfere with system operators' ability to take remedial action to protect system reliability and be set to reliably detect all fault conditions and protect the electrical network from these faults.
PRC-026	**Relay Performance During Stable Power Swings**	To ensure that load-responsible protective relays are expected to not trip in response to stable power swings during non-Fault conditions.
TPL-001	**Transmission System Planning Performance Requirements**	Establish Transmission system planning performance requirements within the planning horizon to develop a Bulk Electric System (BES) that will operate reliably over a broad spectrum of System conditions and following a wide range of probable Contingencies.
TPL-007	**Transmission System Planned Performance for Geomagnetic Disturbance Events**	Establish requirements for Transmission system planned performance during geomagnetic disturbance (GMD) events.

NPCC/NYSRC Area Transmission Reviews

The NPCC/NYSRC Area Transmission Reviews (ATRs) are performed on an annual basis to demonstrate that conformance with the performance criteria specified in NPCC Directory #1 and the NYSRC Reliability Rules. The ATR is prepared in accordance with NPCC and NYSRC procedures that require the assessment to be performed annually, with a Comprehensive Area Transmission Review performed at least every five years. Either an Interim or an Intermediate review can be conducted between Comprehensive reviews, as appropriate. In an Interim review, the planning coordinator summarizes the changes in planned facilities and forecasted system conditions since the last Comprehensive review and assesses the impact of those changes. No new analysis is required for an Interim review. An Intermediate review covers all of the elements of a Comprehensive review, but the analysis may be limited to addressing only significant issues, considering the extent of the system changes. In the ATRs, the NYISO assesses the BPTF for a period four to six years in the future (the NYISO evaluates year five of the Study Period). The 2022 ATR,[31] which is the most recently completed ATR, evaluated study year 2026 and found that the planned system through year 2027 conforms to the reliability criteria described in the NYSRC Reliability Rules and NPCC Directory #1. The next ATR is planned to be completed in the latter part of 2023 or early 2024.

Seven assessments are required in each ATR.

The first assessment evaluates the steady state and dynamics transmission security. For instances where the transmission security assessment results indicate that the planned system does not meet the specified criteria, a corrective action plan is incorporated. The most resent ATR found that with the identified corrective action plans identified in the Reliability Planning Process, the system meets the applicable performance criteria.

For the second assessment, steady state and dynamics analyses are conducted to evaluate the performance of the system for low probability extreme contingencies. The purpose of the extreme contingency analysis is to examine the post-contingency steady state conditions, as well as stability, overload, cascading outages, and voltage collapse, to obtain an indication of system robustness and to determine the extent of any potential widespread system disturbance. In instances where the extreme contingency assessment concludes that there are serious consequences, the NYISO evaluates implementing a change to design or operating practices to address the issues.

The extreme contingency analysis included in the most recent ATR concluded that most events are stable and showed no thermal overloads over Short-Term Emergency (STE) ratings or significant voltage violations on the BPTF. For the events that did show voltage, thermal, or dynamics issues, these events were local in nature (*i.e.*, loss of local load or reduction of location generation) and do not result in a widespread system disturbance.

The third assessment evaluates extreme system conditions that have a low probability of occurrence, such as high peak load conditions (*e.g.*, 90th percentile load) resulting from extreme weather or the loss of fuel supply from a given resource (*e.g.,* loss of all gas units under winter peak load). The extreme system conditions evaluate various design criteria contingencies to evaluate the post contingency steady state conditions, as well as stability, overload, cascading outages, and voltage collapse. The evaluation of extreme

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[31] 2022 Interim Area Transmission Review of the New York State Bulk Power Transmission System

contingencies indicates system robustness and determine the extent of any potential widespread system disturbance. In instances where the extreme contingency assessment concludes that there are serious consequences, the NYISO evaluates implementing a change to design or operating practices to address the issues. For the extreme system conditions evaluated in the most recent ATR, the assessment found no steady state or dynamics transmission security criteria violations.

The fourth assessment evaluates the breaker fault duty at BPTF buses. The most recent ATR found no over-dutied breakers on BPTF buses.

The fifth assessment evaluates other requirements specific to the NYSRC Reliability Rules, including an evaluation of the impacts of planned system expansion or configuration facilities on the NYCA System Restoration Plan and Local Area Operation Rules for New York City Operations, loss of gas supply — New York City, and loss of gas supply — Long Island.

The sixth assessment is a review of Special Protection Systems (SPSs). This review evaluates the designed operation and possible consequences of failure to operate or mis-operation of the SPS within the NYCA.

The seventh assessment is a review of requested exclusions to the NPCC Directory #1 criteria.

NERC Planning Assessments (TPL-001)

The NERC TPL-001 assessment (Planning Assessment) is performed annually. The purpose of the Planning Assessment is to demonstrate conformance with the applicable NERC transmission system planning performance requirements for the NYCA Bulk Electric System (BES). The Planning Assessment is a coordinated study between the NYISO and New York Transmission Owners.

The required system conditions to evaluate for this assessment include planned system representations over a 10-year study period for a variety of system conditions. **Figure 109** below, provides a description of the steady state, dynamics, and short circuit cases required to be evaluated in the Planning Assessment.

Figure 109: Description of NERC TPL-001 Planning Assessment Study Cases

Case Description	Steady State	Dynamics	Short Circuit
System Peak Load (Year 1 or 2)	x		
System Peak Load (Year 5)	x	x	x
System Peak Load (Year 10)	x	x[1]	
System Off-Peak Load (One of the 5 years)	x	x	
System Peak Load (Year 1 or 2) Sensitivity	x		
System Peak Load (Year 5) Sensitivity	x	x	
System Off-Peak Load (One of the 5 years) Sensitivity	x	x	

Notes:
Only required to be assessed to address the impact of proposed material generation additions or changes in that timeframe.

The steady state and dynamics transmission security analyses evaluate the New York State Bulk Electric System (BES) to meet the applicable criteria. As part of this assessment, the unavailability of major transmission equipment with a lead time of more than a year is also assessed. The fault duty at BES buses is evaluated in the short circuit representation. When the steady state, dynamics, or short circuit analysis indicates an inability of the system to meet the performance requirements in the standard, a corrective action plan is developed addressing how the performance requirements will be met. Corrective action plans are reviewed in subsequent Planning Assessments for continued validity and implementation status.

For each steady state and dynamics case, the Planning Assessment evaluates the system response to extreme contingencies. Similar to the ATR, when the Planning Assessment extreme contingency analysis concludes that there is cascading caused by an extreme contingency, the NYISO evaluates possible actions designed to reduce the likelihood or mitigate the consequences and adverse impacts.

The most recent NERC Planning Assessment for compliance with TPL-001 was completed in June 2022. As this study contains Critical Energy Infrastructure Information (CEII), it is not posted on the NYISO website. Generally, the results of this study are consistent with the ATR studies. The study scope of this assessment is different from the ATR because the ATR evaluates the BPTF, while the TPL evaluates the Bulk Electric System (BES). Accordingly, criteria violations were observed on the BES. The corrective action plans for criteria violations are generally addressed in the affected Transmission Owner's Local Transmission Plan (LTP) and/or the proposed transmission facilities listed in Section 7 of the Load and Capacity Data Report.

Resource Adequacy Compliance Efforts

NPCC's Directory 1 defines a compliance obligation for the NYISO, as Resource Planner and Planning Coordinator, to perform a resource adequacy study evaluating a five-year planning horizon. The NYISO delivers a report every year under this study process to verify the system against the one-day-in-ten-years loss of load expectation (LOLE) criterion, usually based on the latest available RNA/CRP results and assumptions. The New York Area Review of Resource Adequacy completed reports are available here.

NYSRC Reliability Rules added a requirement[32] that the NYISO deliver a Long Term Resource Adequacy Assessment report every RNA year, and an annual update in the non-RNA years. The NYISO first implemented this requirement after finalizing the 2020 RNA.

The NYISO is also actively involved in other activities such as the NERC's annual Long Term Reliability Assessment (LTRA), along with its biennial Probabilistic Assessment (ProbA), performed by NERC with the input from all the NERC Regions and Areas, as well as NPCC's Long Range Adequacy Overview (LROA).

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[32] NYSRC Reliability Rule A.3, R.3.

Appendix E - Bulk Power Transmission Facilities

Existing New York State Bulk Power Transmission Facilities

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
MSC-7040	Chateauguay (HQ)	765	Massena	765
BK 1	Marcy	765	Marcy	345
BK 2	Marcy	765	Marcy	345
BK 1	Massena	765	Massena (MMS1)	230
BK 2	Massena	765	Massena (MMS2)	230
MSU1	Massena	765	Marcy	765
5018	Branchburg	500	Ramapo	500
BK 1500	Ramapo	500	Ramapo	345
M29	Academy	345	Sprain Brook	345
2	Alps	345	New Scotland	345
393	Alps	345	Berkshire (ISO-NE)	345
1-AR	Alps	345	Reynolds Road	345
Q35L	Astoria	345	E. 13th St C	345
Q35M	Astoria	345	E. 13th St D	345
G13	Astoria Annex	345	Astoria Energy	345
PAR-1	Astoria Annex	345	Astoria Annex	345
TR-1	Astoria Annex	345	Astoria Annex	138
91	Athens	345	Pleasant Valley	345
95	Athens	345	Leeds	345
CC1	Athens	345	Athens CC/ST #1	18
CC2	Athens	345	Athens CC/ST #2	18
CC3	Athens	345	Athens CC/ST #3	18
G27	Bayonne	345	Gowanus	345
PA301	Beck (IESO) A	345	Niagara	345
PA302	Beck (IESO) B	345	Niagara	345
68	Bowline	345	Ladentown	345
1	Bowline Point	345	Bowline Point #1	20
2	Bowline Point	345	Bowline Point #2	20
67-1	Bowline Point	345	W. Haverstraw	345
BK TA5	Buchanan N.	345	Buchanan TA5	138
W93	Buchanan N.	345	Eastview 2N	345
W95	Buchanan N.	345	Indian Point #2	22
W95	Buchanan N.	345	Indian Point #2	345
Y94	Buchanan N.	345	Ramapo	345
W96	Buchanan S.	345	Indian Point #3	22
W96	Buchanan S.	345	Indian Point #3	345
W97	Buchanan S.	345	Millwood	345

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
W98	Buchanan S.	345	Millwood	345
Y88	Buchanan S.	345	Ladentown	345
36	Clarks Corners	345	Oakdale	345
16893	Clarks Corners	345	Lafayette	345
BK 1	Clarks Corners	345	Clarks Corners	115
BK 2	Clarks Corners	345	Clarks Corners	115
6	Clay	345	Volney	345
8	Clay	345	Nine Mile Point #1	345
13	Clay	345	Dewitt	345
26	Clay	345	Independence	345
1-16	Clay	345	Edic	345
2-15	Clay	345	Edic	345
BK 1	Clay	345	Clay	115
BK 2	Clay	345	Clay	115
PC1	Clay	345	Pannell Rd	345
PC2	Clay	345	Pannell Rd	345
33	Coopers Corners	345	Fraser	345
BK 2	Coopers Corners	345	Coopers Corners	115
BK 3	Coopers Corners	345	Coopers Corners	115
CCDA42	Coopers Corners	345	Dolson Ave	345
CCRT-34	Coopers Corners	345	Rock Tavern/Middletown	345
UCC2-41	Coopers Corners	345	Marcy	345
F83	Cricket Valley	345	Pleasant Valley	345
F84	Cricket Valley	345	Pleasant Valley	345
398	Cricket Valley	345	Long Mountain (NE)	345
MSUT-1	Cricket Valley	345	Cricket Valley	18
MSUT-2	Cricket Valley	345	Cricket Valley	18
MSUT-3	Cricket Valley	345	Cricket Valley	18
22	Dewitt	345	Lafayette	345
BK 2	Dewitt	345	Dewitt	115
DART44	Dolson Ave	345	Rock Tavern	345
501	Duffy Ave	345	Newbridge Road	345
71	Dunwoodie	345	Mott Haven	345
72	Dunwoodie	345	Mott Haven	345
W73/BK S1	Dunwoodie	345	Dunwoodie South	138
W74/BK N1	Dunwoodie	345	Dunwoodie North	138
W75	Dunwoodie	345	Sprain Brook	345
W89	Dunwoodie	345	Pleasantville	345
W90	Dunwoodie	345	Pleasantville	345
Y50	Dunwoodie	345	Shore Road	345

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
BK 17	E. 13th St	345	E. 13th St	69
45	E. 13th St A	345	Farragut	345
BK 14	E. 13th St A	345	E. 13th St	138
BK 15	E. 13th St A	345	E. 13th St	138
M54	E. 13th St A	345	W. 49th St.	345
46	E. 13th St B	345	Farragut	345
BK 12	E. 13th St B	345	E. 13th St	138
BK 13	E. 13th St B	345	E. 13th St	138
M55	E. 13th St B	345	W. 49th St.	345
B47	E. 13th St C	345	Farragut	345
BK 16	E. 13th St C	345	E. 13th St	138
48	E. 13th St D	345	Farragut	345
BK 10	E. 13th St D	345	E. 13th St	138
BK 11	E. 13th St D	345	E. 13th St	138
305	E. Fishkill	345	Roseton	345
BK 1	E. Fishkill	345	E. Fishkill	115
BK 2	E. Fishkill	345	E. Fishkill	115
F36	E. Fishkill	345	Pleasant Valley	345
F37	E. Fishkill	345	Pleasant Valley	345
F38/Y86	E. Fishkill	345	Wood St/Pleasantville	345
F39/Y87	E. Fishkill	345	Wood St/Pleasantville	345
BK 1	E. Garden City	345	E. Garden City	138
BK 2	E. Garden City	345	E. Garden City	138
PAR1	E. Garden City	345	E. Garden City	345
PAR2	E. Garden City	345	E. Garden City	345
Y49	E. Garden City	345	Sprain Brook	345
1N*	Eastview	345	Eastview	138
1S*	Eastview	345	Eastview	138
2N*	Eastview	345	Eastview	138
2S*	Eastview	345	Eastview	138
W64	Eastview 1N	345	Sprain Brook	345
W99	Eastview 1N	345	Millwood	345
W78	Eastview 1S	345	Sprain Brook	345
W85	Eastview 1S	345	Millwood	345
W79	Eastview 2N	345	Sprain Brook	345
W65	Eastview 2S	345	Sprain Brook	345
W82	Eastview 2S	345	Millwood	345
14	Edic	345	New Scotland	345
17/BK 2	Edic	345	Porter	230
BK 3	Edic	345	Porter	115

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
BK 4	Edic	345	Porter	115
BK 5	Edic	345	Edic	115
BK 6	Edic	345	Edic	115
EF24-40	Edic	345	Fraser	345
FE-1	Edic	345	Fitzpatrick	345
UE1-7	Edic	345	Marcy	345
17-EO	Elbridge	345	Oswego	345
17-LE	Elbridge	345	Lafayette	345
BK 1	Elbridge	345	Elbridge	115
41	Farragut	345	Gowanus	345
42	Farragut	345	Gowanus	345
61	Farragut	345	Rainey	345
62	Farragut	345	Rainey	345
63	Farragut	345	Rainey	345
B3402	Farragut	345	Hudson A	345
BK 1*	Farragut	345	Farragut	138
BK 10	Farragut	345	Farragut	138
BK 2*	Farragut	345	Farragut	138
BK 3*	Farragut	345	Farragut	138
BK 4*	Farragut	345	Farragut	138
BK 5*	Farragut	345	Farragut	138
BK 6*	Farragut	345	Farragut	138
BK 7*	Farragut	345	Farragut	138
BK 8	Farragut	345	Farragut	138
BK 9	Farragut	345	Farragut	138
C3403	Farragut	345	Hudson B	345
TR11	Farragut	345	Farragut PAR (B3402)	345
TR12	Farragut	345	Farragut PAR (C3403)	345
1	Fitzpatrick	345	Fitzpatrick	24
FS-10	Fitzpatrick	345	Scriba	345
BK1	Five Mile Rd	345	Five Mile Rd	115
29	Five Mile Road	345	Stolle Road	345
37	Five Mile Road	345	Piercebrook	345
32	Fraser	345	Oakdale	345
BK 2	Fraser	345	Fraser	115
GF5-35	Fraser	345	Gilboa	345
20	Arthur Kill #3	345	Fresh Kills	345
20/TR3	Fresh Kills	345	Arthur Kill #3	22
21	Fresh Kills	345	Goethals	345
22	Fresh Kills	345	Goethals	345

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
TA 1	Fresh Kills	345	Fresh Kills R	138
TB 1	Fresh Kills	345	Fresh Kills R	138
1	Gilboa	345	Gilboa #1	17
2	Gilboa	345	Gilboa #2	17
3	Gilboa	345	Gilboa #3	17
4	Gilboa	345	Gilboa #4	17
GL3	Gilboa	345	Leeds	345
GNS-1	Gilboa	345	New Scotland	345
BK 1	Goethals	345	Goethals	230/13
BK 1N	Goethals	345	Goethals	345
G23L	Goethals	345	Linden Cogen	345
G23M	Goethals	345	Linden Cogen	345
25	Goethals	345	Gowanus	345
BK 2	Gowanus	345	Gowanus	138
26	Goethals	345	Gowanus	345
BK 14	Gowanus	345	Gowanus	138
37	Homer City	345	Stolle Rd	345
47	Homer City	345	Mainesburg	345
48	Homer City	345	Piercebrook	345
Y56	Hudson HVdc	345	W. 49th St	345
HR1	Henrietta (S. 255)	345	Rochester Station #80	345
HR2	Henrietta (S. 255)	345	Rochester Station #80	345
40	Henrietta (S. 255)	345	Rochester Station #80	345
BK1	Henrietta (S. 255)	345	Henrietta (S. 255)	115
BK2	Henrietta (S. 255)	345	Henrietta (S. 255)	115
SHI-39	Henrietta (S. 255)	345	Kintigh (Somerset)	345
301	Hurley Ave	345	Leeds	345
303	Hurley Ave	345	Roseton	345
BK 1	Hurley Ave	345	Hurley Ave	115
25	Independence	345	Scriba	345
27	Independence	345	Sithe Independence #1	18
28	Independence	345	Sithe Independence #2	18
NS1-38	Kintigh (Somerset)	345	Niagara	345
67	Ladentown	345	W. Haverstraw	345
W72	Ladentown	345	Ramapo	345
92	Leeds	345	Pleasant Valley	345
93	Leeds	345	New Scotland	345
94	Leeds	345	New Scotland	345
398	Long Mtn. (ISO-NE)	345	Pleasant Valley	345
30	Mainesburg	345	Watercure	345

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
18	Marcy	345	New Scotland	345
19	Marcy	345	Volney	345
TA 1	Millwood	345	Millwood	138
TA 2	Millwood	345	Millwood	138
F30/W80	Millwood	345	Wood St/Pleasant Valley	345
F31/W81	Millwood	345	Wood St/Pleasant Valley	345
BK 6*	Mott Haven	345	Mott Haven	138
BK 7*	Mott Haven	345	Mott Haven	138
BK 8*	Mott Haven	345	Mott Haven	138
BK 9*	Mott Haven	345	Mott Haven	138
Q11	Mott Haven	345	Rainey	345
Q12	Mott Haven	345	Rainey	345
BK 1	New Scotland	345	New Scotland	115
BK 2	New Scotland	345	New Scotland	115
BUS TIE	New Scotland	345	New Scotland	345
BK 3	Niagara	345	Niagara	230
BK 4	Niagara	345	Niagara	230
BK 5	Niagara	345	Niagara	230
NH2	Niagara	345	Henrietta (S. 255)	345
2	Nine Mile Point	345	Nine Mile Point #1	23
9	Nine Mile Point	345	Scriba	345
23	Nine Mile Point #2	345	Scriba	345
31	Oakdale	345	Watercure	345
BK 2	Oakdale	345	Oakdale	115/34.5
BK 3	Oakdale	345	Oakdale	115
5	Oswego	345	Oswego #5	22
6	Oswego	345	Oswego #6	22
11	Oswego	345	Volney	345
12	Oswego	345	Volney	345
BK 7	Oswego	345	Oswego	115
BK 1	Pannell Road	345	Pannell Road	115
BK 2	Pannell Road	345	Pannell Road	115
BK 3	Pannell Road	345	Pannell Road	115
RP1	Pannell Road	345	Rochester Station #80	345
RP2	Pannell Road	345	Rochester Station #80	345
BK S1	Pleasant Valley	345	Pleasant Valley	115
F30	Pleasant Valley	345	Wood St.	345
F31	Pleasant Valley	345	Wood St.	345
BK 1	Pleasantville	345	Pleasantville	13
BK 2	Pleasantville	345	Pleasantville	13

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
Y86	Pleasantville	345	Wood St.	345
Y87	Pleasantville	345	Wood St.	345
TR5E/PAR5	Rainey	345	Corona	138
30	Rainey	345	Ravenswood #3	22
60L	Rainey	345	Ravenswood	345
60M	Rainey	345	Ravenswood	345
BK 2E*	Rainey	345	Rainey	138
BK 3W*	Rainey	345	Rainey	138
BK 7E*	Rainey	345	Rainey	138
BK 7W*	Rainey	345	Rainey	138
BK 8E	Rainey	345	Rainey	138
BK 8W*	Rainey	345	Rainey	138
BK 9E*	Rainey	345	Rainey	138
69	Ramapo	345	S. Mahwah A	345
70	Ramapo	345	S. Mahwah B	345
76	Ramapo	345	Sugarloaf/Rock Tavern	345
77	Ramapo	345	Rock Tavern	345
PAR3500	Ramapo	345	Ramapo	345
PAR4500	Ramapo	345	Ramapo	345
BK 2	Reynolds Road	345	Reynolds Road	115
BK 1	Rochester Station #80	345	Rochester Station #80	115
BK 2	Rochester Station #80	345	Rochester Station #80	115
BK 3	Rochester Station #80	345	Rochester Station #80	115
BK 5	Rochester Station #80	345	Rochester Station #80	115
311	Rock Tavern	345	Roseton	345
BK TR1	Rock Tavern	345	Rock Tavern	115
BK TR3	Rock Tavern	345	Rock Tavern	115
1	Roseton	345	Roseton #1	20
2	Roseton	345	Roseton #2	20
BK 258	S. Mahwah	345	S. Mahwah	138
J3410	S. Mahwah A	345	Waldwick	345
K3411	S. Mahwah B	345	Waldwick	345
20	Scriba	345	Volney	345
21	Scriba	345	Volney	345
BK 1	Scriba	345	Scriba	115
BK 2	Scriba	345	Scriba	115
1	Kintigh (Somerset)	345	Somerset	24
BK 1	Shore Road	345	Shore Road	138
BK 2	Shore Road	345	Shore Road	138
BK N7	Sprain Brook	345	Sprain Brook	138

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
BK S6	Sprain Brook	345	Sprain Brook	138
M51	Sprain Brook	345	W. 49th St	345
M52	Sprain Brook	345	W. 49th St	345
X28	Sprain Brook	345	Tremont	345
BK 3	Stolle Road	345	Stolle Road	115
BK 4	Stolle Road	345	Stolle Road	115
11	Tremont	345	Tremont	138
12	Tremont	345	Tremont	138
BK 1	W. 49th St	345	W. 49th St	138
BK 2*	W. 49th St	345	W. 49th St	138
BK 3*	W. 49th St	345	W. 49th St	138
BK 4*	W. 49th St	345	W. 49th St	138
BK 5*	W. 49th St	345	W. 49th St	138
Y56	W. 49th St	345	Hudson HVdc	345
BK 194	West Haverstraw	345	West Haverstraw	138
BK 1	Watercure	345	Watercure	230
BK 2	Watercure	345	Watercure	230
BK 1	Wood Street	345	Wood Street	115
BK 2	Wood Street	345	Wood Street	115
13	Adirondack	230	Chases Lake	230
12-AP	Adirondack	230	Porter	230
MA1	Adirondack	230	Moses	230
MA2	Adirondack	230	Moses	230
E205W	Bear Swamp (NE)	230	Eastover Rd.	230
BP76	Beck (IESO)	230	Packard	230
PA27	Beck (IESO)	230	Niagara	230
60	Canandaigua	230	Meyer	230
68	Canandaigua	230	Stoney Ridge	230
11	Chases Lake	230	Porter	230
DP1	Duley	230	Plattsburgh	230
PND-1	Duley	230	Patnode	230
68	Dunkirk	230	S. Ripley	230
73	Dunkirk	230	Gardenville	230
74	Dunkirk	230	Gardenville	230
70	E.Towanda	230	Hillside	230
38	Eastover Rd.	230	Rotterdam	230
TB 1	Eastover Rd.	230	Eastover Rd.	115
TB 2	Eastover Rd.	230	Eastover Rd.	115
17	Edic	230	Porter	230
70	Elm St	230	Huntley	230

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
71	Elm St	230	Gardenville	230
72	Elm St	230	Gardenville	230
69	Erie East (PJM)	230	S. Ripley	230
66	Gardenville	230	Stolle Rd	230
79	Gardenville	230	Huntley	230
80	Gardenville	230	Huntley	230
BK 2	Gardenville	230	Gardenville	115
BK 3	Gardenville	230	Gardenville	115
BK 4	Gardenville	230	Gardenville	115
BK 6	Gardenville	230	Gardenville	115/34.5
BK 7	Gardenville	230	Gardenville	115/34.5
T8-12	Gardenville (NGrid)	230	Gardenville (NYSEG)	230
A2253	Goethals	230	Linden (PJM)	230
67	High Sheldon	230	Stolle Rd	230
81	High Sheldon	230	Stoney Creek	230
69	Hillside	230	Watercure	230
72	Hillside	230	Stoney Ridge	230
BK 3	Hillside	230	Hillside	115/34.5
BK 4	Hillside	230	Hillside	115/34.5
77	Huntley	230	Packard	230
BK 670	Huntley	230	Huntley #67	13
BK 680	Huntley	230	Huntley #68	13
78	Huntley	230	Packard	230
MMS1	Massena	230	Moses	230
MMS2	Massena	230	Moses	230
85/87	Meyer	230	Wethersfield	230
BK 4	Meyer	230	Meyer	115/34.5
BK 1	Moses	230	Moses	115
BK 2	Moses	230	Moses	115
BK 3	Moses	230	Moses	115
BK 4	Moses	230	Moses	115
L33P	Moses	230	St. Lawrence (IESO)	230
L34P	Moses	230	St. Lawrence (IESO)	230
MW1	Moses	230	Willis	230
MW2	Moses	230	Willis	230
61	Niagara	230	Packard	230
62	Niagara	230	Packard	230
64	Niagara	230	Robinson Rd	230
2332	Niagara	230	Niagara	230
2342	Niagara	230	Niagara	230

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
BK T1	Niagara	230	Niagara	115
BK T2	Niagara	230	Niagara	115
N Bus Tie	Niagara	230	Niagara	230
S Bus Tie	Niagara	230	Niagara	230
71	Oakdale	230	Watercure	230
BK 1	Oakdale	230	Oakdale	115
3	Packard	230	Packard	115
4	Packard	230	Packard	115
WPN1	Patnode	230	Willis	230
BK 1	Plattsburgh	230	Plattsburgh	115
BK 4	Plattsburgh	230	Plattsburgh	115
RYP-2	Plattsburgh	230	Ryan	230
30	Porter	230	Rotterdam	230
31	Porter	230	Rotterdam	230
BK 1	Porter	230	Porter	115
BK 2	Porter	230	Porter	115
65	Robinson Road	230	Stolle Road	230
BK 1	Robinson Road	230	Robinson Road	115/34.5
WRY-2	Ryan	230	Willis	230
83	Stony Creek	230	Wethersfield	230
BK 1	Academy 1	138	Academy 1	138
BK 8	Academy 8	138	Academy 8	138
34124L&M	Astoria E	138	Astoria #4	138
34125L&M	Astoria E	138	Astoria #5	138
24121	Astoria W	138	Astoria #3	138
24122	Astoria W	138	Astoria #3	138
24124L&M	Astoria W	138	Astoria #4	138
24125L&M	Astoria W	138	Astoria #5	138
563	Bagatelle Rd.	138	Newbridge Road	138
564	Bagatelle Rd.	138	Pilgrim	138
291	Barrett	138	Valley Stream	138
292	Barrett	138	Valley Stream	138
459	Barrett	138	Freeport	138
PAR	Barrett	138	Barrett PAR	138
861	Brookhaven	138	Wildwood	138
864	Brookhaven	138	Edward Ave	138
874	Brookhaven	138	Sills Road	138
887	Brookhaven	138	Sills Road	138
95891	Buchanan GT	138	Buchanan TA5	138
361	Carle Place	138	E. Garden City	138

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
363	Carle Place	138	Glenwood	138
883	Central Islip	138	Ronkonkoma	138
889	Central Islip	138	Hauppauge	138
BK N1	Dunwoodie	138	Dunwoodie	138
BK N2	Dunwoodie	138	Dunwoodie	138
BK S1	Dunwoodie	138	Dunwoodie	138
BK S2	Dunwoodie	138	Dunwoodie	138
262	E. Garden City	138	Valley Stream	138
261	E. Garden City	138	Valley Stream	138
362	E. Garden City	138	Roslyn	138
462	E. Garden City	138	Newbridge Road	138
463	E. Garden City	138	Newbridge Road	138
465	E. Garden City	138	Newbridge Road	138
467	E. Garden City	138	Newbridge Road	138
893	Edward Ave	138	Riverhead	138
673	Elwood	138	Greenlawn	138
674	Elwood	138	Oakwood	138
678	Elwood	138	Northport	138
681	Elwood	138	Northport	138
461	Freeport	138	Newbridge Road	138
PAR1	Fresh Kills (AK)	138	Fresh Kills PAR	138
PAR2	Fresh Kills (AK)	138	Fresh Kills PAR	138
365	Glenwood	138	Shore Road	138
366-1	Glenwood	138	Shore Road	138
366-2	Glenwood	138	Glenwood GT	138
364	Glenwood GT	138	Roslyn	138
676	Greenlawn	138	Syosset	138
871	Hauppauge	138	Pilgrim	138
872	Holbrook	138	Sills Road	138
884	Holbrook	138	North Shore Beach	138
885	Holbrook	138	Miller Place	138
888	Holbrook	138	West Bus	138
862	Holbrook	138	Port Jefferson	138
875	Holbrook	138	Ronkonkoma	138
882	Holbrook	138	Ruland Road	138
886	Holbrook	138	Port Jefferson	138
818	Holtsville	138	Union Ave	138
876	Holtsville	138	West Bus	138
877	Holtsville	138	West Bus	138
903	Jamaica	138	Lake Success	138

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
901 L&M	Jamaica	138	Valley Stream	138
367	Lake Success	138	Shore Road	138
368	Lake Success	138	Shore Road	138
PAR	Lake Success	138	Lake Success PAR	138
558	Locust Grove	138	Newbridge	138
559	Locust Grove	138	Syosset	138
879	Miller Place	138	Shoreham	138
561	Newbridge Road	138	Ruland Road	138
562	Newbridge Road	138	Ruland Road	138
567	Newbridge Road	138	Ruland Road	138
878	North Shore Beach	138	Wading River	138
1	Northport	138	Northport #1	22
2	Northport	138	Northport #2	22
3	Northport	138	Northport #3	22
4	Northport	138	Northport #4	22
672	Northport	138	Pilgrim	138
677	Northport	138	Pilgrim	138
679	Northport	138	Pilgrim	138
1385 (601, 602, 603)	Northport	138	Norwalk Harbor	138
PAR 1	Northport	138	Northport	138
PS2	Northport	138	Northport	138
675	Oakwood	138	Syosset	138
661	Pilgrim	138	Ruland Road	138
662	Pilgrim	138	Ruland Road	138
881	Pilgrim	138	West Bus	138
PAR	Pilgrim	138	Pilgrim PAR	138
36311	Rainey	138	Vernon	138
36312	Rainey	138	Vernon	138
890	Riverhead	138	Wildwood	138
863	Shoreham	138	Wildwood	138
867	Shoreham	138	Wildwood	138
891	Shoreham	138	Wading River	138
873	Sills Road	138	West Bus	138
PAR11	Tremont	138	Tremont PAR 11	138
PAR12	Tremont	138	Tremont PAR 12	138
PAR	Valley Stream	138	Valley Stream	138
10	Vernon	138	Ravenswood #1	20
20	Vernon	138	Ravenswood #2	20
1-BP	Boonville	115	Porter	115
2-BP	Boonville	115	Porter	115

Facility Identifier	Terminal A	Nominal Voltage	Terminal B	Nominal Voltage
3	Clay	115	Dewitt	115
4	Clay	115	South Oswego	115
5	Clay	115	Dewitt	115
10	Clay	115	Teall Ave.	115
11	Clay	115	Teall Ave.	115
14	Clay	115	Lockheed (GE)	115
17	Clay	115	Woodard	115
7-CL	Clay	115	Lighthouse Hill	115
8	Deerfield	115	Porter	115
9	Deerfield	115	Porter	115
20	Edic	115	Porter	115
1	Ginna	115	Ginna	16
912	Ginna	115	Pannell Rd.	115
908-1	Ginna	115	Pannell Rd.	115
7X8272	Mortimer	115	Sta#82	115
7	Oneida	115	Porter	115
PAR3	Plattsburgh	115	Plattsburgh	115
PV20	Plattsburgh	115	South Hero	115
3	Porter	115	Yahnundasis	115
4	Porter	115	Valley	115
5	Porter	115	Watkins Rd.	115
6	Porter	115	Terminal	115
13	Porter	115	Schuyler	115
10	Edic	115	Porter	115

New York Control Area Proposed Bulk Power Transmission Facilities List

	Terminals		Expected In-Service		Nominal Voltage in kV			Thermal Ratings	
Transmission Owner	From	To	Prior To	Year	Operating	Design	# of Circuits	Summer	Winter
ConEd	Rainey	Corona	S	2023	345/138	345/138		N/A	N/A
ConEd	Cricket Valley	Dover (New Station)	W	2023	345	345	1	2220	2700
ConEd	Dover (New Station)	CT State Line	W	2023	345	345	1	2220	2700
ConEd	Gowanus	Greenwood	S	2025	345/138	345/138		N/A	N/A
ConEd	Goethals	Fox Hills	S	2025	345/138	345/138		N/A	N/A
LIPA	Riverhead	Wildwood	S	2021	138	138	1	1399	1709
LSP	Gordon Rd (New Station)	Rotterdam	S	2022	345/230	345/230	2	478 MVA	478 MVA
LSP	Gordon Rd (New Station)	Princetown (New Station)	S	2023	345	345	1	3410	3709
LSP	Princetown (New Station)	New Scotland	S	2023	345	345	2	3410	3709
LSP	Gordon Rd (New Station)	Gordon Rd (New Station)	S	2029	345/230	345/230	1	478 MVA	478 MVA
LSP	Gordon Rd (New Station)	Rotterdam	S	2029	345/115	345/115	2	650 MVA	650 MVA
LSP/NGRID	Edic	Gordon Rd (New Station)	S	2022	345	345	1	2228	2718
LSP/NGRID	Gordon Rd (New Station)	New Scotland	S	2022	345	345	1	2228	2718
LSP/NGRID	Princetown (New Station)	New Scotland	S	2023	345	345	1	2228	2718
LSP/NYPA/NGRID	Edic	Princetown (New Station)	W	2023	345	345	2	3410	3709
New York Transco	Knickerbocker (New Station)	Pleasant Valley	W	2023	345	345	1	3862	4103
New York Transco/Con Ed	Van Wagner (New Station)	Pleasant Valley	W	2023	345	345	1	3126	3704
New York Transco/Con Ed	Van Wagner (New Station)	Pleasant Valley	W	2023	345	345	1	3126	3704
NextEra Energy Transmission NY	Dysinger (New Station)	East Stolle (New Station)	S	2022	345	345	1	1356 MVA	1612 MVA
NextEra Energy Transmission NY	Dysinger (New Station)	Dysinger (New Station)	S	2022	345	345	1	700 MVA	700 MVA
NGRID	Knickerbocker (New Station)	New Scotland	W	2023	345	345	1	2381	3099
NGRID	Knickerbocker (New Station)	Alps	W	2023	345	345	1	2552	3134
NGRID	Athens	Van Wagner (New Station)	W	2023	345	345	1	2228	2718
NGRID	Leeds	Van Wagner (New Station)	W	2023	345	345	1	2228	2718
NGRID	Gordon Rd (New Station)	Eastover Rd	S	2029	230	230	1	1114	1284
NYSEG	Wood Street	Wood Street	W	2022	345/115	345/115	1	327 MVA	378 MVA
NYSEG	Fraser	Fraser	S	2024	345/115	345/115	1	305 MVA	364 MVA
NYSEG	Gardenville	Gardenville	S	2026	230/115	230/115	1	316 MVA	370 MVA

Transmission Owner	Terminals		Expected In-Service		Nominal Voltage in kV		# of Circuits	Thermal Ratings	
	From	To	Prior To	Year	Operating	Design		Summer	Winter
NYSEG	South Perry	South Perry	S	2027	230/115	230/115	1	246 MVA	291 MVA
NYSEG	Oakdale 345	Oakdale 115	S	2027	345/115	345/115/34.5	1	494MVA	527 MVA
NYSEG	Coopers Corners	Coopers Corners	S	2031	345/115	345/115	1	232 MVA	270 MVA
O & R	Lovett 345 kV Station (New Station)	Lovett	S	2023	345/138	345/138	1	562 MVA	562 MVA
O & R/ConEd	Ladentown	Lovett 345 kV Station (New Station)	S	2023	345	345	1	3000	3211
O & R/ConEd	Lovett 345 kV Station (New Station)	Buchanan	S	2023	345	345	1	3000	3211