New York ISO
Independent System Operator

2024 RNA Preliminary Results

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Reliability Planning

ESPWG/TPAS

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Agenda

- Background
- Key Assumptions
- Resource Adequacy Results
- Transmission Security Results
- Next Steps

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Overview of Preliminary Results

- Statewide resource deficiency of at least 1,000 MW by 2034 results in violations of resource adequacy and transmission security criteria driven by increasing demand, large loads, and assumed gas unavailability.
- New York City transmission security margin baseline deficiency beginning in 2031 driven by assumed NYPA small gas plant retirements, growing to 275 MW by 2034 due to demand growth.
- The objective of providing stakeholders the preliminary results is to offer an opportunity, prior to the final RNA, for stakeholders' input regarding updates in projects and plans, which may impact any identified criteria violations.

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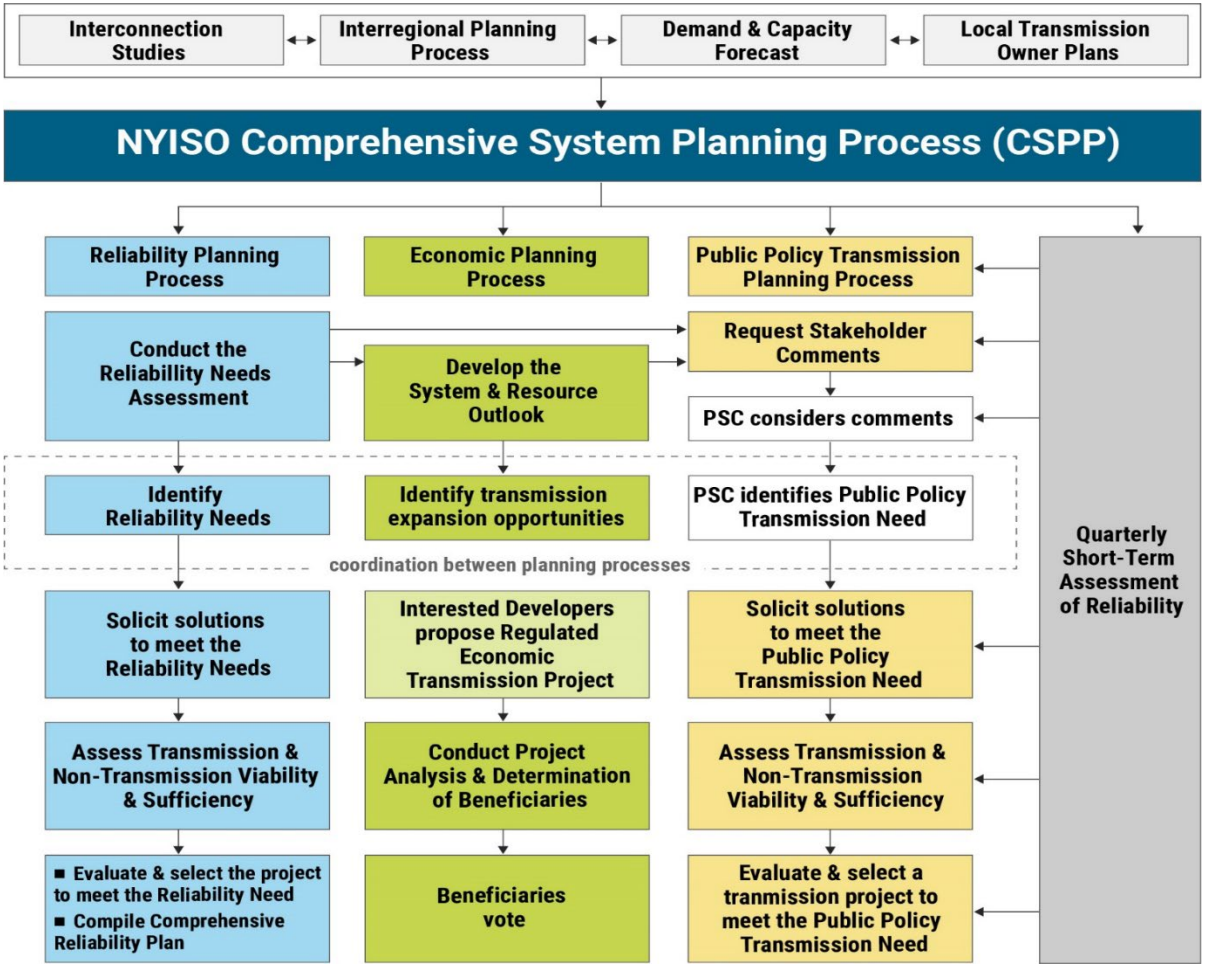
2024 RNA Background



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Reliability Planning Studies

- **Short-Term Assessments of Reliability (STARs)**
  - Conducted quarterly in direct collaboration with Transmission Owners
  - Five-year study with a focus on addressing needs arising in the first three years
- **Reliability Needs Assessment (RNA)**
  - Conducted biennially to identify long-term reliability needs in years 4-10
  - Considers all Transmission Owner LTPs and updates throughout the process
  - If a Reliability Need is identified, the NYISO issues a solicitation for solutions for market-based and regulated solutions and identifies a Responsible Transmission Owner(s) to propose a regulated backstop solution(s)
- **Comprehensive Reliability Plan (CRP)**
  - Biennial report that documents the plans for a reliable grid over the 10-year planning horizon
  - Includes, among other things, the results of the viability and sufficiency assessment of solutions, Trigger Dates of regulated solutions, and the results of the evaluation and selection of transmission solutions to reliability needs in years 4-10 if a Trigger Date to a regulated solution will occur within 36 months of the NYISO's presentation of the Viability and Sufficiency Assessment

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2024-2025 RPP Cycle Background

- **The 2024-2025 Reliability Planning Process (RPP) started with the 2024 Reliability Needs Assessment (2024 RNA) and is followed by the 2025-2034 Comprehensive System Plan (CRP).**
  - 2024 RNA Study Period: year 4 = 2028 through year 10 = 2034
  - Note: year 1 through year 5 are assessed in the quarterly Short-Term Assessment of Reliability (STAR), with a focus on year 1 through 3
- **2024 RNA is based on the information from the 2024 Gold Book, the 2024 FERC 715 filing, historical data, and Market Participant data.**
- **NYISO will identify Reliability Needs when Reliability Criteria is not met in the 2024 RNA Base Case.**

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Reliability Metrics

- **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
  - Measured against the Loss of Load Expectation (LOLE) of 0.1 event-days/year defined by NPCC and NYSRC
- **Transmission Security**
  - The ability of the electric system to withstand disturbances, such as electric short circuits or unanticipated loss of one or more system elements, without involuntarily disconnecting firm load
  - Measured against Reliability Criteria promulgated by NERC, NPCC, and NYSRC

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Key Assumptions

Project Inclusion: Large Generation

Queue	Project Name	MW	Type	POI	Zone	Proposed Date	Interconnection Status	RPP Inclusion Start
618	High River Solar	90	Solar	Inghams - Rotterdam 115kV	F	Jun-24	IA complete	2022 RNA
619	East Point Solar	50	Solar	Cobleskill - Marshville 69kV	F	Mar-24	IA complete	2022 RNA
637	Flint Mine Solar	100	Solar	LaFarge - Pleasant Valley 115kV, Feura Bush - North Catskill 115kV	G	Oct-24	IA complete	2022 RNA
717	Morris Ridge Solar Energy Center	177	Solar	South Perry - Meyer 230kV	C	Sep-24	IA complete	2024 RNA
737	Empire Wind 1	816	Offshore Wind	Gowanus 345kV	J	Dec-26	IA complete	2024 RNA
766/987	Sunrise Wind II	880+44	Offshore Wind	Holbrook 138kV	K	Mar-26	IA complete	2024 RNA

- **528 MW of additional small generators are also included in the preliminary RNA Base Case.**
- **NYISO is tracking the status of many more generation projects than those that currently meet the RNA base case inclusion rules.**
  - Projects in the April 18 ESPWG potential inclusion list that do not have announced NYSERDA REC awards are not included in the preliminary RNA Base Case.

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Planned Changes in Resources and Demand

NYCA, MW								
			Summer Peak			Winter Peak		
Year	Additions (1)	Removals (2)	Net Imports	Summer Baseline Coincident Peak	Large Loads Demand (3)	Net Imports	Winter Baseline Coincident Peak	Large Loads Demand (3)
2024	376	171	1,844	31,541	368	735	23,800	372
2025	981	760	1,844	31,650	630	735	24,210	783
2026	2,005	760	3,094	31,900	1,091	735	24,730	1,201
2027	2,821	760	3,094	32,110	1,409	735	25,270	1,409
2028	2,821	760	3,094	32,130	1,529	735	25,760	1,529
2029	2,821	760	3,094	32,340	1,683	735	26,350	1,683
2030	2,821	760	3,094	32,580	1,894	735	27,020	1,894
2031	2,821	1,216	3,094	32,880	2,009	735	27,900	2,009
2032	2,821	1,216	3,094	33,320	2,124	735	28,850	2,124
2033	2,821	1,216	3,094	33,830	2,239	735	29,950	2,239
2034	2,821	1,216	3,094	34,210	2,268	735	31,480	2,268

Notes:

1. Represents running total of MW based on the Nameplate Rating for the first summer peak period following the addtion.
2. Represents running total of MW based on the Summer Capability (DMNC) for the first summer peak period following removal.
3. Large loads are included in the Baseline Coincident Peak load forecasts.

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Winter Gas Unavailability

- **Consistent with recently adopted changes to NYSRC Reliability Rules, approximately 6,400 MW of generation fueled only by non-firm gas is modeled as unavailable during winter peak conditions.**
  - For transmission security winter peak cases, non-firm gas-only units are modeled as out-of-service.
  - For resource adequacy, the gas unavailability is triggered when the load exceeds that year's forecasted baseline winter coincident peak.
- **Dual-fuel units with non-firm gas contracts are modeled at their generation capability when running on their alternative fuel source [link].**

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Other Key Assumptions

- NYPA small gas plants (517 MW in Zones J & K) modeled as out-of-service at starting in 2031
- Approximately 2,100 MW of additional large loads
- Chateauguay imports set to 0 MW in winter peak months
- Dynamic Load Forecast Uncertainty modeled in resource adequacy models for years 2-10, as discussed at April 18 ESPWG [link]
- Refer to assumptions matrices [RA link, TS link], April 18 ESPWG/TPAS presentation [link], and April 30 [link] ESPWG/TPAS presentations for more detail

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Resource Adequacy Preliminary Results

LOLE Results

- There is a NYCA LOLE violation in study year 10 (2034), mainly due to the winter assumptions for non-firm gas unavailability, dynamic LFU, and demand forecast growth
- Free flow results (i.e., removing internal NYCA transmission limits) show no significant LOLE decrease, which indicates that this is a statewide capacity issue

	Year	Annual NYCA LOLE (d/y)	Summer LOLE (d/y)	Winter LOLE (d/y)	Winter Baseline Peak (MW)	Summer Baseline Peak (MW)	Annual Energy Forecast (GWh)
	2025	**0.029**	*0.029*	*0.000*	23,800	31,650	151,020
	2026	**0.010**	*0.010*	*0.000*	24,210	31,900	152,990
	2027	**0.008**	*0.008*	*0.000*	24,730	32,110	154,530
RNA Study Years y4-y10	2028	**0.006**	*0.006*	*0.000*	25,270	32,130	155,100
	2029	**0.009**	*0.008*	*0.001*	25,760	32,340	156,660
	2030	**0.004**	*0.004*	*0.000*	26,350	32,580	159,050
	2031	**0.011**	*0.010*	*0.001*	27,020	32,880	162,360
	2032	**0.029**	*0.021*	*0.008*	27,900	33,320	166,530
	2033	**0.075**	*0.026*	*0.050*	28,850	33,830	171,380
	2034	**0.283**	*0.035*	*0.248*	29,950	34,210	176,040

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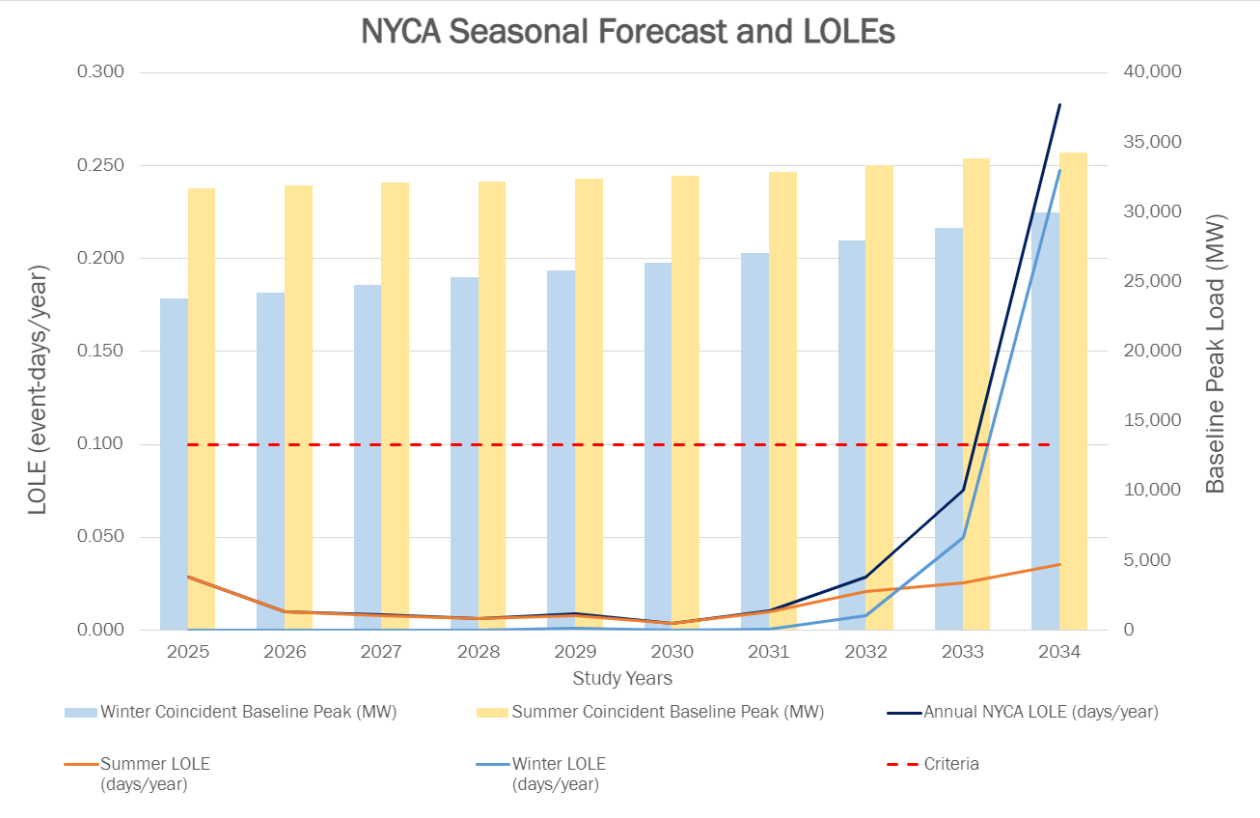
NYCA Annual vs. Seasonal LOLEs and Demand Forecasts



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Resource Adequacy: Observations

- **Zonal Resource Adequacy Margins give a relative measure of the magnitude of the need**
  - Resource capacity is reduced one zone at a time to determine when violations occur. This is done in the same manner as the addition of compensatory "perfect" MW to mitigate resource adequacy violations but with the opposite impact
  - "Perfect capacity" is capacity that is not derated (e.g., due to ambient temperature or unit unavailability), not subject to energy durations limitations (i.e., available at maximum capacity every hour of the study year), and not tested for transmission security or interface impacts
  - This simulation offers another relative measure of how close the system is from not having adequate resources to reliably serve load or, alternatively, how much MW is needed to bring the system back to 0.1 event-days/year LOLE
- **To bring the LOLE back to 0.1 event-days/year in year 10, there will be a need for about 900 MW "perfect capacity" anywhere in Zones A through J or 1,100 MW in Zone K**
  - Resources proposed as solutions will have to provide higher MW than the "perfect capacity"

Study Year	Preliminary Base Case LOLE	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone H	Zone I	Zone J	Zone K
	days/year	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW
2025	**0.029**	-1200	-1200	-1900	-1300	-1900	-1900	-1900	-1600	-1600	-1300	-500
2026	**0.01**	-1200	-1200	-2700	-1500	-2700	-2700	-2700	-2500	-2500	-2200	-700
2027	**0.008**	-1300	-1300	-2700	-1500	-2700	-2700	-2700	-2600	-2600	-2300	-700
2028	**0.006**	-1400	-1400	-2800	-1500	-2800	-2800	-2800	-2600	-2600	-2400	-700
2029	**0.009**	-1400	-1400	-2300	-1600	-2300	-2300	-2300	-2300	-2300	-2100	-600
2030	**0.004**	-1400	-1500	-2700	-1500	-2700	-2700	-2700	-2600	-2600	-2600	-1300
2031	**0.011**	-1400	-1400	-1900	-1400	-1900	-1900	-1900	-1900	-1900	-1900	-1100
2032	**0.029**	-1000	-1000	-1100	-900	-1100	-1100	-1100	-1100	-1100	-1100	-800
2033	**0.075**	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
2034	**0.283**	**900**	**900**	**900**	**900**	**900**	**900**	**900**	**900**	**900**	**900**	**1100**

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Emergency Operating Procedures LOLE Results

- For all years, NYCA is dependent on Emergency Operating Procedures (EOPs), especially emergency assistance from neighboring regions and operating reserves.

	2024 RNA Base Case - NYCA LOLE (days/year) by EOP Step										
	Step	EOP	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
	1	Removing Operating Reserve (1950 MW)	3.415	2.063	2.201	2.120	2.949	1.611	2.579	3.683	5.832	7.547
	2	Require SCRs (Load and Generator)	2.549	1.539	1.672	1.616	2.338	1.028	1.803	2.673	4.436	5.803
	3	5% Manual Voltage Reduction	2.433	1.463	1.590	1.545	2.249	0.945	1.686	2.522	4.235	5.565
	4	655 MW 30-Minute Reserve to Zero	1.206	0.774	0.934	0.825	1.178	0.537	1.067	1.759	3.191	4.297
	5	Voluntary Load Curtailment	0.976	0.642	0.792	0.684	0.991	0.426	0.871	1.511	2.843	3.929
	6	Public Appeals	0.902	0.604	0.761	0.648	0.935	0.401	0.822	1.453	2.763	3.836
	7	5% Remote Controlled Voltage Reduction	0.644	0.448	0.577	0.483	0.726	0.261	0.571	1.102	2.210	3.293
	8	Emergency Assistance	0.104	0.050	0.040	0.032	0.039	0.031	0.061	0.117	0.266	0.730
NYCA LOLE	9	Part of 10-Minute Reserve (910 of 1310 MW) to Zero	**0.029**	**0.010**	**0.008**	**0.006**	**0.009**	**0.004**	**0.011**	**0.029**	**0.075**	**0.283**

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Resource Adequacy Scenarios

- **The following scenarios were performed for information to indicate risk factors and inform potential solutions:**
  - Zonal Resource Adequacy Margins (ZRAM)
  - Champlain Hudson Power Express (CHPE) delay
  - Impact of additional resources:
    - Total of 9,000 MW of offshore wind
    - Projects that have completed Class Year study
  - Impact of large loads:
    - Certain large loads treated as flexible
    - Removing proposed large loads

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CHPE Delayed Scenario

- The 1,250 MW HVDC CHPE from Hydro-Québec to New York City was assumed in service starting 2026
- Scenario with the project removed to gauge impacts of potential delays
- The scenario shows that the impact of CHPE's delay or failure to enter service on NYCA LOLE is significant

Study Year	Preliminary Base Case	Without CHPE Scenario	*Delta Scenario - Base Case*
2025	**0.029**	0.028	*-0.001*
2026	**0.010**	0.025	*0.015*
2027	**0.008**	0.019	*0.011*
2028	**0.006**	0.014	*0.008*
2029	**0.009**	0.017	*0.008*
2030	**0.004**	0.014	*0.010*
2031	**0.011**	0.030	*0.020*
2032	**0.029**	0.058	*0.030*
2033	**0.075**	0.110	*0.034*
2034	**0.283**	0.327	*0.044*

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Preliminary Informative Scenarios

- **To inform potential solutions, additional scenarios were simulated for the study year with LOLE violations (study year 10, 2034), one at a time**
- **Large loads impacts scenarios:**
  - Removal of proposed large loads (~1,900 MW)
    - NYCA LOLE well below 0.1 event-days/year criterion
  - Approximately 1,200 MW of large loads modeled as flexible and used at EOP step (before the SCR step)
    - NYCA LOLE below 0.1 event-days/year criterion
- **Offshore wind scenario:**
  - Models a total of 9,000 MW of offshore wind generation (inclusive of the ~2,000 MW in the preliminary Base Case)
  - NYCA LOLE decreased to just below the 0.1 event-days/year criterion
- **Addition of other proposed projects that completed facilities studies and have not yet met the Base Case inclusion rules**
  - Approximately 5,000 MW added: NYCA LOLE decreased to just below the 0.1 event-days/year criterion

Study Year 10	Preliminary Base Case	Removal of Large Loads	Flex Large Loads as EOP step	Add Offshore Wind	Addition of Other Proposed Projects
2034	0.283	0.024	0.069	0.095	0.089

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Transmission Security Preliminary Results

2024 RNA Transmission Security Analysis

- **The NYISO evaluated the following cases:**
  - 2029 baseline coincident summer peak
  - 2029 daytime light load
  - 2029-2030 baseline coincident winter peak
  - 2034 baseline coincident summer peak
  - 2034 daytime light load
  - 2034-2035 baseline coincident winter peak
  - Note: If criteria violations are observed, analysis is performed to determine the year the need begins.
- **The following analysis types are performed:**
  - Steady-State
  - Stability
  - Short Circuit
  - Transmission Security Margin Calculation (“Tipping Points”)

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2024 RNA Transmission Security Results Summary

- **A resource deficiency is observed under summer and winter baseline coincident peak load conditions.**
  - Transmission constraints observed for N-1-1 near the Oswego Complex in Zone C and Barrett Pocket in Zone K driven by the resource deficiency.
- **Under summer peak load conditions, there are steady-state thermal criteria violations observed for N-1-1 in eastern in Zone K.**
- **Under daytime light load conditions, the NYISO identifies no BPTF transmission security Reliability Criteria violations.**

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2024 RNA Transmission Security Results Summary, cont.

- Transmission security margin deficiency identified in Zone J under summer peak load conditions.
- No stability criteria violations are identified on the BPTF.
- No short circuit criteria violations are identified on the BPTF.
- BPTF violations observed that will be addressed in other NYISO processes:
  - Breaker duty violations observed on Northport 138 kV buses, which were also observed in the System Impact Studies for the Long Island PPTN and will be addressed through the transmission expansion and interconnection processes.
  - Under winter peak load conditions, there is a steady-state thermal criteria violation on one of the Moses 230/115 kV transformers, which begins in the near-term and will be assessed in the 2024 Q3 STAR.

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Year 10 Powerflow Base Case Resource Deficiency

- **By 2034, there are not enough resources in the NYCA to develop a powerflow model consistent with the NYISO's planning practices for establishment of the credible combinations of system conditions. To proceed forward with the transmission security analysis, the following steps were taken:**
  - Winter Year 10:
    - Energy storage is modeled online (~130 MW)
    - Reserve requirement reduced to meet 1x largest loss of source (1,310 MW)
    - Reduction in certain large loads (~1,200 MW)
    - SCRs are modeled as zonal load scaling (~580 MW)
  - Summer Year 10:
    - Energy storage is modeled online (~130 MW)
    - Reserve requirement reduced to meet 1x largest loss of source (1,310 MW)

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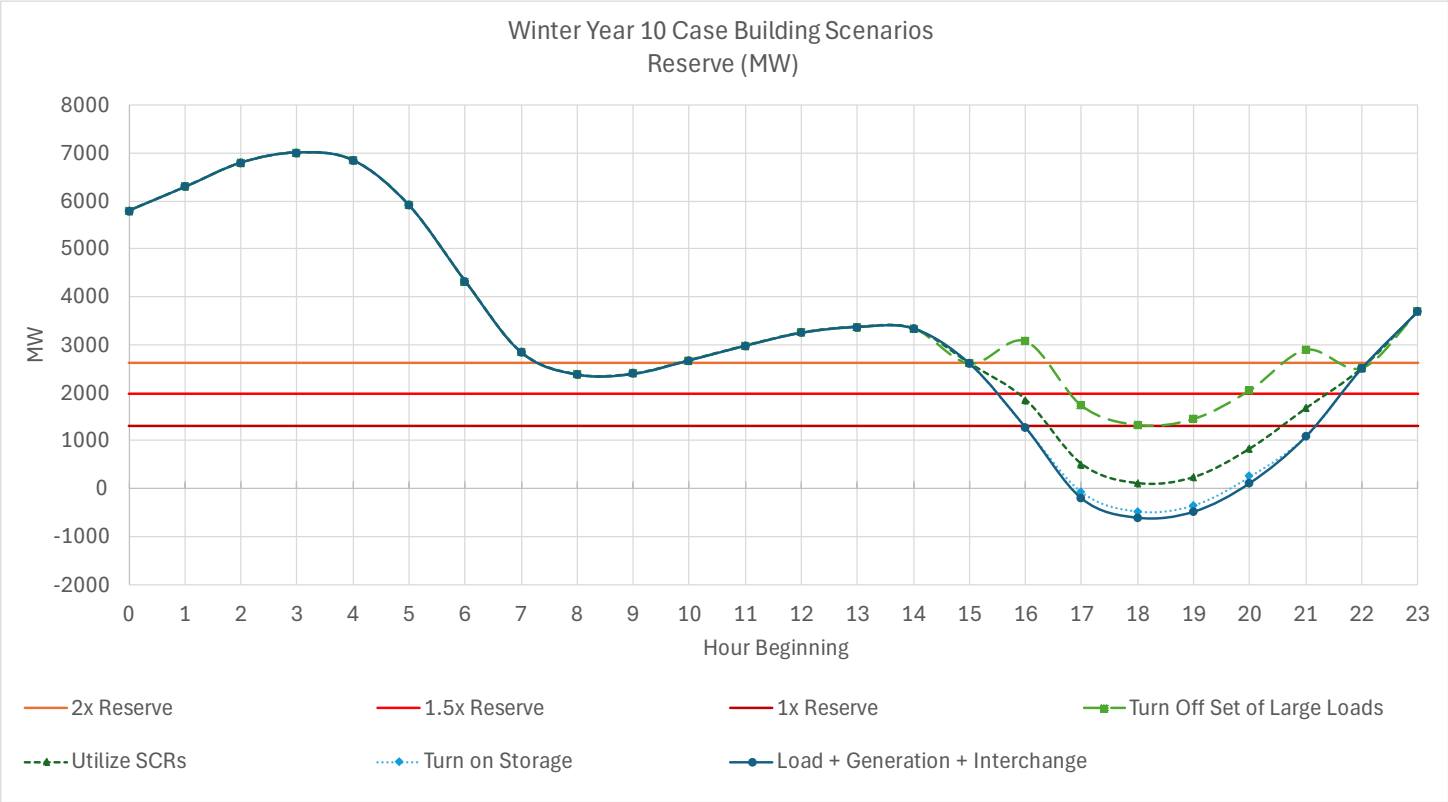
Winter Year 10 Case Reserves



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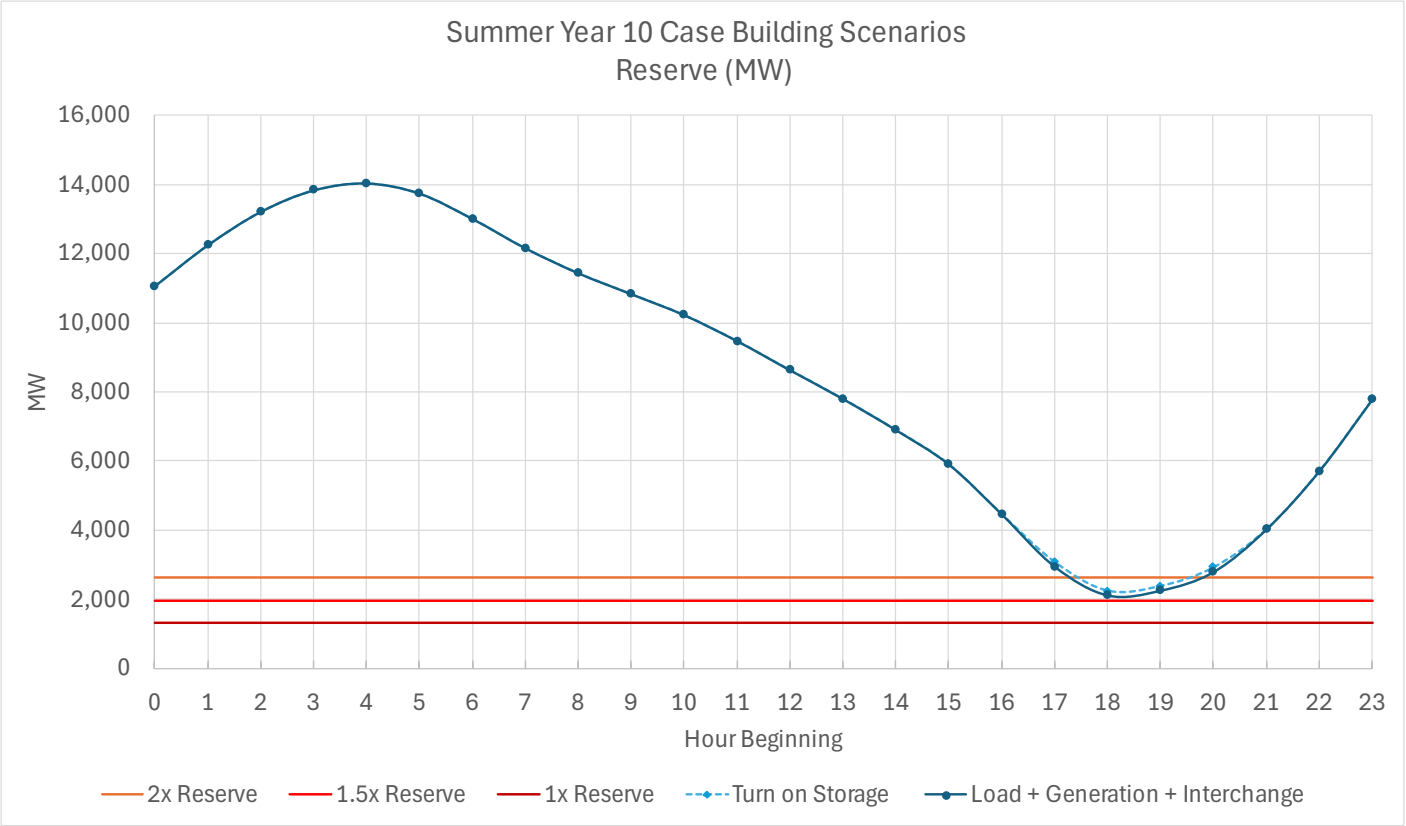
Summer Year 10 Case Reserves



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Description of Resource Deficiency in Base Case

Powerflow Case with Deficiency Observed	Operational Reserve (a)	First Year of Deficiency	Deficient MW (b)	Hours Deficient (c)
2034 Summer Peak	2,620	Y10 (2034)	385 MW	2 hours
2034-35 Winter Peak	2,620	Y8 (2032-33)	3,095 MW	10 hours
	1,965	Y9 (2033-34)	2,440 MW	6 hours
	1,310	Y9 (2033-34)	1,785 MW	5 hours

Notes:

a. Represents MW reserve available which is at least 2, 1.5, or 1 times the largest loss of source in NYCA (1,310 MW).

b. MW deficiency during the peak hour. Considers storage resources are available.

c. The total number of hours the system is deficient of reserve during the peak day. Hours are not necessarily consecutive.

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Year 10 Steady-State Results Summary

Summer Year 10 Steady-State Thermal Overloads

Zone	Owner	Monitored Element	Norm Rating (MVA)	Cont Rating (MVA)	Worst 1st Contingency	Worst 2nd Contingency	2034 Flow (%)
C	National Grid	Clay - Volney (6) 345 kV	1200	1396	Clay - Nine Mile 1 (8) 345 kV	Clay - Independence (26) 345 kV	116
C	National Grid	Clay - Nine Mile 1 (8) 345 kV	1032	1271	Clay - Volney (6) 345 kV	Clay - Independence (26) 345 kV	112
K	PSEG-LI	Edwards Ave - Riverhead (893) 138 kV	263	303	Wildwood - Riverhead (890) 138 kV	Wildwood - Riverhead (912) 138 kV	109

Winter Year 10 Steady-State Thermal Overloads

Zone	Owner	Monitored Element	Norm Rating (MVA)	Cont Rating (MVA)	Worst 1st Contingency	Worst 2nd Contingency	2034-35 Flow (%)
C	National Grid	Clay - Volney (6) 345 kV	1474	1626	Clay - Nine Mile 1 (8) 345 kV	Clay - Independence (26) 345 kV	101
K	PSEG-LI	Barrett - Barrett OSW (2) 138 kV	213	305	Loss of Gas Fuel Supply at Cricket Valley	Barrett - Barrett OSW (1) 138 kV	121
K	PSEG-LI	Barrett - Barrett OSW (1) 138 kV	218	308	Loss of Gas Fuel Supply at Cricket Valley	Barrett - Barrett OSW (2) 138 kV	120
K	PSEG-LI	East Garden City - Newbridge (462) 138 kV	194	284	Loss of Gas Fuel Supply at Cricket Valley	Base Case	101

- The Edwards Ave - Riverhead overload is due to changing load in eastern Long Island and is first observed in 2030. Coordination with PSEG-LI is ongoing to review the load distribution modeling driving the overload.
- The remaining overloads are a symptom of not having enough system flexibility when nearly all generation is at or near maximum output. 880 MW of compensatory MW in summer measured at Pannell 345 kV and 80 MW of compensatory MW measured at New Scotland 345 kV in winter can resolve these overloads. These overloads are first observed in 2033 summer and 2033-34 winter.

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Summary of Transmission Security Margins – Expected Load Conditions

- **Transmission Security Margin calculations are underway.**
  - Preliminary analysis indicates that the Lower Hudson Valley (Zones G-J) transmission security margin is sufficient for all years for summer and winter peak.
  - Preliminary analysis indicates that the Long Island (Zone K) transmission security margin is sufficient for all years for summer and winter peak.
- **Preliminary analysis indicates New York City (Zone J) transmission security margin is:**
  - Deficient starting in 2031 by 15 MW, which increases to 275 MW in summer 2034.
    - The impact of system changes, including the impact of the Long Island PPTN, generation, and load changes the New York City import capability (line B in the Zone J margin tables) is still being evaluated.
  - Sufficient for all years for winter peak.

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Transmission Security Margin
Summer Peak - New York City (Zone J)

Line	Item	Summer Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)									
		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
A	**Zone J Demand Forecast (4)**	(10,960)	(10,990)	(11,020)	(11,040)	(11,050)	(11,080)	(11,130)	(11,220)	(11,310)	(11,390)
B	I+K to J (3)	3,904	4,622	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	4,611	4,611	4,611	4,611	4,611	4,611	4,611	4,611	4,611
E	Loss of Source Contingency	(987)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)	(2,237)
F	**Resource Need (A+D+E)**	(8,054)	(8,616)	(8,646)	(8,666)	(8,676)	(8,706)	(8,756)	(8,846)	(8,936)	(9,016)
G	J Generation (1)	8,104	8,104	8,920	8,920	8,920	8,920	8,510	8,510	8,510	8,510
H	J Generation Derates (2)	(642)	(642)	(1,377)	(1,377)	(1,377)	(1,377)	(1,334)	(1,334)	(1,334)	(1,334)
I	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
J	Net ICAP External Imports	315	1,565	1,565	1,565	1,565	1,565	1,565	1,565	1,565	1,565
K	**Total Resources Available (G+H+I+J)**	7,777	9,027	9,109	9,109	9,109	9,109	8,741	8,741	8,741	8,741
L	**Baseline Transmission Security Margin (F+K)**	(277)	411	462	442	432	402	(15)	(105)	(195)	(275)
M	Higher Demand Impact	(180)	(280)	(380)	(490)	(610)	(720)	(810)	(880)	(950)	(1,040)
N	**Higher Policy Transmission Security Margin (L+M)**	(457)	131	82	(48)	(178)	(318)	(825)	(985)	(1,145)	(1,315)

Notes:

1. Reflects the 2024 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 (2024 Gold Book Table I-9a) and solar PV peak reductions (2024 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2023 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. The limit 2025 is based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2029 are based on the summer peak 2029 representations evaluated in the 2024 RNA. Limits for 2030 through 2034 are based on the summer peak 2024 representations evaluated in the 2024 RNA.
4. Reflects the 2024 Gold Book Forecast.

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Transmission Security Margin
Winter Peak - New York City (Zone J)

Line	Item	Winter Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)									
		2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35
A	**Zone J Demand Forecast (5)**	(7,410)	(7,490)	(7,560)	(7,660)	(7,770)	(7,910)	(8,230)	(8,540)	(8,730)	(9,250)
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	(973)	(973)	(973)	(973)	(973)	(973)	(973)	(973)	(973)	(973)
F	**Resource Need (A+D+E)**	(4,490)	(4,570)	(4,640)	(4,740)	(4,850)	(4,990)	(5,310)	(5,620)	(5,810)	(6,330)
G	J Generation (1)	9,362	10,178	10,178	10,178	10,178	9,766	9,766	9,766	9,766	9,766
H	J Generation Derates (2)	(595)	(1,248)	(1,248)	(1,248)	(1,248)	(1,247)	(1,247)	(1,247)	(1,247)	(1,247)
I	Unavailability of Non-Firm Gas (6)	(1,936)	(1,936)	(1,936)	(1,936)	(1,936)	(1,524)	(1,524)	(1,524)	(1,524)	(1,524)
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)**	7,146	7,309	7,309	7,309	7,309	7,310	7,310	7,310	7,310	7,310
M	**Transmission Security Margin (F+L)**	2,656	2,739	2,669	2,569	2,459	2,320	2,000	1,690	1,500	980

Notes:

1. Reflects the 2024 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 20% of the total nameplate. 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 2023 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. The limit 2025 is based on the summer peak 2025 representations evaluated in the post-2020 RNA updates. Limits for 2026 through 2029 are based on the summer peak 2029 representations evaluated in the 2024 RNA. Limits for 2030 through 2034 are based on the summer peak 2024 representations evaluated in the 2024 RNA.
4. As a conservative winter peak assumption these limits utilize the summer values.
5. Reflects the 2024 Gold Book Forecast.
6. Unavailability of non-firm gas is modeled per NYSRC Reliability Rule 154a which became effective May 2024. Includes all gas only units that do not have a firm gas contract. Also includes reductions in units with duct burner capabilities.

New York ISO

Next Steps

Preliminary vs. Final RNA Results

- **Modeling updates cut-off date: Aug 8**
  - This includes data needed for NYISO to model updates in power flow, stability, and short circuit models.
- **In finalizing the Reliability Needs, changes that occurred since the preliminary RNA assumptions will be considered, such as:**
  - Updated LTPs that may impact the Reliability Needs,
    - If there are any pertinent LTP updates, then the affected Transmission Owners should present updates at or before the **Aug 6** ESPWG/TPAS meeting.
    - The NYISO will present any other updates, if any, at the same meetings.
  - Changes in Bulk Power Transmission Facilities (BPTFs),
  - Change in resources, such as generating unit status or authority to operate in current equipment configuration past a date certain (e.g., due to a new or amended environmental law or regulation), and
  - Change in load forecast or demand response resources.

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RNA Milestones

- July 25 ESPWG/TPAS: present preliminary RNA results
- Modeling updates cut-off: **Aug 8**
- September ESPWG/TPAS: review final results, including scenarios, and review draft RNA report
- October OC & MC: Market Monitoring Unit review and OC and MC votes
- November: Review by NYISO Board of Directors review and publish final RNA Report

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Post-RNA Updates

- **December 2024-January 2025**
  - Stakeholders' presentations at ESPWG/TPAS of any updates (e.g., LTPs, generation additions, demand changes) that may reduce or eliminate the Reliability Needs noted in the final RNA.
  - NYISO re-evaluates the status updates and, if necessary, presents updated Reliability Needs.
- **Early 2025**
  - NYISO issues solicitation of solutions to any remaining Reliability Needs with responses due within 60 days.

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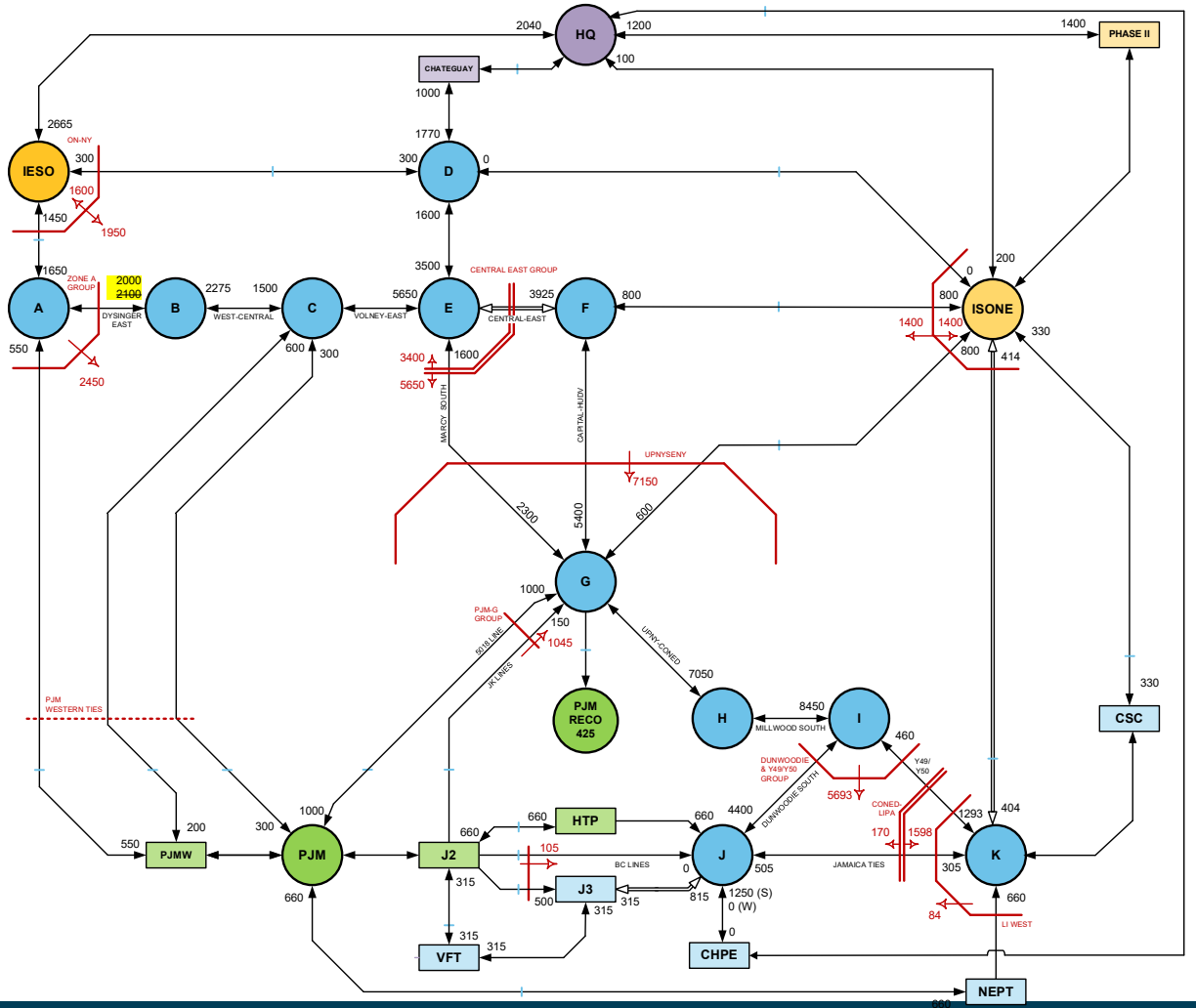
Questions?

Appendix

MARS Preliminary Topology SY4-5 (2028-2029)

- Dysinger East decreased by 100 MW to mainly reflect higher Large Loads forecasts



Notes

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

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

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

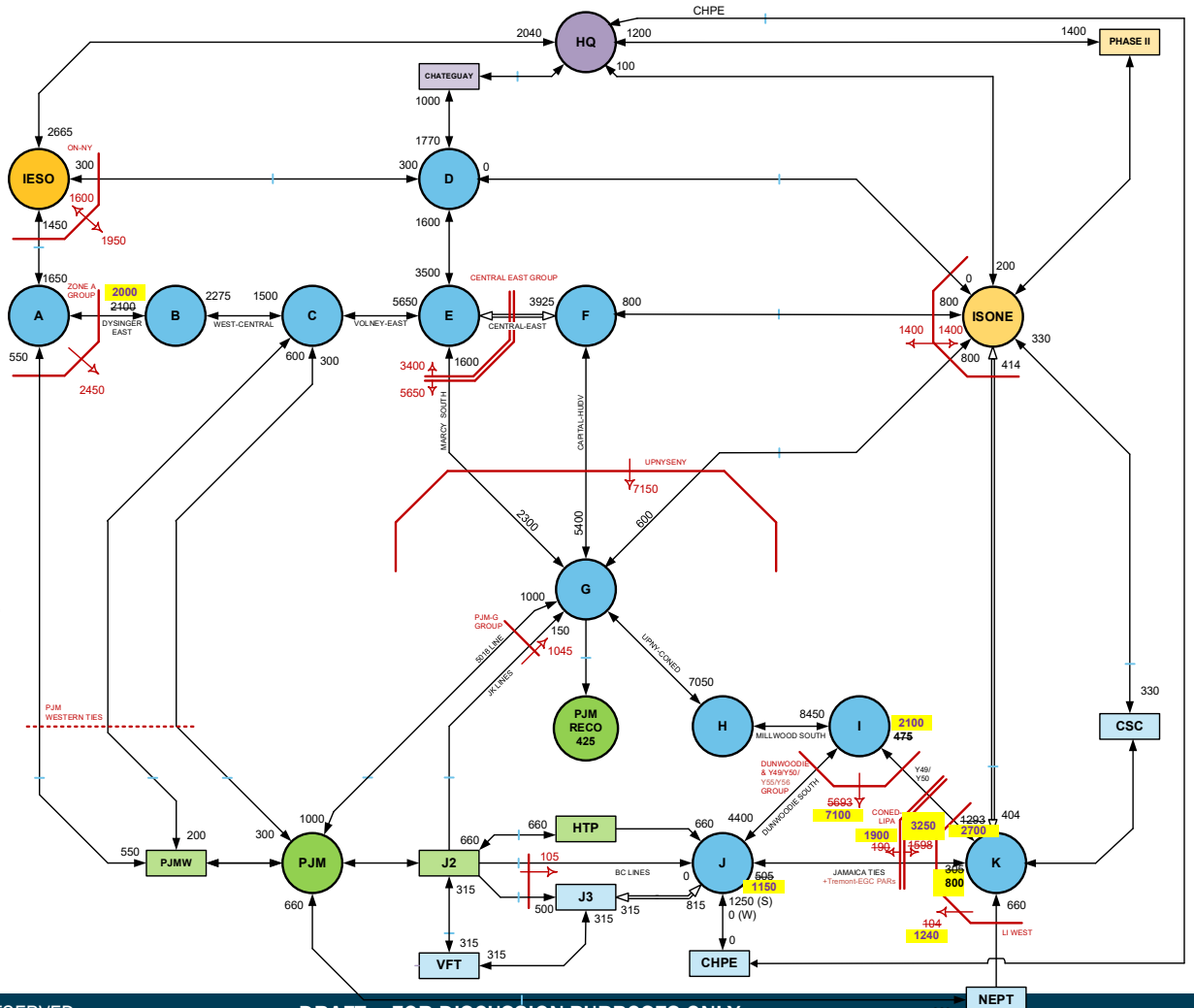
Legend

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

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

MARS Preliminary Topology SY6-10 (2030-2034)

- Dysinger East decreased by 100 MW to mainly reflect higher Large Loads forecasts
- Reflected limits increases due to LIPPTN



Notes

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

Legend

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

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

EOP Steps LOLE LOLH, EUE

2024 RNA Base Case - NYCA LOLE (days/year) by EOP Step											
Step	EOP	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	Removing Operating Reserve (1950 MW)	3.415	2.063	2.201	2.120	2.949	1.611	2.579	3.683	5.832	7.547
2	Require SCRs (Load and Generator)	2.549	1.539	1.672	1.616	2.338	1.028	1.803	2.673	4.436	5.803
3	5% Manual Voltage Reduction	2.433	1.463	1.590	1.545	2.249	0.945	1.686	2.522	4.235	5.565
4	655 MW 30-Minute Reserve to Zero	1.206	0.774	0.934	0.825	1.178	0.537	1.067	1.759	3.191	4.297
5	Voluntary Load Curtailment	0.976	0.642	0.792	0.684	0.991	0.426	0.871	1.511	2.843	3.929
6	Public Appeals	0.902	0.604	0.761	0.648	0.935	0.401	0.822	1.453	2.763	3.836
7	5% Remote Controlled Voltage Reduction	0.644	0.448	0.577	0.483	0.726	0.261	0.571	1.102	2.210	3.293
8	Emergency Assistance	0.104	0.050	0.040	0.032	0.039	0.031	0.061	0.117	0.266	0.730
9	Part of 10-Minute Reserve (910 of 1310 MW) to Zero	**0.029**	**0.010**	**0.008**	**0.006**	**0.009**	**0.004**	**0.011**	**0.029**	**0.075**	**0.283**

2024 RNA Preliminary Base Case - NYCA LOLH (hrs/year) by EOP Step											
Step	EOP	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	Removing Operating Reserve (1950 MW)	14.4	7.7	7.3	6.7	10.1	5.0	8.7	13.2	20.8	27.5
2	Require SCRs (Load and Generator)	10.7	5.8	5.6	5.1	8.0	3.2	6.1	9.8	15.8	21.2
3	5% Manual Voltage Reduction	10.1	5.5	5.3	4.9	7.7	2.9	5.6	9.2	15.0	20.3
4	655 MW 30-Minute Reserve to Zero	4.8	2.8	2.9	2.4	3.6	1.6	3.3	6.3	11.1	15.3
5	Voluntary Load Curtailment	3.9	2.2	2.4	1.9	3.0	1.2	2.7	5.3	9.8	13.9
6	Public Appeals	3.6	2.1	2.2	1.8	2.8	1.1	2.5	5.1	9.5	13.5
7	5% Remote Controlled Voltage Reduction	2.4	1.5	1.6	1.3	2.1	0.7	1.7	3.7	7.5	11.4
8	Emergency Assistance	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.7	2.1
9	Part of 10-Minute Reserve (910 of 1310 MW) to Zero	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.2**	**0.8**

2024 RNA Preliminary Base Case - NYCA EUE (MWh/year) by EOP Step											
Step	EOP	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	Removing Operating Reserve (1950 MW)	13,600	6,394	6,232	5,212	7,835	5,013	10,312	18,889	34,579	53,343
2	Require SCRs (Load and Generator)	8,705	4,086	4,123	3,431	5,471	2,946	6,493	13,119	25,604	41,488
3	5% Manual Voltage Reduction	7,932	3,707	3,767	3,139	5,066	2,632	5,865	12,061	23,895	39,169
4	655 MW 30-Minute Reserve to Zero	3,959	2,045	2,222	1,859	3,137	1,331	3,201	7,498	16,341	28,542
5	Voluntary Load Curtailment	3,003	1,571	1,738	1,465	2,557	991	2,458	6,076	13,799	24,914
6	Public Appeals	2,777	1,505	1,684	1,424	2,495	918	2,297	5,777	13,294	24,114
7	5% Remote Controlled Voltage Reduction	1,636	932	1,085	929	1,740	550	1,439	3,919	9,770	18,774
8	Emergency Assistance	149	44	35	20	28	23	60	169	450	1,764
9	Part of 10-Minute Reserve (910 of 1310 MW) to Zero	**32**	**7**	**6**	**3**	**5**	**2**	**9**	**35**	**104**	**561**

- NYCA LOLE criteria is 0.1 event-days/year
- LOLH and EUE provided for information; there is no criteria otherwise.
- LOLH - Loss of Load Hours (event-days/year)
- EUE or LOEE- loss of energy expectation (MWh/year)

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Statewide System Margin - Summer

Line	Item	Summer Peak - Baseline Expected Summer Weather, Normal Transfer Criteria (MW)									
		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
A	NYCA Generation (1)	38,045	39,069	39,885	39,885	39,885	39,885	39,429	39,429	39,429	39,429
B	NYCA Generation Derates (2)	(6,467)	(7,412)	(8,158)	(8,181)	(8,192)	(8,204)	(8,168)	(8,179)	(8,191)	(8,191)
C	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
D	External Area Interchanges (3)	1,844	3,094	3,094	3,094	3,094	3,094	3,094	3,094	3,094	3,094
E	**Total Resources (A+B+C+D)**	33,421	34,751	34,821	34,798	34,786	34,775	34,356	34,344	34,333	34,333
F	Demand Forecast (5)	(31,650)	(31,900)	(32,110)	(32,130)	(32,340)	(32,580)	(32,880)	(33,320)	(33,830)	(34,210)
G	Largest Loss-of-Source Contingency	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)	(1,310)
H	**Total Capability Requirement (F+G)**	(32,960)	(33,210)	(33,420)	(33,440)	(33,650)	(33,890)	(34,190)	(34,630)	(35,140)	(35,520)
I	**Statewide System Margin (E+H)**	461	1,541	1,401	1,358	1,136	885	166	(286)	(807)	(1,187)
J	Higher Demand Impact	(550)	(1,010)	(1,340)	(1,810)	(2,060)	(2,330)	(2,600)	(2,810)	(2,980)	(3,270)
K	**Higher Statewide System Margin (I+J)**	(89)	531	61	(452)	(924)	(1,445)	(2,434)	(3,096)	(3,787)	(4,457)
L	SCRs (6), (7)	897	897	897	897	897	897	897	897	897	897
M	**Statewide System Margin with SCR (K+L)**	808	1,428	958	444	(27)	(549)	(1,538)	(2,199)	(2,891)	(3,561)
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)**	(502)	118	(352)	(866)	(1,337)	(1,859)	(2,848)	(3,509)	(4,201)	(4,871)

Notes:

1. Reflects the 2024 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 15% of the total nameplate, solar generation is based on the ratio of solar PV nameplate capacity (2024 Gold Book Table I-9a) and solar PV peak reductions (2024 Gold Book Table I-9c). Derates for run-of-river hydro are included as well as the Oswego Export limit for all lines in-service. Includes derates for thermal resources based on NERC five-year class average EFORd data published August 2023 (https://www.nerc.com/pa/RAPA/gads/Pages/Reports.aspx).
3. Interchanges are based on ERAG MMWG values.
4. For informational purposes.
5. Reflects the 2024 Gold Book Forecast.
6. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
7. Includes a derate of 384 MW for SCRs

New York ISO

Statewide System Margin - Winter

Line	Item	Winter Peak - Baseline Expected Winter Weather, Normal Transfer Criteria (MW)									
		2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35
A	NYCA Generation (1)	40,980	42,720	42,720	42,720	42,720	42,262	42,262	42,262	42,262	42,262
B	NYCA Generation Derates (2)	(6,417)	(7,809)	(7,809)	(7,809)	(7,809)	(7,809)	(7,809)	(7,809)	(7,809)	(7,809)
C	Unavailability of Non-Firm Gas (6)	(6,319)	(6,319)	(6,319)	(6,319)	(6,319)	(5,861)	(5,861)	(5,861)	(5,861)	(5,861)
D	Temperature Based Generation Derates	0	0	0	0	0	0	0	0	0	0
E	External Area Interchanges (3)	735	735	735	735	735	735	735	735	735	735
F	**Total Resources (A+B+C+D+E)**	28,979	29,327	29,327	29,327	29,327	29,327	29,327	29,327	29,327	29,327
G	Demand Forecast (5)	(24,210)	(24,730)	(25,270)	(25,760)	(26,350)	(27,020)	(27,900)	(28,850)	(29,950)	(31,480)
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 (G+H)**	(25,520)	(26,040)	(26,580)	(27,070)	(27,660)	(28,330)	(29,210)	(30,160)	(31,260)	(32,790)
J	**Statewide System Margin (F+I)**	3,459	3,287	2,747	2,257	1,667	997	117	(833)	(1,933)	(3,463)
K	SCRs (7), (8)	582	582	582	582	582	582	582	582	582	582
L	**Statewide System Margin with SCR (J+K)**	4,041	3,869	3,329	2,839	2,249	1,579	699	(251)	(1,351)	(2,881)
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)**	2,731	2,559	2,019	1,529	939	269	(611)	(1,561)	(2,661)	(4,191)

Notes:

1. Reflects the 2024 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 20% of the total nameplate. 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 2023 (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 2024 Gold Book Forecast.
6. Includes all gas only units that do not have a firm gas contract. Also includes reductions in units with duct burner capabilities.
7. SCRs are not applied for transmission security analysis of normal operations, but are included for emergency operations.
8. Includes a derate of 221 MW for SCRs.

New York ISO

Our Mission & Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

New York ISO