New York ISO
Independent System Operator

Attachment #7.1.1
Return to Agenda

2024 Reliability Needs Assessment

NYISO System & Resource Planning

New York State Reliability Council

Sep. 13, 2024

RNA Scope

- **Study period of 10 years with focus on years 4-10**
- **Resource Adequacy**
  - Probabilistic analysis of loss of load expectation (LOLE)
- **Transmission Security:**
  - Deterministic analysis of steady state and dynamic stability
  - Locality and statewide margin analyses
  - Study 5-year and 10-year summer peak, winter peak, and light load case

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2024 RNA Schedule

- **July - September: Final Results**
  - Two-week window for assumptions updates
  - Base cases and results updated
  - Scenario results finalized
  - Prepare and present draft RNA report
- **October - November: Review and Approval**
  - OC vote
  - MC vote and Market Monitoring Unit review
  - NYISO Board of Directors review and action
  - Publish the final RNA Report following approval by Board of Directors

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Key Assumptions

- Rate of demand growth increases for both summer peak and winter peak throughout the planning horizon
- ~2,100 MW of additional large loads Upstate
- ~6,400 MW of non-firm gas-only generation modeled as unavailable during winter peak conditions in both transmission security and resource adequacy
- Quebec imports set to 0 MW in winter peak months
- NYPA small gas plants (517 MW in zones J & K) assumed unavailable starting in 2031
- ~2,800 MW of solar and offshore wind additions

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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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Preliminary Findings

Resource Deficiency: LOLE Violation

- A statewide resource deficiency of at least 800 MW results in a loss-of-load-expectation criterion violation in 2034
- Driven by forecasted increases in winter peak demand, assumed unavailability of gas-only generation, and planned generator retirements
- Resource deficiency is statewide, and cannot be solved with transmission within NYCA
- NYISO investigating impact of large loads

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Zonal Resource Adequacy Margin

- **ZRAM results show that to bring the LOLE back to 0.1 event-days/year in year 10, there will be a need for about 800 MW "perfect capacity" anywhere in Zones A through J or 1,000 MW in Zone K**
  - Resources proposed as solutions will have to provide higher MW than the "perfect capacity"
  - "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

Study Year	Base Case LOLE *event-days/year*	Zone A *MW*	Zone B *MW*	Zone C *MW*	Zone D *MW*	Zone E *MW*	Zone F *MW*	Zone G *MW*	Zone H *MW*	Zone I *MW*	Zone J *MW*	Zone K *MW*
2025	**0.027**	-1300	-1300	-2000	-1400	-2000	-2000	-2000	-1600	-1600	-1300	-500
2026	**0.009**	-1300	-1300	-2800	-1500	-2800	-2800	-2800	-2600	-2600	-2200	-700
2027	**0.008**	-1300	-1300	-2800	-1500	-2800	-2800	-2800	-2700	-2700	-2400	-700
2028	**0.006**	-1400	-1500	-2900	-1500	-2900	-2900	-2900	-2700	-2700	-2400	-700
2029	**0.008**	-1400	-1400	-2400	-1600	-2400	-2400	-2400	-2300	-2300	-2100	-600
2030	**0.003**	-1500	-1500	-2800	-1500	-2800	-2800	-2800	-2700	-2700	-2700	-1300
2031	**0.010**	-1400	-1400	-2000	-1500	-2000	-2000	-2000	-2000	-2000	-2000	-1100
2032	**0.026**	-1100	-1100	-1100	-1000	-1100	-1100	-1100	-1100	-1100	-1100	-800
2033	**0.068**	-300	-300	-300	-200	-300	-300	-300	-300	-300	-300	-200
2034	0.254	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**800**	**1000**

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Resource Deficiency: Powerflow Cases

- Typical case building practice is to ensure that area interchange with neighbors matches the MMWG schedule, and to model enough reserve in NYCA to meet 2x the largest loss of source.
- Due to a resource deficiency in the 2034 winter peak base case, to build a case that maintains area interchange schedule and meets reserve requirements:
  - Model certain large loads offline (1,200 MW)
  - SCRs are modeled as zonal load scaling (580 MW)
  - Energy storage is modeled generating without state-of-charge confirmation (130 MW)
- Summer 2034 is short of 2x the largest loss of source reserve by ~500 MW.
- Cases are very tight and it is difficult to dispatch around overloads since all available generation is at or near peak

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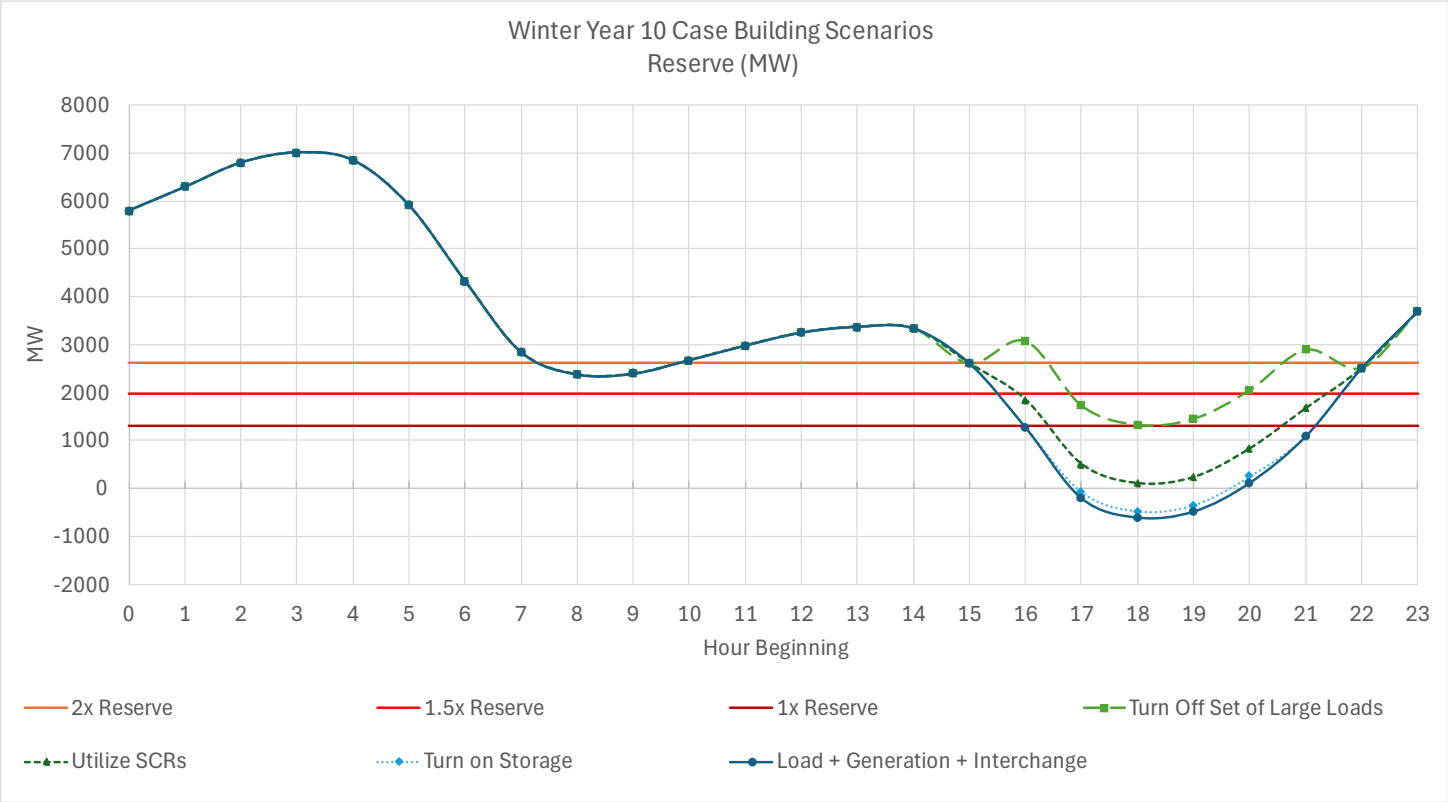
Winter Year 10 Case Reserves



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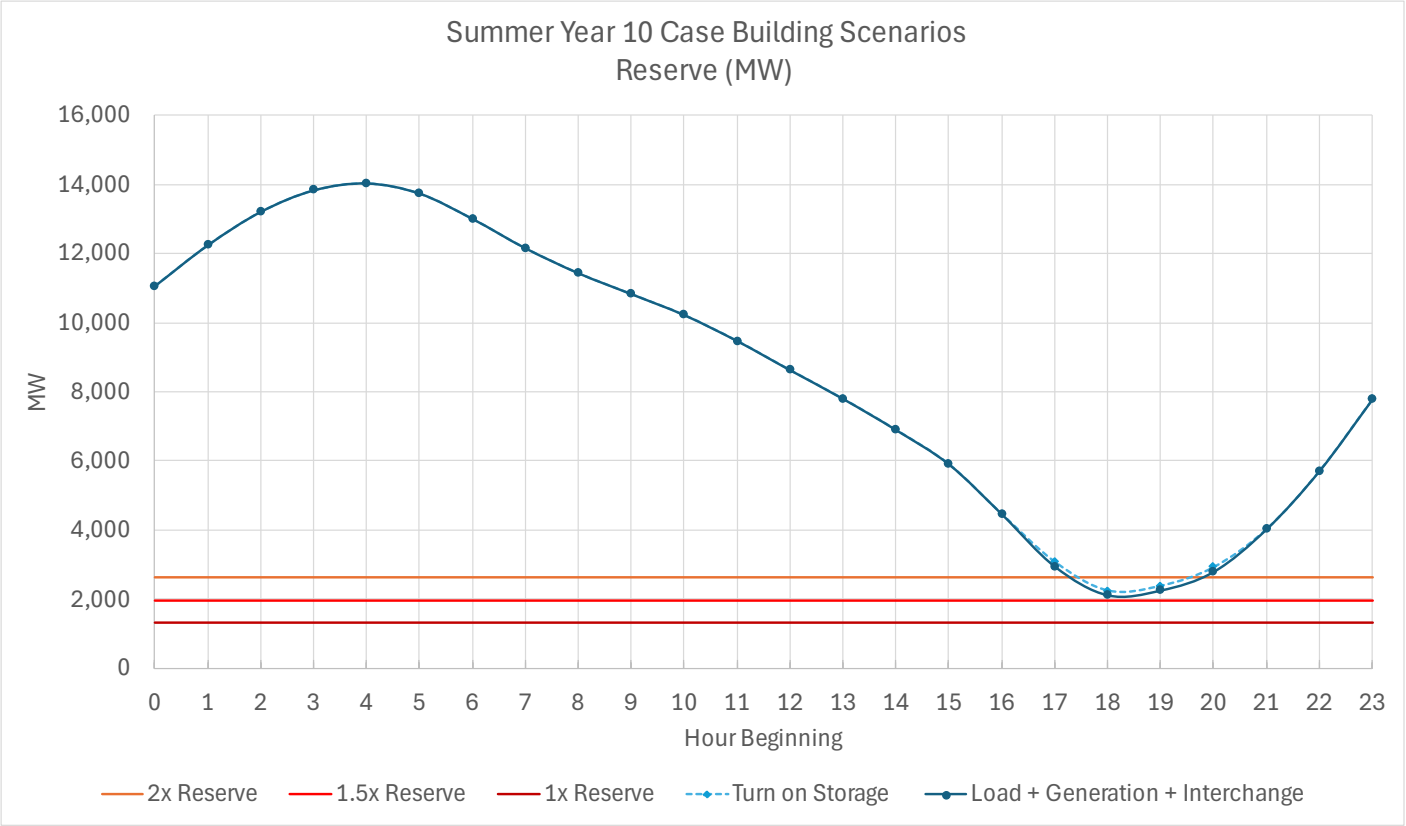
Summer Year 10 Case Reserves



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NYC Transmission Security Margin

- Transmission security margin deficiency in New York City (Zone J) starting in 2033, growing to approximately 100 MW shortfall in 2034.
  - The deficiency could be greater and occur earlier for the higher demand scenario
- Driven by summer peak load growth, peaker retirements, and NYPA small gas plant retirements
- Evaluation of local reliability needs still pending

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

Summer Peak - Baseline Expected Weather, Normal Transfer Criteria (MW)										
	Item	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)	3,900	4,700	4,700	4,700	4,700	4,800	4,800	4,800	4,800	4,800
C	ABC PARs to J	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
D	**Total J AC Import (B+C)**	3,889	4,689	4,689	4,689	4,689	4,789	4,789	4,789	4,789	4,789
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)**	(8,058)	(8,538)	(8,568)	(8,588)	(8,598)	(8,528)	(8,578)	(8,668)	(8,758)	(8,838)
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)**	(281)	489	540	520	510	580	163	73	(17)	(97)
M	Higher Demand Impact	(180)	(280)	(380)	(490)	(610)	(720)	(810)	(880)	(950)	(1,040)
N	**Higher Demand Transmission Security Margin (L+M)**	(461)	209	160	30	(100)	(140)	(647)	(807)	(967)	(1,137)

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 2034 representations evaluated in the 2024 RNA.
4. Reflects the 2024 Gold Book Forecast.

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Scenario Results

Scenario Analysis

- **NYISO performs scenarios for information to indicate risk factors and inform potential solutions**
- **NYISO has performed the following scenarios:**
  - Impact of Champlain Hudson Power Express (CHPE) delay
  - Impact of additional resources
  - Impact of large loads
  - Impact of non-firm gas unit availability
- **NYISO is considering additional scenarios for the report, including :**
  - Impact of various assumptions on statewide and transmission security margins
  - Impact of load forecast variations

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Additional Resource Scenarios

- **NYISO performed separate scenarios to inform potential solutions to the statewide resource deficiency**
  - OSW: 9,000 MW total of offshore wind generation (inclusive of the ~2,000 MW in the Base Case)
  - Additional Queue Projects: ~5,000 MW of proposed projects in the NYISO's interconnection queue that completed facilities studies and have not yet met the Base Case inclusion rules. These include roughly 2,400 MW of solar, 1,600 MW of land-based wind, and 1,000 MW of storage projects
  - Flex Large Loads: ~1,200 MW of planned large loads treated as "flexible," such that they are assumed offline under system peak demand conditions

2034 Reliability metric	Base Case	Flex Large Loads (1,200 MW)	Offshore Wind (additonal 7,000 MW)	Additional Q Projects (5,000 MW)
LOLE	0.283	0.069	0.095	0.089
Winter Peak Compensatory MW (1)	1875	675	475	140
Summer Peak Compensatory MW (1)	580	0	0	0

(1) Pending full scenario results

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Non-Firm Gas Scenario

- The LOLE criterion could be met through 2034 if 1,100 MW of non-firm gas generation is available during winter peak conditions (reduces unavailable gas generation to 5,300 MW)
- Additional compensatory MW would still be required to resolve the winter peak and summer peak power flow violations

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High Demand Forecast Scenario

- **Using the High Demand Forecast for expected weather from the 2024 Gold Book, the LOLE and power flow violations increase and occur earlier in the planning horizon**

	Summer Demand Forecast (MW)			Winter Demand Forecast (MW)			LOLE (event-days/year)		Winter Peak (Compensatory MW)	
Year	Baseline	High	Delta	Baseline	High	Delta	2024 RNA Base Case	High Demand Forecast	2024 RNA Base Case	High Demand Forecast
2025	31,650	32,200	*550*	24,210	24,960	*750*	0.027	0.040	0	0
2026	31,900	32,910	*1,010*	24,730	25,790	*1,060*	0.009	0.020	0	0
2027	32,110	33,450	*1,340*	25,270	26,690	*1,420*	0.008	0.026	0	0
2028	32,130	33,940	*1,810*	25,760	27,610	*1,850*	0.006	0.032	0	0
2029	32,340	34,400	*2,060*	26,350	28,560	*2,210*	0.008	0.059	0	0
2030	32,580	34,910	*2,330*	27,020	29,650	*2,630*	0.003	0.062	0	45
2031	32,880	35,480	*2,600*	27,900	30,960	*3,060*	0.010	0.203	0	1355
2032	33,320	36,130	*2,810*	28,850	32,540	*3,690*	0.026	0.633	0	2935
2033	33,830	36,810	*2,980*	29,950	34,350	*4,400*	0.068	2.167	345	4745
2034	34,210	37,480	*3,270*	31,480	36,370	*4,890*	0.254	3.624	1875	6765

CHPE Delayed Scenario

- The Base Case assumes that the 1,250 MW HVDC CHPE from Hydro-Québec to New York City will be in service starting 2026
- The scenario removes the project to consider the impacts of potential delays
- The scenario shows that the absence of CHPE would accelerate the statewide resource deficiency.
- Analysis of impact to NYC deficiency still underway.

Study Year	Preliminary Base Case	Without CHPE Scenario	*Delta Scenario - Base Case*
2025	0.029		
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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Questions?

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

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