New York ISO
Independent System Operator

Reserves for Resource Flexibility

SENY Reserve Region Enhancements

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Agenda

- Background
- Review: Proposed SENY Reserve Enhancements
- Thunderstorm Alert Treatment
- Tariff Revisions
- Next Steps
- Appendix I: Normal Transfer Criteria Analysis
- Appendix II: Operating Reserves Overview

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Background

Date	Working Group	Discussion Points and Links to Materials
May 9, 2019	ICAPWG/MIWG	Project overview https://www.nyiso.com/documents/20142/6474763/5_9_2019_Reserves_for_Resource_Flexibility_FINAL.pdf/f5b74852-2b18-9233-a8fa-bfc488ed1238
July 15, 2019	ICAPWG/MIWG	Discuss additional SENY reserve requirement for Normal Transfer Criteria post-contingency https://www.nyiso.com/documents/20142/7575688/7_15_2019_Reserves_for_Resource_Flexibility_FINAL.pdf/60a62b16-895c-9185-9ba5-d3538da9e10b
September 26, 2019	ICAPWG/MIWG	Discuss SENY Reserve Region Enhancements and Uncertainty Analysis https://www.nyiso.com/documents/20142/8414685/9_26_2019_Reserves_for_Resource_Flexibility_FINAL.pdf/ba7fb774-49d5-0c96-1d2c-664a2c9c3c05
October 28, 2019	ICAPWG/MIWG	Market Design Concept Proposal https://www.nyiso.com/documents/20142/8922912/10_28_2019_Reserves_for_Resource_Flexibility_MDCP_FINAL.pdf/e8bedc39-867b-88d6-ef5a-fe92943d48ba

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Reserves for Resource Flexibility: Scope

- **This initiative originally included two components:**
  1. Procuring additional 30-minute reserves in the SENY reserve region to enable the NYISO to return transmission elements in SENY to Normal Transfer Criteria following a contingency.
  2. Procuring additional reserves as the amount of weather-dependent generation on the grid increases.

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Reserves for Resource Flexibility: Scope

- **The NYISO will continue stakeholder discussions on procuring additional 30-minute reserves in SENY within the Reserves for Resource Flexibility project.**
  - The NYISO will also pursue reducing the NYC (Zone J) reserve requirement to zero MW during Thunderstorm Alerts (TSAs) as part of this project.
    - NYISO currently reduces the SENY 30-minute reserve requirement to zero MW during TSAs.
- **The NYISO will continue to discuss procuring additional reserves for system uncertainty within the Ancillary Services Shortage Pricing project.**
  - Procuring additional reserve beyond minimum requirements should be considered in the context of the potential adjustments to the existing reserve demand curves.

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Review: Proposed SENY Reserve Enhancements

Normal Transfer Criteria

- **The NYISO proposes to procure an additional 500 MW of 30-minute reserves in the SENY reserve region (zones G-K).[1]**
  - The current SENY 1,300 MW 30-minute reserve requirement serves to bring transmission assets to Emergency Transfer Criteria after suffering a contingency.
    - This proposal increases the portion of the total statewide reserve requirement carried in SENY from 1,300 MW to 1,800 MW.
  - Procuring additional 30-minute reserves in the SENY reserve region will provide ready access to additional resource flexibility through a market-based mechanism to bring transmission assets to Normal Transfer Criteria following a contingency.
    - Absent such a mechanism, out of market actions may be required to return facilities to Normal Transfer Criteria following a contingency.
- **Proposal contemplates shifting of current locational reserve procurements only and does not propose to increase the 2,620 MW level of 30-minute total reserves procured statewide (NYCA).**
- **This additional reserve would be procured at all times in the Day-Ahead and Real-Time Markets.**
- **The 1,800 MW 30-minute reserve requirement would be reduced to zero MW during a TSA.**

[1] For further information, please see Appendix I: Normal Transfer Criteria Analysis

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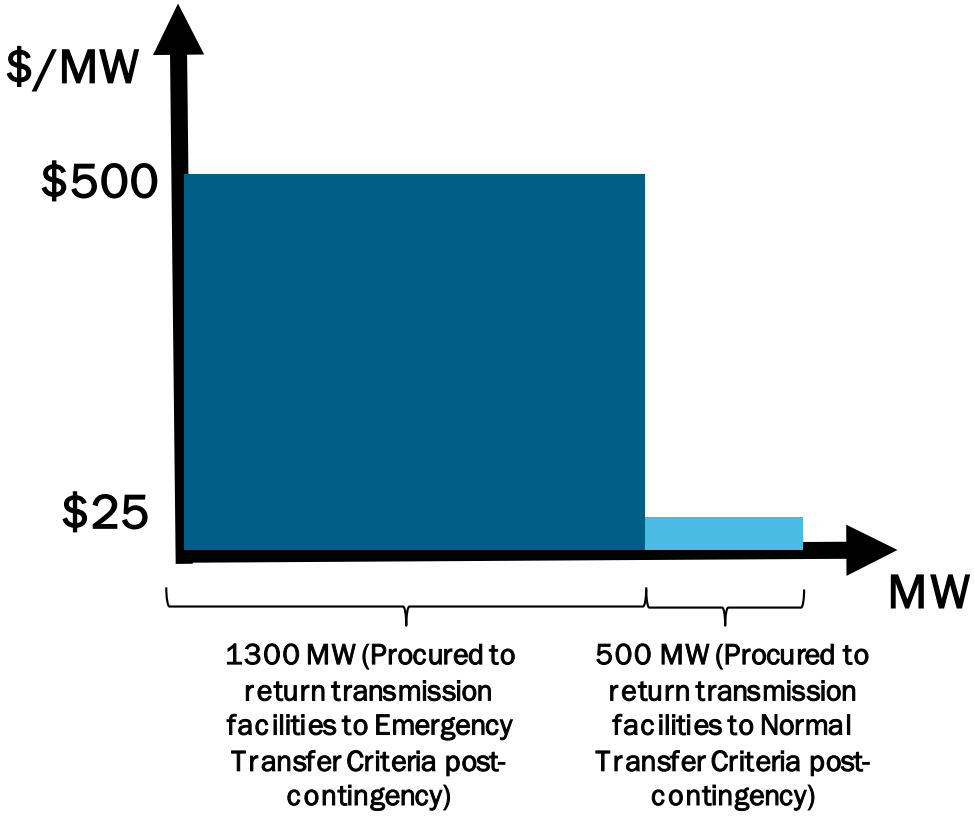
Proposed SENY 30-Minute Reserve Demand Curve



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SENY 30-Minute Reserve Demand Curve

- **The current 1,300 MW SENY 30-minute reserve requirement returns transmission assets to Emergency Transfer Criteria following a contingency.**
  - The shortage price for SENY 30-minute reserves is currently $500/MWh.
  - When evaluating whether to call Special Case Resources/ Emergency Demand Response Program ("SCR/EDRP") resources in SENY, currently valued at $500/MWh, NYISO Operations currently uses post-contingency Emergency Transfer Criteria.
- **As discussed, the addition to the SENY 30-minute reserve requirement will provide a market-based mechanism to bring transmission assets to Normal Transfer Criteria following a contingency.**
  - The NYISO proposes a shortage price value of $25/MWh for the 500 MW increase in the SENY 30-minute reserve requirement.
    - The $25/MWh value is intended to facilitate efficient procurement of additional reserve capability for securing the transmission system in response to real-time contingencies that may arise.
  - This lower shortage price recognizes that reserves procured for Emergency Transfer Criteria are more valuable than reserves procured for Normal Transfer Criteria.

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Scarcity Pricing Logic

- **The NYISO proposes that the $25/MW value for the additional 500 MW in SENY be maintained during an SCR/EDRP activation.**
  - Any Scarcity Reserve Requirement in SENY would be added to the $500/MW "step" of the SENY 30-minute reserve demand curve.
  - This treatment is similar to the treatment of the East of Central-East reserve region during an SCR/EDRP activation.*

*For further information on the treatment of the East of Central-East reserve region during an SCR/EDRP activation, see p.78 of the Ancillary Services Manual: https://www.nyiso.com/documents/20142/2923301/ancserv.pdf/df83ac75-c616-8c89-c664-99dfea06fe2f

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Thunderstorm Alert (TSA) Treatment

SENY & NYC Reserve Requirements during a TSA

- **Power transfer into Southeastern New York (SENY) and NYC (Zone J) is lowered during a TSA.**
  - Generation in SENY ramps up during a TSA, and less power flows across lines into SENY.
  - Reserves are effectively carried on the transmission system in these instances, as line flow could be increased to deliver more power into SENY and NYC in the event of a contingency.
    - NYISO Operations would then redispatch additional SENY generation as necessary to re-secure the transmission constraint.

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SENY & NYC Reserve Requirements during a TSA

- **Given that reserves are effectively carried on the transmission system during a TSA, maintaining the otherwise applicable reserve requirements for SENY and NYC may result in pricing outcomes that do not accurately reflect grid conditions.**
  - To address this concern, the 30-minute reserve requirement for SENY (1,300 MW) is currently reduced to zero MW during a TSA.
    - Consistent with current procedures, the NYISO proposed to reduce the revised SENY 30-minute reserve requirement (1,800 MW) to zero MW during a TSA.
  - The NYISO also proposes to extend this logic to reduce the 10-minute and 30-minute reserve requirements for NYC to zero MW during a TSA.

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Tariff Revisions

MST 15.4, Rate Schedule 4

- **Proposed revisions are included in Section 15.4.7(m), which describes the SENY 30-minute reserve demand curves.**
  - The revisions reflect the addition of a new $25/MW demand curve "step" for the proposed incremental 500 MW requirement.
  - The description of the reserve demand curves during various SCR/EDRP activations are also revised to reflect the additional $25/MW "step."

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Next Steps

Next Steps

- **April/May 2020**
  - Present Consumer Impact Analysis methodology.
- **May/June 2020**
  - Continue to discuss proposal.
  - Present Consumer Impact Analysis.
- **June/July 2020**
  - Seek stakeholder approval of proposal at BIC and MC.
- **2021**
  - Currently targeted timeframe to develop the necessary software.
- **2022**
  - Currently targeted timeframe to implement the proposed enhancements.

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Appendix I: Normal Transfer Criteria Analysis

Normal Transfer Criteria Analysis

- **The NYISO conducted an analysis to determine the proposed additional reserve quantity.**
  - A summer case was analyzed with transmission facility flow into SENY at limits.
  - The analysis confirmed that the current 1,300 MW 30-minute reserve requirement provides ready access to sufficient resource capability to recover from the first worst contingency in SENY, and return transmission facilities into SENY to Emergency Transfer Criteria post-contingency.
    - Emergency Transfer Criteria in this case indicates that post-contingency facility flow would be below short-term emergency (STE) ratings.

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Normal Transfer Criteria Analysis (Continued)

- **The analysis further demonstrated that increasing the SENY 30-minute reserve requirement by an additional 500 MW provides ready access to resource capability that allows the NYISO to return transmission facilities into SENY to Normal Transfer Criteria post-contingency.**
  - Normal Transfer Criteria in this case indicates that post-contingency flow would be below long-term emergency (LTE) ratings.

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Normal Transfer Criteria

- The Central East transmission constraint that led to the creation of the East of Central-East reserve region is currently a voltage collapse Interconnection Reliability Operating Limit (IROL).
  - The current East of Central-East reserve requirements are sufficient to reestablish flows under the IROL limit after suffering the worst contingency.
- The NYC (Zone J) reserve requirements already provide sufficient capability to return to Normal Transfer Criteria following a contingency, thus no increase to the NYC reserve requirement is necessary.
- The NYISO does not recommend changes to the LI reserve requirement at this time, due to the concern that this could result in more reserves being held on LI than is actually deliverable to the rest of the NYCA.[1]

[1]For a discussion of the LI Reserve Modeling, please see the presentation at the following link: https://www.nyiso.com/documents/20142/1403425/LI%20Reserve%20Modeling%20-%20Nov%20MIWG%20FINAL.pdf/439eb65b-879c-fa77-6337-b36eb5435bbf

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Appendix II: Operating Reserve Overview

Operating Reserves Overview

- **10-Minute Spinning Reserve:**
  - Currently synchronized to the NYS power system
  - Can change output or reduce demand level in 10 minutes
  - If a resource is capable of providing this product, it is capable of providing all reserve products
- **10-Minute Non-Synchronized Reserve:**
  - Can be started, synchronized, and change output level or reduce demand within 10 minutes
  - If a resource is capable of providing this product, it is also capable of providing 30-Minute Reserve
- **30-Minute Reserve (Spinning and Non-Synchronized):**
  - Spinning: Currently synchronized and can change output level or reduce demand within 30 minutes
  - Non-synchronized: Can be started, synchronized, and change output level or reduce demand within 30 minutes

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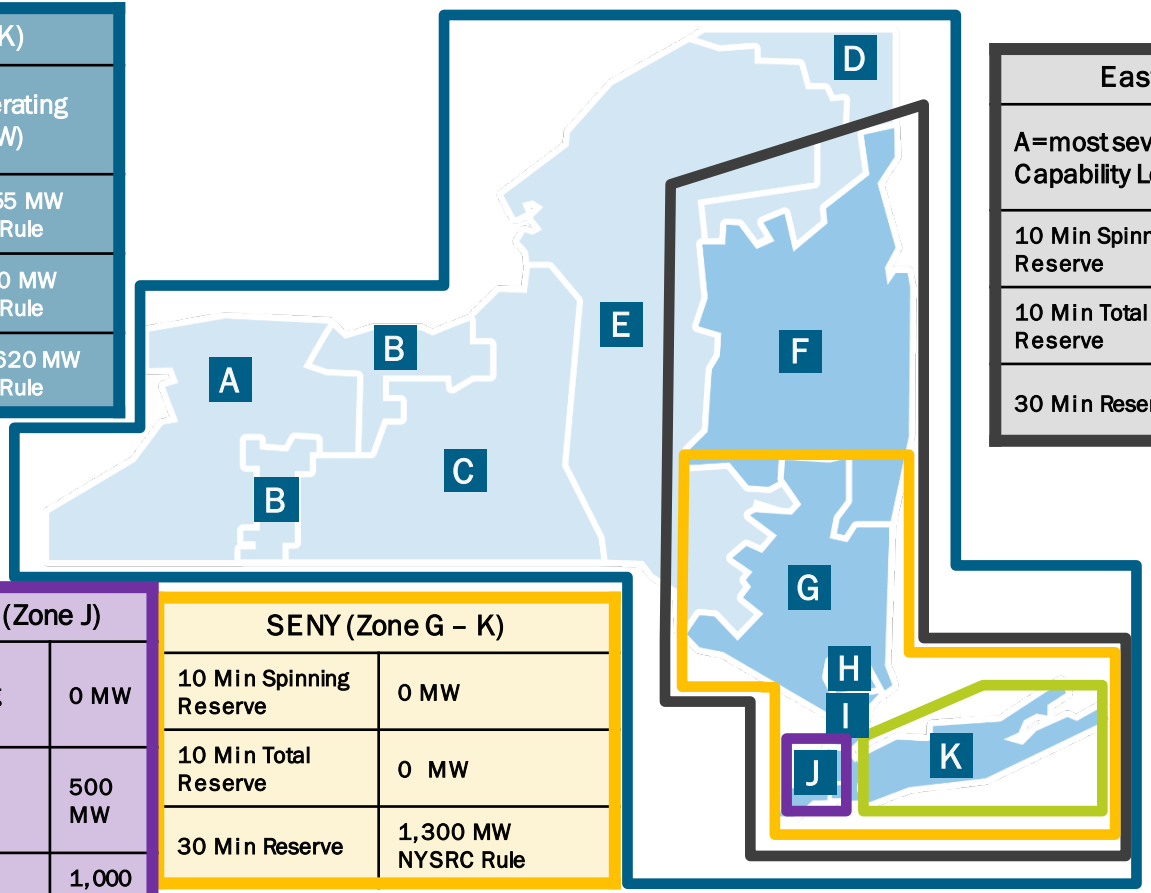
Current NYISO Operating Reserve Requirements

NYCA (Zone A – K)	
A=most severe NYCA Operating Capability Loss (1,310 MW)	
10 Min Spinning Reserve	½ A=655 MW NYSRC Rule
10 Min Total Reserve	A=1,310 MW NYSRC Rule
30 Min Reserve	2xA=2,620 MW NYSRC Rule

A	WEST
B	GENESE
C	CENTRL
D	NORTH
E	MHK VL
F	CAPITL
G	HUD VL
H	MILLWD
I	DUNWOD
J	N.Y.C.
K	LONGIL



East (Zone F – K)	
A=most severe NYCA Operating Capability Loss (1,310 MW)	
10 Min Spinning Reserve	¼ A=330 MW NERC, NPCC Rule
10 Min Total Reserve	1,200 MW NYSRC Rule
30 Min Reserve	1,200 MW NERC, NPCC Rule

NYC (Zone J)	
10 Min Spinning Reserve	0 MW
10 Min Total Reserve	500 MW
30 Min Reserve	1,000 MW

SENY (Zone G – K)	
10 Min Spinning Reserve	0 MW
10 Min Total Reserve	0 MW
30 Min Reserve	1,300 MW NYSRC Rule

Long Island (Zone K)	
10 Min Spinning Reserve	0 MW
10 Min Total Reserve	120 MW NERC, NPCC Rule
30 Min Reserve	270 – 540 MW Max limits NYSRC Rule

Reserve Clearing Price Calculation

- **Each reserve product and location pair produces a shadow price for procurement of the reserve product**
  - This shadow price is the cost to procure one additional MW of the reserve product in question
- **The maximum shadow price value is capped based on the pricing values of the operating reserve demand curves**
  - These maximum pricing values are shown in the table below
    - The reserve demand curve prices reflect those in effect during periods when the Special Case Resource program and/or the EDRP have not been activated

Reserve Product	NYCA	EAST	SENY	NYC	LI
10 Spinning	S.P.3 = $775	S.P.6 = $25	S.P.9 = $25	S.P.12 = $25	S.P.13 = $25
10 Total	S.P.2 = $750	S.P.5 = $775	S.P.8 = $25	S.P.11 = $25	S.P.14 = $25
30	S.P.1 = $25, $100, $200, or $750	S.P.4 = $25	S.P.7 = $500	S.P.10 = $25	S.P.15 = $25

Note: these calculations do not include the proposed additional SENY requirements; proposal would add a $25 value to S.P.7

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Reserve Clearing Price Calculation

- Reserve clearing price calculations reflect the cascaded nature of reserve products
  - This cascading is reflected in the formulas in the following table
- Resources receive the total price equal to the summation of the shadow prices for all of the products that they are providing

Reserve Product	NYCA	EAST	SENY	NYC	LI
10 Spinning	S.P.1 + S.P.2 + S.P.3	S.P.1 + S.P.2 + S.P.3 + S.P.4 + S.P.5 + S.P.6	S.P.1 + S.P.2 + S.P.3 + S.P.4 + S.P.5 + S.P.6 + S.P.7 + S.P.8 + S.P.9	S.P.1 + S.P.2 + S.P.3 + S.P.4 + S.P.5 + S.P.6 + S.P.7 + S.P.8 + S.P.9 + S.P.10 + S.P.11 + S.P.12	S.P.1 + S.P.2 + S.P.3 + S.P.4 + S.P.5 + S.P.6 + S.P.7 + S.P.8 + S.P.9 + S.P.13 + S.P.14 + S.P.15
10 Total	S.P.1 + S.P.2	S.P.1 + S.P.2 + S.P.4 + S.P.5	S.P.1 + S.P.2 + S.P.4 + S.P.5 + S.P.7 + S.P.8	S.P.1 + S.P.2 + S.P.4 + S.P.5 + S.P.7 + S.P.8 + S.P.10 + S.P.11	S.P.1 + S.P.2 + S.P.4 + S.P.5 + S.P.7 + S.P.8 + S.P.13 + S.P.14
30	S.P.1	S.P.1 + S.P.4	S.P.1 + S.P.4 + S.P.7	S.P.1 + S.P.4 + S.P.7 + S.P.10	S.P.1 + S.P.4 + S.P.7 + S.P.13

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The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system

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