

# Reserves for Resource Flexibility

## SENY Reserve Region Enhancements

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Ethan D. Avallone

TECHNICAL SPECIALIST – ENERGY MARKET DESIGN

**Business Issues Committee**

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Rensselaer NY

# Agenda

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- **Proposal Summary**
- **Proposed Tariff Revisions**
- **Next Steps**
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- **Appendix II: SENY Facility Binding Transmission Constraint Analysis**
- **Appendix III: SENY 30-Minute Reserve Procurement Analysis**
- **Appendix IV: Thunderstorm Alert (TSA) Treatment**

# Background

# A Grid in Transition – The Plan

- Carbon Pricing
- Comprehensive Mitigation Review
- DER Participation Model
- Energy Storage Participation Model
- Hybrid Storage Model

Aligning Competitive Markets and New York State Clean Energy Objectives



- Enhancing Energy & Shortage Pricing
  - Ancillary Services Shortage Pricing
  - Constraint Specific Transmission Shortage Pricing
  - Enhanced Fast Start Pricing
- Review Energy & Ancillary Services Product Design
  - More Granular Operating Reserves
  - Reserve Enhancements for Constrained Areas
  - Reserves for Resource Flexibility

Valuing Resource & Grid Flexibility



- Enhancements to Resource Adequacy Models
- Revise Resource Capacity Ratings to Reflect Reliability Contribution
  - Expanding Capacity Eligibility
  - Tailored Availability Metric
- Capacity Demand Curve Adjustments

Improving Capacity Market Valuation



| Date               | Working Group | Discussion Points and Links to Materials  |
|--------------------|---------------|---|
| May 9, 2019        | ICAPWG/MIWG   | Project overview<br><a href="https://www.nyiso.com/documents/20142/6474763/5_9_2019_Reserves_for_Resource_Flexibility_FINAL.pdf/f5b74852-2b18-9233-a8fa-bfc488ed1238">https://www.nyiso.com/documents/20142/6474763/5_9_2019_Reserves_for_Resource_Flexibility_FINAL.pdf/f5b74852-2b18-9233-a8fa-bfc488ed1238</a>   |
| July 15, 2019      | ICAPWG/MIWG   | Discuss additional SENY reserve requirement for Normal Transfer Criteria post-contingency<br><a href="https://www.nyiso.com/documents/20142/7575688/7_15_2019_Reserves_for_Resource_Flexibility_FINAL.pdf/60a62b16-895c-9185-9ba5-d3538da9e10b">https://www.nyiso.com/documents/20142/7575688/7_15_2019_Reserves_for_Resource_Flexibility_FINAL.pdf/60a62b16-895c-9185-9ba5-d3538da9e10b</a>  |
| September 26, 2019 | ICAPWG/MIWG   | Discuss SENY Reserve Region Enhancements and Uncertainty Analysis<br><a href="https://www.nyiso.com/documents/20142/8414685/9_26_2019_Reserves_for_Resource_Flexibility_FINAL.pdf/ba7fb774-49d5-0c96-1d2c-664a2c9c3c05">https://www.nyiso.com/documents/20142/8414685/9_26_2019_Reserves_for_Resource_Flexibility_FINAL.pdf/ba7fb774-49d5-0c96-1d2c-664a2c9c3c05</a>  |
| October 28, 2019   | ICAPWG/MIWG   | Market Design Concept Proposal<br><a href="https://www.nyiso.com/documents/20142/8922912/10_28_2019_Reserves_for_Resource_Flexibility_MDCP_FINAL.pdf/e8bedc39-867b-88d6-ef5a-fe92943d48ba">https://www.nyiso.com/documents/20142/8922912/10_28_2019_Reserves_for_Resource_Flexibility_MDCP_FINAL.pdf/e8bedc39-867b-88d6-ef5a-fe92943d48ba</a>   |
| April 22, 2020     | ICAPWG/MIWG   | Discuss draft tariff language<br><a href="https://www.nyiso.com/documents/20142/12170360/4_22_2020_Reserves_for_Resource_Flexibility_FINAL.pdf/b2db3169-5d56-ec11-1541-c83bc5f58ed5">https://www.nyiso.com/documents/20142/12170360/4_22_2020_Reserves_for_Resource_Flexibility_FINAL.pdf/b2db3169-5d56-ec11-1541-c83bc5f58ed5</a>  |
| April 27, 2020     | ICAPWG/MIWG   | Discuss Consumer Impact Analysis Methodology<br><a href="https://www.nyiso.com/documents/20142/12170360/CIA%20Methodology%20for%20Reserves%20for%20Resource%20Flexibility.pdf/a994ee00-e91b-1e70-44c8-7eba40645503">https://www.nyiso.com/documents/20142/12170360/CIA%20Methodology%20for%20Reserves%20for%20Resource%20Flexibility.pdf/a994ee00-e91b-1e70-44c8-7eba40645503</a>   |
| June 2, 2020       | ICAPWG/MIWG   | Discuss Supplemental Analysis<br><a href="https://www.nyiso.com/documents/20142/12891716/3%20Reserves_for_Resource_Flexibility_FINAL.pdf/89165cef-43da-e54f-19f4-770728ccdc4d">https://www.nyiso.com/documents/20142/12891716/3%20Reserves_for_Resource_Flexibility_FINAL.pdf/89165cef-43da-e54f-19f4-770728ccdc4d</a><br>Discuss Consumer Impact Analysis<br><a href="https://www.nyiso.com/documents/20142/12891716/4%20CIA%20-%20Reserves%20for%20Resource%20Flexibility.pdf/2f4dc147-8904-b325-3c34-ebf9bc304525">https://www.nyiso.com/documents/20142/12891716/4%20CIA%20-%20Reserves%20for%20Resource%20Flexibility.pdf/2f4dc147-8904-b325-3c34-ebf9bc304525</a> |
| June 30, 2020      | ICAPWG/MIWG   | Discuss Hourly SENY Reserve Requirement Proposal<br><a href="https://www.nyiso.com/documents/20142/13434223/6_30_2020_Reserves_for_Resource_Flexibility_FINAL.pdf/aeae9b47-9dcb-ad02-5608-d3edb30389ab">https://www.nyiso.com/documents/20142/13434223/6_30_2020_Reserves_for_Resource_Flexibility_FINAL.pdf/aeae9b47-9dcb-ad02-5608-d3edb30389ab</a>   |

# Proposal Summary

# Normal Transfer Criteria

- **The NYISO proposes to procure up to an incremental 500 MW of 30-minute reserves in the Southeastern New York (SENY) reserve region (zones G-K) as part of the Reserves for Resource Flexibility project.**
  - 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 1,550 or 1,800 MW in certain hours.
  - Procuring additional 30-minute reserves in the SENY reserve region during certain hours of the day 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).**
- **Consistent with the treatment of SENY reserves, the NYISO is also proposing to reduce the NYC (Load Zone J) reserve requirements to zero MW in real-time during Thunderstorm Alerts (TSAs) as part of this project.**
- **This additional reserve requirement would, when applicable, be procured consistently in the Day-Ahead and Real-Time Markets (except in real-time during TSAs when the SENY reserve requirement is reduced to zero MW).**

# Proposed SENY 30-Minute Reserve Requirements

- Binding constraints for the relevant transmission facilities are concentrated in certain hours throughout the year, thus the NYISO proposes to vary the incremental SENY 30-minute reserve requirement based on hours within the year.<sup>1</sup> The SENY 30-minute reserve requirement is proposed to be:

| Hour(s)     | Incremental SENY Reserve (MW) | SENY 30-Minute Reserve Requirement (MW) |
|-------------|-------------------------------|---|
| HB6         | 250                           | 1,550                                   |
| HB7 to HB21 | 500                           | 1,800                                   |
| HB22        | 250                           | 1,550                                   |
| HB23 to HB5 | 0                             | 1,300                                   |

<sup>1</sup> For further information, see Appendix II of this presentation.

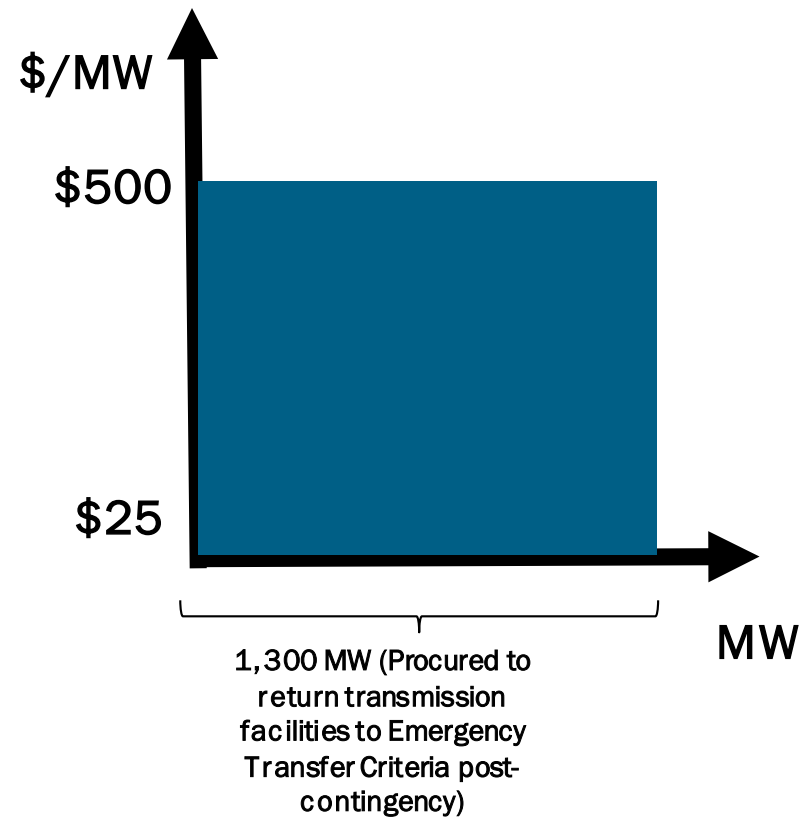


# SENY 30-Minute Reserve Demand Curve

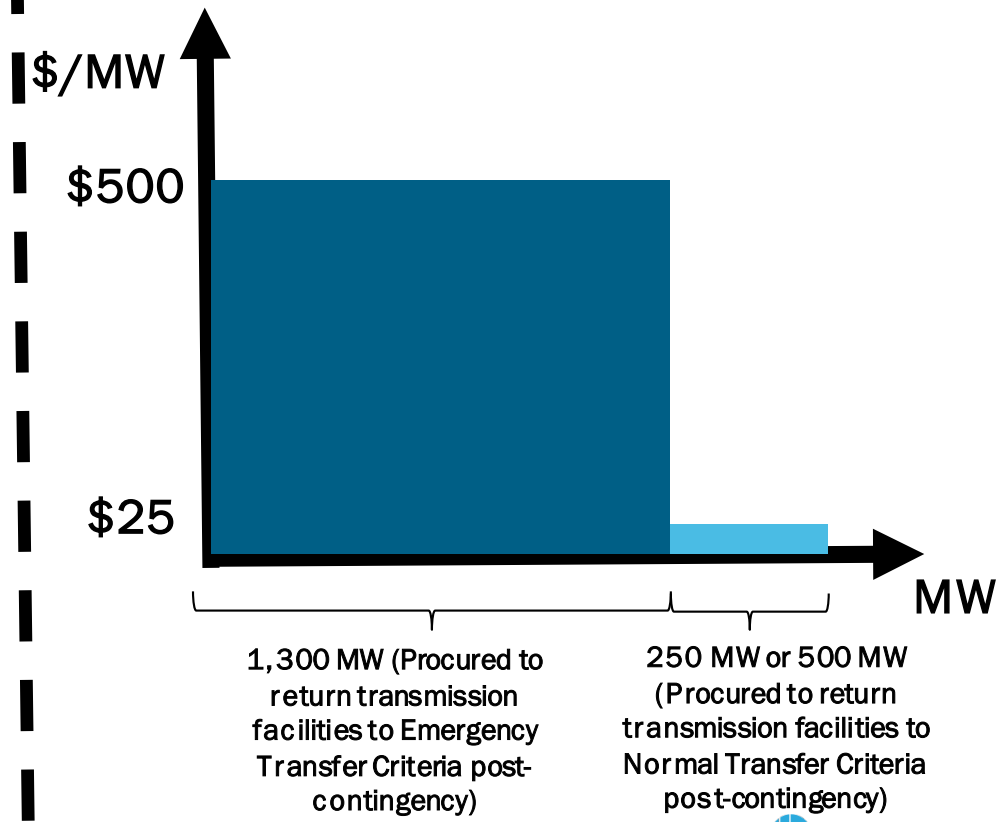
- **The current 1,300 MW SENY 30-minute reserve requirement returns transmission assets to Emergency Transfer Criteria following a contingency.**
  - The shortage price for SENY 30-minute reserves is currently \$500/MWh.
  - When evaluating whether to call Special Case Resources/ Emergency Demand Response 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 incremental SENY 30-minute reserve requirement (either 250 MW or 500 MW, depending on the hour).
    - 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 a higher relative priority than reserves procured for Normal Transfer Criteria.

# Proposed SENY 30-Minute Reserve Demand Curve

Hours when SENY Requirement is 1,300 MW



Hours when SENY Requirement is 1,550 MW or 1,800 MW



# Scarcity Pricing Logic

- **The NYISO proposes that the \$25/MW value for the additional 30-minute reserves in SENY be maintained during an SCR/EDRP activation for intervals when the additional requirement is applicable (i.e., during periods when the SENY 30-minute reserve requirement is 1,550 or 1,800 MW).**
  - Any Scarcity Reserve Requirement in SENY during these hours 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.\*
- **The SENY 30-minute reserve demand curve will continue to function as it does today during SCR/EDRP activations for intervals when the SENY 30-minute reserve requirement is 1,300 MW.**

\*For further information on the treatment of the East of Central-East reserve region during an SCR/EDRP activation, see p.71-72 of the Ancillary Services Manual: <https://www.nyiso.com/documents/20142/2923301/ancserv.pdf/df83ac75-c616-8c89-c664-99dfea06fe2f>

# Future Modifications

- **The NYISO will continue to monitor the effectiveness of the proposed hourly reserve requirements, and, if warranted, propose modifications in the future to meet changing system needs.**
- **The NYISO views its updated proposal as an incremental improvement toward a more dynamic procurement of reserves that is feasible to implement with the current technology available.**
  - The potential for a more dynamic procurement of reserves (including the feasibility thereof) is being considered as part of the “Reserve Enhancements for Constrained Areas” project being considered as part of the ongoing project prioritization process for 2021 projects.

# Proposed Tariff Revisions

# Proposed Tariff Revisions

- **Revisions are proposed in Section 15.4.7(m) of the MST (Rate Schedule 4), 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 reserve requirement and accounts for the proposal to utilize a time differentiated requirement.
  - The description of the reserve demand curves during various SCR/EDRP activations has also been revised to reflect the additional \$25/MW “step.”

# Next Steps

# Next Steps

- **August 2020**
  - Seek stakeholder approval of proposal at BIC and MC.
- **2021**
  - Currently targeted timeframe to implement the proposed enhancements.



# 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.

# 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.

# 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.<sup>1</sup>**

<sup>1</sup>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>

# Appendix II: SENY Facility Binding Transmission Constraint Analysis

# SENY Limiting Facility Ratings

- The transmission constraints most often binding into SENY, and their current summer ratings are shown in the table below.
- Suffering a contingency on one of these facilities when a transmission constraint for the facility is binding would require 1,800 MW of 30-minute reserve to restore the transmission system to Normal Transfer Criteria.

| Equipment Name            | PTID  | NOR   | LTE   | STE   | Line ID |
|---------------------------|-------|-------|-------|-------|---------|
| LEEDS___-PLSNTVLY_345_92  | 25056 | 1,331 | 1,538 | 1,724 | 92      |
| ATHENS___-PLSNTVLY_345_91 | 25054 | 1,331 | 1,538 | 1,724 | 91      |

- The NYISO analyzed a summer case with transmission facility flow into SENY at limits to establish the proposed 500 MW of additional SENY 30-minute reserve.
  - “At limits” in this context refers to post-contingency flow being part way between Long Term Emergency (“LTE”) and Short Term Emergency (“STE”) ratings as allowed by NYSRC Operating Exception #23.

# Facility Forced Outages

- The NYISO examined outages of the applicable lines and found that for the time period of 2015 to 2019, there were four total forced outages.

| Equipment Name           | Forced Outage Duration |
|--------------------------|------------------------|
| ATHENS__-PLSNTVLY_345_91 | 21 minutes             |
|                          | 54 minutes             |
| LEEDS__-PLSNTVLY_345_92  | 15 hours 4 minutes     |
|                          | 13 hours 23 minutes    |

- **Though infrequent, forced outages of these lines can and do occur at any time.**
  - Procuring the additional SENY reserve proposed will allow the NYISO to return to Normal Transfer Criteria following a forced outage, as well as manage grid uncertainty in SENY.

# SENY Transmission Facility Considerations

- **Transmission constraints on the applicable SENY facilities, as well as forced outages of the transmission facilities, can and do occur at any time.**
  - Procuring the proposed additional reserve will provide NYISO Operators access to resource capability in SENY that is needed to meet the operating objective to return to Normal Transfer Criteria now and in the future by incenting the necessary resource fleet flexibility.
  - The impact of procuring additional reserve in SENY today is expected to be limited given the current resource mix and system conditions. As system conditions and the resource mix changes during the transition to the grid of the future, the need to incent additional resource flexibility will increase.



# Binding Transmission Constraints

- If the applicable SENY transmission constraints are binding, then this indicates that a contingency occurring for one of these limiting facilities would require 1,800 MW in SENY to return to normal transfer criteria. These facilities include:
  - LEEDS\_\_\_-PLSNTVLY\_345\_92
  - ATHENS\_\_-PLSNTVLY\_345\_91
- The NYISO's binding transmission constraint analysis includes the years 2010 to 2019.
  - Data presented on the next slide shows the percent frequency of total hours with applicable transmission constraints binding by year and hour for the Day-Ahead Market (DAM).

# Percent frequency of total DAM hours with applicable transmission constraints binding by year and hour\*

|      |      | Day Ahead Market Hour |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|------|------|-----------------------|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
|      |      | 0                     | 1  | 2  | 3  | 4  | 5  | 6  | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22 | 23 |
| Year | 2010 | 0%                    | 0% | 0% | 0% | 0% | 0% | 0% | 1%  | 3%  | 5%  | 7%  | 9%  | 12% | 17% | 20% | 20% | 23% | 20% | 15% | 14% | 11% | 6%  | 1% | 0% |
|      | 2011 | 0%                    | 0% | 0% | 0% | 0% | 0% | 0% | 1%  | 2%  | 2%  | 4%  | 7%  | 10% | 16% | 18% | 19% | 17% | 16% | 11% | 8%  | 5%  | 2%  | 1% | 0% |
|      | 2012 | 0%                    | 0% | 0% | 0% | 0% | 0% | 0% | 1%  | 2%  | 4%  | 7%  | 7%  | 8%  | 12% | 14% | 16% | 14% | 10% | 4%  | 4%  | 3%  | 1%  | 0% | 0% |
|      | 2013 | 0%                    | 0% | 0% | 0% | 0% | 0% | 0% | 0%  | 2%  | 4%  | 7%  | 9%  | 14% | 15% | 20% | 22% | 21% | 19% | 13% | 12% | 5%  | 5%  | 3% | 0% |
|      | 2014 | 0%                    | 0% | 0% | 0% | 0% | 0% | 0% | 2%  | 3%  | 4%  | 5%  | 7%  | 6%  | 8%  | 10% | 12% | 10% | 10% | 7%  | 5%  | 4%  | 4%  | 3% | 1% |
|      | 2015 | 1%                    | 1% | 0% | 0% | 1% | 1% | 1% | 10% | 13% | 15% | 16% | 18% | 19% | 22% | 23% | 22% | 21% | 15% | 12% | 11% | 12% | 9%  | 3% | 1% |
|      | 2016 | 1%                    | 0% | 0% | 0% | 0% | 0% | 1% | 8%  | 8%  | 8%  | 8%  | 11% | 14% | 17% | 19% | 20% | 15% | 10% | 8%  | 8%  | 7%  | 2%  | 3% | 1% |
|      | 2017 | 0%                    | 0% | 0% | 0% | 0% | 0% | 3% | 7%  | 10% | 12% | 13% | 15% | 17% | 19% | 20% | 22% | 23% | 18% | 19% | 20% | 16% | 12% | 2% | 0% |
|      | 2018 | 0%                    | 0% | 0% | 0% | 0% | 0% | 0% | 0%  | 0%  | 0%  | 0%  | 0%  | 1%  | 1%  | 3%  | 5%  | 5%  | 4%  | 2%  | 1%  | 1%  | 0%  | 0% | 0% |
|      | 2019 | 0%                    | 0% | 0% | 0% | 0% | 0% | 0% | 1%  | 1%  | 1%  | 1%  | 1%  | 1%  | 2%  | 3%  | 5%  | 6%  | 5%  | 4%  | 3%  | 2%  | 1%  | 1% | 0% |

\* Percentages are out of 365 days for each hour, except for 2012 and 2016, which are leap years, and therefore out of 366 days for each hour. Values are rounded to the nearest whole number.

# Appendix III: SENY 30- Minute Reserve Procurement Analysis

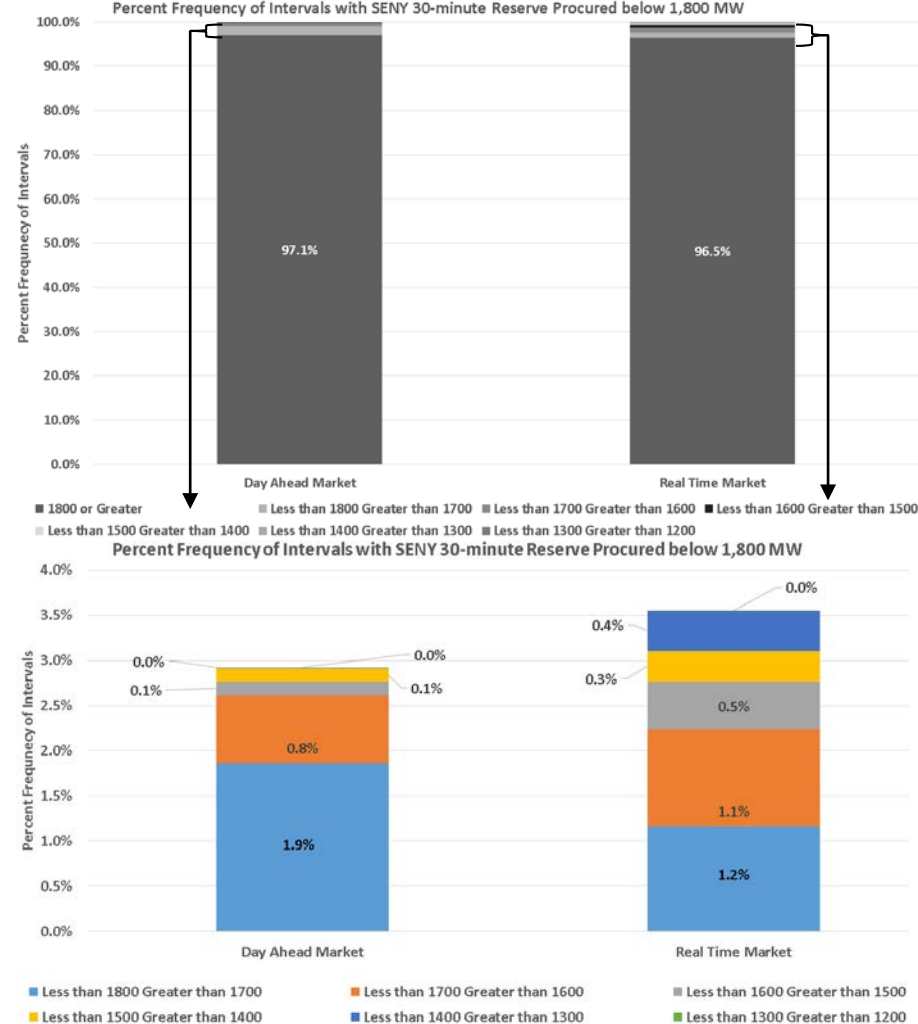
# Reserve Currently Procured in SENY

- **Today, at least 1,800 MW is already procured in SENY in the majority of DAM and RTD intervals.**
  - As a reminder, the current statewide 30-minute reserve requirement is 2,620 MW, with a minimum requirement of procuring 1,300 MW from resources located within the SENY reserve region.
- **The following slide depicts, for 2019, how often the market software procured at least 1,800 MW of 30-minute reserve in SENY.**
  - In these instances, procuring 30-minute reserve in SENY in excess of the 1,300 MW requirement was the lowest cost solution for meeting the statewide reserve requirements.

# Reserve Currently Procured in SENY

- The NYISO believes that the short term impact of this proposal will be limited.
  - 97.1% of DAM intervals in 2019 had 1,800 MW or more of SENY 30-minute reserve procured.
  - 256 DA intervals in 2019 had less than 1,800 MW procured in SENY.
  - 96.5% of RTD intervals had 1,800 MW or more of SENY 30-minute reserve procured.
  - 3,730 RTD intervals had less than 1,800 MW procured in SENY.
- Once this project is implemented, prices will more transparently reflect the value of the additional reserve as needed for reliability today, and also help the NYISO to prepare for a future with increased grid uncertainty.

Note: due to rounding, values in the charts may not sum to 100%.



# Appendix IV: Thunderstorm Alert (TSA) Treatment

# SENY & NYC Reserve Requirements during a TSA

- **Power transfer into SENY and NYC (Load 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.

# 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 (1,300 MW, 1,550 MW, or 1,800 MW depending on the hour) 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.



# SENY and NYC Reserve Requirements during a TSA

- **During a TSA, the NYISO operates the transmission system as if the worst first contingency has already occurred per the NYSRC Rule G.1.R4<sup>1</sup> and the NYISO Transmission and Dispatching Operations Manual section 4.2.9.<sup>2</sup>**
  - Once the system is secured through this process, sufficient room is created on the transmission system such that normal transfer criteria can be maintained upon the first transmission loss.
  - It is therefore appropriate to reduce SENY and NYC reserve requirements to zero MW in real-time during TSAs.

<sup>1</sup>See NYSRC Reliability Rules, Version 44, at the following link:  
<http://www.nysrc.org/NYSRCReliabilityRulesComplianceMonitoring.html>

<sup>2</sup>See the NYISO Transmission and Dispatching Operations Manual:  
[https://www.nyiso.com/documents/20142/2923301/trans\\_disp.pdf/9d91ad95-0281-2b17-5573-f054f7169551](https://www.nyiso.com/documents/20142/2923301/trans_disp.pdf/9d91ad95-0281-2b17-5573-f054f7169551)

# 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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