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Independent System Operator

Transmission Security Limits in NYISO Capacity Markets

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Background

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Reliability of the New York Power System

- **The main aspects of reliability are rooted in transmission security and resource adequacy requirements.**
  - Resource adequacy is a probabilistic determination of the amount of capacity needed to meet a 1 in 10 year loss of load probability using Emergency Transfer limits.
    - Assumption are controlled though the NYSRC Process
  - Transmission security is a deterministic look at the generation and transmission resources needed to avoid thermal, voltage, and stability issues when respecting N-1, N-1-1 or more stringent NYSRC local area criteria such as the N-2-0 Con Edison requirement
    - The N-1-1 analysis looks at meeting Normal Transfer Criteria (NTC) from a planning and operations perspective as expected by NERC, NPCC and NYSRC rules
    - NERC, NPCC and NYSRC rules governing Transmission Security Requirement have not changed substantively since 1999.

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Short History of NYISO Capacity Market

- **The primary objective of the NYISO Capacity Market is to ensure sufficient capacity exists to satisfy both resource adequacy and transmission security requirements, by ensuring revenue adequacy for supply resources.**
- **Began using the IRM and LCRs developed using the TAN 45 process.**
  - TAN 45 process
    - Starts with the as found system
    - Balances use of existing generation and transmission assets
    - Historically resulted in sufficient capacity to meet both resource adequacy and transmission security requirements

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2010-2020 IRM and LCR Values

Capability Year (May - April)	Base Case IRM (%)	EC Approved IRM (%)	NYCA Equivalent UCAP Requirement (%)	NYISO Approved NYC LCR (%)	NYISO Approved LI LCR (%)	NYISO Approved G-J LCR (%)
2010	17.9	18.0	6.12	80.0	104.5	
2011	15.5	15.5	6.03	81.0	101.5	
2012	16.1	16.0	5.35	83.0	99.0	
2013	17.1	17.0	6.58	86.0	105.0	
2014	17.0	17.0	6.38	85.0	107.0	88.0
2015	17.3	17.0	7.01	83.5	103.5	90.5
2016	17.4	17.5	6.21	80.5	102.5	90.0
2017	18.1	18.0	7.04	81.5	103.5	91.5
2018	18.2	18.2	8.08	80.5	103.5	94.5
2019	16.8	17.0	6.72	82.8	104.1	92.3
2020	18.9	18.9	9.03	86.6	103.4	90.0

http://nysrc.org/PDF/Reports/2021%20IRM%20Study%20Appendices%2012_4_20%20(1).pdf

The LCRs in 2021 are 102.9% in Zone K, 80.3% in Zone J and 87.6% in Zones G-J to meet transmission security requirements

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Introduction of the Capacity Optimizer

- In 2017 the NYISO introduced the concept of the Capacity Optimizer as a way to minimize costs while still ensuring sufficient capacity to meet reliability
- The Transmission Security Limit (TSL) was introduced into the optimizer as a floor to maintain sufficient resources in the ICAP localities to meet ICAP locality transmission security requirements

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Transmission Security Limit

- **Determined each year though a study that is reviewed by stakeholders.**
  - Developed consistent with New York State Reliability Council planning criteria for N-1-1 into the G-K and K localities
  - Respects the more stringent NYS Reliability Council Local Reliability Rule G.1-R1. N-2-0 Con Ed requirement
    - Consistent with the NYISO Operating Objective to operate in the "normal" operating state following the worst first contingency.
      - Rules allow Operations to go into Emergency Transfer Criteria (ETC) to avoid load shedding.
      - The RPP and Short-Term Reliability Process use generator DMNC values and Firm Purchases/ Sales when conducting transmission security assessments.
- **The most recent TSL report is posted at the following link**
  - https://www.nyiso.com/documents/20142/17462310/Summer2021-N-1-1-Analysis.pdf/ed9b287a-a484-4460-37c8-a923be6354e1

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Side by Side Comparison of Treatment

Assumption Criteria/Considerations	Resource Adequacy Market Operations Treatment	Transmission Security Market Operations Treatment
Methodolgy	*Sequential Monte Carlo Probabalistic*	*Deterministic*
Demand Level	*Forecast Load w/LFU*	*Forecast Load*
NYSRC IRM /LCR Setting Process *	*Tan 45*	*N/A*
Transmission Operating Criteria	*Emergency Transfer Criteria*	*Normal Transfer Criteria*
Transmission Contingency Ratings	*STE or 15-minute ratings*	*LTE or 4-hour ratings, STE with Operating Exception*
Thermal Contingency Depth	*N-1*	*N-1-1 or N-2-0*
Thermal Contingency Definition	*only Single*	*Single, Towers and Stuck Circuit Breakers*
Stability/VC Contingency Depth	*N-1*	*N-1-1*
Stability/VC Contingency Definition	*Single, Towers and Stuck Circuit Breakers*	*Single, Towers and Stuck Circuit Breakers*
Generator Forced Outage Rates	*Yes (EFORd)*	*Yes (EFORd)*
Wind Renewable Resources	*Yes (ICAP value)*	*Yes (ICAP value)*
External Emergency Assistance	*Yes*	*No*
External UDR Supply Resource	*Yes*	*Yes*
Special Case Resources	*Yes*	*Yes*
Voltage Reduction	Yes	No
Voluntary Curtailment / Public Appeals	Yes	No
Operating Reserves to Zero	Yes	Yes

Color Code Definition
More Conservative Relative Treatment
Similarly Conservative across all Treatments
Less Conservative Relative Treatment

* The more conservative treatment of the NYSRC IRM/LCR Setting process for Resource Adequacy (i.e. tan45 LCR process) has largely addessed the historical transmission security needs of the NYISO capacity maket localities
With the implemenation of the ALTLCR, the tan45 process no longer sets the LCR values and it became necessary to explicity include transmission security needs as constraints for the NYISO capacity market localiities

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Questions?

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Our mission, in collaboration with our stakeholders, is to serve the public interest and provide benefit 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 policymakers, stakeholders and investors in the power system

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