New York ISO
Independent System Operator

Valuing Transmission Security: Key Concepts Overview

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Agenda

- Previous Discussions
- Project Overview
- Resource Adequacy & Transmission Security Overview
- Transmission Security Limits and the Capacity Market
- Next Steps
- Appendix

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Previous Discussions

Previous Discussions

Date	Working Group	Discussion Points and Links to Materials
February 7, 2023	ICAPWG	Valuing Transmission Security: Project Kick Off: https://www.nyiso.com/documents/20142/42807168/Valuing%20Transmission%20Security%20Kick%20Off%20v2.pdf/389f28dd-a518-bd2f-775d-c93aaa11e1dc

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Project Overview

Project Overview

- The Locational Minimum Installed Capacity Requirement (LCR) setting process incorporates transmission security by utilizing transmission security limits (TSLs) as LCR floors
- A resource can have different contributions to transmission security than resource adequacy
  - Due to these potential differing contributions, a unit may have different capacity values when an LCR is set by the TSL rather than strictly by resource adequacy needs
- This project will:
  - evaluate if and how transmission security should be valued in the capacity market; and
  - investigate the effectiveness of ICAP market price signals when transmission security limitations are reflected in the capacity market
    - Analysis will be conducted under different resource adequacy and transmission security requirements
- Deliverable: Q4 Issue Discovery

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Resource Adequacy & Transmission Security Overview

Resource Adequacy

- **Resource adequacy is the "ability of the electric system to supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements"[1]**
  - Resource adequacy is assessed through a probabilistic analysis of the system's loss of load expectation (LOLE) of disconnecting firm load due to resource deficiencies, not to exceed 1 day in 10 years allowing for emergency transfer criteria
  - To maintain resource adequacy, the New York State Reliability Council (NYSRC) establishes an installed reserve margin (IRM) for the New York Control Area (NYCA) for each Capability Year

[1] See Section 3.2 of the NYSRC Reliability Rule & Compliance Manual

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Transmission Security

- **Transmission security is the "ability of the electric system to withstand disturbances such as electric short circuits or unanticipated loss of system elements"[1]**
  - Transmission security is a deterministic analysis of credible combinations of system conditions which stress the system. The system is assessed for its ability to withstand the loss of specified, representative and reasonably foreseeable design criteria contingencies (N-1, N-1-1, N-1-1-0) at projected customer demand and anticipated transfer levels. Design criteria are applied according to normal transfer criteria
  - Transmission security is assessed in the NYISO's Reliability Planning processes and incorporated into the Installed Capacity market by using TSL floors in the LCR setting process

[1] See Section 3.2 of the NYSRC Reliability Rule & Compliance Manual

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Key Differences

- **Since transmission security is a deterministic analysis under a Normal State while resource adequacy is a probabilistic analysis considering emergency states, there are four resulting key differences:**
  - Transmission security utilizes Normal Transfer Criteria to establish limits, while resource adequacy utilizes Emergency Transfer Criteria
  - Resource adequacy considers emergency operation procedures and emergency assistance from neighboring systems, whereas transmission security does not consider emergency actions
  - Transmission security utilizes a single load level, while resource adequacy probabilistically looks at a wide range of demand levels
  - Resource adequacy models resource availability probabilistically, whereas transmission security models resource availability deterministically

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Transmission Security Limits and the Capacity Market

LCR Setting Process Overview

- After the NYSRC determines the IRM for the upcoming Capability Year, the NYISO determines the LCRs for the Installed Capacity market
- Since 2019, the NYISO has utilized an economic optimization software (LCR Optimizer) to establish the LCRs for the NYC, LI and G-J Localities
- The LCR Optimizer is designed to produce least cost LCRs while maintaining the NYSRC approved-IRM and respecting the NYSRC/NPCC transmission security criteria through the utilization of TSL floors

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Transmission Security Limits (TSLs)

- Bulk power transmission limits are studied by NYISO Operations and considered in the process for determining TSL floor values
- TSL floors allow resource requirements and market signals to be aligned with Transmission System Planning criteria
- The NYISO establishes annual TSL floor values for Load Zone J, Load Zone K, and the G-J Locality

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TSL Floor Calculation Methodology

- **In general, the TSL floor calculation methodology consists of the following four main steps:**
  1. Deduct transmission capability from the peak load forecast to establish the Unforced Capacity (UCAP) required to meet the forecasted load
  2. Apply the zonal 5-year equivalent demand forced outage rate (EFORd) to the UCAP requirements to convert into Installed Capacity (ICAP)[1]
  3. Add Special Case Resources (SCR) MW to establish the ICAP requirements
  4. Divide the calculated ICAP requirements by the peak load forecast. This is the TSL floor value expressed as a percentage
- **The TSL floor calculation methodology has been updated over the past few years to accommodate certain enhancements and changes in study inputs and maintain alignment with Reliability Planning practices[2]**

[1] Additional adjustments may be required to account for resources that have different forced outage rates/availability in the IRM model versus the Reliability Planning Transmission Security analysis

[2] For additional information on historical TSL floor calculation methodologies see the 10/04/2022 presentation to the ICAPWG

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2024-25 TSL Floor Values

- The NYISO presented final TSL floor values for the 2024-25 Capability Year at the 10/26/23 ICAPWG meeting:

Transmission Security Limit Floor Calculation	Formula	G-J	NYC	LI	Notes
Load Forecast (MW)	[A] = Given	15,274	11,171	5,080	[1]
Bulk Power Transmission Limit (MW)	[B] = Studied	4,350	2,875	275	[2]
Net Flow Adjustment to Transmission Limit (MW)*	[N] = Study Assumption	275			[3]
Offshore Wind (MW)	[O] = Given			37.5	[4]
UCAP Requirement (MW)	[C] = [A]-[B]+[N]+[O]	11,199	8,296	4,843	
UCAP Requirement Floor	[D] = [C]/[A]	73.3%	74.3%	95.3%	
5-Year Derating Factor	[E] = Given	5.4%	4.5%	8.9%	[5]
Special Case Resources (MW)	[F] = Given	526.7	442.4	35.3	[6]
ICAP Requirement (MW)	[G] = ([C]/(1-[E]))+[F]	12,364	9,129	5,348	
ICAP Requirement Floor (%)	[H] = [G]/[A]	81.0%	81.7%	105.3%	

*See Bulk Power Transmission Capability Report for study assumptions and adjustment details

[1] 2024 Fall Load Forecast

[2] Based on 2024 Locality Bulk Power Transmission Capability Report

[3] LI Bulk Power Transmission Limit Adjustment

[4] Difference in Resource Adequacy and Transmission Security UCAP Valuation

[5] 5-year Market EFORd based on the generation mix in the 2024-2025 IRM FBC

[6] Modeled SCRs for 2024-2025

1

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Next Steps

Next Steps

- **Return to a future ICAPWG to:**
  - Review how transmission security and resource adequacy are used in Reliability Planning
  - Understand how different resource types contribute to meeting Resource Adequacy and Transmission security needs

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Questions?

Appendix

Scope

- This project will:
  - evaluate if and how transmission security should be valued in the capacity market; and
  - investigate the effectiveness of ICAP market price signals when transmission security limitations are reflected in the capacity market
    - Analysis will be conducted under different resource adequacy and transmission security requirements
- Examination of the Reliability Planning transmission security assessments and TSL floor calculations are not in scope for this project
- Discussion of transmission security methodology will be occurring at ESPWG outside the scope of this project

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Schedule

- **Q1-Q2**
  - Stakeholder education on existing practices and market structure
- **Q2-Q3**
  - Identify and research issues
  - Discuss issues with stakeholders
- **Q3-Q4**
  - Assess stakeholder feedback and finalize Issue Discovery report/presentation

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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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