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Independent System Operator

Granular Capacity Zones

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ICAPWG

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Agenda

- New Capacity Zone Study Overview
- Potential Deficiencies of the New Capacity Zone Study
- Working List of Education Areas
- Next Steps
- Appendix
  - Project Overview
  - Project Timeline
  - Working List of Education Areas
  - Previous Discussions

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Today's Objective

- **Today's objective is to discuss the high-level processes and assumptions related to the existing New Capacity Zone Study (NCZ) and highlight those that are potentially impacting market efficiency/power system reliability**
  - Today's presentation is not intended to discuss changes to the NCZ study

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New Capacity Zone Study Overview

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Overview

- **Per MST 5.16, the NYISO performs the New Capacity Zone (NCZ) Study to determine whether any Highway interface(s) are constrained, which would require establishment of new capacity zone(s)**
  - NCZ Study is conducted every four years in conjunction with the ICAP Demand Curve reset (DCR)
- **What is an NCZ?**
  - A single Load Zone or group of Load Zones that is proposed as a new Locality; an Installed Capacity Demand Curve is also developed for each NCZ.

2023/24 NCZ study info:

1. Inputs and Assumptions: https://www.nyiso.com/documents/20142/40044890/6%20New%20Capacity%20Zones%20Study%20Inputs%20and%20Assumptions%20-%20ICAPWG%2009-18.pdf/90acb80c-8aeb-f14f-b77c-92892d0f1f1c
2. Results: https://www.nyiso.com/documents/20142/42276797/2023-2024%20NCZ%20Study%20Results%20-%2001092024%20ICAPWG.pdf/0365ad14-2e67-cbdf-c6e1-2fe650d2bd6f

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Overview

- The NCZ Study is a deliverability study primarily utilizing the Deliverability test methodology (Attachment S of the OATT) along five Highway interfaces:
  - Dysinger East, West Central, Volney East, Moses South, Central East/Total East, and UPNY-ConEd
- The test checks the transfer capability across highway interfaces within Rest of State (ROS) Capacity Region and across the UPNY-ConEd Highway interface located within Load Zones G through I by increasing generation “upstream” of an interface and reducing generation “downstream” of that interface

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Methodology

- **The study involves three major steps:**
  - Finalizing inputs and assumptions
  - Base case creation
  - Balancing generation and load

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Inputs and Assumptions

- **The NCZ study contains five types of modeling inputs (See Appendix for more detail):**
  - IRM/LCR Assumptions
    - Installed Capacity Requirement and associated Locational Capacity Requirements - Latest NYSRC IRM report
    - Emergency Transfer Limits – Latest RNA Report
  - Load Assumptions
    - Peak Load Forecast – 5-year lookahead from current Gold Book
    - Load Forecast Uncertainty – Latest NYSRC IRM report

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Inputs and Assumptions (Cont'd)

- **The NCZ study contains five types of modeling inputs (See Appendix for more detail):**
  - Generation Assumptions
    - Existing CRIS generators and all projects with Unforced Capacity Deliverability Rights – Current Gold Book
    - Planned generation projects or Merchant Transmission Facilities – Current Gold Book
    - UCAP Deration Factors (UCDF) – Latest NYSRC IRM report
    - Deactivated CRIS Units – OATT Attachment S
  - Transmission Assumptions
    - Existing transmission facilities – Current Gold Book
    - Firm plans for changes to transmission facilities by TOs – Current Gold Book
    - System Upgrade Facilities and System Deliverability Upgrades –Current Gold Book
  - Import/Export Assumptions
    - External system import/export – OATT Attachment S

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Base Case Creation

- **The conditioning steps are applied to (See Appendix for more detail):**
  - Modeling of load
  - NYCA generation
  - External system import/export
- **The NCZ Study base case is a five-year look-ahead utilizing a FERC approved Summer peak load case, adjusted, as necessary, to meet the specific requirements of Section 5.16.1 of the MST**

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Balancing Generation and Load

- This step balances the supply of resources and demand
  - Demands include load (including load forecast uncertainty), transmission losses, and external schedule commitments
- All CRIS generation within each Capacity Region is placed in-service and each resource is scaled proportionally to the ratio of its P_{max} to the sum of the P_{max} of all CRIS generation located in the respective exporting or importing zone(s) or Capacity Region (i.e., Actual generation is proportionally scaled (up or down) to match the demand)

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Balancing Generation and Load

- **The concept of "first contingency incremental transfer capability" (FCITC) is used in the determination of deliverable capacity across Highway interfaces**

  - The FCITC measures the amount of generation in the exporting zone that can be increased to load the interface to its transmission limit. It is a measure of the additional generation capacity that could be exported from a given zone(s) above the base case dispatch level
  - The FCITC and Highway transmission constraint(s) for the exporting zone(s) are noted for each export/import combination

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Study Results

- The level of deliverability across each Highway interface is measured as either "Additional Transmission Capacity" (*i.e.*, deliverability "headroom"), or "Bottled Generation Capacity" (*i.e.*, constrained interface)
- If all the Highway interfaces were found to have positive Additional Transmission Capacity, then there is no need to establish a New Capacity Zone
- If a constrained Highway interface into one or more Load Zones were identified, a New Capacity Zone is required and the NYISO must identify the boundary thereof
  - The boundary of the New Capacity Zone may encompass a single constrained Load Zone or group of Load Zones including one or more constrained Load Zones on the constrained side of the Highway

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Concerns Identified by Potomac Economics

Concerns Identified by Potomac Economics

- **Potomac Economics has identified possible issues with the NCZ and the deliverability test methodology including:**
  - NCZ study is conducted every four years during the Demand Curve Reset Process
    - This timing limits the addition of new information, potentially leading to prices not reflecting the locational value of resources
  - Is the deliverability test an appropriate way to send a Resource Adequacy signal?
    - Deterministic Model - Has been criticized for producing dispatch conditions that would not be observed in actual operation
      - Transmission flows modeled in the NCZ study on interfaces other than those studied do not reflect the range of probabilistic outcomes which could impact that study set under certain conditions
      - Imports are not probabilistic
    - Ignores Byway Constraints
      - Study is not designed to detect constraints left off pre-defined lists
    - Only creates a new zone when excess supply is not deliverable to another zone and not when there is an internal reliability need (i.e., supply shortage)

See Potomac Economics 2022 State of the Market Report

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Concerns Identified by Potomac Economics: NCZ Study/Deliverability Test Assumptions

- **Generation Assumptions**
  - CRIS
    - Proposed resources that have obtained CRIS are modeled whether or not they have been built, affecting the determination of SDUs
  - Treatment of retirements
    - New resources are potentially incentivized to delay entry to avoid SDUs since potential economic retirements are modeled as in service
  - UCAP Derating Factors (UCDF)
    - UCDF for dispatchable resources based on average zonal EFORd
    - UCDF for intermittent resources equal the average output for the resource type during "summer afternoon hours"
      - This assumption is potentially overestimating the level of intermittent dispatch
    - Inaccurate hourly weightings used in new UCDF calculation
      - These look to tie the hourly summer capacity factor of intermittent resources to the load shedding probability in each hour of the day to better reflect their output

*See Potomac Economics 2022 State of the Market Report

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Concerns Identified by Potomac Economics : NCZ Study/Deliverability Test Assumptions

- **Peak Load Assumptions**
  - Considers summer peak conditions only and utilizes a 5-year lookahead
    - The summer assumption does not address transmission limits under winter supply and demand conditions
    - This can lead to the unfair allocation of upgrade costs to solar and other resources with high summer availability

*See Potomac Economics 2022 State of the Market Report

Working List of Education Areas

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Working List of Education Areas

- ~~New Capacity Zone Study~~
- Transmission Constraints
- CRIS
- Demand Curves
- Anything Missing?

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Next Steps

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Next Steps

- Return to a late March/early April ICAPWG to continue the discussion with stakeholders
- For any questions or comments please email ntubbs@nyiso.com

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Appendix

NCZ Inputs and Assumptions

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Inputs and Assumptions

- NCZ Study inputs and assumptions are in accordance with Section 5.16.1 of the MST
- Inputs and Assumptions outlined herein are specific to the 2023-2024 NCZ Study

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NCZ Inputs and Assumptions Matrix

#	Parameter	Description	Reference
1	Installed Capacity Requirement	NYCA Minimum Installed Capacity Requirement to achieve LOLE less than 0.1 day per year, which is based on the NYCA Installed Reserve Margin (IRM) identified by the New York State Reliability Council (NYSRC) and accepted by New York Public Service Commission	2023 NYSRC IRM report (for the 2023-2024 Capability Year)
2	Emergency Transfer Limits	Emergency transfer limits on interfaces corresponding to 2022 RNA study	Transfer limits from the 2022 RNA report
3	Locational Capacity Requirements	The Locational Minimum Installed Capacity Requirements (LCR) for the NYC (Load Zone J) and Long Island (Load Zone K) Capacity Regions and for the G-J Locality	2023 NYISO LCR report (for the 2023-2024 Capability Year; approved by Operating Committee on January 23, 2023)
	Load model		
4	Peak Load Forecast	NCZ Study Capability Period peak demand forecast contained in the most recent Load and Capacity Data report (*i.e.*, "Gold Book")	2028 Summer peak load forecast from 2023 Gold Book
5	Load Forecast Uncertainty	The impact to IRM due to uncertainty relative to forecasting NYCA loads	2023 NYSRC IRM report
	Generator model		
6	Existing CRIS generators, and all projects with Unforced Capacity Deliverability Rights	Generators with Capacity Resource Interconnection Service ("CRIS"), as well as transmission facilities with Unforced Capacity Deliverability Rights (UDRs) and External-to-ROS Deliverability Rights (EDRs) in-service on the date of the most recent Load and Capacity Data report	2023 Gold Book
7	Planned generation projects or Merchant Transmission Facilities	Projects that have accepted either (a) Deliverable MW or (b) a System Deliverability Upgrade ("SDU") cost allocation (and provided cash or posted required security for the SDU cost allocation)	

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NCZ Inputs and Assumptions Matrix

#	Parameter	Description	Reference
8	UCAP Deration Factor (UCDF)	Factor used to convert ICAP to Unforced Capacity (UCAP) based on derated generator capacity incorporating historic performance on a Capacity Region basis	2023 NYSRC IRM report and 2023 NYISO LCR report
9	Deactivated CRIS units	Units retaining CRIS rights for three years after being considered “deactivated” unless the ability to transfer those rights has been exercised or expired	OATT Attachment S
Transmission model			
10	Existing transmission facilities	Identified as existing in the most recent Load and Capacity Data report	2023 Gold Book
11	Firm plans for changes to transmission facilities by TOs	Planned changes of facilities in the most recent Load and Capacity Data report that are scheduled to be in-service prior to the 2028 Summer Capability Period	2023 Gold Book
12	System Upgrade Facilities and System Deliverability Upgrades	SUFs and SDUs for which planned projects have accepted cost allocations and paid cash or posted security, except that ROS Highway SDUs will only be modeled if the construction is triggered	2023 Gold Book
Import/Export model			
13	External System Import/Export	NYCA scheduled imports from HQ/PJM/ISO-NE/IESO	OATT Attachment S

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Detailed Base Case Creation

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Detailed Base Case Creation

Load Modeling

The Load forecast used in the NCZ Study base case is the coincident 2028 Summer firm peak load before reductions for the Emergency Demand Response Program. Certain factors for "load forecast uncertainty" (LFU) are applied to each of the 4 Capacity Regions

E.g.: 2028 NYCA Summer Peak Load Forecast Assumptions (MW) {2023 Gold Book}

Capacity Region	Baseline	LFU	Total
NYCA	32,310	1,681	33,992

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Detailed Base Case Creation

Transmission System

- Existing transmission facilities in the 2023 Gold Book
- All firm transmission plans in the 2023 Gold Book scheduled to be in service by 2028

Generation and Class Year Transmission

- Existing generators with CRIS rights
- Existing Class Year transmission facilities with Unforced Capacity Deliverability Rights or External-to-ROS Deliverability Rights
- Deactivated resources with unexpired CRIS as per Attachment S section 25.9.3.1
- Previous Class Year projects that accepted Deliverability MW or a System Deliverability Upgrade cost allocation (and paid cash or posted required security)
- CRIS Expiration: The CRIS for a facility is modeled in the NCZ Study base case unless that CRIS will expire prior to the NCZ Study Start Date (*i.e.*, September 1, 2023 for the 2023-2024 NCZ Study)

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Detailed Base Case Creation

External System Imports Modeling Limits

The total external system import modeling limits for 2023-2024 Capability Year →

PJM	ISO-NE	Quebec	Ontario	Total
1,138	75	1,121	80	2,414

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Detailed Base Case Creation

- **Unforced Capacity Deliverability Rights and External-to-ROS Deliverability Rights**

Transmission projects with UDRs and External-to-ROS Deliverability Rights (EDRs) are represented at their respective UDR and EDR capacity from the external area into the respective NYCA Capacity Region

- *E.g.*: Linden VFT to New York City: 315 MW; Neptune to Long Island: 660 MW
  CSC to Long Island: 330 MW; HQ-US (EDR): 20 MW;
  Cedar Rapids Transmission (EDR): 80 MW.

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Timeline and Project Overview

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Timeline

- **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 reports

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Project Overview

- **The Granular Capacity Zones project is slated for 2024 Issue Discovery**
- **Issues potentially addressed via more granular capacity zones primarily involve:**
  - Capturing differences in the value of capacity where intra-zonal transmission constraints (import/export) exist
    - As a result, existing units that are not deliverable to the rest of their zone are overcompensated while new capacity additions are barred from entry due to elevated deliverability upgrades
- **<u>Eliminating barriers to entry and overcompensation will help promote power system reliability at the lowest cost to consumers</u>**

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Project Overview

- **The goals:**
  - Understand the considerations and potential impacts of creating a new process for evaluating what capacity zones are needed and explore the frequency that zones should be re-examined. Additionally, this project will evaluate what demand curves may be needed for export constrained regions.

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Previous Discussions

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Previous Discussions

Date	Working Group	Discussion Points and Links to Materials
February 2, 2024	ICAPWG	Granular Capacity Zones: Project Kick Off - https://www.nyiso.com/documents/20142/42748388/4%20Granular%20Capacity%20Zones_Kick%20Off_2.2.2024_ICAPWG_Final.pdf/6741aa07-c79b-7405-68c9-d89c26a1f609

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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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