New York ISO
Independent System Operator

2022 Market Projects

Capacity, New Resource Integration, and Energy Market Design Teams

ICAP/MIWG

January 20, 2022

The NYISO Market Design Team

- The Market Design Team (led by Mike DeSocio) is composed of 3 focused teams, with Dr. Nicole Bouchez, PhD as Principal Economist
- Capacity Market Design (led by Zach T. Smith)
  - Maddy Mohrman
  - Juan Sanchez
- New Resource Integration (led by James Pigeon)
  - Michael Ferrari
  - Harris Eisenhardt
  - Francesco Biancardi
  - Katherine Zoellmer
- Energy Market Design
  - Amanda Myott
  - Ashley Ferrer
  - Kanchan Upadhyay

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Purpose

- **Our objective is to share the 2022 Capacity, New Resource Integration, and Energy Market Design projects including anticipated Q1 schedules and 2022 deliverables with stakeholders.**
  - NYISO staff will return at the beginning of each quarter to discuss quarterly engagement plans with stakeholders.
- **The following slides include the project description, schedule and deliverables of each project that was prioritized for 2022.**

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Capacity Market Design

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Capacity Market Project Overview

2022 Capacity Market Design Projects	Q1	2022 Deliverable
Improving Capacity Accreditation	CD	Q3 Market Design Complete
Capacity Value Study	CD	Q3 Study Defined
CRIS Expiration Evaluation	CD	Q3 Market Design Complete

Key			
CD	Continued Discussions	MDC	Market Design Complete
ID	Issue Discovery	FR	Functional Requirements
SD	Study Defined	SD	Software Design Specification
SC	Study Complete	DC	Development Complete
CP	Market Design Concept Proposed	DEP	Deployment

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Improving Capacity Accreditation

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Improving Capacity Accreditation

- **Background:**
  - Capacity accreditation that reflects resources' contribution to resource adequacy is crucial to just and reasonable ICAP Market outcomes. Therefore, the Improving Capacity Accreditation project was coupled with the CMR proposal filed with FERC on January 5th, 2022
  - The NYISO has entered Phase 2 of this project and will begin discussions with stakeholders to determine the procedures and details for establishing Capacity Accreditation Factors and necessary ICAP Manual revisions

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Improving Capacity Accreditation

- **Deliverable: Q3 2022 – Market Design Complete**
- **Project Description:**
  - The NYISO, in conjunction with GE Energy Consulting, will work on the following as part of Phase 2:
    - Determine methodology for establishing Capacity Accreditation Factor Resource Classes
    - Determine methodology for annually calculating Capacity Accreditation Factors
  - The NYISO will evaluate any necessary ICAP Manual revisions related to:
    - Resource specific derating factor evaluations
    - Peak Load Windows
    - Participation model rules for resource types
  - The NYISO will also evaluate impacts to Planning Studies

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Improving Capacity Accreditation

- **Stakeholder Engagement Plan:**
  - February:
    - Kick-off Phase 2 of the Capacity Accreditation Study
    - GE Energy Consulting will review the GE MARS model and study methods with stakeholders
  - March
    - Continue reviewing study methodologies

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Capacity Value Study

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Capacity Value Study

- **Background:**
  - As developed and discussed in the Expanding Capacity Eligibility and Tailored Availability Metric projects, the current NYISO Services Tariff requires a quadrennial review of the capacity values of Energy Duration Limited resources and Intermittent Power Resources to evaluate the reliability benefit that these resources provide to the system
    - The NYISO will select an independent consultant to provide recommendations on the Energy Duration Limitations, Duration Adjustment Factors, Peak Load Windows for Resources with Energy Duration Limitations, and Peak Load Window weightings for Intermittent Power Resources
  - This study will be subsumed by the Improving Capacity Accreditation project upon FERC acceptance of the CMR filing
  - However, if FERC rejects the CMR filing, the tariff requires the NYISO to contract with an independent consultant to complete the Capacity Value Study in 2023

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Capacity Value Study

- **Deliverable: Q3 2022 – Study Defined**
- **Project Description:**
  - If the CMR filing is accepted by FERC, the capacity value of Energy Duration Limited resources and Intermittent Power Resources will be studied as part of the Improving Capacity Accreditation project with GE Energy Consulting
    - This study will also produce sensitivity analyses for greater stakeholder awareness of potential future capacity accreditation values
  - If the CMR filing is rejected by FERC, the NYISO will contract with an independent consultant to complete the Capacity Value Study in 2023
    - Any corresponding changes to Installed Capacity Suppliers would require a 205 process to the NYISO Services Tariff to become effective with the 2025-2026 Capability Year

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Capacity Value Study

- **Stakeholder Engagement Plan:**
  - Two potential paths:
    - FERC Acceptance of CMR Filing:
      - Follow the Improving Capacity Accreditation stakeholder engagement plan
        - » Sensitivity analysis will occur in Q2 and Q3
    - FERC Rejection of CMR Filing:
      - Q2:
        - » Begin developing the RFP for an independent consultant to complete the Capacity Value Study in 2023

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CRIS Expiration Evaluation

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CRIS Expiration

- **Background:**
  - As a part of a 2021 initiative, the NYISO evaluated potential mechanisms through which to provide for more stringent CRIS expiration rules.
    - Current rules may allow a facility to retain CRIS that, if terminated, could eliminate the need for deliverability upgrades or require less costly deliverability upgrades for new entry
      - For example, the existing rules allow a facility to retain its full CRIS by offering as little as 1 MW into the capacity market.
      - Additionally, a facility is able to retain all CRIS obtained for up to three years after it retires, rather than immediately making its unused CRIS available to other new entrants.
  - Further enhancements to the CRIS Expiration rules will more appropriately address the retention of CRIS by retired facilities and facilities no longer fully participating in the ICAP market

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CRIS Expiration Evaluation

- **Deliverable: Q3 2022 – Market Design Complete**
- **Project Description:**
  - This project will build upon the 2021 Market Design Concept Proposal to further pursue rule changes to limit the extent to which facilities can retain their CRIS beyond the effective date of their retirement, the extent to which facilities using only part of their CRIS can retain unused CRIS, and modifications to CRIS transfers to better facilitate new entrants
  - Further enhancements to the CRIS Expiration rules will more appropriately address the retention of CRIS by retired facilities and facilities no longer fully participating in the ICAP market
  - Modifications to these rules will seek to increase capacity deliverability headroom and potentially lower the cost of market entry to future facilities

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CRIS Expiration

- **Stakeholder Engagement Plan:**
  - February – March:
    - Continue discussions with stakeholders based off the 2021 MDCP
    - Conduct analysis as necessary

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Ongoing & Implementation Efforts

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Ongoing & Implementation

- **Comprehensive Mitigation Review – 2022**
  - Continue to implement existing BSM Rules for CY 2021 and any Expedited Deliverability Studies until FERC accepts tariff changes to Attachment H submitted in ER22-772
  - Participate in Docket ER-22-772 as necessary and deploy/implement tariff amendments upon FERC approval

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New Resource Integration

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NRI Projects Overview

2022 NRI Market Design Projects	Q1	2022 Deliverable
Hybrid Aggregation Model	CD	Q4 Functional Requirements
Ongoing TSO/DSO Coordination	CD	Q4 Issue Discovery
Grid in Transition	CD	Q4 Study Complete
Internal Controllable Lines	CD	Q4 Market Design Concept Proposal

Key			
CD	Continued Discussions	MDC	Market Design Complete
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Hybrid Aggregation Model

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Hybrid Aggregation Model

- **Background:**
  - State and Federal initiatives such as REC procurements provide incentives for developers to couple storage and intermittent renewable assets. Such programs are aimed at improving the availability of intermittent resources and firming their output.
  - In December 2021, the NYISO implemented a market participation model (Co-Located Storage Resources or “CSR”), which enables an Intermittent Power Resource and an Energy Storage Resource to participate in NYISO markets as two distinct resources with a shared injection limit, which better aligns the NYISO’s market rules with state and federal efforts to integrate more clean energy.

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Hybrid Aggregation Model

- **Deliverable: Q4 Functional Requirements**
- **Project Description:**
  - This project is distinct from the CSR, DER, and ESR Integration initiatives, but it will build on work completed as part of those initiatives. This project is a continuation of the 2020-2021 Hybrid Storage model effort and will develop market rules that allow at least one ESR to be co-located behind the same point of interconnection with other Generator(s), to share a single PTID, and to act as a single market resource. The 2022 project deliverable is the completion of Market Design and Functional Requirements.

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Hybrid Aggregation Model

- **Stakeholder Engagement Plan:**
  - January 2022
    - 1/27 – Project Overview and Ancillary Services (ICAPWG/MIWG)
  - February 2022
    - 2/24 - Energy Market Design: Participation Rules (Energy + Ancillary Services), Bidding (ICAPWG/MIWG)
  - March 2022
    - 3/15 - Energy Market Design: Participation Rules (Energy + Ancillary Services), Bidding Follow – Up (ICAPWG/MIWG)
    - 3/15 - Capacity Market Design, Interconnection Rules (ICAPWG/MIWG)
  - April 2022
    - 4/5 - Capacity Market Design, Capacity Mitigation (ICAPWG/MIWG)
    - 4/5 - Energy Market Design: Settlements and Metering, Energy Mitigation (ICAPWG/MIWG)
    - 4/19 - Energy Market Design: Settlements and Metering, Energy Mitigation Follow – Up (ICAPWG/MIWG)
    - 4/19 - Capacity Market Design, Capacity Mitigation Follow - Up (ICAPWG/MIWG)

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Ongoing TSO & DSO Coordination

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Ongoing TSO & DSO Coordination

- **Background:**
  - Transmission system and distribution system operational coordination and situational awareness are necessary to successfully integrate DER. The NYISO must continue working with distribution utilities to finalize coordination details, and the issues identified throughout 2022 will assist the NYISO in preparing for implementation of the NYISO's DER participation model in Q4 2022.
  - The NYISO will continue working with all stakeholder groups on topics relevant or ancillary to the larger DER effort throughout 2022, including the DPS, NYSERDA, and Aggregators.
  - This project will help the NYISO and the New York transmission and distribution operators identify issues and develop proper tools, communication protocols, and procedures to maintain reliability as the penetration of DER on the grid increases.

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Ongoing TSO & DSO Coordination

- **Deliverable: Q4 Issue Discovery**
- **Project Description:**
  - In 2022 the NYISO and distribution utilities will continue to coordinate in support of DER participation model topics, including but not limited to Transmission Nodes, Dual Participation, and operational tools. The NYISO will review the results of those efforts with its stakeholders via NYISO market and operational working groups as an issue discovery effort.

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Ongoing TSO & DSO Coordination

- **Stakeholder Engagement Plan:**
  - January 2022
    - 1/27 - DER 2022 NYISO Overview – Manuals and Ongoing Efforts (ICAP/MIWG)
    - 1/27 or 2/3 - Discuss Transmission Nodes (ICAP/MIWG)
  - Q1 – Q4 2022
    - Support NYS DPS Market Design and Integration Working Group efforts
    - Continue DER Meetings w/ Stakeholders
      - Review Topics Related to NYISO Manual Updates
      - Review NYISO Manual Updates
      - Utility Metering Issues presented by JU on 11/18/21

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Grid in Transition

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Grid in Transition

- **Background:**
  - A rapid transition is underway in New York State from a power grid where energy is largely produced by central-station fossil fuel generation, towards a grid with increased intermittent renewable resources and distributed generation.
  - A grid characterized by high levels of intermittent renewable resources and distributed generation will require new thinking. We approach potential market enhancement efforts with two guiding principles:
    - (1) all aspects of grid reliability must be maintained; and
    - (2) competitive markets should continue to maximize economic efficiency and minimize the cost of maintaining reliability while supporting the achievement of New York's climate policy codified in the CLCPA.
  - The study will inform the NYISO's planning, forecasting, and operations, as well as the development of wholesale market mechanisms to enhance grid resilience.

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Grid in Transition

- **Deliverable: Q4 Study Complete**
- **Project Description:**
  - Using the work completed to date across various NYISO studies and initiatives, including the Reliability and Market Considerations for a Grid in Transition work and Climate Change Study work, the 2022 effort will identify and, if possible, quantify through a 2022 study, the potential level of system flexibility and/or grid attributes needed to reliably maintain system balance.

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Grid in Transition

- **Q1 Stakeholder Engagement Plan:**
  - January/February
    - Define study analysis
  - February
    - Begin analysis
  - March
    - Update BPCG metrics

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Internal Controllable Lines

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Internal Controllable Lines

- **Background:**
  - There are no internal controllable lines in operation within the NYCA
  - NYISO has high-level rules to allow Internal Unforced Capacity Deliverability Rights (UDRs) to participate within the ICAP Market, but these rules also have gaps including, but not limited to, the determination of requirements for providing capacity on the Internal UDR and the determination of obligations for the Internal UDR that sells capacity.
  - Additionally, market rules for the scheduling and pricing of internal controllable lines within the Energy Market do not exist.

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Internal Controllable Lines

- Deliverable: Q4 Market Design Concept Proposed
- Project Description:
  - This project will begin with developing market rules for the scheduling and pricing of internal controllable lines within the Energy Market.
    - Based on these newly developed rules, the NYISO would evaluate and, if necessary, propose revisions to, the existing ICAP market rules for Internal UDRs to ensure compatibility with the expected operation of internal controllable lines in the Energy Market.
  - This project will proceed to a Market Design Concept Proposed (MDCP) on a point-to-point internal controllable line.
    - The NYISO will also assess the feasibility of implementing a multi-terminal internal controllable line, which may be included in the MDCP if no significant issues are found.

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Internal Controllable Lines

- **Q1 Stakeholder Engagement Plan:**
  - January/February 2022
    - Introduce ICL Concept and Discuss Project Background (ICAP/MIWG)
  - February 2022
    - Discuss Energy Market Design Concepts (ICAP/MIWG)
  - March/April 2022
    - Discuss Energy Market Design Examples (ICAP/MIWG)

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Energy Market Design

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Energy Market Projects Overview

2021 Energy Market Design Projects	Q1	2021 Deliverable
Improved Duct-Firing Cycle Modeling	CD	Q3 Market Design Concept Proposed
Constraint Specific Transmission Shortage Pricing	CD	Q3 Functional Requirements
Dynamic Reserves	CD	Q4 Market Design Concept Proposed

Key			
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Improved Duct-Firing Cycle Modeling

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Improved Duct-Firing Cycle Modeling

- **Project Background:**
  - Providers of reserves and regulation are currently required to achieve their emergency response rate over the entire range of operation.
    - This is problematic for combined-cycle gas turbines (“CCGTs”) with duct firing because the response rate of the duct-firing portion is typically slower than the baseload portion of the plant.

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Improved Duct-Firing Cycle Modeling

- **Deliverable: Q3 2022 – Market Design Concept Proposed**
- **Project Description:**
  - This project will consider the necessary market enhancements for a combined-cycle generator to reflect the operating characteristics in its duct-burning range as well as the benefits of this functionality.

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Improved Duct-Firing Cycle Modeling

- **Q1 Stakeholder Engagement Plan:**
  - January/February
    - Discuss the problem and provide examples on how it can happen today
  - February
    - Discuss potential concept and begin prototyping
  - March
    - Continue prototyping

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Constraint Specific Transmission Shortage Pricing

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Constraint Specific Transmission Shortage Pricing

- **Project Background:**
  - 2017, 2018, and 2019 State of the Market reports included a recommendation to utilize constraint specific transmission demand curves to set transmission constraint Shadow Prices during transmission shortages.
  - The NYISO completed a study of the current transmission constraint pricing logic in September 2018.[1]
  - The NYISO presented a Market Design Concept Proposal to stakeholders in February 2019.[2]
  - The BIC and MC approved a Market Design Complete in October 2021.[3]

1. Link to the Constraint Specific Transmission Shortage Pricing study: https://www.nyiso.com/documents/20142/2549789/Constraint%20Specific%20Transmission%20Shortage%20Pricing%20-%20Paper_Final.pdf/7f69227a-7ca8-656e-b895-0f8147635319
2. Link to the Constraint Specific Transmission Shortage Pricing Market Design Concept Proposal: https://www.nyiso.com/documents/20142/5020603/Constraint%20Specific%20Transmission%20Shortage%20Pricing%20_MDCP_021519.pdf/d7d80189-e48e-a893-a860-6e4b9636b8bf
3. Link to the Constraint Specific Transmission Shortage Pricing Market Design Complete Presentation: https://www.nyiso.com/documents/20142/25263575/6%20CSTSP%20BIC%2010132021%20presentation.pdf/23a1f22a-3842-8c77-ec7f-ca1e8cf04102

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Constraint Specific Transmission Shortage Pricing

- **Deliverable: Q3 2022 – Functional Requirements**
- **Project Description:**
  - This project will develop the transmission constraint pricing logic to enable the NYISO's market software to re–dispatch suppliers efficiently in the short term to alleviate constraints, as well as incentivize long–term investment in locations where suppliers could provide the greatest benefits.
  - This project will also include the "Lines-in-Series" effort
    - The Lines-in-Series effort will seek to develop enhancements to the current measures used for addressing the limitations arising from the operation of graduated transmission demand curve mechanisms
    - Given the expanded scope of graduated transmission demand curves envisioned by the stakeholder approved Constraint Specific Transmission Shortage Pricing proposal, the NYISO believes it is prudent to implement the enhancements developed for these efforts together

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Constraint Specific Transmission Shortage Pricing

- **Q1 Stakeholder Engagement Plan:**
  - January
    - Discuss situations with multiple active transmission constraints on a single facility, such as the line-in-series scenario (see the 9/10/2019 MIWG presentation for additional information)
  - February/March
    - Discuss concepts for addressing multiple active transmission constraints on a single facility

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Dynamic Reserves

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Dynamic Reserves

- **Project Background:**
  - Currently, the NYISO procures fixed quantities of operating reserves in specified regions across the state.
    - Under this structure, the static modeling of reserve regions and their associated requirements may not fully reflect the flexibility of the grid to respond to system needs by utilizing the transmission system to import capacity into generation-constrained regions.
  - As the potential implementation of certain load pocket reserve requirements within New York City is considered, a dynamic reserve procurement methodology that does not exist today could be useful to improve market efficiency, better align market outcomes with how the power system is operated and avoid the potential for unnecessary price volatility.
    - A dynamic reserve procurement methodology would also be important to support reliability as more intermittent resources are integrated into the grid

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Dynamic Reserves

- **Deliverable: Q4 2022 – Market Design Concept Proposed**
- **Project Description:**
  - This effort will leverage the recommendations from the 2021 study[1] to develop potential changes to the NYISO's market software and market rules with the following goals:
    - Facilitate more efficient scheduling of operating reserves based on system conditions
    - Enable reserves to be scheduled in more cost-effective regions if sufficient transmission capability is available to deliver the reserves to another location/reserve region, post-contingency
    - Efficiently incorporate potential reserve requirements for certain load pockets within New York City into the market software

[1] The 2021 Dynamic Reserves study report can be found at: 27990919-e81b-76a4-12e1-57b9458b553d (nyiso.com).

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Dynamic Reserves

- **Stakeholder Engagement Plan:**
  - January/February
    - Discuss recommendations and considerations enumerated in the 2021 study report
      - Topics identified in the report need to be discussed to inform development of the Market Design Concept Proposal, including:
        - » Impacts to reserve and transmission demand curve modeling, impacts on scarcity pricing logic, impacts on real-time market solutions, correlated contingencies that might impact reserve requirements, and which reserve areas should implement dynamic reserves.
  - March
    - Continued discussion on recommendations and considerations

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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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