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Independent System Operator

HSR Model: Capacity Market

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Agenda

- Project Scope
- HSR Participation
- Energy Market & Ancillary Services Summary
- Capacity Market
- Planned Timeline & Next Steps
- Appendix: Background & Reference Material

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Project Scope

- **This project will explore different aspects related to participation of hybrid resources, including:**
  - Participation in NYISO's Day-Ahead and Real-Time Energy markets
  - Provision of Ancillary Services, including Operating Reserves, Regulation, and voltage support
  - Participation in NYISO's Installed Capacity market
  - Settlement process
  - Modeling for interconnection, planning and operations
  - Metering requirements
- **The project will evaluate the changes required to enable hybrid storage aggregated resources to receive a single dispatch schedule.**

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HSR Participation

Proposed Definition

- **A Hybrid Storage Resource ("HSR"):**
  - A single Resource (and PTID) including storage and at least one other technology;
  - That is located behind a single Point of Interconnection; and
  - That cannot serve behind-the-meter Load at the facility.

HSR Participation Model

- **A HSR will have a single PTID/bid/schedule/settlement**
  - A HSR shall be represented by a single NYISO Market Participant as the Billing Organization and have a single bidding agent
- **A HSR must have a single Point of Interconnection at the NYS Transmission System or a distribution system**
- **HSRs will be able to provide Energy, 10-Minute Spinning Reserves, Regulation Service or a combination if capable and qualified to do so**

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Energy Market & Ancillary Services Summary

Energy & Ancillary Services

- HSRs will be Self-Managed Resources, able to bid in both Day-Ahead and Real-Time Markets HSRs as ISO-Committed Flexible, Self-Committed Flexible, or Self-Committed Fixed
- HSRs will be responsible for managing operating constraints through their offers and the operation of their Resource
- HSRs will be scheduled consistent with their bids and operating parameters
  - A single basepoint will be sent to the HSR
  - HSRs will be expected to operate consistent with their ISO dispatch, and will be subject to balancing obligations and charges for being off-schedule
- The NYISO will determine energy, reserves and regulation schedules for an HSR based on Real-Time LOL/UOL update constraints

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Capacity Market

Interconnection and CRIS

- The NYISO will return to a future meeting to discuss the interconnection process and CRIS requests for HSRs

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ICAP Suppliers

- HSRs will not be eligible to qualify as a Resource with an Energy Duration Limitation
- HSRs, like other Resources that do not have a daily run-time limitation, will receive 100% capacity payment
- Subject to most existing qualification requirements for Resources that are not duration limited

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ICAP Calculation

- **ICAP and UCAP calculations will still apply to all resources as current practice**
  - ICAP = min(CRIS, DMNC)
  - ICAP value used consistent with current practices (e.g, Bid/Schedule/Notify, etc.)
  - Payment for all resources will be based on an Adjusted ICAP
  - UCAP = Adjusted ICAP * (1 – Derating Factor)
    - Availability-based Derating Factors are calculated using a time-weighted UOL availability evaluated against the ICAP sold

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DMNC Test

- **Consistent with current rules for Generators, the NYISO will require the HSR to perform a DMNC test once every Capability Period for the HSR as a whole**
  - Sustained maximum net output averaged over 4 consecutive hours
    - Integrated hourly average at top of each hour
  - HSRs will not be eligible for Ambient Condition Dependent status

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Bid/Schedule/Notify

- **Consistent with current rules for Generators, if a Resource sells capacity, it has energy obligations in the Day-Ahead Market to Bid/Schedule/Notify in the Day-Ahead Market for the ICAP equivalent of the UCAP sold**
- **HSRs will be responsible for**
  - Managing operating constraints through their offers and the operation of their Resource
  - Updating their Real-Time LOL/UOL constraints

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Outages

- **Consistent with current rules for Generators, HSRs must notify the NYISO and Transmission Owner of outages**
  - This results in a full or partial de-rate of RT capabilities and is considered a forced outage
  - Forced outages and derates may impact ICAP payments and Energy market settlements
- **Reductions in the availability of HSRs due to Energy Level constraints will be classified as forced outages**
  - HSRs are expected to adjust their operating characteristics to reflect their availability
    - Failure to do so will result in derates

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Planned Timeline & Next Steps

Stakeholder Engagement Plan

- **Q3 2021**
  - Continue to solicit and share feedback from stakeholders
  - Consider concepts based on feedback provided
  - Develop market design and discuss tariff revisions
- **Q4 2021**
  - Present Market Design to Stakeholders at BIC

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Next Steps

- **Based on feedback received from stakeholders and developers, NYISO will bring more details on the HSR participation rules to future stakeholder discussions**
  - NYISO will continue discussions with stakeholders on different use cases

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Questions?

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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Appendix: Background & Reference Material

2021 Approved Market Project

- The 2021 Hybrid Aggregation Model project deliverable is a Q4 Market Design Complete.
- 2021 Project Schedule Milestone Update
- 2021 Approved Market Projects Product and Project Management
  - See Project 14 (Page 17 of 26)

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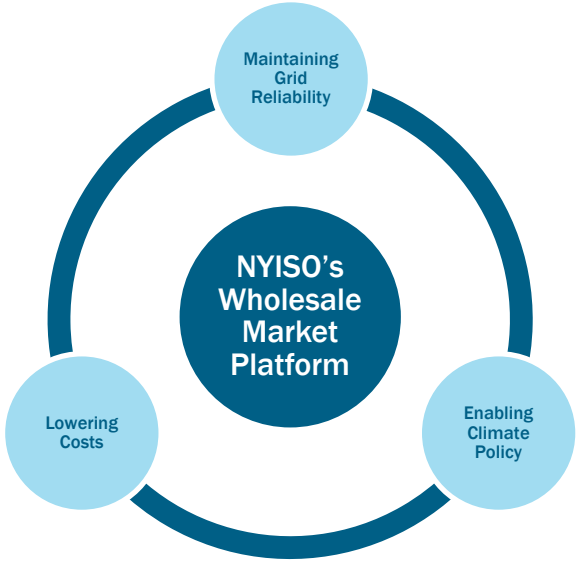
Grid in Transition – A Path Forward in 2021

- **The NYISO's wholesale markets can serve as an effective platform for achieving New York State environmental objectives.**
  - Through active engagement with stakeholders and policymakers, the NYISO is developing design improvements to meet the future challenges expected to arise with high levels of intermittent renewable and distributed energy resources.
- **The plan includes a set of enhancements that work together coherently and efficiently to satisfy New York's changing grid reliability needs.**
  - These opportunities are organized across three main points of focus (discussed on the next slide)
  - Some opportunities will require immediate attention while others might be something to consider as more information and experience becomes available.



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Grid in Transition – A Multifaceted Approach

- **Aligning Market Incentives**
  - Carbon Pricing
  - Comprehensive Mitigation Review
- **Prepare for New Technologies**
  - DER Participation Model
  - Energy Storage Participation Model
  - Hybrid Co-Located Model
  - Hybrid Aggregation Model
  - Large Scale Solar on Dispatch
- And more....

Aligning Competitive Markets and New York State Clean Energy Objectives

- **Review Energy & Ancillary Services Design for Incenting Flexibility**
  - More Granular Operating Reserves
  - Regulation Up & Down Services
  - Ramping Services
  - Grid Services from Renewable Generators
- **Evolve the Day Ahead and Real-Time Markets to improve managing Forecast Uncertainty**
- **Track certain market metrics to evaluate incentives for flexible resources**
- And more...

Valuing Resource & Grid Flexibility

- **Enhancements to Resource Adequacy Modeling**
- **Improving Installed Capacity Market Incentives**
- **Review Capacity Market Resource Ratings to Reflect Reliability Contribution**
  - Expanding Capacity Eligibility
  - Tailored Availability Metric

Improving Capacity Market Valuation

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Background / Project Justification

- The NYISO's market rules currently allow an Energy Storage Resource (ESR) and a Wind or Solar Generator to be co-located at a single point of interconnection and share a common injection limit. These rules were introduced in the Co-located Storage Resource (CSR) market participation model.
- However, those rules do not permit these resources to share the same point identifier (PTID). Instead, each resource type must be separately metered, bid, and scheduled.
- 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.

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Hybrid Storage Resource ("HSR") Participation Model

- This project is distinct from the 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 Hybrid Storage model effort and will develop market rules that allow at least one ESR and other Generator(s) to be co-located behind the same point of interconnection, share a single PTID, and act as a single market resource.
- It is reasonable to expect that the design could be multifaceted, where some elements of the design are advanced faster than others.
- The 2021 project deliverable is a Q4 Market Design Complete.

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Previous Presentations

Date	Working Group	Presentation Title
03/11/21	ICAP/MIWG/PRLWG	Hybrid Storage *Aggregation* Resource (HSR) Model: Project Kick-Off
05/19/21	ICAP/MIWG/PRLWG	Hybrid Storage Resource (HSR) Model: Energy & Ancillary Services
06/30/21	ICAP/PRLWG/LFTF	HSR Model: Energy & Ancillary Services Update

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