New York ISO
Independent System Operator

Hybrid Storage Model: CSR Market Design Proposal Updates

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New Resource Integration

ICAPWG/MIWG

August 24, 2022
WebEx

Agenda

- **CSR Market Design Proposal Updates**
  - Project Background
  - CSR Market Design Overview
  - CSR Capacity Market Participation Proposal
  - CSR Energy Market Participation Proposal

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Previous Presentations for Hybrid Aggregated Storage (HSR) Model (2022) and Final CSR Presentation (2020)

Date	Working Group	Topic/Links to Materials
August 9th, 2022	MIWG/ICAPWG	Hybrid Aggregated Storage (HSR) Model – Energy and Capacity Market Design Proposal
July 15th, 2022	MIWG/ICAPWG	Hybrid Aggregated Storage (HSR) Model – Energy and Ancillary Services Market Design Proposal Update
May 11th, 2022	MIWG/ICAPWG	NYISO Hybrid Aggregated Storage Resource (HSR) Model Use Case and Proposal Update
March 25th, 2022	MIWG/ICAPWG	Hybrid Storage Model – Energy and Capacity Market Design Proposal
October 27th, 2020	MIWG/ICAPWG	Hybrid Storage Model: Comprehensive CSR Market Design Proposal

Presentation Format

- **This presentation contains proposed modifications to the CSR project design to accommodate additional use cases, with these slides covering only a selection of topics where the changes will be necessary.**
  - The proposed substantive modifications are represented via redlines to previous CSR presentation materials. Redlines are not included on new slides.

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Project Background

Project Background

- As presented at the 5/11/2022 MIWG on "NYISO Hybrid Aggregated Storage Resource (HSR) Model Use Case and Proposal Update," the NYISO proposed a scope for the HSR project that includes updating the CSR model to allow for the following additional use cases:
  - ESR + Fast-Start Resource
  - ESR + Limited Control Run-of-River Hydro Resource (RoR)
  - ESR + Landfill Gas Intermittent Power Resource

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Use Cases and Possible Participation Models

- **Use Case 1 - ESR + Fast-Start Resource**
  - 1a – Could participate as a Generator [1 PTID]. Use case 1a is not addressed in this presentation.
  - 1b – Could participate as Co-located Storage Resources (CSR) [2 PTIDs]
- **Use Case 2 - ESR + (Landfill Gas IPR or RoR)**
  - 2a - Could participate as a Hybrid Storage Resource (HSR) [1 PTID]. Use case 2a is not addressed in this presentation.
  - 2b - Could participate as Co-located Storage Resources (CSR) [2 PTIDs]

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ESR + Fast-Start Resource - Use Case 1b

Hybrid Co-located Storage Resource (CSR)

- **Fast-Start Resource:** A Generator that (1) submits Start-up Bids and/or Minimum Generation Bids in the Day-Ahead or Real-Time Markets, (2) can respond to instructions to start, synchronize to the NYS Power System and inject Energy within thirty (30) minutes, and (3) has a minimum run time of one hour or less. Fast-Start Resources include but are not limited to Fixed Block Units.
- NYISO proposes updating the CSR model to allow for a Fast-Start Resource to be scheduled considering minimum runtimes and startup notification times
- A Fast-Start Resource will be considered in commitment decisions by the NYISO scheduling software
- The ESR will be eligible to qualify to provide sync reserves
- The Fast-Start Resource will be eligible to qualify to provide 10-minute or 30-minute non-sync reserves, based on its capabilities
- Slide 20 includes additional rules that are relevant to Use Case 1b

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ESR + Landfill Gas or RoR Hydro - Use Case 2b

Hybrid Co-located Storage Resource (CSR)

- NYISO proposes updating the CSR model to allow for:
  - an ESR + a Landfill Gas Intermittent Power Resource
  - an ESR + a ROR Hydro Generator (ROR)
- Slide 21 includes additional rules that are relevant to Use Case 2b

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CSR Market Design Overview

Updated CSR Definition

- **Co-located Storage Resources ("CSR"):** A wind, ~~or~~ solar or landfill gas Intermittent Power Resource, Limited Control Run of River Hydro Resource or a Fast-Start Resource and an Energy Storage Resource that: (a) are both located behind a single Point of Injection (as defined in Section 1.16 of the OATT); (b) participate in the ISO Administered Markets as two distinct Generators; and (c) share a set of CSR Scheduling Limits. Resources that serve a Host Load may not participate in the ISO-Administered Markets as components of a CSR.

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CSR: Market Design Overview

- **Only the ESR and/or a Fast-Start Resource will be eligible to provide Operating Reserves and Regulation Service**
- **Voltage Support Service (VSS)**
  - Subject to the existing supplier qualification criteria, ~~both the ESR and IPR unit~~ all generators may be eligible to provide Voltage Support Service
  - The total MVAR capability from the CSR shall be based on the lesser of the reactive power capability of the individual VSS Supplier(s) or the total Reactive Power capability at the Point of Injection (POI) and not the sum of individual units' capabilities
  - For providing this service, necessary metering/telemetry to measure the MVAR flows at the units and POI shall be required
  - Testing requirements and performance measurement details for CSR will be incorporated into the Ancillary Services Manual, as necessary

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CSR Capacity Market Participation Proposal

ICAP Mitigation Measures

- All existing supply side mitigation measures will apply
- Each unit within a CSR will be a distinct ~~Examined Facility~~ Generator
- Each CSR Generator in a Mitigated Capacity Zone will be subject to the mitigation evaluations that pertain to ICAP offering behavior
  - Pivotal Supplier "must offer"
- Each CSR Generator in a Mitigated Capacity Zone will be subject to the mitigation evaluations that pertain to market entrance/exit
  - Physical Withholding
  - ~~Buyer Side Mitigation~~
    - ~~Renewable units within CSRs will be eligible for the BSM Renewable Exemption~~
      - ~~The NYISO's Market Services Tariff defines an "Exempt Renewable Technology," in all Mitigated Capacity Zones, as "an Intermittent Power Resource solely powered by wind or solar energy"~~
- A CSR Generator in a Mitigated Capacity Zone will be subject to the Buyer Side Mitigation unless it is determined to be an Excluded Facility

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DMNC Test for CSR

- **Each unit within the CSR will have its own DMNC value**
  - Existing DMNC rules for each resource type will be applicable to units within a CSR
    - ESR units must perform DMNC tests during the Peak Load Window if they have an Energy Duration Limitation (EDL) or provide operating data
    - DMNC is nameplate for Intermittent Power Resources
    - Fast-Start Resources will use the applicable DMNC test rules

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CSR Energy Market Participation Proposal

CSR Energy Market Bidding Proposal

Energy Market Bidding for CSRs

- Generators that participate in a CSR are able to bid in both Day Ahead and Real Time markets
- Minimum offer size for Energy and Ancillary Services:
  - 1 MW for generation units;
  - 100 kW for ESR unit
- The Bidding process will be same as currently applicable to ESR, solar, ~~or~~ wind or landfill gas IPR, RoR, or a Fast-Start Resource
  - Must submit CSR Scheduling Limit with each Bid
- Bid types (e.g., fixed, flexible, self-schedule) available to each resource type within CSRs will be consistent with existing Generator bidding rules
  - Limitations on self-scheduling are addressed on slides 20 and 21

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Energy Market Bidding for CSRs

- **Must submit separate bids for each CSR Generator participating in the NYISO Energy market**
- **Bidding rules and parameter requirements depends upon the participation model used by the CSR Generators**
  - For the ESR unit, ESR bidding rules and parameter requirements will apply
  - For a IPR unit, resource-specific (solar, ~~or~~ wind and landfill gas) bidding rules and parameter requirement will apply
  - For a Limited Control Run of River Hydro Resource (RoR), RoR bidding rules and parameter requirements will apply
  - For a Fast-Start Resource, Fast-Start Resource bidding rules and parameter requirements including commitment parameters will apply
- **CSR Scheduling Limits are biddable parameters**
  - Each CSR Generator must specify the CSR Scheduling Limits with its Day-Ahead and Real-Time Bids
  - Each of the CSR Scheduling Limits is a MW submission only. There is not a price ($/MW) associated with the CSR Scheduling Limit values
  - NYISO will review submitted limits for possible Energy market physical withholding
- **Desired injection and withdrawal schedules should be achieved through market Bids**

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New CSR Constraints — Fast-Start Resources

- **The CSR Injection Scheduling Limit constraint must include non-sync reserves**
  - Energy + Regulation + Spinning Reserves + Non-Sync Reserves <= CSR Injection Scheduling Limit
- **When the CSR includes a Fast-Start Resource, the POI limit must be greater than or equal to the Fast-Start Resource's maximum output**
- **An ESR that participates with a Fast-Start Resource as CSR shall not submit Real-Time Market Bids that would Self-Commit the ESR to inject Energy such that the Fast-Start Resource's Minimum Generation (which is equal to the full output of a Fixed Block Unit), plus the ESR's Self Schedule, exceeds the CSR injection Scheduling Limit.**
  - ESR Self-Committed (inflexible) injection MW <= POI – Fast-Start Resource's Minimum Generation MW

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New CSR Constraints — Landfill Gas and RoR

- Because LFG and RoR are expected to submit self-committed fixed bids, the NYISO proposes to revise its existing rule that addresses self-schedules by an ESR that participates in a CSR to state:

  Resources that participate as CSR shall not submit Bids that would Self-Commit either of the Generators, or both of the Generators together, to inject or to withdraw a quantity of Energy that exceeds an applicable CSR Scheduling Limit

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CSR Energy Market Scheduling Proposal

Energy Market Scheduling for CSR

- When the total CSR schedules are near the CSR injection Scheduling Limit, the solar, ~~or~~ wind or landfill gas IPR unit, or the Limited Control Run of River Hydro Resource will be instructed not to exceed its economic basepoint
- This instruction will be communicated via a Wind and Solar Output Limit flag
  - The purpose of this treatment is to ensure that reliability services, such as operating reserves and regulation service, are deliverable by the ESR at times when the schedules of the CSR are near or equal to the CSR injection Scheduling Limit
  - This Output Limit flag will also be applied to landfill gas IPR and Limited Control Run of River Hydro Resources that participate as CSR

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Next Steps

- HSR Energy/Capacity Mitigation
- CSR Metering and Settlements Updates

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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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Questions?