New York ISO
Independent System Operator

Hybrid Aggregated Storage (HSR) Model – Tariff Modifications, Energy and Settlements

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New Resource Integration

MIWG/ICAPWG

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Agenda

- Project Background
- Overview of Tariff Changes
- Revisions to Previously Proposed Tariff Modifications
- New Proposed Tariff Modifications
- Next Steps

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Previous HSR Presentations (2022)

Date	Working Group	Topic/Links to Materials
March 25th, 2022	MIWG/ICAPWG	Hybrid Storage Model – Energy and Capacity Market Design Proposal
May 11th, 2022	MIWG/ICAPWG	NYISO Hybrid Aggregated Storage Resource (HSR) Model Use Case and Proposal Update
July 15th, 2022	MIWG/ICAPWG	Hybrid Aggregated Storage (HSR) Model – Energy and Ancillary Services Market Design Proposal Update
August 9th, 2022	MIWG/ICAPWG	Hybrid Aggregated Storage (HSR) Model – Energy and Capacity Market Design Proposal
August 24th, 2022	MIWG/ICAPWG	Hybrid Storage Model – CSR Market Design Proposal Updates
September 12th, 2022	MIWG/ICAPWG	Hybrid Aggregated Storage (HSR) Model – CSR Market Design Proposal Updates (Settlements/Metering and Telemetry)
September 12th, 2022	MIWG/ICAPWG	Hybrid Aggregated Storage (HSR) Model – Tariff Modifications, Energy and Settlements
September 20th, 2022	MIWG/ICAPWG	Hybrid Aggregated Storage (HSR) Model – Tariff Modifications, Interconnection, ERIS, CRIS

Project Background

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Project Background

- **An HSR consists of an Energy Storage Resource (ESR) and at least one Intermittent Power Resource (IPR) and/or Run-of-River (RoR) Hydro Resource**
  - This model will support ESR(s) with one or more Wind, Solar, Landfill Gas, or RoR Hydro resources that aggregate, and share a POI, and operate as a single dispatchable resource
- **As part of the HSR project, the Co-located Storage Resource (CSR) model will be updated to allow for:**
  - An ESR + a Landfill Gas Generator
  - An ESR + a RoR Hydro Generator
  - An ESR + a Fast-Start Resource

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Overview of Tariff Changes

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Overview of Tariff Changes

- The following proposed modifications to the Market Administration and Control Area Services Tariff (MST) and the Open Access Transmission Tariff (OATT) address updates needed for the Hybrid Storage Resource participation model and the Co-located Storage model regarding Energy, Operating Reserves, Voltage Support Service and related Settlements
- The rules for HSR generally parallel those for ESR or CSR. As such, the following sections include additions to rules currently in place to also account for HSR:
  - E.g., in MST 4.4.1.1, the following language is proposed: "RTC will treat Behind-the-Meter Net Generation Resources, Hybrid Storage Resources and Energy Storage Resources as already being committed and available to be scheduled."
  - ESR rules: MST 2.13, MST 2.19 (Start-Up Power, Station Power, Start-Up Bid, Supplier), MST 7.2.8

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Revisions to Previously Proposed Tariff Modifications

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Previously Proposed Modifications

- At the September 12, 2022, MIWG presentation titled "Hybrid Aggregated Storage (HSR) Model – Tariff Modifications, Energy and Settlements", the NYISO proposed a variety of tariff changes to the MST and the OATT
- In response to feedback, the NYISO has made updates to a number of sections in the attached meeting materials. Editorial revisions have been made to the following sections and posted with the meeting materials:
  - MST 2.3, MST 2.12, MST 4.2.3, MST 15.2.2.1, MST 15.3A, MST 15.4.1.3, MST 15.4.2.1
- Modifications to the previously posted redlines are highlighted in the attached meeting materials and in the following slides

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Previously Proposed Modifications, cont.

- **Additional revisions have been made to the following sections:**
  - MST 2.3 – Definitions – C
  - MST 2.5 – Definitions – E
  - MST 2.8 – Definitions – H
  - MST 2.15 – Definitions – O
  - MST 4.2 – Day-Ahead Markets and Schedules
  - MST 4.4 – Real-Time Markets and Schedules
  - MST 15.2 – Rate Schedule 2 – Payments for Supplying Voltage Support Service
  - MST 15.4 – Rate Schedule 4 – Payments for Supplying Operating Reserves

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MST 2.5 – Energy Limited Resource

- **The proposed update precludes Energy Limited Resources from participating as an ESR or HSR. This language is consistent with the definition of Capacity Limited Resources in MST 2.3**
- **The NYISO proposes the following updated definition for Capacity Limited Resources:**
  - Capacity resources, not including BTM:NG Resources, that, due to environmental restrictions on operations, cyclical requirements, such as the need to recharge or refill, or other non-economic reasons, are unable to operate continuously on a daily basis, but are able to operate for at least four consecutive hours each day. Energy Limited Resources must register their Energy limiting characteristics with, and justify them to, the ISO consistent with ISO Procedures. The wholesale market participation rules for Energy Limited Resources, Capacity Limited Resources, Energy Storage Resources and Hybrid Storage Resources are mutually exclusive~~that meet the qualifications to be an Energy Limited Resource, and choose to participate in the wholesale market as an Energy Limited Resource, are not subject to the rules applicable to Energy Storage Resources~~.

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MST 2.8 – Hybrid Storage Resource

- **The NYISO proposes to add the following new definition for Hybrid Storage Resource ("HSR") to MST Section 2.8:**

  At least two Generators, one Energy Storage Resource and one or more of a wind Intermittent Power Resource, and/or a solar Intermittent Power Resource, and/or a landfill gas Intermittent Power Resource, and/or a Limited Control Run-of-River Hydro Resource. The Generators must (a) all be located behind a single Point of Injection (as defined in Section 1.16 of the OATT) that accommodates Energy injections greater than 20 MW; and (b) participate in the ISO Administered Markets together as a single Resource that is capable of following the ISO's dispatch instructions. A HSR is not permitted to share metering or telemetry with Load, other than its own station service load.

  Where there are not HSR-specific rules or exceptions, a HSR follows the rules that apply to Generators. A HSR can register to be, but is not required to be eligible to withdraw Energy. Where there are not HSR-specific rules or exceptions, Energy withdrawals by HSRs follow the rules for self-managed Energy Storage Resources. The ISO will not consider a HSR's State of Charge when it develops dispatch instructions for, or issues Energy or Ancillary Service schedules to the HSR.

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MST 2.15 – Operating Reserve Limit

- **The NYISO proposes to add the following new definition for Operating Reserve Limit to MST Section 2.15:**
  - The capability, in MW, of a Hybrid Storage Resource to provide Operating Reserves that ~~are sustainable for one hour~~it will be able to provide for at least one hour if its Operating Reserve schedule is converted to Energy. The capability of a Hybrid Storage Resource to provide Operating Reserves shall be based on the capability of its Energy Storage Resource.

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MST 4.2.1.3.1 – General Rules

- **The proposed updates to MST 4.2.1.3.1 discuss HSR bidding in the Day-Ahead Market, including the new bidding parameter: Operating Reserve Limit**
- **Proposed new language:**
  - A Supplier's Day-Ahead Bids for a Hybrid Storage Resource to withdraw Energy and to inject Energy shall be submitted as a single, continuous, bid curve representing the Capacity, in MW, available for ~~commitment~~scheduling in the Day-Ahead Market for each hour of the Dispatch Day. A Hybrid Storage Resource may not submit a LOL that exceeds zero MW, or a UOL that is less than zero MW.
- **Proposed updated language:**
  - Day-Ahead Bids by Suppliers using the ISO-Committed Flexible, Self-Committed Flexible or ISO-Committed Fixed bid modes shall identify the Capacity, in MW, available for ~~commitment~~ scheduling in the Day-Ahead Market (for every hour of the Dispatch Day) and the price(s) at which the Supplier will voluntarily enter into dispatch commitments.
  - A Supplier's Day-Ahead Bids for an Energy Storage Resource to withdraw Energy and to inject Energy shall be submitted as a single, continuous, bid curve representing the Capacity, in MW, available for ~~commitment~~ scheduling in the Day-Ahead Market for each hour of the Dispatch Day, and shall indicate whether the Resource's Energy Level will be ISO- or Self-Managed.

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MST 4.2.1.3.5 – Additional Parameters for Hybrid Storage Resources

- The new proposed language describes the Operating Reserve Limit, which is a new bidding parameter developed for HSR
- Proposed new language:
  - In addition to the parameters that Suppliers submit for Generators, Hybrid Storage Resources must also submit an Operating Reserve Limit for each hour of the Day-Ahead Market to indicate the Energy that the Hybrid Storage Resource reasonably expects it will be able to provide for at least one hour if its Operating Reserve schedule is converted to Energy.

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MST 4.2.3.1 – Reliability Forecast for the Dispatch Day

- **The proposed modification to MST 4.2.3.1 discusses the use of the NYISO's electronic portal that is in development as part of the DER project (GOCP) by a Transmission Owner to submit a request for HSR availability**
- **Proposed language:**
  - A Transmission Owner may request commitment of additional Generators for a Dispatch Day following the close of the Day-Ahead Market to meet changed or local system conditions for the Dispatch Day that may cause the Day-Ahead schedules for the Dispatch Day to be inadequate to ensure the reliability of its local system. A Transmission Owner that wishes to request the availability of a Hybrid Storage Resource to meet changed or local system conditions that may cause the Day-Ahead schedules for the Dispatch Day to be inadequate to ensure the reliability of its local system shall use the ISO's electronic portal to submit its request. The ISO will use SRE to fulfill a Transmission Owner's request for additional units

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MST 4.4 – Real-Time Markets and Schedules

- The NYISO proposes updates to the following sections to address Real-Time Commitment, Bidding, and Reserve Pickups for HSRs/CSRs, and an explanation of the Operating Reserve Limit for HSRs:
  - MST 4.4.1.1
  - MST 4.4.1.2
  - MST 4.4.1.2.1
  - MST 4.4.3.1.1
- See MST 4.4 in the attached meeting materials for the complete proposed language

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MST 15.4.3.1 –Bid Selection

- **The updates address the Operating Reserve Limit as well as consideration for Fast-Start Resources that participate as part of a CSR**
- **Proposed language:**
  - However, (a) the sum of the amount of Energy or Demand Reduction, that each Resource is scheduled to provide, the amount of Regulation Service it is scheduled to provide, and the amount of each Operating Reserves product it is scheduled to provide shall not exceed its UOLN or UOLE, whichever is applicable, and (b) the quantity of Operating Reserves a Hybrid Storage Resource is scheduled to provide may be further limited by an Operating Reserve Limit that is considered by the NYISO's Real-Time Commitment or its Real-Time Dispatch (as appropriate).
  - For ~~a~~ Co-located Storage Resources the sum of the amount of Energy each Generator is scheduled to provide, the amount of Regulation Service the Energy Storage Resource and any Fast-Start Resource are~~is~~ scheduled to provide, and the amount of each Operating Reserves product the Energy Storage Resource and any Fast-Start Resource are is scheduled to provide, shall account for the CSR injection Scheduling Limit consistent with ISO Procedures. The net amount of Energy that the CSR Generators are scheduled to withdraw, plus the amount of Regulation Service the Energy Storage Resource and any Fast-Start Resource are~~is~~ scheduled to provide, shall account for the CSR withdrawal Scheduling Limit consistent with ISO Procedures.

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New Proposed Tariff Modifications

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New Proposed Modifications

- **Additionally, the NYISO proposes new modifications to the following tariff sections:**
  - MST 2.13 – Definitions – M
  - MST 2.19 – Definitions – S
  - MST 7.2 – Billing and Payment Procedures

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MST 2.19 – Supplemental Resource Evaluation

- The proposed modifications provide clarification on how an HSR is expected to respond to an SRE
- The NYISO proposes adding the following to the definition of Supplemental Resource Evaluation ("SRE"):
  - A Hybrid Storage Resource is expected to make its dispatchable capability available in real-time for the duration of any SRE schedule the Hybrid Storage Resource receives. The Energy Storage Resource that participates in a Hybrid Storage Resource is expected to be capable of injecting Energy at its full capability for the duration of the SRE schedule.

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Next Steps

- HSR Metering and Telemetry
- Additional tariff 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?

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