

Hybrid Aggregated Storage (HSR) Market Design Proposal

Francesco Biancardi and Katherine Zoellmer

New Resource Integration

Business Issues Committee

December 14, 2022

Agenda

- **Project Background**
- **HSR Market Design Proposal Summary**
- **CSR Model Updates Proposal**
- **Enhanced Fast Start Resource Proposal**
- **Proposed Tariff Revisions**
- **Next Steps**

Previous HSR Presentations (2022)

Date	Working Group	Topic/Links to Materials
March 25 th , 2022	MIWG/ICAPWG	<u>Hybrid Storage Model – Energy and Capacity Market Design Proposal</u>
May 11 th , 2022	MIWG/ICAPWG	<u>NYISO Hybrid Aggregated Storage Resource (HSR) Model Use Case and Proposal Update</u>
July 15 th , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – Energy and Ancillary Services Market Design Proposal Update</u>
August 9 th , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – Energy and Capacity Market Design Proposal</u>
August 24 th , 2022	MIWG/ICAPWG	<u>Hybrid Storage Model – CSR Market Design Proposal Updates</u>
September 12 th , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – CSR Market Design Proposal Updates (Settlements/Metering and Telemetry)</u>
September 12 th , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – Tariff Modifications, Energy and Settlements</u>
September 20 th , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – Tariff Modifications: Interconnection, ERIS, CRIS</u>
October 4 th , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – Tariff Modifications: Energy and Settlements</u>
October 20 th , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – Capacity Tariff, Capacity Mitigation Tariff, Interconnection Tariff, CSR Updates Tariff, Enhanced Fast Start Resources Tariff, and Metering and Telemetry</u>
November 3 rd , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – Metering and Telemetry Tariff</u>
November 14 th , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – Generator Deactivation Rules for HSRs, Energy Mitigation - Updated</u>
November 21 st , 2022	MIWG/ICAPWG	<u>HSR Participation Model: Generator Deactivation and Energy Market Mitigation Tariff Updates - Updated</u>
December 6 th , 2022	MIWG/ICAPWG	<u>Hybrid Aggregated Storage (HSR) Model – Generator Deactivation Tariff Updates</u>

Project Background

Project Background

- **The HSR project explores market participation options for Generators that are co-located with Energy Storage Resources and are all behind a single Point of Injection**
 - Financial incentives, along with improvements to flexibility and availability of resources, are motivating developers to couple generation resources with storage resources

Project Background, cont.

- In addition to the HSR model, the project will make updates to the Co-located Storage Resources (CSR) model to allow for the following use cases:
 - Limited-Control Run of River Hydro (RoR) + ESR
 - Landfill Gas + ESR
 - Fast-Start Resource + ESR
- There are also updates to allow for Fast-Start Resources that are integrated with a battery to participate as a Generator

HSR Market Design Proposal Summary

HSR Key Definitions

- **New terms have been added to Market Administration and Control Area Services Tariff (MST) 2 Definitions, and conforming changes will be made to the OATT definitions, or a cross-reference to the MST definition will be added to the OATT:**

Hybrid Storage Resource (“HSR”): 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 Energy and Ancillary Services 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, the rules that apply to Generators also apply to HSRs. 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.

Wholesale market participation rules for Capacity Limited Resources, Energy Limited Resources, Energy Storage Resources and Hybrid Storage Resources differ. Any Resource that could qualify to participate in the ISO-Administered Markets under more than one of those participation models must select the model that will govern its market participation.

HSR Key Definitions, cont.

Operating Reserve Limit: The capability, in MW, of a Hybrid Storage Resource to produce Energy 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.

HSR Market Design Overview

- A HSR consists of at least one Energy Storage Resource (ESR) and at least one Intermittent Power Resource (IPR) [wind, solar, and/or landfill gas] and/or Run-of-River Hydro Resource that are all located behind a single Point of Injection
- A HSR participates in the Energy and Ancillary Services Market as one Resource sharing a single PTID
- A HSR must have a POI that accommodates injections greater than 20 MW
- A HSR is dispatch-only
 - The Resource does not receive startup commitment and is considered dispatchable over its entire offer curve
- **The HSR cannot be co-located with Load**
 - Only station service load is permitted
- The HSR must be directly metered
- The HSR is eligible to provide spinning Reserves and Regulation Service based on the capabilities of the ESR component only

Other Modified Terms

- Actual Energy Withdrawals
- Capacity Limited Resource
- Co-located Storage Resource (“CSR”)
- Commenced Repair
- Compensable Overgeneration
- CSR Scheduling Limit
- Energy Limited Resource
- Energy Storage Resource (“ESR”)
- Fast-Start Resource
- Inactive Reserves
- Lower Operating Limit
- Minimum Generation Bid
- Minimum Generation Level
- Normal Upper Operating Limit (“UOLn”)
- Operating Reserves
- Resource
- Start-Up Period
- Station Power
- Start-Up Bid
- Supplemental Resource Evaluation (“SRE”)
- Supplier
- Wind and Solar Output Limit

HSR Interconnection Rules Overview

HSR Interconnection Rules Proposal

- **The NYISO proposes to modify the definition of “Project” to also include HSRs as part of the HSR tariff filing**
 - CSRs and HSRs will share the same interconnection rules
 - All Projects will specify a chosen Participation Model (CSR, HSR, Generator) on submitted Interconnection Requests
- **New Projects must proceed through the interconnection queue under a single Interconnection Request and must proceed under a single Interconnection Agreement upon completion of interconnection studies**
- **An existing Project participating as a standalone Generator may submit a request to reconfigure into either a HSR or CSR (e.g., the addition of an Energy Storage Resource to an existing Solar Resource)**
- **A Project that is already in the Interconnection Queue may add a new technology and proceed under the Project’s existing queue position**
- **The NYISO plans to introduce a transition rule that will allow facilities with separate queue positions, and proceeding through the Interconnection Queue under individual Interconnection Requests, to combine the two facilities into a single HSR (Project) and proceed through the queue under a single Interconnection Request**
 - The NYISO will introduce two separate transition rules with two separate effective periods, the first pertaining to CSR, the second pertaining to HSRs

HSR ERIS/CRIS Rules Proposal

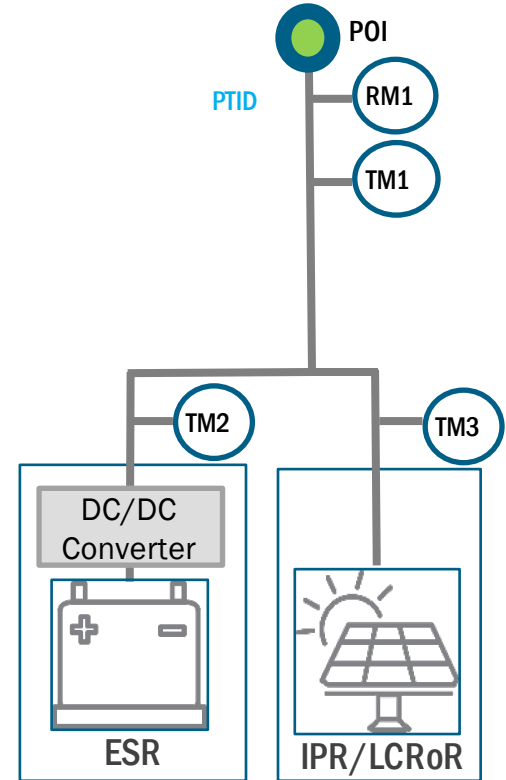
- Each Project will be studied in the interconnection process under a single Interconnection Request, evaluated at a single total ERIS and CRIS value, with the total ERIS and CRIS allocated to each of the units within said Project (such that each unit will have its own ERIS and CRIS value)
- **Maximum Permissible Requested CRIS:**
 - Unit (HSR component) CRIS values may not exceed the injection capability of the unit (component) in question
 - The sum of CRIS awarded to all units within a Project may not exceed the Project's POI Limit
 - Example: A HSR with a POI Limit (UOL) of 100 MW will be awarded a maximum of 100 MW of CRIS, which can be allocated to the individual components within said HSR.
- **Maximum Permissible Requested ERIS:**
 - ESR unit (component) ERIS cannot exceed the lesser of:
 - The HSR's POI Limit, or
 - The ESR Component's nameplate
 - Non-ESR unit (component) ERIS cannot exceed the lesser of;
 - The HSR's POI Limit + ESR Withdrawal capability
 - The Component's nameplate
 - While the sum of ERIS among all units within a Project may exceed the Project's POI limit, actual energy injections at the POI may not exceed the Project's POI Limit
 - Units within a Project may request ERIS below the nameplate of said unit, in order to avoid being required to upgrade injection capability, provided proper control technologies are in place

HSR Metering and Telemetry Proposal

HSR Metering and Telemetry Proposal

Meter Designation	Meter Requirements	Data flows
RM1	Revenue grade; dual – channel meter; reported by a Meter Authority	Hourly data
TM1	SCADA data	6 second output telemetry from HSR
TM2	SCADA data	6 second SOC telemetry measuring of ESR component
TM3	SCADA data	6 second output telemetry measuring performance of IPR/LCRoR Hydro component(s)

- **TM1 and RM1 will inform HSR scheduling, dispatch, and settlement**
- **TM2 and TM3 will provide the operating data needed to calculate a HSR components' ICAP/UCAP**



HSR Energy and Ancillary Services Market Participation Proposal

HSR Ancillary Service Eligibilities

■ Voltage Support Service (VSS)

- HSRs may qualify to provide VSS, subject to the existing supplier qualification criteria
- HSRs must conduct a test for VSS eligibility according to “normal operating conditions” of their Resource
- Multiple HSR components may be required to test together if they will normally be operated in tandem
- The total compensable MVARs of the HSR shall be the lesser of:
 - The combined HSR component VSS test results, or
 - The injection limit at the POI
- Metering/telemetry to measure the MVAR flows at the units and POI will be required for an HSR to provide VSS
- Testing requirements and performance measurement details for HSR will be incorporated into the Ancillary Services Manual, as necessary

■ Operating Reserves

- HSR Reserve bids and registered capabilities are predicated on the capabilities of the HSR’s ESR component
 - Non-ESR components of an HSR cannot contribute to the HSR’s Reserve qualifications
 - HSR Reserve eligibilities/offers are described in further detail on slides 20 and 21

■ Regulation Service

- HSR Regulation bids and registered capabilities are predicated on the capabilities of the HSR’s ESR component
 - Non-ESR components of an HSR cannot contribute to the HSR’s Regulation qualifications

HSR Energy Market Bidding Proposal

- **HSRs will be able to bid in both Day Ahead and Real Time markets**
- **HSRs may offer via the following bid modes:**
 - Self-Committed Fixed
 - Self-Committed Flex
 - ISO-Committed Flex
- **HSRs will self-manage their storage levels; there will be no SOC management by the NYISO**
- **HSRs must be able to offer at least 1 MW to bid Energy and Ancillary Services**
- **HSRs may submit Bids in increments of 100 kW above 1 MW**
- **HSR operators will submit a single Bid for the entire HSR**
 - LOL, UOL and ORL (discussed on the next slide) values must be included as part of a HSR's Bid and updated as necessary based on changing HSR capabilities and conditions (e.g., wind production decreases sooner than anticipated)

HSR Energy Market Bidding Proposal: Operating Reserve Limit

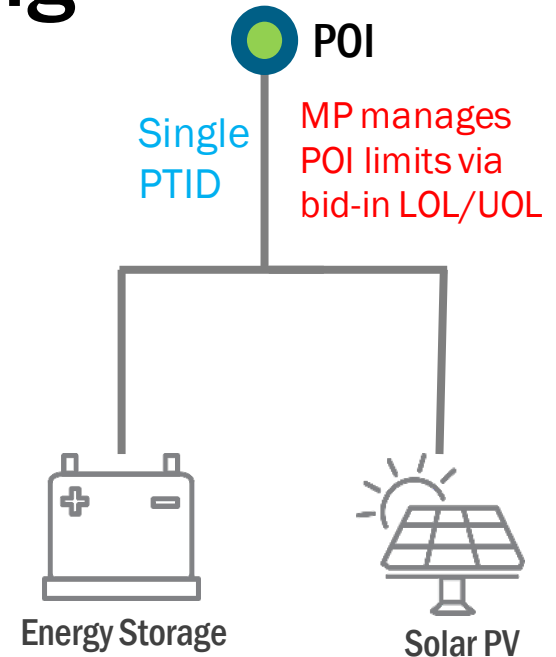
- HSRs will have access to a new bidding parameter, “Operating Reserve Limit” (ORL), which will be used in determining the Resource’s maximum possible Reserves schedule
- The bid-in ORL must reflect the maximum sustainable output that the HSR’s ESR component can maintain for one hour, accounting for ESR SOC, ESR injection capabilities, Regulation Service awards, and adjusted for MP risk tolerance
- ORL measures must be included as part of a HSR’s bid and updated as necessary based on changing HSR capabilities and conditions (e.g., wind production decreases sooner than anticipated)
 - A HSR Operator will be required to derate their HSR’s ORL below its DAM Reserves Schedule and/or RT Reserves offers after RT market close if it is unable to meet its DAM schedule or RT Reserves offer. The update to the ORL will be done via a new tool that is in development as part of the DER project (GOCP)
- The NYISO will consider removing an HSR’s Operating Reserves qualification should it persistently underperform

ORL, UOL, and LOL Derates

- **HSRs will have the ability to update their UOL, LOL and ORL (enhancement as part of HSR development) after RT market close via new software being developed for DER (GOCP) that will allow electronic submission of derates to the ISO**
- **An HSR Operator may derate its HSR's UOL, LOL and ORL below its DAM Reserves Schedule and/or RT Reserves offers after RT market close if it is unable to meet its DAM schedule or RT Reserves offer due to:**
 - Reserves are converted to Energy via a Reserve Pickup (RPU) call and/or OOM by the NYISO (or TO OOM), reducing Reserves capability in future market hours. If necessary, a UOL and/or ORL update must be submitted when the HSR operator is aware of an issue
 - If an unexpected Equipment Outage reduces/eliminates Reserve Capabilities, then a UOL and/or ORL update must be submitted immediately when the outage occurs, and a LOL update may also be necessary
 - In all other cases where the HSR will not be able to meet the next hour's DAM Reserves schedules and/or RT Reserves offers, UOL, LOL and ORL updates must be submitted when the HSR operator is aware of an issue
 - Examples
 - Lower IPR output than forecast prevents the HSR from charging its ESR up to levels required to meet the next hour's DAM Reserves Schedule or RT Reserve offers
 - HSR operator provides energy offers indicating that, based on the LBMP at the HSR's location, it prefers to inject energy onto the grid now instead of charging the ESR. This decision results in a reduced SOC and less ability to provide Reserves in later hours
 - HSRs that are not able to meet their Day-Ahead Energy or Operating Reserve schedules in real-time will be subject to balancing settlement between DAM and RT markets

HSR Energy Market Scheduling

- **A single Basepoint/Schedule will be sent to the HSR**
 - Injections and withdrawals will not be scheduled independently
- **NYISO will determine energy, reserves and regulation schedule for the HSR**
 - The NYISO will use HSR net telemetry (TM1), real-time operating limits and ramp rate to determine feasible energy and ancillary service schedules
 - The NYISO will use the Operating Reserve Limit as one of several parameters for determining a HSR's maximum reserve schedule



*Please note that intermittent resources are not eligible to provide reserves and regulation

HSR Energy Market Settlements Proposal

- **Energy and Ancillary Services Settlements will occur at the HSR level – the NYISO will not be settling individual HSR components for these products**
- **The settlement rules for HSRs largely parallel those applicable to ESRs, with a notable exception**
 - HSR that is not providing Regulation Service, that is scheduled to inject Energy, and is operating at a level greater than its schedule (plus a 3% of UOLn tolerance) will be subject to an Overgeneration Charge
 - This is similar to treatment given to standalone Wind and Solar units that are operating in excess of their RT basepoints when a Wind and Solar Output Limit is in effect.
 - Overgeneration charges are also proposed to be applied to landfill gas IPRs and limited control Run-of-River hydro resources that participate as CSR when total injections approach the CSR injection Scheduling Limit

HSR Energy Market Mitigation Proposal

- **The NYISO will compare the state-of-charge information it receives for a HSR's component ESR to the ORL the HSR submits with its Bids or updates post market-close to test for possible physical withholding**
 - A Hybrid Storage Resource will violate the withholding threshold whenever its Operating Reserve Limit is less than 75% of the minimum of (a) the HSR's Beginning Energy Level, or (b) the HSR's emergency ramp rate multiplied by the time period over which the Operating Reserves would have been scheduled
 - However, withholding less than 5 MW of Operating Reserves will not result in a violation
- **Physical withholding reviews are Ex Post mitigation and require consultation with the Market Party before sanctions are imposed**

HSR Capacity Market Participation Proposal

Capacity Market Participation Proposal

- **NYISO proposes that HSRs use largely the same Capacity Market Participation rules as CSRs**
 - The proposed Capacity participation model simplifies Resource participation, as an MP operating a HSR will be able to convert it to a CSR without needing to learn a new set of Capacity rules.
 - The proposed rules will also make it easier for Resources participating as CSR to become HSRs.
 - Applying very similar rules to CSR and HSRs will give the NYISO the insights needed to appropriately model HSRs in long term planning studies
- **HSR Capacity Market participation occurs at the individual HSR Component level**
 - Each component of a HSR that wishes to participate in the Capacity Market will need to register as individual ICAP Suppliers
 - Each component of a HSR will have its own DMNC value and will use DMNC rules applicable to each component's individual resource type
 - Each component will be responsible for measuring and reporting specific sets of operating data and operating limits, which are documented later in this presentation

HSR ICAP/UCAP Calculations

- **HSR components will use ICAP and UCAP calculation methods developed as part of Capacity Accreditation, based on resource type, that respect the co-located configuration of said components**
- **As co-located resources, HSR components will be subject to one or more shared constraints that may limit component UCAP**
 - The HSR's POI/UOL can limit HSR component exports to the grid
 - An inverter bank shared by a Solar component and an ESR component can also limit each component's availability/performance
 - Derates to shared constraints can further limit individual component performance/availability
- **Resource – specific derating factors have been adapted to account for these shared constraints**
 - ESR derating factors will be determined using both the ESR component's Availability Factor and the Availability Factor of the more limiting shared constraint
 - IPR production factors will be determined by comparing individual performance with the more limiting shared constraint, the lesser of which will be used in determining said production factor

HSR ICAP/UCAP Calculations

- **HSR Component ICAP/UCAP:**
 - $ICAP = \min(CRIS, DMNC)$
 - $Adjusted\ ICAP = ICAP * CAF$
 - $UCAP = Adjusted\ ICAP * (1 - \text{resource specific derating factor})$
- **The method for calculating resource specific derating factors will vary between resource types**
 - These calculations have been developed and explained as part of the Capacity Accreditation project

HSR Component-Level Operating Limits and Operating Data

- **Component-level Operating Data and operating limit requirements vary by technology type**
 - IPRs, LCRoR Hydro units must measure their actual output throughout Real-Time via 6-second telemetry
 - ESRs must measure their availability throughout RT, i.e. report operating limits, as well as report SOC throughout Real-Time via 6-second telemetry
- **IPR/LCRoR Hydro performance must be measured in RT via 6-second telemetry to inform IPR/LCRoR Hydro ICAP/UCAP calculations:**
 - More details in HSR Metering and Telemetry Proposal
- **HSR Operators will also need to provide the NYISO with the following Component-level operating limits to inform component ESR ICAP/UCAP calculations:**
 - ESR component Upper Operating Limit
 - ESR component Lower Operating Limit
 - ESR component Lower Storage Limit
 - ESR component Upper Storage Limit
- **Operating limits will be reported to the NYISO at a 5-minute granularity, as after-the-fact data**
- **HSR Operators must submit operating limits to the NYISO according to the GADs data entry timeline, which requires operating data from a given operating month to be submitted by the 20th of the next month.**
 - For example, operating limits collected on 10/22 must be submitted to the NYISO by 11/20

HSR Bid/Schedule/Notify (B/S/N) Obligations

- **The Energy Storage Resource within a HSR will be subject to B/S/N obligations consistent with existing rules for the ESR**
 - An ESR within a HSR that has an Energy Duration Limitation (EDL) must Bid/Schedule/Notify in the Day-Ahead Market (DAM) for injection of the ICAP Equivalent of UCAP sold (ICE) for each hour of the Peak Load Window (PLW)
 - An ESR within a HSR that is withdrawal-eligible that has an EDL must also bid the full withdrawal range for all hours outside of the Peak Load Window
 - If the ESR does not have an EDL, it must B/S/N ICE injection into the DAM for all hours, consistent with traditional generator requirements
- **Intermittent Power Resources and Limited Control Run-of-River Hydro Resources that participate as part of a HSR are not subject to B/S/N requirements**

ICAP Mitigation Measures

- **For a HSR that contains a landfill gas IPR, the landfill gas IPR will be treated as a separate Examined Facility subject to Buyer Side Mitigation**
 - The HSR developer may certify that the resource qualifies as an Excluded Facility as defined in the MST
- **For a CSR that contains a landfill gas IPR or Fast-Start Resource, the landfill gas IPR and Fast-Start Resource will be treated as separate Examined Facilities subject to Buyer Side Mitigation**
 - The CSR developer may certify that the resources qualify as an Excluded Facility as defined in the MST

HSR Generator Deactivation Proposal

Planned/Forced Outages and IIFO of HSR Generators

- **Individual HSR component generators will be subject to the Outage States/Short Term Reliability Process rules**
 - Each of the HSR component generators will individually enter outage states (Forced Outage, IIFO)
 - The HSR will be required to take a derate to reflect its reduced capability when one of its component generators is out of service (OOS), but the HSR itself will not enter an outage state.
 - The loss of the ESR presents a more significant concern than the loss of an IPR or RoR Hydro, because the ESR is expected to help the HSR operator conform HSR output to the dispatch the NYISO issues

ESR Component Outage

- **If the component ESR suffers a complete Forced Outage, the HSR will be required to temporarily exit the market to apply appropriate limitations to its capabilities**
 - Without its ESR component, a HSR cannot provide Operating Reserves or Regulation Service, cannot withdraw Energy, and its ramp capability is likely to be reduced
- **Following the temporary outage, the HSR will be permitted to return to ISO market participation, with reduced Ancillary Service Eligibility, and operational limitations that reflect its reduced capabilities**
 - The HSR will still be subject to HSR operating requirements and settlement rules, including the obligation to follow the NYISO's dispatch instructions

ESR Component Outage, cont.

- **If repairs to the ESR are going to require significant time to complete, the MP will be required to submit a Repair Plan to the NYISO within 120 days of the start of the ESR's Forced Outage**
 - All updates regarding the Repair Plan must be submitted to the NYISO by day 150 of the ESR's Forced Outage
 - The Repair Plan will need to demonstrate that the MP is actively working to either
 - (a) repair the ESR, or
 - (b) to reconfigure the HSR so that the remaining generators can participate independently as IPR(s) or LCRoR Hydro after the work is finished
- **If NYISO determines that the MP has a "Credible Repair Plan" that it is actively pursuing, then the HSR will be permitted to continue operating until the repairs are completed**
- **If the MP has not submitted a Repair Plan, or has not adequately demonstrated that it is actively working to repair the ESR in the information it submitted, then NYISO will require the HSR to shut down at the end of the month that includes the 180th day of the ESR's Forced Outage until either:**
 - (a) the ESR returns to service, or
 - (b) the MP finishes reconfiguring the generators so that the remaining generators can participate independently as IPR(s) or LCRoR Hydro

CSR Model Updates Proposal

CSR Model Updates Proposal Summary

- **Proposed modifications include adding RoR, Landfill Gas, and Fast-Start Resources in a number of definitions and rules listing resources that qualify to participate as CSR, extending the rules to these resources**
- **Additionally, for a CSR that contains a Fast-Start Resource, RoR, or landfill gas, the Resource will be required to provide the breaker status and Generator status as part of its metering requirements**
- **The Wind and Solar Output Limit will also be applied to RoR and landfill gas resources that participate as CSR when total output approaches the CSR injection Scheduling Limit**
 - The corresponding settlement rules when the Wind and Solar Output Limit is in effect will also apply to RoR and landfill gas resources within a CSR
- **Landfill gas and RoR resources that participate in CSR will be subject to existing mitigation rules**

New CSR Constraints – Fast-Start Resources

- **The CSR Injection Scheduling Limit constraint must include non-sync reserves**
 - Energy + Regulation + Spinning Reserves + Non-Sync Reserves \leq 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 \leq POI – Fast-Start Resource's Minimum Generation MW

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

Enhanced Fast-Start Proposal

Enhanced Fast-Start Resource Proposal

- **The NYISO proposes to update the definition of Fast-Start Resources (FSRs) to accommodate a FSR plus a battery that are hybridized in a manner that both are controlled by a single control system and will be treated as a FSR**
 - This can improve FSR characteristics, such as decreasing startup time or improving ramp rates, and may permit a FSR that is already capable of providing synchronous reserves to provide additional synchronous reserves, so long as they are sustainable for an hour
 - This resource will be scheduled as a FSR, consistent with its operating parameters

Proposed Tariff Revisions

Proposed Tariff Changes

- **Proposed tariff modifications have been made to support both the HSR model and the corresponding updates to the CSR and Generator models**
- **Interconnection related tariff changes have been proposed to the following sections and are posted with today's meeting materials:**
 - OATT 25.3; 25.8; 30
- **Capacity Market related tariff changes have been proposed to the following sections and are posted with today's meeting materials:**
 - MST 2.3; 2.9; 2.19; 5.12; 5.18; 23.2
- **Energy Market related tariff changes have been proposed to the following sections and are posted with today's meeting materials:**
 - MST 2.1; 2.3; 2.5; 2.6; 2.8; 2.12; 2.13; 2.14; 2.15; 2.18; 2.19; 2.23; 4.2; 4.4; 4.5; 7.2; 8.2; 13; 15.2; 15.3A; 15.4; 17.1; 18; 23.3; 23.4; 25
 - OATT 2.7; 38
- **Conforming changes will be made to OATT definitions, or a cross-reference to the MST definition will be added to the OATT**
- **The NYISO will need to conform the HSR Tariff revisions with the DER Tariff revisions in its FERC filing**

Next Steps

Next Steps

- **MC vote on December 21, 2022 pending BIC approval**
- **FERC filing**
 - Target date is Q3 2023
- **This project has a 2023 Software Design milestone with a planned implementation expected in 2025**

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

Questions?