

Hybrid Storage: Market Design Updates and Tariff Revisions for Co-located Storage Resources (CSR)

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ICAPWG/MIWG

October 2, 2020

WebEx

Agenda

- **Project Background**
- **Market Design Updates**
 - CSR Scheduling
 - CSR Settlements - NTAC/TSC charges on withdrawals from ESR within a CSR
- **Proposed tariff revisions to Market Administration and Control Area Services Tariff (MST) and Open Access Transmission Tariff (OATT)**
- **Next Steps**
- **Appendix**
 - Stakeholder's Feedback summary - Response to Stakeholder's questions from September 22 ICAPWG/MIWG

Previous Presentations on Market Design Proposal and Tariff revisions

Date	Working Group	Discussion Points and Links to Materials
01-13-20	ICAPWG/MIWG	Hybrid Storage Model Project Kick-Off https://www.nyiso.com/documents/20142/10252714/Hybrid%20Storage%20Model_MIWG_Jan%2013%202019.pdf/caf29abe-a431-a2d1-358d-43326153824a
04-14-20	ICAPWG/MIWG	Hybrid Storage Model – Initial Market Design Concept Overview https://www.nyiso.com/documents/20142/11904936/Hybrid%20Storage%20Model%20MIWG%2004142020%20Final.pdf/08841944-5251-4497-c52b-105151f150ad
05-11-20	ICAPWG/MIWG	Hybrid Storage Interconnection Proposal https://www.nyiso.com/documents/20142/12465245/Hybrid%20Storage%20Interconnection_0511%20MIWG_ICAPWG_FINAL.pdf/0740db02-ac07-e7f4-42b4-0b17da0e82eb
06-30-20	ICAPWG/MIWG	Hybrid Storage: Proposal for participation options https://www.nyiso.com/documents/20142/13434223/Hybrid%20Storage%206.30.2020%20ICAPWG_MIWG%20draft%20v5_final.pdf/176a272a-cc21-08ef-749a-c4a157fe2bc3
07-22-20	ICAPWG/MIWG	Hybrid Storage: Energy Market Participation rules for Co-located Storage Resources https://www.nyiso.com/documents/20142/13960166/Hybrid%20Storage%20ICAPWG%20MIWG%2007.22.20%20Energy%20Market%20Rules%20%20final.pdf/89700275-108e-8002-1e44-aaffe1712f0e
07-22-20	ICAPWG/MIWG	Hybrid Storage Model: Interconnection and Capacity https://www.nyiso.com/documents/20142/13960166/Hybrid%20Storage%20Interconnection%20and%20Capacity_07222020%20MIWG_FINAL.pdf/e3ba434d-a7ac-21d2-855d-c9cb249da614

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Previous Presentations on Market Design Proposal and Tariff revisions(cont'd)

Date	Working Group	Discussion Points and Links to Materials
08-10-20	ICAPWG/MIWG	Hybrid Storage: Market Design for Co-located Storage Resources https://www.nyiso.com/documents/20142/14404876/Hybrid%20Storage%20ICAPWG%20MIWG%20081020%20final.pdf/f414f66a-eee0-3a3c-393d-6b075fe5a1ba
08-19-20	ICAPWG/MIWG	Hybrid Storage: Proposed Energy market tariff revisions for Co-located Storage Resources (CSR) https://www.nyiso.com/documents/20142/14617012/02_Hybrid%20Storage%20Energy%20tariff%20ICAPWG%20MIWG%2008.19.20%20draft%20final.pdf/a6b81cb1-fe9a-72cd-2a8f-75befec4afa
08-19-20	ICAPWG/MIWG	Hybrid Storage: Proposed CRIS and Interconnections tariff revisions for Co-located Storage Resources (CSR) https://www.nyiso.com/documents/20142/14617012/03_Hybrid%20Storage%20Interconnection%20tariff%20ICAPWG%20MIWG%2008.19.20_FINAL.pdf/dbae9003-8314-e5c0-d0c3-55a7d6384cec
08-25-20	ICAPWG/MIWG	Hybrid Storage: Proposed Market design updates and energy market tariff revisions for Co-located Storage Resources (CSR) https://www.nyiso.com/documents/20142/14757023/Hybrid%20Storage_Market%20Design%20Updates%20%20Energy%20tariff%20ICAPWG%20MIWG%2008.25.20%20draft%20final.pdf/ffb01347-c4bd-24a1-6549-91cda42d8cb3
08-25-20	ICAPWG/MIWG	Hybrid Storage: Proposed Tariff Revisions for Co-located Storage Resources (CSR) https://www.nyiso.com/documents/20142/14757023/CSR%20ICAP%20Tariff%20Revisions.pdf/01796e6b-d1d8-ba86-9ab8-12c7bdf1d6f6
09-08-20	ICAPWG/MIWG	Hybrid Storage: Proposed Market design updates and energy market tariff revisions for Co-located Storage Resources (CSR) https://www.nyiso.com/documents/20142/15078529/Hybrid%20Storage_Market%20Design%20Updates%20%20Energy%20tariff%20ICAPWG%20MIWG%2009.08.20%20final.pdf/fcbb65d6-71d1-c1ac-52e9-8ecb6efb20f7

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Previous Presentations on Market Design Proposal and Tariff revisions(cont'd)

Date	Working Group	Discussion Points and Links to Materials
09-22-20	ICAPWG/MIWG	Hybrid Storage: Participation Examples and Energy Market Tariff Revisions for Co-located Storage Resources (CSR) https://www.nyiso.com/documents/20142/15473217/Hybrid%20Storage_CSR%20examples_%20%20Energy%20tariff%20ICAPWG%20MIWG%2009.22.20%20draft%20final.pdf/944fc9aa-edfb-a77a-3d77-b94c82e74b2c

Project Background

A Grid in Transition – The Plan

- Carbon Pricing
- Comprehensive Mitigation Review
- DER Participation Model
- Energy Storage Participation Model
- Hybrid Storage Model

Aligning Competitive Markets and New York State Clean Energy Objectives



- Enhancing Energy & Shortage Pricing
 - Ancillary Services Shortage Pricing
 - Constraint Specific Transmission Shortage Pricing
 - Enhanced Fast Start Pricing
- Review Energy & Ancillary Services Product Design
 - More Granular Operating Reserves
 - Reserve Enhancements for Constrained Areas
 - Reserves for Resource Flexibility

Valuing Resource & Grid Flexibility



- Enhancements to Resource Adequacy Models
- Revise Resource Capacity Ratings to Reflect Reliability Contribution
 - Expanding Capacity Eligibility
 - Tailored Availability Metric
- Capacity Demand Curve Adjustments

Improving Capacity Market Valuation



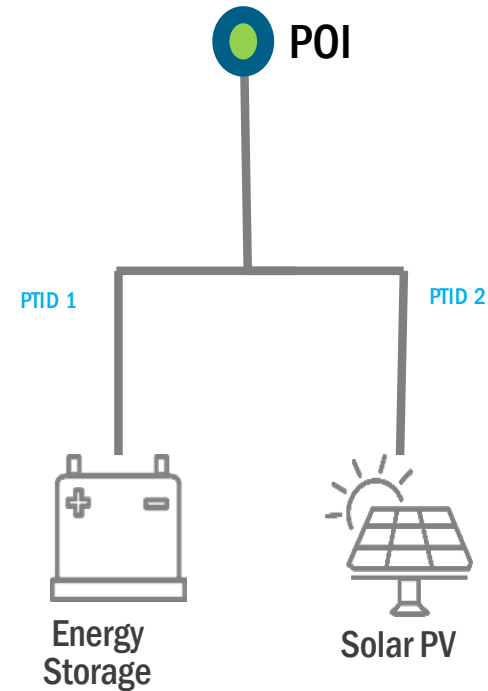
Project Background

- **This project seeks to explore market participation option(s) for co-located front-of-the-meter generators and energy storage resources**
 - Incentives along with improvements in flexibility and availability are motivating developers to couple generation resources with storage resources
- **Modifications to existing market rules will be developed to accommodate CSR by the end of 2020**

CSR Market Design Overview

CSR: Market Design Overview

- Each unit within a CSR will have a distinct PTID/bid/schedule/settlement
- The NYISO proposes to require a CSR to be represented by a single Billing Organization and to have a single bidding agent
- Units will participate under their own participation model. In the illustrative example shown here, Solar PV will participate as an Intermittent Power Resource (IPR) and Energy Storage will participate under Energy Storage Resource (ESR) model
 - Only the ESR unit will be eligible to provide Reserves and Regulation
- The NYISO plans to utilize a CSR scheduling constraint to determine feasible energy and reserve schedules for units within the CSR
- All units within a CSR will be settled at the same LBMP at the Point of Injection (POI)



CSR Market Design Updates

CSR Scheduling

CSR Scheduling

- **At the 08/10/2020 and 08/25/2020 ICAPWG/MIWG meeting the NYISO proposed that the solar or wind IPR unit shall not exceed its economically-determined real-time dispatch schedule when the total CSR schedules are near the CSR injection Scheduling Limit**
 - 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
 - The NYISO provided details and examples on how “Do Not Exceed” limit (a “Wind and Solar Output Limit”) on the intermittent unit will be set if certain conditions are met
 - Condition 1: ESR unit either has a non-zero ancillary services award or a positive energy schedule; and
 - Condition 2: The sum of the CSR Generators Energy + Operating Reserves + Regulation Service schedules is greater than or equal to a threshold(X %) times the CSR Injection Limit
- **The purpose of today’s discussion on this topic is to propose a value for this threshold (X%)**

CSR Scheduling

- **The NYISO is proposing that whenever the CSR's total schedule exceeds 90% of CSR Scheduling Limit, the intermittent unit shall be instructed not to exceed its economic dispatch schedule**
 - This value of 90% corresponds to a margin of 10 % that NYISO utilizes for other reliability parameters. E.g. Constraint Reliability margin of 10% is applied to 115 kV transmission facilities
 - The value will be posted on NYISO's public website
- **The NYISO will monitor this value as it gains operational experience with Co-located storage resources**

CSR Settlements

TSC and NTAC charges

- **TSC (Transmission Service Charges) and NTAC (NYPA Transmission Adjustment Charge) are assessed to an ESR based on the ESR’s actual energy withdrawals when it is not providing a FERC-approved “service”**
- **The NYISO is proposing that the ESR unit that participates in a CSR not pay TSC and NTAC when it receives charging energy from its co-located Intermittent Power Resource behind the shared POI/POW. The ESR will still be required to pay TSC and NTAC for the net energy withdrawals from the grid by the combined CSR Generators at the POI/POW if the ESR is not providing a FERC-approved “service”**
 - E.g., Intermittent unit injecting 20 MW; ESR withdrawing 30 MW. Net withdrawal for CSR is 10 MW (30 – 20 MW), so ESR unit will pay TSC and NTAC on 10 MW withdrawals if it is not providing a FERC-approved “service”
 - See proposed revisions to OATT Section 2.7

Proposed Tariff Revisions

Partial Set of Proposed Tariff Revisions

- **Redlined version of Tariff revisions to reflect market participation rules of CSR proposal are posted with today's meeting materials**
- **Revised sections pertains to**
 - MST 8 Eligibility for ISO Services
 - MST 15 Rate Schedules
 - MST 17 Attachment B
 - OATT 2 Common Service Provisions
 - OATT 38 Attachment FF – Generator Deactivation Process

MST 8 Eligibility for ISO Services

- **The NYISO proposes revisions to Section 8.2**
- **Proposed changes include :**
 - Generators that participate in the ISO Administered Markets together as Co-located Storage Resources must share the same bidding entity and the same billing organization
 - To change the bidding entity or the billing organization, Market Participants and owners of Co-located Storage Resources must provide the ISO at least 60 days advance written notice
 - Change of billing organization will only be effectuated on the first day of a month (same as other resources)

MST 15 Rate Schedules

- The NYISO proposes revisions to Section 15.2
- Proposed changes include :
 - Replacement of term “Automatic Voltage Regulator” with “automatic voltage controlling equipment”
 - Automatic voltage controlling equipment includes but is not limited to an Automatic Voltage Regulator (“AVR”) for non-inverter-based Generators or inverters capable of automatic voltage control for inverter-based Generators.
 - For VSS Suppliers that are CSR Generators, compensation for each VSS Supplier shall be limited to the lesser of its Reactive Power capability, demonstrated in accordance with ISO procedures, or the total Reactive Power capability of the CSR’s Point of Injection/Point of Withdrawal.

MST 17 Attachment B

- **The NYISO proposes clarifications to these sections**
 - 17.1.2.1.2; 17.1.2.1.2.2
 - The proposed clarifications are not CSR specific; they apply to all ESRs, including ESRs in a CSR
- **Proposed changes include :**
 - Inclusion of ESR operating characteristics in determination of their Upper and Lower Dispatch Limits

OATT 2 Common Service Provisions

- **The NYISO proposes revisions to these sections**
 - 2.7.2.1.5; 2.7.2.4.4
- **Proposed changes include :**
 - An Energy Storage Resource that participates as a Co-located Storage Resource will only pay a TSC and NTAC for net Actual Energy Withdrawals by the combined Co-located Storage Resources. It will not pay a TSC and NTAC when it receives charging Energy from its co-located Intermittent Power Resource behind the Co-located Storage Resources' shared Point of Injection/Point of Withdrawal.

OATT 38 Attachment FF – Generator Deactivation Process

- **The NYISO proposes revisions to these sections**
 - 38.3.1; 38.3.2
- **Proposed changes include:**
 - If one of the two Generators in a CSR enters an ICAP Ineligible Forced Outage or Mothball Outage but the other CSR Generator continues operating, the remaining Generator may continue to participate as a Generator in a CSR unless or until the Generator in the outage retires
 - Changes are same as previously presented revisions to MST 5.18

Next Steps

Next Steps

- **NYISO will return to future working groups to discuss Tariff revisions to other sections**
- **BIC vote**
 - Target date is October 14, 2020
- **MC vote**
 - Target date is October 28, 2020

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



Appendix

Stakeholder's feedback summary

- **Below is a summary of stakeholder questions from previous working groups and NYISO's response to them:**
 - Request for additional information on Market Participation charges and their applicability to CSR units
 - Market Participation charges include ISO annual budget charge and FERC fees. For more details on these charges, please refer to OATT 6.1 Rate Schedule 1. All quantities (MWh) of Injection Billing Units and Withdrawal Billing Units are subject to each of these charges.
 - An ESR in a CSR may be assessed TSC and NTAC when it is not providing a service. See proposed revisions to OATT 2.7
 - Request for clarification on calculation of Under-generation, over-generation and over-withdrawal charges
 - Under-generation, over-generation and over-withdrawal charges are based primarily on telemetered data and schedules