

Hybrid Storage Model: Interconnection Tariff Changes

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Capacity Market Design

ICAPWG/MIWG/TPAS

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WebEx

Agenda

- **Background**
- **Incremental OATT Tariff Revisions**
- **Next Steps**
- **Appendix: Interconnection Rules Proposal**

Background

Previous Presentations

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%2006.30.2020%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

Previous Presentations (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-75befefc4afa
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/fccb65d6-71d1-c1ac-52e9-8ecb6efb20f7
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
10-02-20	ICAPWG/MIWG	Hybrid Storage: Proposed Market design updates and energy market tariff revisions for Co-located Storage Resources (CSR) https://www.nyiso.com/documents/20142/15773723/4%20Hybrid%20Storage_Energy%20tariff%20ICAPWG%20MIWG%2010.02.20%20final.pdf/856b5bb8-175c-cd27-e972-b72c34e58a19

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

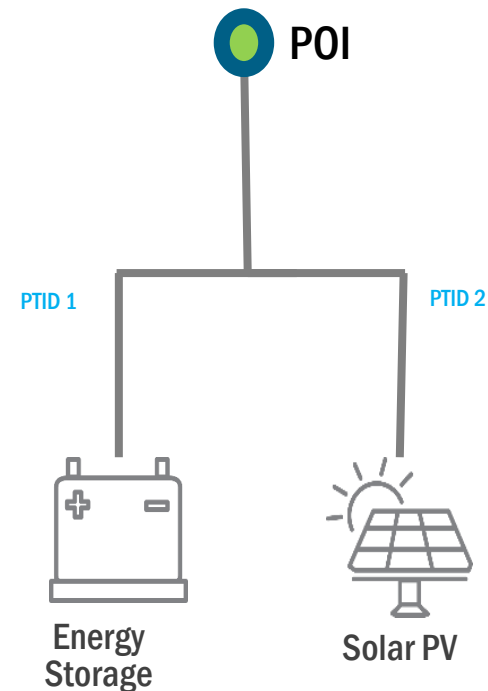


Project Background

- **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 Co-Located Storage Resources (CSR) by the end of 2020**

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 schedule for units within the CSR
- All units within a CSR will be settled at the same LBMP at the Point of Injection (POI)



Incremental OATT Tariff Revisions

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- **The NYISO is proposing incremental revisions to the following Tariff sections:**
 - Section 25.8 (Attachment S to the OATT – Class Year Study provisions)
 - Sections 30.3, 30.4, 30.14 (Attachment X to the OATT – Large Facility Interconnection Procedures)
 - Sections 32.4, and 32.5 (Attachment Z to the OATT – Small Generator Interconnection Procedures)
 - Additional proposed ministerial edits not posted with today’s meeting materials, but will be posted for the BIC
- **Proposed incremental tariff revisions:**
 - Clarifying edits to indicate that units comprising a CSR must share a single Point of Interconnection
 - Clarifying edits to provide that Co-located Storage Resources may not, in the Class Year decision process, make separate Project Cost Allocation decisions for individual resources within the CSR (or other multi-unit Class Year project)
 - Clarification to indicate that any modification to a Class Year Project during a Class Year Study for which it is a member shall constitute a Material Modification
 - Revisions to further streamline data forms Developers must submit with the Interconnection Request and facilities study agreements

Next Steps

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- **NYISO will return to future working groups to discuss Tariff revisions to other sections as necessary**
- **BIC vote**
 - Target date is November 11, 2020
- **MC vote**
 - Target date is November 18, 2020

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

Interconnection Rules Proposal

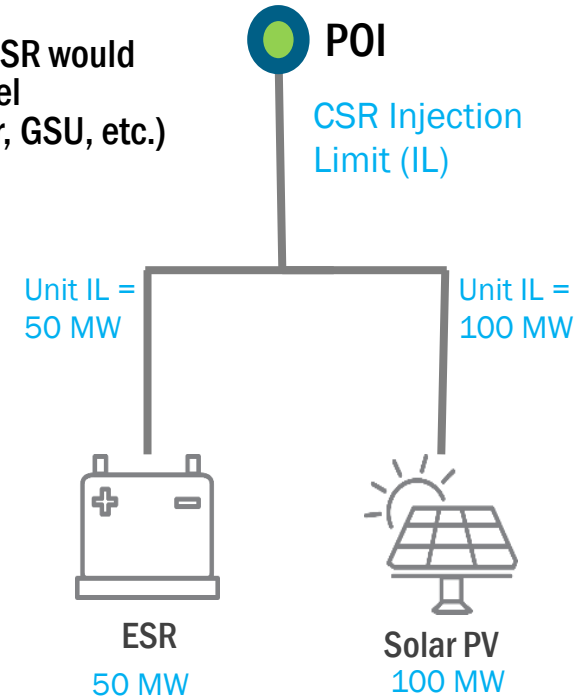
Interconnection Rules for CSRs

- **For facilities proposing to interconnect as a CSR, all units within the CSR may be included in a single Interconnection Request (IR)**
 - The NYISO is working on transition rules to enable projects that currently have separate positions in the Interconnection Queue to combine and proceed under a single Interconnection Request as a CSR
- **Each CSR will be studied in the interconnection process as a single facility with separate ERIIS and CRIS values for each unit**
 - The CSR will indicate to the NYISO how much ERIIS and CRIS it is requesting for each unit within the CSR
 - Requested CRIS may not exceed ERIIS
 - ERIIS and CRIS values may not exceed the injection capability of each unit
 - The sum of CRIS among all units may not exceed the CSR injection limit
 - While the sum of ERIIS among all units may exceed the CSR injection limit, energy injection at the POI may not exceed the CSR injection limit, as described in the examples on subsequent slides
 - The CSR shall register each unit consistent with the allocation of ERIIS and CRIS values awarded during the interconnection study process
- **As currently permitted for facilities proceeding through the NYISO interconnection process, units within the CSR may request ERIIS below the nameplate for the unit in order to avoid upgrading injection capability, provided proper control technologies are in place, per the Tariff**
- **All units within the CSR will have a single Interconnection Agreement (IA), provided they submit a single IR**

Interconnection Examples

- The scenarios below illustrate the amount of ERES and CRIS that units within a CSR would be eligible to receive based on whether injection capability is limited by unit-level equipment (such as PV inverter) and/or facility-level equipment (shared inverter, GSU, etc.)
 - In the examples on this slide, unit-level injection capability is sized to unit nameplate

	Example 1: CSR IL=150 MW	Example 2 : CSR IL=100 MW	Example 3 : CSR IL = 70 MW
Eligible ERES (MW)	PV <= 100 ESR <= 50	PV <= 100 ESR <= 50	PV <= 100* ESR <= 50
Eligible CRIS (MW)	PV + ESR <=150 PV <= 100 ESR <= 50	PV + ESR <=100 PV <= 100 ESR <= 50	PV + ESR <=70 PV <= 70 ESR <= 50

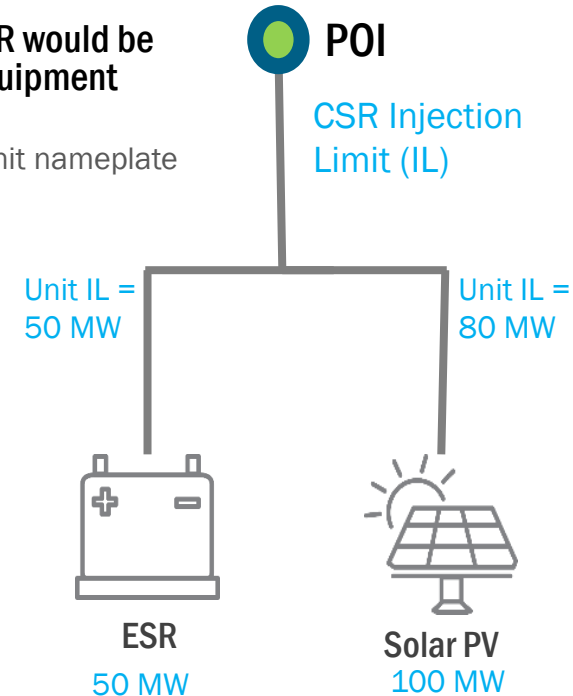


*ERIS may only exceed the IL in the case where both CSR units are in the same Interconnection Request

Interconnection Examples

- The scenarios below illustrate the amount of ERIS and CRIS that units within a CSR would be eligible to receive based on whether injection capability is limited by unit-level equipment (such as PV inverter) and/or facility-level equipment (shared inverter, GSU, etc.)
 - In the examples on this slide, PV injection capability is undersized compared to unit nameplate

	Example 1: CSR IL=130MW	Example 2 : CSR IL=80 MW	Example 3 : CSR IL = 70 MW
Eligible ERIS (MW)	PV <= 80 ESR <= 50	PV <= 80 ESR <= 50	PV <= 80* ESR <= 50
Eligible CRIS (MW)	PV + ESR <= 130 PV <= 80 ESR <= 50	PV + ESR <= 80 PV <= 80 ESR <= 50	PV + ESR <= 70 PV <= 70 ESR <= 50



* ERIS may only exceed the IL in the case where both CSR units are in the same Interconnection Request