New York ISO
Independent System Operator

Manual Updates for the Co-located Storage Resources (CSR) Participation Model

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Agenda

- Background
- Proposed ICAP Manual Updates
- Proposed Incremental Energy Market Manual Updates
- Next Steps
- Appendix: Example

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Background

CSR Participation Model

- **In 2020, NYISO developed modifications to the market rules that are necessary to accommodate Co-located Storage Resources (CSR)[1]**
  - A CSR consists of a wind or solar Intermittent Power Resource (IPR) and an Energy Storage resource that are co-located behind a single Point of Injection and share a set of common Injection/Withdrawal limits.
  - The two generators that constitute the CSR will participate in the NYISO markets as distinct generators. The market software will take into account the common Injection/Withdrawal limits when determining energy and ancillary services schedules for these generators.
- **The NYISO plans to deploy the CSR participation model in Q4 2021**
- **This presentation will review the updates to the ICAP, Ancillary Service, Day-Ahead Scheduling, and Transmission & Dispatch Operations manuals that are necessary for the implementation of CSR participation model**

1. Comprehensive CSR Market Design Proposal: https://www.nyiso.com/documents/20142/16364783/Hybrid%20Storage_CSR%20proposal%20overview%20ICAPWG%20MIWG%2010.27.20%20final.pdf
2. Proposed CSR Energy Market Manual Changes: https://www.nyiso.com/documents/20142/23492128/CSR%20Manuals%20Updates_draft%20final_ICAPWG.pdf/1819d8dc-f976-a927-37c1-7f75c3225573

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Proposed ICAP Manual Updates

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CSR ICAP Manual Updates

- **Section 4.1.3**
  - New section to reference that resources in a CSR must fulfill all obligations applicable to their respective resource types
- **Section 4.2.2.1**
  - Discussion that each resource in a CSR must fulfill all applicable DMNC requirements
- **Section 4.4.9**
  - New section to discuss data reporting requirements for resources in a CSR
- **Section 4.5**
  - Discussion pertaining to the derating factor dispute process, which is applicable to all resource types in addition to resources in a CSR
  - High-level discussion of UCAP calculation methodology for Generators in a CSR
- **Section 4.8.7**
  - New section referencing the requirement that CSR Generators submit a CSR injection Scheduling Limit and CSR withdrawal Scheduling Limit for each hour of the DAM

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CSR ICAP Manual Attachment J Updates

- **Section 3.8**
  - Additional section detailing the UCAP calculation procedure for Generators in a CSR
    - Methodologies for each Generator are based on the existing method for each respective resource type, with revisions to incorporate the shared injection equipment

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Proposed Incremental Energy Market Manual Updates

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Energy Market Manual Updates Background

- At the 10/05/2021 MIWG, the NYISO discussed with stakeholders incremental Tariff revisions that were necessary to accommodate scenarios when other constraints in the NYISO optimization should be prioritized above the CSR injection Scheduling Limit and the CSR withdrawal Scheduling Limit constraints
  - 10/05/21 Presentation
- Today's presentation proposes the corresponding manual changes
  - Incremental changes from previous CSR revisions are highlighted in yellow

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Incremental CSR Energy Market Manual Updates

- **The NYISO added clarifying language in the following Manual Sections pertaining to circumstances under which the NYISO may relax a CSR Scheduling Limit when it is in direct conflict with other limits, such as a Generator-specific response rate, upper operating limit or lower operating limit**
  - Ancillary Services Manual, Sections 6.3.1 and 6.4.1 (pages 85 and 87)
  - Day-Ahead Scheduling Manual, Section 4.3.6 (page 33)
  - Transmission & Dispatch Operations Manual, Section 6.1.1 (page 58)

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Example–Proposed Revisions to Section 6.1.1 of the T&D Manual

"The sum of (a) the Energy injection schedule(s) minus the Energy withdrawal schedule, (b) the Operating Reserve schedule, and (c) the Regulation Capacity schedule(s) for a set of CSR Generators ~~shall~~ will ordinarily be less than or equal to the applicable CSR injection Scheduling Limit. The sum of (a) the Energy withdrawal schedule minus the Energy injection schedule(s), and (b) the Regulation Capacity schedule(s) for a set of CSR Generators ~~shall~~ will ordinarily be less than or equal to the applicable CSR withdrawal Scheduling Limit.

The NYISO may relax a CSR Scheduling Limit when it is in direct conflict with other limits. Conflicting limits are expected to be a response rate, upper storage limit (USL), lower storage limit (LSL), upper operating limit or lower operating limit of a CSR Generator. In all cases, the NYISO will relax the CSR Scheduling Limit by the minimum amount and for the shortest time period necessary to resolve the conflict."

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Example: CSR injection Scheduling Limit Conflicts with Generator Ramp Rate

Equipment at the CSR POI experiences an issue, and the CSR injection Scheduling Limit drops from 200MW to 100MW

	CSR ESR	CSR IPR
UOL (MW)	50	150
Telemetered Output (MW)	50	150
NYISO Schedule (MW) in next interval *	30	95
Ramp Rate (MW/minute)	4	11

- **50MW ESR output + 150MW IPR output = 200MW (violates CSR Injection Scheduling Limit by 100MW)**
- **(4MW/minute ESR ramp rate + 11MW/minute IPR ramp rate) * (5-minute RTD interval) = 75MW/5 minutes**
  - Given the ramp rate of each Generator in the CSR, the combined output cannot get below the CSR Injection Scheduling Limit by the next RTD interval (units can only move 75MW, but output is 100 MW above the CSR injection Scheduling Limit)
  - In this scenario, the NYISO's dispatch software would violate the CSR injection Scheduling Limit in order to respect the Generator ramp rates for a few intervals, until the net output of the CSR Generators can be dispatched down to the Scheduling Limit

*In this simplified example, CSR Generator schedules are limited to energy only.

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