Energy Storage Resources: ICAP Manual Changes

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Agenda

- Background
- Overview of revisions to ICAP Manual
- Overview of revisions to ICAP Manual Attachments
- Next Steps
- Appendix

Background

FERC Order No. 841

- On February 15, 2018, FERC issued a final rule to remove barriers to the participation of ESRs in the competitive wholesale markets
- On December 3, 2018, NYISO filed its proposed tariff revisions to comply with Order 841 to accommodate and establish rules for participation of Energy Storage Resources (ESRs) in the ISO markets
  - FERC action on the proposed tariff revisions is pending

Purpose of Today's meeting

- **Review proposed changes to the ICAP Manual and appropriate Attachments that are necessary to administer the proposed tariff revisions for Energy Storage Resources filed in December 2018**
  - Note that the proposed language captures the rules as of the implementation of the ESR Participation Model
    - The rules changes applicable to DER participation and Expanding Capacity Eligibility are anticipated to be in effect in May 2021
- **A redlined version of the proposed changes to the ICAP Manual are posted with today's meeting materials**

Overview of revisions to ICAP Manual

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Revisions to ICAP Manual

- **The following sections of the ICAP Manual include revisions to account for ESRs:**
  - Sections 4.2.5, 4.5, and 4.6
    - Ministerial edits
  - Sections 4.2.2, 4.5, and 4.8.1
    - Revisions to explicitly include ESRs

Proposed Installed Capacity Manual Changes

- **Minor revisions were made throughout the ICAP Manual in the following sections:**
  - Section 4.2.5 – Required DMNC Generating Capability Test Data
    - Revisions to formatting
  - Sections 4.5 – Calculation of the Amount of Unforced Capacity each Resource may Supply to the NYCA
    - Revisions to correct reference to NYISO Services Tariff
    - Changed "Resource" to "Generator" in some instances to account for correct resource types
  - Section 4.6 – Operating Data Default Value and Exception for Certain Equipment Failures
    - Revisions to correct reference to NYISO Services Tariff

Proposed Installed Capacity Manual Changes

- **Section 4.2.2 – Resource Specific Test Conditions**
  - Revisions have been made to include DMNC testing requirements for Energy Storage Resources
    - Measures maximum sustained output over 4 consecutive hours
    - Resources can derate to meet the 4 hour duration requirement

Proposed Installed Capacity Manual Changes

- **Section 4.5 – Calculation of the Amount of Unforced Capacity each Resource may Supply to the NYCA**
  - Revisions have been made to include Energy Storage Resources in the UCAP Calculation Procedure
    - Clarify the resource types applicable to different UCAP calculations
    - Specifically include ESRs as a resource type
      - Details on the ESR UCAP calculation are included in Attachment J of the ICAP Manual
    - Clarify the default derating factor for different resource types, including ESRs
      - Until there are 3 ESRs in the ISO Capacity market the default derating factor for ESRs will be the NERC class average of Pumped Hydro
      - Once there are 3 or more ESRs in the ISO Capacity market, the default derating factor will be the NYISO class average for ESRs

Proposed Installed Capacity Manual Changes

- **Section 4.8.1 – Generators and System Resources**
  - Revisions have been made to include the Bid, Schedule, Notify requirement for Energy Storage Resources
    - ESRs that are Installed Capacity Suppliers must Bid, Schedule, or Notify in the Day-Ahead Market as ISO-Managed
    - Obligation extends to Installed Capacity Equivalent of UCAP sold for the Capacity Month

Overview of revisions to ICAP Manual Attachments

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Revisions to ICAP Manual Attachments

- **The following Attachments include revisions to account for ESRs:**
  - Attachment D – DMNC/PMPC Test Form
  - Attachment J – Unforced Capacity for Installed Capacity Suppliers
  - Attachment K – Reportable Operating Data

Proposed Revisions to ICAP Manual Attachment D

- **Attachment D – DMNC/PMPC Test Form**
  - Revisions have been made to explicitly include Energy Storage Resources as a resource type for DMNC testing
    - NYISO is currently working through the revisions to the actual DMNC/PMPC Test Forms

Proposed Revisions to ICAP Manual Attachment J

- **Attachment J – Unforced Capacity for Installed Capacity Suppliers**
  - Revisions were made to Sections 3.1 and 3.2 to correct the months used in the EFORd calculation
    - The Winter Capability Period uses 12-month periods ending with months January, February, March, April, May and June
    - The Summer Capability Period uses 12-month periods ending with months July, August, September, October, November and December

Proposed Revisions to ICAP Manual Attachment J

- **Attachment J – Unforced Capacity for Installed Capacity Suppliers**
  - Revisions were made to Section 3.4 to include all Intermittent Power Resources
    - The language has been generalized to include all Intermittent Power Resources rather than just wind generation
    - The revisions mirror the language in Section 4.5 of the ICAP Manual

Proposed Revisions to ICAP Manual Attachment J

- **Attachment J – Unforced Capacity for Installed Capacity Suppliers**
  - A new section, 3.7, has been added to include the details of the UCAP calculation for Energy Storage Resources
    - This calculation uses the same timeframe as the EFORd calculation (described in Sections 3.1 and 3.2)
    - The Unavailability Factor for ESRs will be based on the resource's availability to the Real-Time Market System

Proposed Revisions to ICAP Manual Attachment K

- **Attachment K – Reportable Operating Data**
  - Revisions have been made to remove details on GADS Reporting Requirements
    - The concept with additional details are captured correctly in Attachment J
    - Attachment J has been revised to explicitly include ESRs as a resource type for this requirement

Next Steps

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Next Steps

- The NYISO is seeking stakeholder feedback on the draft ICAP Manual revisions posted with today's meeting materials
- Return to a future ICAPWG/MIWG to continue discussions on the ICAP Manual and Attachment revisions

Feedback/Questions?

Email additional feedback to: scarkner@nyiso.com and deckels@nyiso.com

Appendix

Scheduling ESRs

- **The following slides were presented at the August 30, 2018 and September 21, 2018 ICAPWG/MIWGs**
  - These slides include details on ISO-Managed and Self-Managed scheduling of ESRs
  - Further details are included at the following links:
    - August 30, 2018
    - September 21, 2018

Energy Level Modes for ESRs

9/21/2018 presentation

- **ESRs will be allowed to participate in one of two Energy Level Modes:**
  - NYISO-Managed:
    - NYISO market optimization will use Beginning Energy Level, Roundtrip Efficiency, Lower and Upper Storage limits to ensure that ESRs receive physically feasible schedules in the DAM and RTM.
    - For example: once an ESR reaches its Upper Storage Limit, it will not be scheduled to withdraw more energy, regardless of its bid.
  - Self-Managed:
    - Beginning Energy Level, Roundtrip Efficiency, Lower and Upper Storage limits will not be considered in the market optimization.
      - Energy Level telemetry will be evaluated as a pre-optimization step to ensure that Reserve schedules meet reliability requirements and Energy schedules are feasible.
  - Self-Managed ESR's will be responsible for managing their energy level constraints through their offers.

Scheduling Self-Managed ESRs

8/30/2018 presentation

- **The NYISO plans to use RT Energy Level telemetry to modify the UOL, Min Gen and Maximum Withdrawal Limit, whichever are applicable, of Self-Managed ESRs as part of the dispatch envelope calculation step that occurs before each RTM optimization period.**
  - If an ESR would not be physically capable of sustaining its offered UOL, Min Gen, or Maximum Withdrawal Limit for the next RTM interval (5 minutes in RTD and 15 minutes in RTC) as a result of Energy Level constraints, the UOL, Min Gen, or Maximum Withdrawal Limit will be derated automatically **before** the ESR is evaluated by RTD or RTC.
- **The NYISO has previously stated that Initial State of Charge, Roundtrip Efficiency, Upper and Lower Storage limits will not be considered as part of the market optimization for Self-Managed ESRs.[1]**
  - Although SoC telemetry will be used to impose limits on total Energy and Reserve availability for the next binding market interval in RTD and RTC, the statement above is still accurate because Energy Level constraints will not be included in the market optimization and will not be considered for advisory intervals.

1. See NYISO, *ESR Operating Characteristics*, (MIWG, 7/31/18) at this link

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Scheduling Self-Managed ESRs

9/21/2018 presentation

- **Currently, a Generator must notify the NYISO and Transmission Owner of all fuel outages[1]**
  - This results in a full or partial derate of RT capabilities and is considered a forced outage.
  - Forced outages and derates may impact ICAP payments and Energy market settlements.
- **Reductions in the availability of Self-Managed ESRs due to Energy Level constraints will be classified as forced outages.**
  - Self-Managed ESRs are expected to adjust their operating characteristics to reflect their availability. Failure to do so will result in derates.
- **Automatic derates for Self-Managed ESRs will:**
  - Reduce the risk that operators will be overwhelmed by multiple simultaneous derate requests.
  - Contribute to securing system reliability by more accurately reflecting RT system capability in the market software.

1. See the NYISO's *Outage Scheduling Manual* for more information on forced outages and derates, available at this link

NYISO Energy Level Management

8/30/2018 presentation

- **Offering as NYISO-Managed in the DAM will result in optimal and feasible DA schedules for ESRs.**
  - Because Energy Level constraints will tie injection and withdrawal offers together, NYISO-Managed ESRs are more likely to be scheduled than Self-Managed ESRs when offering to inject and withdraw at the same price levels.
  - Bid spread can override discrete price levels if ESRs guess "wrong" when submitting their Incremental Bid Curves.
- **The NYISO will be limited in its ability to optimize Energy Level constraints in Real-Time because RTC and RTD have shorter look-ahead periods than SCUC.**
  - Changing the look-ahead periods of RTC and RTD to better align them with the DAM would require a significant market and software redesign.
  - NYISO staff have considered alternatives such as including an Ending State of Charge constraint, but have not found a solution that could be implemented in the near term without adverse effects.

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