

Energy Storage Resources: ICAP Manual Changes

Sarah Carkner
Market Design Specialist

ICAPWG/MIWG

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Agenda

- Background
- Incremental Revisions for ESRs
- Revisions for Expanding Capacity Eligibility
- Next Steps
- Appendix

Background

A Grid in Transition – The Plan

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



FERC Order No. 841

- On February 15, 2018, FERC issued a final rule to remove barriers to the participation of Energy Storage Resources (ESRs) in the competitive wholesale markets
- On December 3, 2018, NYISO filed proposed tariff revisions to comply with Order No. 841 to accommodate and establish rules for participation of ESRs in the ISO-administered markets
- On December 20, 2019, FERC issued an Order accepting the majority of the NYISO's proposed tariff revisions
 - The NYISO is undertaking a small number of further compliance obligations directed in the December 20, 2019 Order
 - NYISO also sought rehearing on the application of transmission charges to ESR Energy withdrawals, and the Commission's required effective date of May 1, 2020
 - The Commission has not yet issued an Order on the NYISO's request for rehearing
 - FERC accepted the NYISO's request to extend the deadline for the implementation of the compliance tariff revisions to no later than September 30, 2020

Purpose of Today's Meeting

- **Review incremental changes to the ICAP Manual and ICAP Manual Attachments that are necessary to administer the ESR tariff revisions**
 - Note that the revisions capture only the rules proposed in the NYISO's ESR compliance filing
 - A redlined version of the proposed changes to the ICAP Manual and Attachments are posted with today's meeting materials
 - Incremental revisions since the February 10, 2020 ICAPWG are highlighted in yellow in the ICAP Manual and ICAP Manual Attachments
- **Review revisions to Section 4.1 of the ICAP Manual that are necessary to administer the election process for Expanding Capacity Eligibility**
 - Note that the revisions capture only the rules corresponding to the election process for Resources with Energy Duration Limitations since Resources will need to make an election for 2021 by August 1, 2020
 - Additional revisions are anticipated to be proposed in 2021 to address DER and the remaining Expanding Capacity Eligibility rules
 - These revisions are included in the consolidated version of the ICAP Manual changes which are intended to go to the April BIC and are posted with today's meeting materials

Incremental Revisions for ESRs

Incremental Revisions to ICAP Manual

- **Section 4.8.1 – Generators and System Resources**
 - Minor edits have been made to accommodate stakeholder feedback and mirror the proposed language in MST 5.12.7
 - ESRs that are Installed Capacity Suppliers must Bid, Schedule, or Notify the maximum of the negative of the Installed Capacity Equivalent of Unforced Capacity sold or the Lower Operating Limit such that the amount scheduled, bid, or declared to be unavailable reflects the entire withdrawal to injection operating range

Proposed Revisions to ICAP Manual

Attachment J

- **Attachment J – Unforced Capacity for Installed Capacity Suppliers**
 - Section 3.7 includes revisions to terminology and formatting as follows:
 - Corrected the terminology for “Total Expected Monthly Seconds_{gh}” to include “Expected” throughout section as needed
 - Formatting edits throughout section to make the equations and definitions read more clearly
 - Added language to the definition of Normal Withdrawal Limit (NWL_{gh}) to make definition more explicit
 - i.e. note potential derates from planned and maintenance outages

Revisions for Expanding Capacity Eligibility

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Revisions to ICAP Manual

- **Section 4.1.1 Energy Duration Limitations and Duration Adjustment Factors for Installed Capacity Suppliers**
 - A new section, 4.1.1, has been added to include the duration election process for Resources with a daily run-time limitation
 - Resources must elect an Energy Duration Limitation and inform the ISO by August 1 preceding the upcoming Capability Year
 - Request must be provided in writing and received via electronic mail to Customer_Registration@nyiso.com
 - Request must include the following information:
 - Generator name and PTID
 - Duration election
 - Rationale for duration

Next Steps

Next Steps

- **The NYISO is seeking to bring the proposed revisions to Section 4.1.1 of the ICAP Manual to the April BIC**
 - These revisions are necessary to administer the duration election process for Expanding Capacity Eligibility
- **The NYISO is seeking to bring the proposed revisions to the ICAP Manual and appropriate Attachments to accommodate ESRs to an upcoming BIC at a later date**
 - These ICAP Manual revisions will become effective in accordance with the effective date for the tariff revisions

Feedback/Questions?

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

Appendix

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

Incremental Revisions to ICAP Manual

- **Section 4.5 – Calculation of the Amount of Unforced Capacity each Resource may Supply to the NYCA**
 - Revisions to formatting
 - Revisions to more explicitly address the default derating factor for different resource types
 - Explicitly include existing process that initial UCAP value (i.e. default derating factor) is applicable to all months in appropriate derating factor calculation
 - Clarify existing process that the NYISO class average is calculated based on resources of the same type with sufficient operational data

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
 - Obligation extends to Installed Capacity Equivalent of UCAP sold for the Capacity Month

Overview of revisions to ICAP Manual Attachments

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

- The DMNC/PMPC Test Form has been updated to include Energy Storage Resources
- The form for ESRs is similar to that of Hydro Generation

Proposed Revisions to ICAP Manual

Attachment J

- **Attachment J – Unforced Capacity for Installed Capacity Suppliers**
 - Sections 3.1, 3.2, 3.4, 3.5, and 3.6 include ministerial edits and revisions to formatting
 - Sections 3.1 and 3.2
 - The following language has been removed from the definition of $DMNC_{gm}$
 - » “as of the close of business on the last business day preceding the Monthly Installed Capacity Auction that is conducted during the month preceding month *m*”
 - Sections 3.4, 3.5, and 3.6
 - Subsection titles (a), (b), and/or (c) have been revised for consistency of terminology between sections
 - Sections 3.5 and 3.6
 - Titles have been revised to say “Calculation of UCAP” rather than “Calculating UCAP” for consistency

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
 - Terms throughout Section 3.7 have been named consistent with earlier sections of Attachment J

Proposed Revisions to ICAP Manual

Attachment J

- **Attachment J – Unforced Capacity for Installed Capacity Suppliers**
 - Section 3.7 includes revisions to the procedure for calculating Unforced Capacity values for Energy Storage Resources
 - Two additional parameters were added to the “Total Available ICAP Seconds” equation to more accurately measure the availability of the storage asset has in the Real-Time Market
 - Energy Level Availability
 - » Measure the ratio of the Resource’s real-time Energy Level to the sum of its DAM Energy and Reserves schedule
 - LOL Availability
 - » Measure the ratio of the Resource’s real-time LOL to the negative ICAP equivalent of UCAP sold
 - Additional terms have been added to Section 3.7 to elaborate on the Energy Level Availability and LOL Availability equations

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

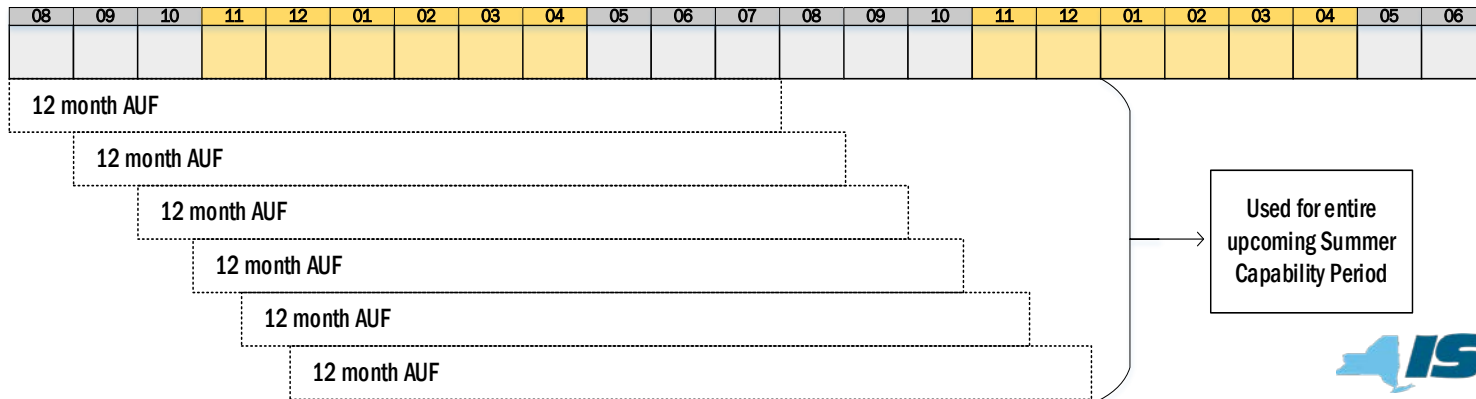
Derating Factor Example

ESR Derating Factor

- **The unavailability calculation for ESRs will use the same time frame as the existing EFORD methodology**
 - Derating factor to determine Summer UCAP uses a 12 month period ending in July, August, September, October, November, and December from the prior year
 - Derating factor to determine Winter UCAP uses a 12 month period ending in January, February, March, April, May, and June from the current year
 - Derating Factor = $1 - \text{Unavailability Factor}$
- **The following slides include examples on the ESR derating factor calculation**

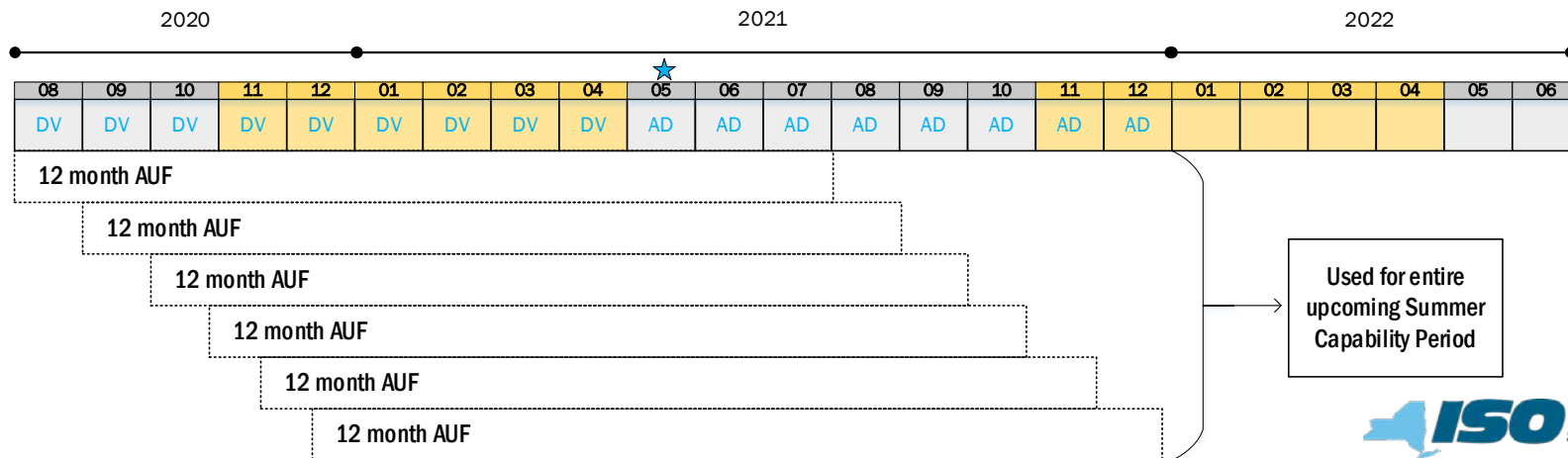
Derating Factor Example

- The current methodology for calculating a Capability Period AEFORd is the average of six consecutive (rolling) 12-month EFORd calculations
 - The derating factor calculation for ESRs will use this same time frame
 - The Capability Period value for ESRs will be the Average Unavailability Factor (AUF)
- For a Summer Capability Period, the derating factor value will be calculated based on the following months:



Derating Factor Example

- The following example shows the derating factor calculation for the Summer 2022 Capability Period for an ESR that entered the ICAP market in May 2021
 - The months where the default value is used for the calculation are noted by “DV”
 - The months where the availability data is used for the calculation are noted by “AD”



The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits 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



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