

# Energy Storage Resources: ICAP Manual Changes

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# Agenda

- Background
- Incremental Changes to Availability Calculation
- Incremental Revisions to ICAP Manual
- Incremental Revisions to ICAP Manual Attachments
- Derating Factor Example
- Next Steps
- Appendix

# Background

# 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 its proposed tariff revisions to comply with Order 841 to accommodate and establish rules for participation of ESRs in the ISO-administered markets
  - FERC has not acted on the NYISO's filing at this time

# Purpose of Today's meeting

- **Review incremental changes to the ICAP Manual and appropriate Attachments that are necessary to administer the proposed ESR tariff revisions**
  - The initial ICAP Manual revisions to accommodate ESRs were presented at the July 10, 2019 ICAPWG
  - Note that the revisions capture only the rules proposed in the NYISO's ESR compliance filing
    - Additional revisions are anticipated to be proposed in 2021 to address DER and Expanding Capacity Eligibility
- **A redlined version of the proposed changes to the ICAP Manual and Attachments are posted with today's meeting materials**
  - Incremental revisions since the July 10, 2019 ICAPWG are highlighted in yellow in the ICAP Manual and ICAP Manual Attachments

# Incremental Changes to Availability Calculation since July 10, 2019 ICAPWG

# Incremental Changes to Availability Calculation

- **The ESR availability calculation will no longer depend on whether the Resource is ISO or Self-Managed in the Real-Time Market**
  - The Energy Level (state-of-charge) constraint will be considered in the Real-Time Market for both ISO and Self-Managed ESRs
- **The revised availability calculation will more accurately capture the real-time availability of ESRs**
  - Additional detail on the following slides

# Incremental Changes to Availability Calculation

- **Changes to Bid, Schedule, Notify obligation will ensure that ESRs offer their full operating range to optimize their potential schedule**
  - ESRs will be required to Bid, Schedule, Notify their full positive to negative range of the ICAP equivalent of UCAP sold in the DAM as ISO-Managed (e.g., an ESR's 3 MW ICAP Obligation will require it to bid, schedule, notify for the range of -3 MW thru +3 MW)
    - Note that this will require a change to MST 5, as proposed in the Filing
    - Bidding the resource's negative range will give the optimization the opportunity to schedule withdrawals for later injection into the grid
      - The optimization will be able to provide a schedule to an ESR that has an Energy Level of 0 going into the DAM, which would otherwise not truly be available to the system
    - This range will be used to evaluate potential B/S/N penalties
  - ESR Real-Time Market offers will be considered in the availability calculation, but there is no obligation to offer (i.e. no financial penalties like with DAM bid/schedule/notify obligation)
    - ESRs will need to offer their full positive to negative range associated with its ICAP Obligation (ICAP Equivalent of UCAP sold) in the RTM (either ISO-Managed or Self-Managed) in order to maintain full availability
    - Will allow optimization to schedule withdrawals for later injection into grid if economic



# Incremental Changes to Availability Calculation

- **NYISO will measure ESR Energy Level on an hourly basis in the Real-Time Market to more accurately reflect the Resource's capabilities**
  - If the Resource has a DAM schedule for an hour the real-time Energy Level at the start of the hour will be compared to the DAM schedule for that hour
  - A Resource that receives a DAM schedule should either (i) be available for that schedule, or (ii) take a derate/outage because it is unable to meet that schedule
    - This is consistent with treatment of existing resources
    - For example, a GT that receives a DAM schedule should either be available in the RTM to meet that schedule or take a derate/outage
- **NYISO will measure Lower Operating Limit (LOL) for real time intervals**
  - Mirrors UOL measurement
  - The addition of LOL availability captures the full range of resource
- **Note that these concepts are incremental to the proposed UOL and Storage Availability parameters in the availability equation**

# Incremental Revisions to ICAP Manual

# 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

# Incremental Revisions to ICAP Manual

## ■ Section 4.8.1 – Generators and System Resources

- Revisions have been made to the Bid, Schedule, Notify requirement for Energy Storage Resources
  - ESRs that are Installed Capacity Suppliers must Bid, Schedule, or Notify the maximum of the negative Installed Capacity Equivalent or the maximum withdrawal

# Incremental Revisions to ICAP Manual Attachments

# Revisions to ICAP Manual Attachments

- **The following sections of the ICAP Manual Attachments include incremental revisions since the July 10<sup>th</sup> ICAPWG:**
  - Attachment D
  - Attachment J

# 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**
  - Section 3.7 includes revisions to terminology as follows:
    - The following terms have been renamed for consistency with earlier sections of Attachment J
      - “Unavailability Factor” changed to “Average Unavailability Factor”
      - “ICAP Sold for DAM” changed to “ICE”
    - The following terms have been renamed for clarity
      - “Total Available ICAP” changed to “Total Available ICAP Seconds”
      - “Total Expected ICAP” changed to “Total Expected ICAP Seconds”

# 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

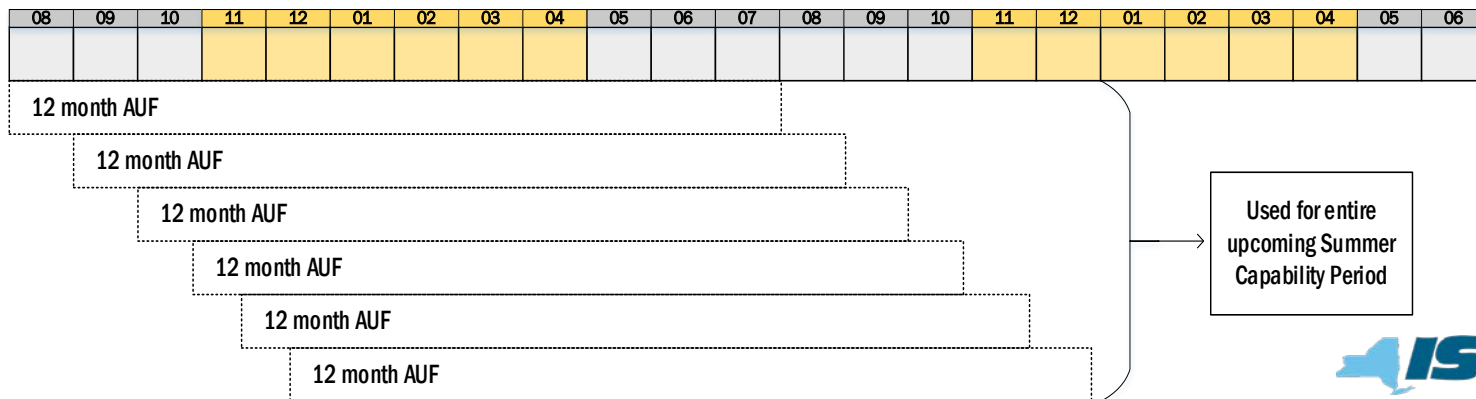
# Derating Factor Example

# 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**

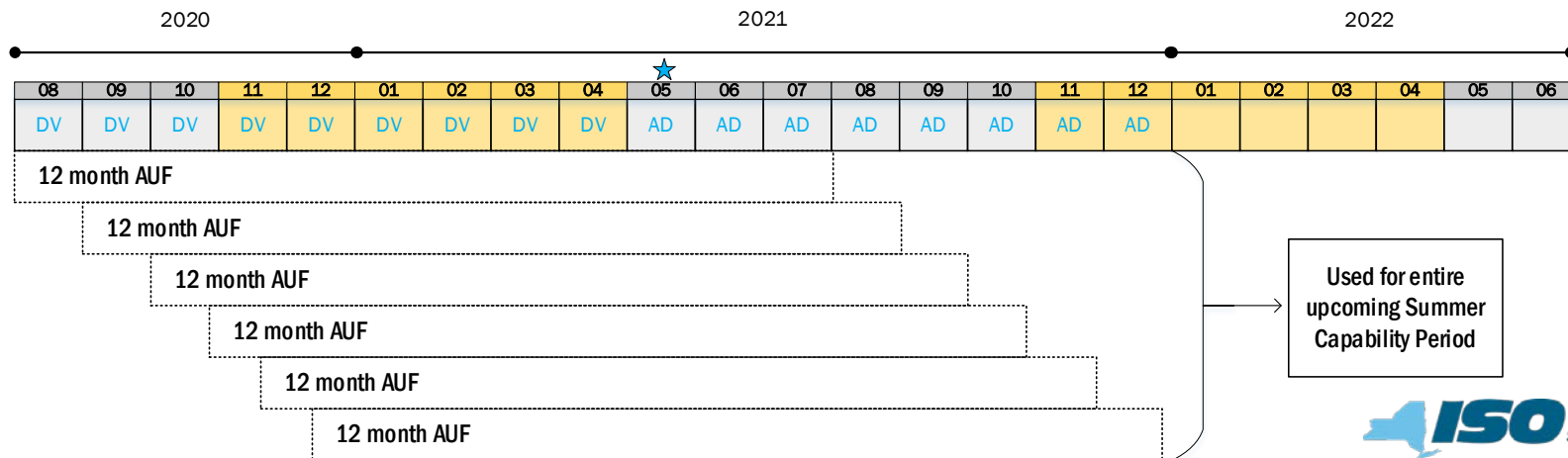
# Derating Factor Example

- 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”



# Next Steps

# Next Steps

- The NYISO is seeking stakeholder feedback on the draft ICAP Manual revisions posted with today's meeting materials
- Pending additional feedback, return to a future ICAPWG/MIWG to continue discussions on the revisions to the ICAP Manual and appropriate Attachments



# Feedback/Questions?

Email additional feedback to: [scarkner@nyiso.com](mailto:scarkner@nyiso.com) and  
[deckels@nyiso.com](mailto:deckels@nyiso.com)

# Appendix

The following slides were included in the July 10, 2019 ICAPWG presentation

# Overview of revisions to ICAP Manual

# 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

# 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

# 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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