

ICAP Manual – DER Updates

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April 27, 2023

Agenda

- **Background & Overview**
- **Draft Manual Language for Discussion**
 - ICAP Manual
 - Attachment J
- **Next Steps**

Background & Overview

- To support the deployment of the DER Participation Model, NYISO seeks stakeholder feedback on draft language that will be included in NYISO Manuals, Guides, & Technical Bulletins.
- At the February 24, 2022, ICAPWG/MIWG, NYISO shared the high-level timeline and anticipated scope of updates for the full suite of documents.
- Before NYISO seeks approval of draft manual language, stakeholder input on the concepts must be solicited and captured in the documents by staff.

Background & Overview

- **Today's discussion will review updates to the ICAP Manual and Attachment J of the ICAP Manual.**
 - Attachment J draft is a subsection – additional content will be featured at ICAPWG currently targeting May
- **Updates include 1) responses to feedback received at, or shortly after, the March 31 ICAPWG and 2) new content added to the manual and Attachment J.**

Draft Manual Language for Discussion

ICAP Manual

Updates based on feedback and new content

ICAP Manual Updates (**highlight** in draft)

- Throughout, various ministerial edits have been incorporated to improve clarity.
- **Section 4.1.1 Energy Duration Limitations and Duration Adjustment Factors for Installed Capacity Suppliers**
 - Feedback: NYISO should provide further details on time-stacking.
- **NYISO Response: The draft section now includes further information on time-stacking, including:**
 - Enrollment of EDL information
 - DMNC test provision of individual DER duration capabilities
 - Time-stacking example

ICAP Manual Updates cont'd

- **Section 4.1.3 DER and Aggregations**
 - Feedback: Clarify the notification timing requirement associated with changes to an Aggregation that are effective on the Capability Year boundary
- **NYISO Response: Ministerial edits incorporated to clarify that changes only permitted to become effective at the Capability Year boundary (e.g., a DER switching from one Aggregation type to a different Aggregation type) must be communicated to the NYISO prior to August 1 in order to become effective beginning on the following May 1.**
- **4.2.2.2. Installed Capacity Suppliers with an Energy Duration Limitation**
 - Added details pertaining to Aggregations with an EDL and DMNC testing requirements, including conditions under which a new DMNC test is required (e.g., adding new capacity to an Aggregation)

ICAP Manual Updates cont'd

■ 4.4.1 Generators

- Clarified the terminology of GADS reporting requirements to generating assets within an Aggregation

■ 4.4.9 Generating Assets that Participate in an Aggregation

- Clarified terminology and applicability to injection-capable assets in any Aggregation type, not exclusively DER Aggregations

■ 4.5 Calculation of the Amount of Unforced Capacity each Resource may Supply to the NYCA

- Added reference to Attachment J, which will contain details pertaining to UCAP calculation for an Aggregation containing injection-capable assets and Demand Side Resources
- Feedback: NYISO should clarify the use of the NYCA Translation Factor in the Unavailability calculation
 - The NYCA translation factor serves as a best-estimate for DER unavailability until operational data for DERs in the NYCA is available

Attachment J

ICAP Manual – Appendix

- **Attachment J will have a new section, tentatively 3.9, which will contain all UCAP calculations for all viable types of Aggregations.**
 - This will enable an Aggregator to refer to one section of the Attachment, which mirrors the UCAP calculations for existing participation models including new details for Aggregations as appropriate
- **The draft Attachment J posted with today’s materials only reflects three (3) types of Aggregation UCAP. NYISO will continue to add Aggregation types as the draft is further developed based on stakeholder feedback.**
 - DER Aggregation without Demand Reduction and without an EDL
 - ESR Aggregation without an EDL
 - ESR Aggregation with an EDL
 - Includes time-stacking
- **Added General statement about Resource definition and participation model rules applicable to Aggregations classified under the same model.**
 - These definition and rules have been used throughout the Attachments accordingly.

ICAP Manual – Appendix: Attachment J

Calculation of UCAP for Aggregations

$$\text{AggregationUCAPMW}_{a,m} = (\text{Aggregation ICAP MW}_{a,m} * \text{DurationAdjustmentFactor}_{am}) * (100\% - \text{AggregationDeratingFactor}_{a,m})$$

Where:

- $\text{Aggregation ICAP MW}_{a,m} * \text{DurationAdjustmentFactor}_{am}$ is the Adjusted ICAP
- $\text{Aggregation ICAP MW}_{a,m}$ is the sum of all individual DER ICAP MWs for a given auction month. The ICAP MW for each individual DER is a function of several variables, including:
 - o Type of the Aggregation in which the DER participates
 - o Demand Side Resource participation within the DER
 - o Time-stacking, dependent on the presence of an EDL
 - o DMNC MW
 - o CRIS MW
 - o Total Supply Declared Value MW
- $\text{DurationAdjustmentFactor}_{am}$ is the Duration Adjustment Factor expressed as a percentage, for an Aggregation a which is applicable for the month m , pursuant to Section 4.1.1 of the ICAP Manual and Section 5.12.14 of the ISO Services Tariff.

ICAP Manual – Appendix: Attachment J

Calculation of UCAP for Aggregations (cont.)

- *AggregationDeratingFactor_{a,m}* is the Derating Factor for a given Aggregation and is calculated consistent with the type of Aggregation:
 - Generator Aggregation types the Derating Factor calculation uses GADS data based on EFORd – such information is derived from the individual GADS-reporting ‘assets’ within each individual DER comprising an Aggregation that is classified as ‘Single Resource Type’ Generator Aggregation.
 - ELRs and CLRs Aggregation types the Derating Factor calculation uses equivalent GADS data based on the Average Outage Factor (AOF).
 - Availability-based Aggregation types (DER; ESR) the Derating Factor calculation is based on Aggregation-level unavailability historic data (AUF).
 - Production-based Aggregation types (Wind, Solar, Landfill Gas), the Derating Factor calculation uses a ‘Production Factor’ approach, which employs an Aggregation-level historic production data.
- ‘Single Resource Type’ LESR Aggregations are not permitted to participate in the ISO-administered Capacity market.

ICAP Manual – Appendix: Attachment J

UCAP for DER Aggregations without Demand Reduction and without an EDL

$$UCAP_{am}^Q = (1 - AUF_{am}) * (ICAP_{am} * DAF_{am})$$

Where:

- $UCAP_{am}^Q$ is the amount of Unforced Capacity that Aggregation a is qualified to provide in month m
- $ICAP_{am}$ is the total ICAP MW for Aggregation a which is calculated on a monthly basis by summing the ICAP MW values for all individual DER comprising the Aggregation.
- DAF_{am} is the Duration Adjustment Factor expressed in percentage for Aggregation a which is applicable for month m , pursuant to Section 4.1.1 of the ICAP Manual and Section 5.12.14 of the ISO Services Tariff.
- AUF_{am} (*Average Unavailability Factor_{am}*) is the Derating Factor calculated for Aggregation a that will be used to determine the amount of Unforced Capacity that an Aggregation will be permitted to provide in month m and is calculated as follows:

ICAP Manual – Appendix: Attachment J

UCAP for DER Aggregations without Demand Reduction and without an EDL

$$AUF_{am} = \left(1 - \left(\frac{\text{Aggregation DER Contributions}_{am}}{ICAP_{am}} \right) \right)$$

The Unavailability Factor of the Aggregation AUF_{am} is calculated using the UOL Availability of the Aggregation over the previous two like-Capability Periods, which informs the ratio of Available ICAP Seconds to Expected ICAP Seconds.

Where:

- $ICAP_{am}$ is the total ICAP MW for Aggregation a in month m , which is calculated by summing the ICAP MW values for all individual DER comprising the Aggregation.
- $\text{Aggregation DER Contributions}_{am} = \sum_{der \in a_m} ICAP_{der\ m} \times AUF_{der\ s}$

ICAP Manual – Appendix: Attachment J

UCAP for DER Aggregations without Demand Reduction and without an EDL

Where (cont.):

- $ICAP_{der\ m}$ is the ICAP MW for each individual DER der which is applicable for month m and is calculated as follows:

$$ICAP_{der\ m} = \min(DMNC_{der\ m}, CRIS_{der\ m}, Total\ Supply\ Declared\ Value_{der\ m})$$

Where:

- $DMNC_{der\ m}$ is the Demonstrated Maximum Net Capability for the individual DER der for month m .
- $CRIS_{der\ m}$ is the Capacity Resource Interconnection Service Value for the individual DER der for month m .
- $Total\ Supply\ Declared\ Value_{der\ m}$ is the MW amount reflecting the Injection capability of the DER der , and may be equal to or less than the $DER\ CRIS$ or $DER\ DMNC$ for the Month m .

ICAP Manual – Appendix: Attachment J

UCAP for DER Aggregations without Demand Reduction and without an EDL

And (cont.):

- $AUF_{der\ s}$ is the Average Unavailability Factor value for the individual DER der in a given month m . If month m is in the Winter Capability Period, then $AUF_{der\ s}$ will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for the DER der . If month m is in the Summer Capability Period, then $AUF_{der\ s}$ will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for the DER der . It is calculated as follows:

$$AUF_{der\ s} = \frac{\sum_{m \in S} Unavailability\ Factor_{am}}{6}$$

The Unavailability Factor value for each individual DER der for each month in the calculation of $AUF_{der\ s}$, will be calculated based on historic unavailability data of the Aggregation.

Where:

$$Unavailability\ Factor_{am} = 1 - \left(\frac{Total\ Available\ ICAP\ Seconds_{am}}{Total\ Expected\ ICAP\ Seconds_{am}} \right)$$

- $Total\ Available\ ICAP\ Seconds_{am}$ is the sum of Total Available ICAP Seconds_a for each month m ;
- $Total\ Expected\ ICAP\ Seconds_{am}$ is the sum of seconds in all real-time in month m in which Aggregation a was not on a planned or scheduled outage

ICAP Manual – Appendix: Attachment J

UCAP for DER Aggregations without Demand Reduction and without an EDL

Determining the Installed Capacity Equivalent (ICE) of the Amount of UCAP Supplied

$$ICE_{a,m} = \left(\frac{UCAP_{am}^Q}{(1 - AUF_{am}) * (DAF_{am})} \right)$$

Where:

- $ICE_{a,m}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m .
- $UCAP_{am}^Q$ is the amount of Unforced Capacity that Aggregation a supplies in month m .
- AUF_{am} is the Derating Factor calculated for Aggregation a that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m .
- DAF_{am} is the Duration Adjustment Factor for Aggregation a which is applicable for month m , pursuant to Section 4.1.1 of the *ICAP Manual* and Section 5.12.14 of the ISO Services Tariff.

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations without an EDL

$$UCAP_{am}^Q = (1 - AUF_{am}) * (ICAP_{am} * DAF_{am})$$

Where:

- $UCAP_{am}^Q$ is the amount of Unforced Capacity that Aggregation *a* is qualified to provide in month *m*.
- $ICAP_{am}$ is the total ICAP MW for Aggregation *a* which is calculated on a monthly basis by summing the ICAP MW values for all individual ESR comprising the Aggregation.
- DAF_{am} is the Duration Adjustment Factor expressed in percentage for Aggregation *a* which is applicable for month *m*, pursuant to Section 4.1.1 of the ICAP Manual and Section 5.12.14 of the ISO Services Tariff.
- AUF_{am} (*Average Unavailability Factor_{am}*) is the Derating Factor calculated for Aggregation *a* that will be used to determine the amount of Unforced Capacity that an Aggregation will be permitted to provide in month *m*.

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations without an EDL

Where:

$$AUF_{am} = \left(1 - \left(\frac{\text{Aggregation ESR Contributions}_{a,m}}{ICAP_{am}} \right) \right)$$

- The AUF applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs, each based on the ESRs comprising the Aggregation.
- $ICAP_{am}$ is the total ICAP MW for Aggregation a which is calculated on a monthly basis by summing the ICAP MW values for all individual ESR comprising the Aggregation a .
- $\text{Aggregation ESR Contributions}_{am}$ is the summation of MW contribution from each individual ESR in Aggregation a for month m ; and is calculated as follows:

$$\text{Aggregation ESR Contributions}_{am} = \sum_{esr \in a_m} ICAP_{esr\ m} \times AUF_{esr\ s}$$

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations without an EDL

Where:

- $ICAP_{esr\ m}$ is the ICAP MW for each individual ESR esr which is applicable for month m ; and is calculated as follows:

$$ICAP_{esr\ m} = \min(DMNC_{esr\ m}, CRIS_{esr\ m}, Total\ Supply\ Declared\ Value_{esr\ m})$$

- $DMNC_{esr\ m}$ is the Demonstrated Maximum Net Capability for the individual ESR esr for Month m ;
- $CRIS_{esr\ m}$ is the Capacity Resource Interconnection Service Value for the individual ESR esr for Month m ;
- $Total\ Supply\ Declared\ Value_{esr\ m}$ is the MW amount reflecting the Injection capability of the ESR esr , and may be equal to or less than the $ESR\ CRIS$ or $ESR\ DMNC$ for the Month m ;

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations without an EDL

And:

$AUF_{esr,s}$ is the Average Unavailability Factor value for the individual ESR esr in a given month m . If month m is in the Winter Capability Period, then $AUF_{esr,s}$ will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for the ESR esr . If month m is in the Summer Capability Period, then $AUF_{esr,s}$ will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for the ESR esr . It is calculated as follows:

$$AUF_{esr,s} = \frac{\sum_{m \in S} \text{Unavailability Factor}_{am}}{6}$$

The Unavailability Factor value for each individual ESR esr for each month in the calculation of $AUF_{esr,s}$, will be calculated based on historic unavailability data of the Aggregation.

Where:

$$\text{Unavailability Factor}_{a,m} = 1 - \left(\frac{\text{Total Available ICAP Seconds}_{am}}{\text{Total Expected ICAP Seconds}_{am}} \right)$$

- $\text{Total Available ICAP Seconds}_{am}$ is the sum of Total Available ICAP Seconds for Aggregation a for each month m .
- $\text{Total Expected ICAP Seconds}_{am}$ is the sum of seconds in all real-time in month m in which Aggregation a was not on a planned or scheduled outage.
- The calculations for both terms follow the same approach and is consistent with section 3.7 of Attachment J (Calculation of UCAP for ESRs).

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations without an EDL

Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^Q}{(1 - AUF_{am}) * (DAF_{am})} \right)$$

Where:

- ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m .
- $UCAP_{am}^Q$ is the amount of Unforced Capacity that Aggregation a supplies in month m .
- AUF_{am} is the Derating Factor calculated for Aggregation a that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m .
- DAF_{am} is the Duration Adjustment Factor for Aggregation a which is applicable for month m , pursuant to Section 4.1.1 of the *ICAP Manual* and Section 5.12.14 of the ISO Services Tariff.

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations with an EDL with time-stacking

$$UCAP_{am}^Q = (1 - AUF_{am}) * (ICAP_{am} * DAF_{am})$$

Where:

- $UCAP_{am}^Q$ is the amount of Unforced Capacity that Aggregation a is qualified to provide in month m .
- $ICAP_{am}$ is the total ICAP MW for Aggregation a which is calculated on a monthly basis by taking the minimum or consecutive sustained output from all individual ESR comprising the Aggregation.
- DAF_{am} is the Duration Adjustment Factor expressed in percentage for Aggregation a which is applicable for month m , pursuant to Section 4.1.1 of the ICAP Manual and Section 5.12.14 of the ISO Services Tariff.
- AUF_{am} (*Average Unavailability Factor_{am}*) is the Derating Factor calculated for Aggregation a that will be used to determine the amount of Unforced Capacity that an Aggregation will be permitted to provide in month m .

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations with an EDL with time-stacking

Where:

$$AUF_{am} = 1 - \left(\frac{\text{Aggregation ESR Contributions}_{am}}{ICAP MWh_{am}} \right)$$

Where:

- *Aggregation ESR Contributions*_{am} is the MW contribution from all ESR in Aggregation *a* for month *m*; and is calculated as follows:

$$\text{Aggregation ESR Contributions}_{am} = \sum_{esr \in a_m} ICAP_{esr\ m} \times AUF_{esr\ s}$$

Where:

- *ICAP Mwh*_{esr m} is the contribution of each ESR's ICAP MW in Aggregation *a* for month *m*, multiplied by the number of hours that the ESR will contribute to the Aggregation time-stacking. Further defined in next slide:

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations with an EDL with time-stacking

$$ICAP\ MWh_{esr\ m} = \left(\min \left(DMNC_{esr\ m}, CRIS_{esr\ m}, Total\ Supply\ Declared\ Value_{esr\ m} \right) \right) \times (Elected\ Timestacking\ hour(s))$$

Where:

- $DMNC_{esr\ m}$ is the Demonstrated Maximum Net Capability for the individual ESR esr for Month m ; for an Aggregation that has an EDL and is time-stacking, the DMNC is the minimum of either:
 - 1) Minimum DMNC – the minimum of all post-test rating MWs for all time-stacked hours included in the duration of the DMNC test for the applicable Capability Period.
 - 2) Average EDL DMNC – If applicable, the sum of the DMNC MW based on a previous EDL DMNC test, for all ESR, comprising the Aggregation, divided by the minimum of either 1) the Aggregation-level EDL or 2) the time-stacking hours contributed by the ESR.
- $CRIS_{esr\ m}$ is the Capacity Resource Interconnection Service Value for the individual ESR esr for Month m ;
- $Total\ Supply\ Declared\ Value_{esr\ m}$ is the MW amount reflecting the Injection capability of the ESR esr , and may be equal to or less than the ESR CRIS or ESR DMNC for the Month m ;
- $Elected\ Timestacking\ hour(s)$ is the declared number of hours that a ESR will contribute to the Aggregation's total time stacked duration.

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations with an EDL with time-stacking

And:

AUF_{esr_s} is the Average Unavailability Factor value for the individual ESR esr in a given month m . If month m is in the Winter Capability Period, then AUF_{esr_s} will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for the ESR esr . If month m is in the Summer Capability Period, then AUF_{esr_s} will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for the ESR esr . It is calculated as follows:

$$AUF_{esr_s} = \frac{\sum_{m \in s} Unavailability\ Factor_{am}}{6}$$

The Unavailability Factor value for each individual ESR esr for each month in the calculation of AUF_{esr_s} , will be calculated based on historic unavailability data of the Aggregation.

Where:

$$Unavailability\ Factor_{am} = 1 - \left(\frac{Total\ Available\ ICAP\ Seconds_{am}}{Total\ Expected\ ICAP\ Seconds_{am}} \right)$$

- $Total\ Available\ ICAP\ Seconds_{am}$ is the sum of Total Available ICAP Seconds for Aggregation a for each month m .
- $Total\ Expected\ ICAP\ Seconds_{am}$ is the sum of seconds in all real-time in month m in which Aggregation a was not on a planned or scheduled outage.
- The calculations for both terms follow the same approach and is consistent with section 3.7 of Attachment J (Calculation of UCAP for ESRs).

ICAP Manual – Appendix: Attachment J

UCAP for ESR Aggregations with an EDL with time-stacking Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^Q}{(1 - AUF_{am}) * (DAF_{am})} \right)$$

Where:

- ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*.
- $UCAP_{am}^Q$ is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*.
- AUF_{am} is the Derating Factor calculated for Aggregation *a* that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month *m*.
- DAF_{am} is the Duration Adjustment Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 4.1.1 of the *ICAP Manual* and Section 5.12.14 of the ISO Services Tariff.

Next Steps

Next Steps

- **Please provide feedback to the NYISO by COB Thursday, May 4.**
- **NYISO intends to return with additional language in May.**
- **NYISO will post any subsequent revisions to redlined documents on the website.**
- **Please send any questions, comments, or feedback that were not addressed during this presentation to: DER_Feedback@nyiso.com**
 - Comments/feedback submitted to the NYISO will be posted publicly unless the NYISO is specifically asked not to do so.

Our Mission & Vision



Mission

Ensure power system reliability and competitive markets for New York in a clean energy future



Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

Questions?