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Installed Capacity
Manual Attachments

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(Version 12.0)

2024–2025 Maximum Allowances for Installed Capacity Provided by Resources Outside the NYCA (Excludes Resources using Unforced Capacity Deliverability Rights – UDRs)

- The maximum Installed Capacity Equivalent of Unforced Capacity that may be allocated for a NYCA interface is set forth in the tables below. These tables will be updated annually based on ISO reliability studies. See Attachment E for a list of Grandfathered contracts. With the exception of Unforced Capacity Deliverability Rights (UDRs), Import Rights will be permitted on a first-come, first-serve basis.[a] Note also that, for all interfaces, any External Installed Capacity that is being wheeled-through the NYCA will reduce Import Rights availability on the importing interface by the amount of Installed Capacity being wheeled and Import Rights taken on the interface will reduce any External Installed Capacity that can be wheeled through the NYCA.

- The maximum amount of Installed Capacity that may be allocated for NYCA interfaces is:

Amount of External ICAP Permitted to be Allocated for NYCA Interfaces	Total (MW)	Grandfathered (MW) and CY External CRIS (MW)	Remaining (MW)
	2404	38 (May 1, 2024 – April 30, 2025)	2366 (May 1, 2024 – April 30, 2025)

- The maximum amount of Installed Capacity subject to the above limits that may be allocated for NYCA interfaces from each of the following Control Areas, due to transmission constraints, is as follows:

Neighboring Control Area	Total (MW)	Grandfathered (MW) and CY External CRIS (MW)	Remaining (MW)
PJM	1177	38	1139
ISO-NE	68	0	68
Ontario	37	0	37
Quebec via Chateauguay	1122	1110 May - October 914 November 0 December – February 20 March 914[k] April	12 May - October 208 November 1122 December – February 1102 March 208 April
Quebec via Cedars	0	0	0

The amount set forth in the tables immediately above for PJM includes 1080 MW of PJM Import Rights, which are subject to reservation in accordance with *NYISO Services Tariff* Section 5.12.2 in amounts up to those listed in the *NYISO OATT* Attachment L, Section 18.3, Table 3 (Existing Transmission Capacity for Native Load ETCNL), and includes 1110 MW of External CRIS Rights at the Chateauguay Interface and 38 MW of

Grandfathered capacity in the PJM Control Area (as set forth in Attachment E of this *ICAP Manual*).

2025–2026 Maximum Allowances for Installed Capacity Provided by Resources Outside the NYCA (Excludes Resources using Unforced Capacity Deliverability Rights – UDRs)

- The maximum Installed Capacity Equivalent of Unforced Capacity that may be allocated for a NYCA interface is set forth in the tables below. These tables will be updated annually based on ISO reliability studies. See Attachment E for a list of Grandfathered contracts. With the exception of Unforced Capacity Deliverability Rights (UDRs), Import Rights will be permitted on a first-come, first-serve basis.[a] Note also that, for all interfaces, any External Installed Capacity that is being wheeled-through the NYCA will reduce Import Rights availability on the importing interface by the amount of Installed Capacity being wheeled and Import Rights taken on the interface will reduce any External Installed Capacity that can be wheeled through the NYCA.

- The maximum amount of Installed Capacity that may be allocated for NYCA interfaces is:

Amount of External ICAP Permitted to be Allocated for NYCA Interfaces	Total (MW)	Grandfathered (MW) and CY External CRIS (MW)	Remaining (MW)
	2304	38 (May 1, 2025 – April 30, 2026)	2266 (May 1, 2025 – April 30, 2026)

- The maximum amount of Installed Capacity subject to the above limits that may be allocated for NYCA interfaces from each of the following Control Areas, due to transmission constraints, is as follows:

Neighboring Control Area	Total (MW)	Grandfathered (MW) and CY External CRIS (MW)	Remaining (MW)
PJM	1171	38	1133
ISO-NE	8	0	8
Ontario	13	0	13
Quebec via Chateauguay	1112	1110 May - October 914 November 0 December – February 20 March 914[k] April	2 May - October 198 November 1112 December – February 1092 March 198 April
Quebec via Cedars	0	0	0

The amount set forth in the tables immediately above for PJM includes 1080 MW of PJM Import Rights, which are subject to reservation in accordance with *NYISO Services Tariff* Section 5.12.2 in amounts up to those listed in the *NYISO OATT* Attachment L, Section 18.3, Table 3 (Existing Transmission Capacity for Native Load ETCNL), and

includes 1110 MW of External CRIS Rights at the Chateauguay Interface and 38 MW of Grandfathered capacity in the PJM Control Area (as set forth in Attachment E of this *ICAP Manual*).

Unforced Capacity Deliverability Rights (UDRs), not subject to the above limits or first-come, first-serve Import Rights, are:
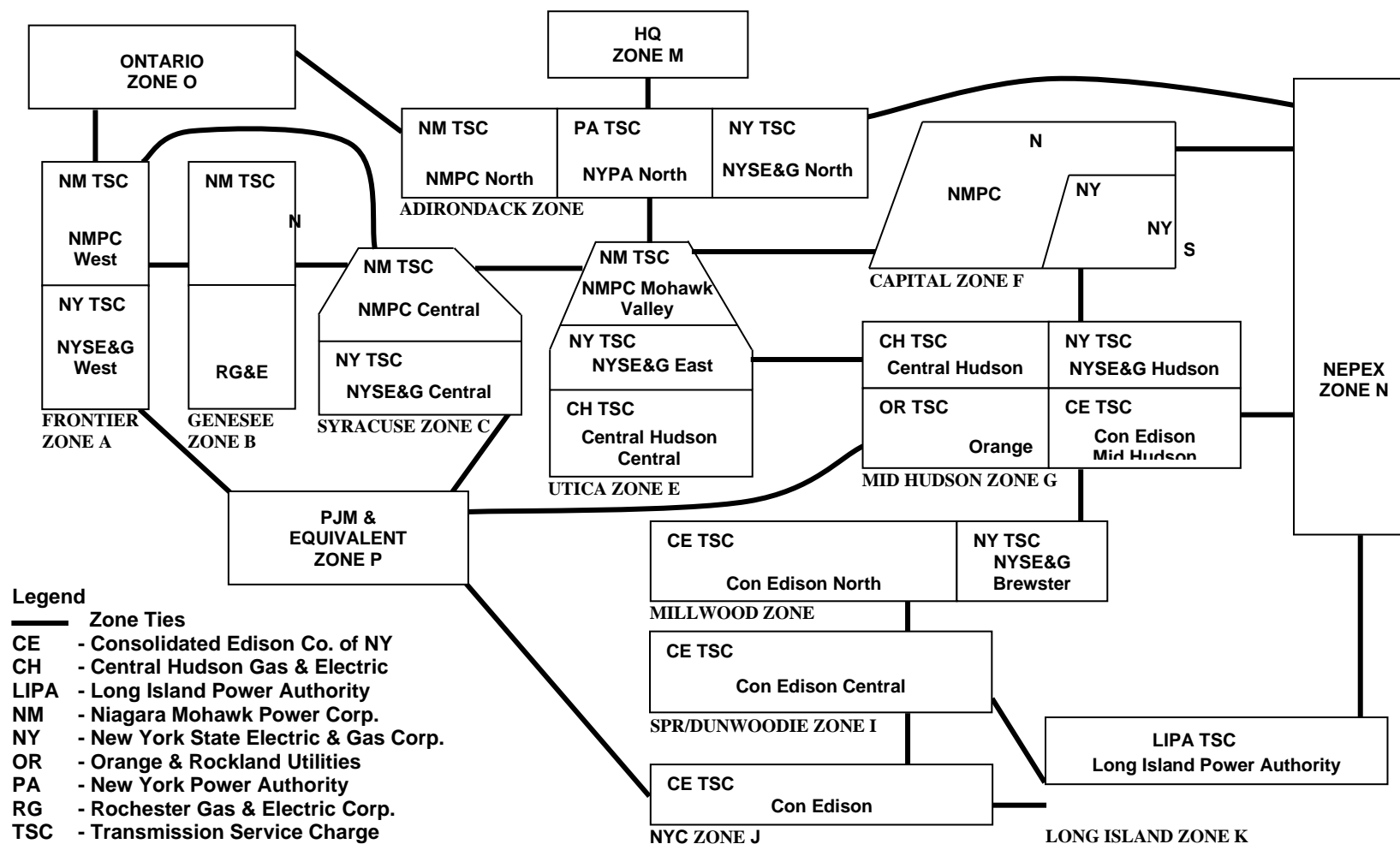
Unforced Capacity Deliverability Rights	
Cross Sound Cable (CSC) – New England to Long Island, Zone K	330 MW
Neptune Cable – PJM to Long Island, Zone K	660 MW
Linden VFT – PJM to New York City, Zone J	315 MW
Hudson Transmission Project - PJM to New York City, Zone J	660 MW[j]

Footnotes

[a]   Please refer to Section 4.9 of this Manual for further information in connection with ICAP sales in the NYCA from Resources located in External Control Areas.

[b]   The "Total" and "Remaining" NYCA ICAP that may be located in each of the listed External Control Areas, when tallied, exceeds the total amount of external ICAP permitted to be sold in the NYCA.

[c]   1080 MW of PJM Import Rights are subject to reservation in accordance with Section 5.12.2 of the ISO Services Tariff in amounts up to those listed in OATT Attachment L Table 3 (Existing Transmission Capacity for Native Load ETCNL), including 37 MWs of Grandfathered capacity in the PJM Control Area (see Attachment E of this Manual).

[d]   350 MW of Installed Capacity can be wheeled from Quebec via Ontario.

[e]   This is the amount that may be allocated for the NYCA Interfaces at the Chateaguay and Dennisons ties.

[f]   Figures represent awarded UDRs and do not necessarily reflect the use of UDRs described in section 4.14 of the ICAP Manual. The procedures for requesting and using UDRs can be found in sections 2.194a.1 and 5.10 through 5.12 of the Market Administration and Control Area Services Tariff and sections 4.9 and 4.14 of the ICAP Manual.

[j]   CRIS Rights for the HTP line expired 4/30/2020

[k]   The MW at Quebec via Chateauguay are subject to Section 25.7.11 of the NYISO OATT Attachment S

Attachment C   Maps of the NYCA Transmission Districts and Zones

(Version 1.0)

Legend

— Zone Ties
- CE   - Consolidated Edison Co. of NY
- CH   - Central Hudson Gas & Electric
- LIPA - Long Island Power Authority
- NM   - Niagara Mohawk Power Corp.
- NY   - New York State Electric & Gas Corp.
- OR   - Orange & Rockland Utilities
- PA   - New York Power Authority
- RG   - Rochester Gas & Electric Corp.
- TSC - Transmission Service Charge

Attachment D   DMNC Test Supplemental Information Form

***DMNC Test Supplemental Information Form Version 1.6** Dependable Maximum Net Capability Test Supplemental Information Form, and the Procedure to Weather Adjust DMNC Test Data*

The following forms are included in this attachment:

- Steam Generation
- Hydro Generation
- Internal Combustion and Combustion Turbine Generation
- Combined Cycle Generation
- Energy Storage Resource – electrochemical technology (for example, lithium ion battery)
- Energy Storage Resource – other (non-electrochemical) technology
- DER Aggregations
- Other

> **Note:** The forms themselves are accessible from the NYISO Web site at https://www.nyiso.com/installed-capacity-market

Procedure to Weather Adjust DMNC Test Data

All DMNC tests on internal combustion, combustion units and combined cycle units must be temperature adjusted. The Average Ambient Temperature to be used for the temperature adjustment is the average of the ambient temperatures recorded at the time of the Transmission District's seasonal peak during the previous four like-Capability Periods (as posted at the link given here), as recorded at the nearest approved weather station or recorded on an auditable recording device at the generator site. Once the decision is made where the temperature is obtained that location may not change for future test data submittals. The dates and times of the Transmission District peak in each Capability Period are posted on the ISO website at: https://www.nyiso.com/installed-capacity-market under "ICAP Information." & Announcements." The Test Temperature is defined as the temperature measure closest to the start of the test period obtained from the location chosen (above) then averaged for each hour of the test.

- Determine the weather adjusted DMNC rating for the generator using the manufacturer's provided temperature adjustment curve, and if applicable, determine the weather adjusted DMNC rating using generator specific curves produced from historical experience.
- Provide the rating and temperature adjustment curves.

Submittal of DMNC Test Data

DMNC test data must be submitted separately in accordance with Attachment A, and Sections 2.7 and 4.2 of this ICAP Manual, online via the ICAP Automated Market System. Attachment D submittals should be addressed as follows:

> Email: dmncattachments@nyiso.com

Attachment E   Grandfathered External Installed Capacity Agreements

(Version 4.0)

Existing Installed Capacity Agreements entered into by Load Serving Entities and Suppliers in the neighboring Control Areas prior to September 17, 1999 have a Grandfathered status for the duration of the original contract.

Grandfathered External Installed Capacity rights are described in Section 5.12.2 of the ISO Services Tariff.

The Grandfathered contracts associated with each of the neighboring Control Areas are listed below:

Neighboring Control Area	Grandfathered (MW)	Contract Est. Date	Contract End Date
PJM	37	10/1/1990 11/1/1990	10/1/2030 11/1/2030
ISO-NE	50	9/25/1996	12/31/2013

Attachment F   Agreement to Purchase or Sell Unforced Capacity in NYISO Installed Capacity Auctions

(Version 5.0)

THIS AGREEMENT TO PURCHASE OR SELL UNFORCED CAPACITY (the "Agreement"), dated as of this _____ day of _____, _____, is given by _____, having a principal business address at _____ (referred to hereinafter as "Market Participant," or "Offeror" or "Bidder").

RECITALS

WHEREAS, pursuant to the terms of the New York Independent System Operator Market Administration and Control Area Services Tariff (the "ISO Services Tariff") and the NYISO Installed Capacity Manual (the "ICAP Manual"), the New York Independent System Operator, Inc. (the "NYISO") will administer (i) six-month Capability Period "Strip" auctions (twice per year) and "Monthly" auctions (12 per year), wherein Offerors may sell and Bidders may purchase Unforced Capacity, and, (ii) "Spot Market" auctions (12 per year), wherein Offerors may sell Unforced Capacity and the NYISO will purchase Unforced Capacity on behalf of Load Serving Entities; and

WHEREAS, a capitalized term used herein without definition shall have the meaning ascribed thereto in the ISO Services Tariff or the Independent System Operator Agreement (the "ISO Agreement") or the ICAP Manual; and

WHEREAS, because Market Participant may, at various times, be participating in the Strip, Monthly, or Spot Market Auctions as an Offeror seeking to sell or a Bidder seeking to purchase Unforced Capacity, Article 1 of this Agreement shall govern bids to purchase Unforced Capacity ("Bids") and Article 2 of this Agreement shall govern offers to sell Unforced Capacity ("Offers"); and

WHEREAS, to the extent that Bidder purchases Unforced Capacity under the terms of this Agreement, Bidder satisfies its Unforced Capacity requirements with the Unforced Capacity so purchased; and

WHEREAS, Market Participant, whether acting as a Bidder or Offeror, is a Customer under the ISO Services Tariff and is eligible to participate in a NYISO Installed Capacity ("ICAP") auction ("Auction"), and intends to submit this Agreement, coupled with submissions of properly formatted Bids or Offers (each an "Electronic Bid" or "Electronic Offer") (such Bids or Offers together with the Agreement constituting a "Bid Package" or "Offer Package" respectively) to Auctions operated on an automated basis through the submission of Bids and Offers over the Internet (the "ICAP Automated Market System"); and

WHEREAS, Market Participant intends that such Bid Package or Offer Package shall constitute a binding Bid or Offer for the purposes of each Auction in which Market Participant submits an Electronic Bid or Offer and that the Bid or Offer Package will be recorded and objectively analyzed pursuant to the ISO Services Tariff and the ICAP Manual, which materials have been reviewed by Market Participant; and

WHEREAS, any prior Agreement to Purchase Unforced Capacity in NYISO Installed Capacity Auctions or Agreement to Sell Unforced Capacity in NYISO Installed Capacity Auctions executed by Market Participant and the NYISO shall remain in full force and effect until the implementation of the ICAP Automated Market System, at which time such prior agreement shall be superseded by this Agreement, and thereafter this Agreement shall govern Market Participant's ICAP market participation; and

NOW, THEREFORE, in consideration of the NYISO's including Market Participant's Electronic Bids and Electronic Offers in the Auctions, which Market Participant acknowledges and agrees is adequate consideration for its obligations hereunder, Market Participant and the NYISO (together the "Parties") hereby agree to the following:

1. **Purchases of Unforced Capacity**

    A. **Bids to Purchase Unforced Capacity.**

    (1) Auctions shall be conducted in accordance with the ISO Services Tariff and the ICAP Manual.

    (2) Each Electronic Bid submitted is valid for only one Auction. An Electronic Bid must be submitted for each Auction in which Bidder desires to participate.

    (3) Bidder offers to purchase Unforced Capacity in the amounts, for the monthly effective periods, in the locations and for the maximum price (or less) listed in Bidder's Electronic Bids (each individual bid listed in Bidder's Electronic Bid being referred to as an "Individual Bid"), and requests that the NYISO include the Individual Bids in the Auction for which they are submitted.

    (4) The purchase price for the Unforced Capacity offered in each Individual Bid in an Auction shall be the Market Clearing Price established in that Auction as determined by the NYISO.

    (5) Bidder's submission of a completed Bid Package represents a binding obligation of Bidder to purchase and pay for the amount of Unforced Capacity designated by the NYISO in the Award Notice (as defined below) pursuant to the terms of the ISO Services Tariff and the ICAP Manual.

    (6) The submission of a Bid Package does not obligate the NYISO to accept the Bid Package, in whole or in part, nor does the submission of a Bid Package grant any right to Bidder to purchase any Unforced Capacity.

    (7) The Market Clearing Price for Unforced Capacity can be positive or zero.

    (8) Any of the Individual Bids contained in Bidder's Electronic Bids, or an entire Electronic Bid, may be amended by Bidder at any time during the period specified for the submission of Electronic Bids (the "Bidding Period") by submitting an amended Individual Bid or a new entire Electronic Bid, any of which subsequent Bids must be received in accordance with this Agreement, the ISO Services Tariff and the ICAP Manual. If such an amended Individual Bid or new Electronic Bid is timely and correctly submitted by Bidder as provided herein, the most recently received Individual Bid or Electronic Bid, as indicated by the date and time of submission reported in the ICAP Automated Market System, shall supersede any previous version of the Individual Bid or Electronic Bid being changed, and any superseded Individual Bid or Electronic Bid shall have no further force or effect. A newly uploaded Electronic Bid must include all Individual Bids that Bidder intends to be in effect, including any previously submitted Individual Bids that are not being amended.

    (9) To complete a Bid Package, Bidder must submit, in addition to this Agreement, a properly formatted Electronic Bid to the ICAP Automated Market System prior to the close of the Bidding Period in each Auction in which Bidder wishes to participate. The Parties further agree that all Electronic Bids must be submitted in the format, and include all the information, required by the ICAP Automated Market System, the ISO Services Tariff and

the ICAP Manual, and that the time of submission for all Electronic Bids shall be determined by the ICAP Automated Market System.

(10) Timely submission of a Bid Package does not guarantee that the Bid Package is valid for inclusion in an Auction. This Agreement is a component of a complete Bid Package, and if not completed in conformity with the ISO Services Tariff and the ICAP Manual and the terms and conditions of the form of this Agreement included in the ICAP Manual as Attachment F thereto shall, in the NYISO's sole determination, be invalid and may be rejected. Signature by the NYISO in the place provided below shall signify its acceptance of this Agreement. Whether the Electronic Bid component of a Bid Package is sufficient in format and content shall be assessed by the ICAP Automated Market System, which may reject any incomplete or insufficient Electronic Bid.

(11) In the event that the NYISO rejects a form of this Agreement tendered as a component of a Bidder's Bid Package, it shall notify Bidder as soon as reasonably possible via email. If a Bidder's Agreement is rejected, Bidder shall have the right to submit a replacement Agreement. Rejected Electronic Bids may be resubmitted at any time during the Bidding Period for an Auction until the close of that Bidding Period.

(12) Bidder bears the sole responsibility for submitting a correct and complete Bid Package.

(13) Bidder shall not assign any of its rights or obligations under a Bid Package unless the assignee of such rights and obligations makes the representations and warranties in Section 5 applicable to bidders and is otherwise eligible to participate in the Auction or Auctions to which the Bid Package is applicable.

B. Payment Procedures for the Purchase of Unforced Capacity.

(1) Bidder's obligation to purchase and pay for Unforced Capacity shall become effective upon the posting following each Auction in the ICAP Automated Market System of awards of Unforced Capacity from the Auction results (the "Award Notice"). The Award Notice shall specify the amount of Unforced Capacity, if any, that Bidder shall be required to purchase (the "Awarded Unforced Capacity"), the Market Clearing Price of such Awarded Unforced Capacity, the location of such Awarded Unforced Capacity, and the Total Purchase Price, as defined in this Section 1B(1). The Total Purchase Price shall equal the sum of the products of the amount of Awarded Unforced Capacity and the Market Clearing Price for such capacity.

(2) Amounts due on Unforced Capacity purchased in a Strip Auction shall be settled on a monthly basis. In each monthly billing, the NYISO shall issue bills for one sixth of the Total Purchase Price specified in the Award Notice for the last Capability Period Auction. Bills issued by the NYISO for the purchase of Unforced Capacity shall be net of any rebates due to Bidder.

(3) Amounts due on Unforced Capacity purchased in Monthly and Spot Market Auctions shall be settled on a monthly basis. In each monthly billing, the NYISO shall issue bills for the Total Purchase Price specified in the Award Notice for the last Auction. Bills issued by the NYISO for the purchase of Unforced Capacity shall be net of any rebates due to Bidder.

(4) By 10:00 AM on the first banking day after the fifteenth day of the month after the month for which Unforced Capacity was purchased in any Auction, Bidder shall cause funds to be wired according to instructions in the monthly billing invoice in an amount equal to the cumulative Total Purchase Price from all such Auctions as indicated in the monthly billing invoice issued by the NYISO.

(5) To the extent that Bidder disputes the calculation of the Total Purchase Price due and payable, Bidder shall remain obligated to make payment in full for the Unforced Capacity indicated in the Award Notice. If it is later determined in accordance with this Agreement that an overpayment has been made by Bidder to the NYISO, then the NYISO shall refund the amount overpaid to Bidder. If it is later determined in accordance with this Agreement that an underpayment has been made by Bidder, then Bidder shall pay the amount owed to the NYISO. Payments made pursuant to this Section 1B(5) shall also include interest calculated from the date that the overpayment or underpayment was made, in accordance with the methodology specified for interest on refunds in the Federal Energy Regulatory Commission ("FERC") regulations at 18 C.F.R. § 35.19a(a)(2)(iii).

(6) If the NYISO determines that a mistake has been made in the information provided in an Award Notice after its delivery, the NYISO reserves the right and has the obligation to revise the Award Notice and the information therein, and Bidder acknowledges that it shall be obligated to pay or receive payment for Unforced Capacity in accordance with the revised Award Notice. Prior to making such revision, the NYISO shall notify Bidder of the mistake and provide Bidder with an explanation of the basis for the revised Award Notice.

2. **Sales of Unforced Capacity**

A. **Offers to Sell Unforced Capacity.**

(1) Auctions shall be conducted in accordance with the ISO Services Tariff and the ICAP Manual.

(2) Each Electronic Offer submitted is valid for only one Auction. An Electronic Offer must be submitted for each Auction in which Offeror desires to participate.

(3) Offeror offers to sell Unforced Capacity in the amounts, for at least the minimum prices, and from the resources specified in Offeror's Electronic Offers (each individual offer listed in an Offeror's Electronic Offer being referred to as an "Individual Offer"), and requests that the NYISO submit the Individual Offers in the Auction for which they are submitted.

(4) The sale price for Unforced Capacity offered in each Individual Offer in an Auction shall be the Market Clearing Price established in that Auction as determined by the NYISO; provided, however, that if the Unforced Capacity is from a Subject Generator (as defined in Attachment I of the ICAP Manual) then the sale price for the Unforced Capacity indicated in such Individual Offer shall be calculated pursuant to the ICAP Manual.

(5) Offeror's submission of a completed Offer Package represents a binding obligation of Offeror to sell the amount of Unforced Capacity referenced in an Electronic Offer.

(6) The submission of an Offer Package does not obligate the NYISO to accept the Offer Package, in whole or in part, nor does the submission of an Offer Package grant any right to Offeror to sell any Unforced Capacity.

(7) The Market Clearing Price for Unforced Capacity can be positive or zero.

(8) Any of the Individual Offers contained in Offeror's Electronic Offers, or an entire Electronic Offer, may be amended by Offeror at any time during the period specified for the submission of Electronic Offers (the "Offering Period") by submitting an amended Individual Offer or a new entire Electronic Offer, any of which subsequent offers must be received in accordance with this Agreement, the ISO Services Tariff and the ICAP Manual.

If such an amended Individual Offer or new Electronic Offer is timely and correctly submitted by Offeror as provided herein, the most recently received Individual Offer or Electronic Offer, as indicated by the date and time of submission reported in the ICAP Automated Market System, shall supersede any previous version of the Individual Offer or Electronic Offer being changed, and any such superseded Individual Offer or Electronic Offer shall have no further force or effect. A newly uploaded Electronic Bid must include all Individual Offers that Offeror intends to be in effect, including any previously submitted Individual Offers that are not being amended.

(9) To complete an Offer Package, Offeror must submit, in addition to this Agreement, a properly formatted Electronic Offer to the ICAP Automated Market System prior to close of the Offering Period in each Auction in which Offeror wishes to participate. The Parties further agree that all Electronic Offers must be submitted in the format, and include all the information, required by the ICAP Automated Market System, the ISO Services Tariff and the ICAP Manual, and that the time of submission for all Electronic Offers shall be determined by the ICAP Automated Market System.

(10) Timely submission of an Offer Package does not guarantee that the Offer Package is valid for inclusion in an Auction. This Agreement is a component of an Offer Package, and if not completed in conformity with the ISO Services Tariff and the ICAP Manual and the terms and conditions of the form of this Agreement included in the ICAP Manual as Attachment F thereto shall, in the NYISO's sole determination, be invalid and may be rejected. Signature by the NYISO in the place provided below shall signify its acceptance of this Agreement. Whether the Electronic Offer component of an Offer Package is sufficient in format and content shall be assessed by the ICAP Automated Market System, which may reject any incomplete or insufficient Electronic Offer.

(11) In the event that the NYISO rejects a form of this Agreement tendered as a component of an Offeror's Offer Package, it shall notify Offeror as soon as reasonably possible via email and Offeror shall have the right to submit a replacement Agreement. Rejected Electronic Offers may be resubmitted at any time during the Offering Period for an Auction until the close of that Offering Period.

(12) The Parties agree that Offeror bears the sole responsibility for submitting a correct and complete Offer Package.

B. Payment Procedures for Sales of Unforced Capacity

(1) Offeror's obligation to sell Unforced Capacity shall become effective upon the posting following each Auction in the ICAP Automated Market System of awards of Unforced Capacity from the Auction results (the "Award Notice"). The Award Notice shall specify the amount of Unforced Capacity that Offeror has sold in the Auction ("Sold Capacity"), the Market Clearing Price of such Unforced Capacity, the location of the resource and the Total Selling Price, as defined in this Section 2B(1). The Total Selling Price shall equal the sum of the products of the amounts of Sold Capacity and the Market Clearing Price applicable to each Individual Offer for such Sold Capacity, except, if any Individual Offer to be included in such calculation includes Unforced Capacity from a Subject Generator (as defined in the Attachment I of the ICAP Manual), then the individual sales price for any such Individual Offer that must be included in the calculation of Total Selling Price shall be calculated pursuant to the ICAP Manual.

(2) Amounts owed on Unforced Capacity sold in a Strip Auction shall be settled on a monthly basis. In each monthly payment, the NYISO shall pay one sixth of the Total Selling Price

specified for an Offeror in the Award Notice for the last Capability Period Auction, and continue such payments each month thereafter until the total award value is satisfied.

(3) Unforced Capacity sold in Monthly and Spot Market Auctions shall be settled on a monthly basis. In each monthly billing, the NYISO shall issue bills for the Total Selling Price specified in the Award Notice for the last Auction.

(4) By 10:00 AM on the first banking day after the 20th day of the month after the month for which Unforced Capacity was sold in any Auction, the NYISO shall cause funds to be wired to the accounts specified by Offeror in an amount equal to the cumulative Total Selling Price from all such Auctions, as indicated in the monthly billing invoice issued by the NYISO.

(5) Within six (6) business days after the day on which Offeror's Award Notice is posted on the ICAP Automated Market System, Offeror shall give wiring instructions to the NYISO, designating the account(s) to which funds generated from the Auction shall be transferred by the NYISO pursuant to the ICAP Manual.

(6) To the extent that Offeror disputes the calculation of the Total Selling Price due and payable, NYISO shall remain obligated to make payment in full for the Unforced Capacity as indicated in the Award Notice. If it is later determined in accordance with this Agreement that an underpayment has been made by the NYISO to Offeror, then the NYISO shall pay the amount owed to Offeror. If it is later determined in accordance with this Agreement that an overpayment has been made by the NYISO to Offeror, then Offeror shall refund the amount of the overpayment to the NYISO. Payments made pursuant to this Section 2B(6) shall also include interest calculated from the date that the underpayment or overpayment was made, in accordance with the methodology specified for interest on refunds in the FERC regulations at 18 C.F.R. § 35.19a(a)(2)(iii).

(7) If the NYISO determines that a mistake has been made in the information provided in an Award Notice after its delivery, the NYISO reserves the right and has the obligation to revise the Award Notice and the information therein, and Offeror acknowledges that it shall be obligated to pay or receive payment for Unforced Capacity in accordance with the revised Award Notice. Prior to making such revision, the NYISO shall notify Offeror of the mistake and provide Offeror with an explanation of the basis for the revised Award Notice.

3. Dispute Resolution

(1) Within six (6) business days after the day on which Market Participant's Award Notice is posted on the ICAP Automated Market System, to the extent that Market Participant disputes the calculation of the Total Purchase Price or the Total Selling Price, Market Participant shall give written notice by email or electronic facsimile transmission to the NYISO, setting forth in reasonable detail the basis for any such disagreement ("Dispute"). If Market Participant does not give written notice within the six (6) business day period, Market Participant shall be deemed to have irrevocably accepted the Total Purchase Price or Total Selling Price as specified in the Award Notice as delivered to Market Participant by the NYISO.

(2) If a timely filed written notice of a Dispute is given, Market Participant and the NYISO shall promptly commence good faith negotiations with a view to resolving the Dispute within five (5) business days of the NYISO's receipt of such notice. If the Dispute is not resolved within the five (5) business day period, then the Dispute shall thereafter be referred by either Market Participant or the NYISO to the Director of the FERC Office of

Dispute Resolution Service or the successor office (the "Director") for a resolution of such Dispute in accordance with this Agreement, the ISO Services Tariff and the ICAP Manual. The resolution of the Dispute shall be conducted in the following manner:

(a) Within three (3) business days after being notified of a Dispute, the Director shall identify and create a list of five (5) arbitrators who must be knowledgeable about the electric energy industry, and deliver the list to Market Participant and the NYISO.

(b) Within five (5) business days of receipt of such list from the Director, Market Participant and the NYISO, separately, shall select three (3) arbitrators from the Director's list and resubmit their selections to the Director.

(c) Within two (2) business days of the Director's receipt of the resubmitted lists of arbitrators from Market Participant and the NYISO, the Director shall select in its sole discretion one arbitrator (the "Arbitrator") from the common name or names on the resubmitted lists to resolve the Dispute in accordance with the terms and conditions of this Agreement and the ICAP Manual. The decision and resolution of the Arbitrator shall be rendered within twenty (20) business days after referral of the Dispute to the Arbitrator and shall be final and binding upon the parties. During this twenty (20) business day period, Market Participant and the NYISO shall be afforded an opportunity to make written and oral presentations to the Arbitrator. Market Participant and the NYISO shall use their best efforts to enable the Arbitrator to render a decision within the twenty (20) business day period described above, and each shall cooperate with the Arbitrator and provide the Arbitrator with access to the books, records and representatives of each as the Arbitrator may require in order to render its determination. All of the fees and expenses of any Arbitrator retained pursuant to this Section shall be paid by the party who does not prevail in the Dispute.

(d) In the event that Market Participant is barred by law from entering into binding arbitration, Disputes shall be heard in a court of competent jurisdiction in the State of New York.

4. Representations and Warranties of Market Participant

A. Market Participant hereby represents and warrants to the NYISO as follows:

(1) Market Participant is a Customer eligible to participate in Auctions and is purchasing or selling Unforced Capacity solely for purposes related to its business as a producer, processor, commercial user of or a merchant handling Unforced Capacity or the products or by-products thereof.

(2) Market Participant shall not resell any Unforced Capacity purchased through an Auction for the purpose of meeting the electric generation capacity requirements in an External Control Area.

(3) Market Participant has full power and authority to execute and deliver the Bid or Offer Package and to perform its obligations hereunder. Each completed Bid or Offer Package constitutes a valid and legally binding obligation of Market Participant.

(4) The execution and delivery of all Bid or Offer Packages and the consummation of the transactions contemplated thereby have been duly and validly approved by all requisite action, corporate or otherwise, on the part of Market Participant, and no other proceeding or action, corporate or otherwise, on the part of Market Participant is necessary to approve and submit Bid or Offer Packages and to consummate the transactions contemplated thereby.

(5) Market Participant is qualified to purchase Unforced Capacity awarded in an Auction and has sufficient funds to purchase such Unforced Capacity as contemplated herein.

(6) Any and all Unforced Capacity being offered pursuant to this Agreement is free and clear of any restrictions on transfer (other than those imposed under the ISO Services Tariff and the ICAP Manual), taxes, security interests, options, warrants, purchase rights, contracts, commitments, equities, claims, or demands.

(7) The amount of Unforced Capacity that Market Participant offers for sale at any time pursuant to this Agreement shall not exceed the amount of capacity that meets the qualifications for Installed Capacity set forth in the ICAP Manual that the resource from which such Unforced Capacity is obtained (the "Selected Resource") is permitted to provide. Market Participant shall provide documentation evidencing the amount of such capacity that the Selected Resource may provide.

(8) The amount of Unforced Capacity that Market Participant offers for sale at any time pursuant to this Agreement shall not exceed Market Participant's share of the amount of Unforced Capacity that the Selected Resource is permitted to provide.

(9) Market Participant owns, has contracted to purchase, or is an authorized agent for the owner of, all shares of Unforced Capacity from the Selected Resource offered pursuant to this Agreement.

(10) The Unforced Capacity offered for sale for any Capability Period pursuant to this Agreement has not previously been committed in the New York market or in any other capacity market for that same Capability Period.

(11) All Unforced Capacity sold by Market Participant in an Auction is thereby committed to the New York Control Area ("NYCA") and cannot be released by Market Participant outside the NYCA until the commitment term of such Unforced Capacity sold in such Auction has expired.

(12) Market Participant shall hold, use, or assign any Unforced Capacity offered in any Auction in accordance with the terms and conditions set forth in the ISO Services Tariff and the ICAP Manual.

(13) Market Participant holds all licenses, franchises, permits and authorizations in compliance with all applicable laws, rules or regulations that are necessary for the lawful ownership or use of Unforced Capacity.

(14) Other than providing the information required to complete this Agreement, Market Participant has not amended or changed this Agreement in any way to make it different from the "Agreement to Purchase or Sell Unforced Capacity in NYISO Installed Capacity Auctions" appended to the ICAP Manual as Attachment F, as may be amended by the NYISO from time to time.

(15) All representations and warranties contained herein shall be deemed to be made again at the time of each purchase or sale of Unforced Capacity in an Auction.

5. Indemnification; Release of Liability

(1) Market Participant agrees to indemnify and save and hold harmless the NYISO, and all of its officers, directors, employees, and agents, from and against any and all losses, damages, expenses, liabilities, claims or demands, including attorney's fees, (collectively, "Damages") whatsoever suffered or incurred by such parties resulting, arising from or relating to Market Participant's breach of any of its agreements, covenants,

representations or warranties contained herein, except for those Damages resulting from the NYISO's gross negligence or intentional misconduct.

(2) Market Participant hereby releases the NYISO, and all of its officers, directors, employees and agents, from any and all liability arising from or relating to the Auctions, except with respect to any gross negligence or intentional misconduct on the part of the NYISO, its officers, directors, employees, or agents.

6. Miscellaneous

(a) All inquiries, notices, and communications can be given by the NYISO to Market Participant as follows:

Name: _____

Address: _____

Phone: _____

Fax: _____

E-mail: _____

Unless otherwise specified in the Agreement, all inquiries, notices, and communications can be given by Market Participant to the NYISO as follows:

Customer Registration Department
c/o The New York Independent System Operator, Inc.
10 Krey Blvd,
Rensselaer, NY 12144
Phone: 518-356-6000
E-mail: participation@nyiso.com

(b) All representations, warranties, covenants, and obligations of this Agreement shall survive each purchase or sale of Unforced Capacity by Market Participant.

(c) Market Participant's Bid or Offer Packages, together with the ISO Services Tariff and the ICAP Manual, shall constitute the entire agreement between the Parties on the subject matter hereof and shall supersede all prior discussions, agreements, and understandings of any kind and nature between them on such subject matter.

(d) It is understood and agreed that the provisions of this Agreement are intended for the respective benefit of Market Participant and the NYISO and may be enforced directly by the NYISO against Market Participant or by Market Participant against the NYISO.

(e) This Agreement and all Electronic Bids and Electronic Offers shall be governed by and construed in accordance with the laws of the State of New York without giving effect to its conflict of laws provisions.

IN WITNESS WHEREOF, this Agreement has been submitted as of the date first above written.

NAME OF MARKET PARTICIPANT: _____

By: _____

Name: _____

Title: _____

(An officer or employee with legal
authority to bind Market Participant)

The New York Independent System Operator, Inc.

By: _____

Name: _____

Title: _____

(An officer or employee with legal
authority to bind the NYISO)

Attachment G   Notification Template

ICAP Notification Template (Required for generating facilities or Aggregations entering the ICAP Market)

[REPLACE BRACKETS AND INSTRUCTIONAL INFORMATION WITHIN THE BRACKETS WITH THE DATA SPECIFIED PRIOR TO EXECUTION]

[Current Date]

[Customer Name]

[Customer Street Address]

[City, State, Zip]

Manager - ICAP Market Operations
New York Independent System Operator
10 Krey Boulevard
Rensselaer, NY 12144

Subject: Notification of [Resource Name] Intent to Seek to Qualify as an ICAP Supplier

Dear NYISO Manager:

[MP Name] intends to seek to qualify a new generating Resource as an Installed Capacity Supplier in the NYISO-administered market effective in the month of [Month-name]. In accordance with the notification requirement in Section 4.2.5 of the Installed Capacity Manual, listed below are the details of this new generating Resource.

Customer Name: [list here]

New Resource Name: [list here]

New Resource ID: [list here the NYISO-issued PTID or Aggregation ID for a Resource located within the NYCA or the reference ID number assigned to the Resource by the Control Area operator in whose Control Area the External Resource is located]

New Resource DMNC Rating: [list here]

New Resource Location (City/State): [list here, and if the new Resource is located in an External Control Area, the Customer must also separately demonstrate that it has ownership of or contractual control over the External Resource]

New Resource Load Zone: [list here the NYCA Load Zone for a Resource electrically located in the NYCA or if external to the NYCA, the zone identifier of the External Control Area in which the Resource is located]

New Resource Transmission Node PTID: [list here the Transmission Node PTID to which the Aggregation electrically maps]

Facility ID(s): [list here the NYISO-issued Facility ID number(s) for all individual DER comprising the Aggregation that is the prospective ICAP Supplier]

_____

Signature

[Customer Employee Name]

[Customer Employee Title]

[Customer Employee Phone Number]

[FN 1] In accordance with the requirements of the Installed Capacity Manual and the Event Calendar, the notification is being sent so that the NYISO receives it notification letter no later than 5:00:00 P.M. on the first business day of the month that is two months prior to the month indicated in this notice. For example, to qualify in the month of April to participate in the May Installed Capacity market, the NYISO must receive this notification letter no later than 5:00:00 P.M. on the first business day of March.

Attachment H   NYISO Administered Installed Capacity Auctions:

Illustrations of Market-Clearing Price Calculations

(Version 1.0)

Example 1: No Locational Constraints Bind, Partially Selected Offer

Suppose that the following offers are made into a second phase of a two-phase auction (or into the single phase of a one-phase auction):

- 100 MW of Unforced Capacity from Generator X, which is located in the NYCA but not in any other Locality, is offered at $2/kW month.
- 100 MW of Unforced Capacity from Generator Y, located in Locality Z, is offered at $5/kW month.

Also suppose the following bids are made into that phase:

- Bidder A offers to purchase 150 MW of Unforced Capacity at $6/kW month.
- Bidder B offers to purchase 75 MW of Unforced Capacity at $3/kW month.

Both Bidders state that the Unforced Capacity they are purchasing must be located in the NYCA, but do not place further restrictions on the location of the Installed Capacity Supplier.

The ISO will select the following offers and bids in this phase:

- All of the 100 MW of Unforced Capacity offered from Generator X.
- 50 MW of the 100 MW of Unforced Capacity offered from Generator Y.
- All of the 150 MW that Bidder A Bids to purchase.
- None of the 75 MW that Bidder B Bids to purchase.

Since all of the Unforced Capacity offered in this phase meets the locational criteria stated in each of the bids, the locational constraints did not affect the ISO's selection of Installed Capacity Suppliers. This also means that the ISO will only calculate a single Market-Clearing Price for Unforced Capacity for this phase, which will apply to all locations.

That Market-Clearing Price shall be the bid cost of meeting demand for a small incremental amount of Unforced Capacity at the lowest cost. If it had been necessary to acquire an additional MW of Unforced Capacity in this phase[*], (1) the ISO could have selected 51 MW from Generator Y, instead of 50 MW; or (2) it could have selected only 149 MW of Bidder A's 150 MW bid to purchase Energy. Since Generator Y's offer price is $5/kW month, while Bidder A's bid price is $6/kW month, it would be less expensive to purchase additional Installed Capacity from Generator Y than to buy it back from Bidder A. Therefore, Generator Y's bid of $5/kW month will set the Market-Clearing Price of Unforced Capacity. (If the price were set at $6/kW month, 200 MW would be offered, while only 150 MW are demanded. Therefore, a price of $6/kW month

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[*] The size of the increment of demand that the NYISO will actually use to determine Market-Clearing Prices will be smaller than the minimum increment specified for bids and offers in the ISO Procedures. Therefore, if the ISO Procedures call for the number of MWs of Unforced Capacity that a Bidder Bids to buy or an Offeror offers to sell to be stated in terms of tenths of a MW, for example, then the ISO would determine Market-Clearing Prices of Unforced Capacity by calculating the bid cost of meeting an incremental demand for a quantity of Unforced Capacity that is smaller than a tenth of a MW.

would not clear the market, and it is necessary to bring the price down to $5/kW month to bring the quantity offered into the market down to 150 MW.)

Example 1
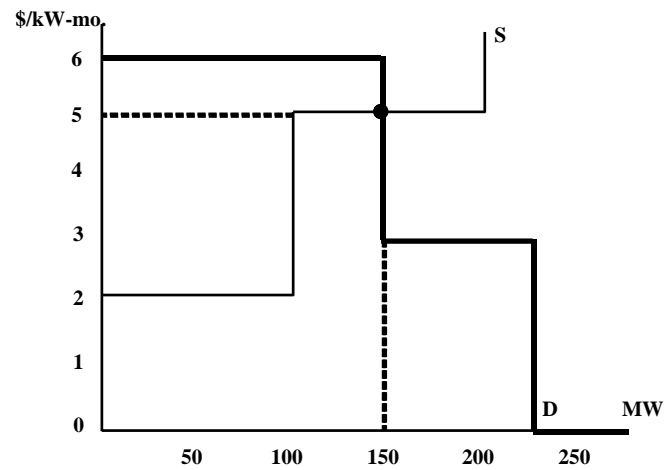
Example 2: No Locational Constraints Bind, Partially Selected Bid

If we modify the preceding example by changing the price specified by Bidder A to $4/kW month (but not making any other changes), then the ISO would select the following offers and bids in this phase:

- All of the 100 MW of Unforced Capacity offered from Generator X.
- None of the 100 MW of Unforced Capacity offered from Generator Y.
- 100 of the 150 MW that Bidder A bids to purchase.
- None of the 75 MW that Bidder B bids to purchase.

If it had been necessary to acquire an additional MW of Unforced Capacity in this phase, (1) the ISO could have selected 1 MW from Generator Y, instead of 0 MW; or (2) it could have selected only 99 MW of Bidder A's 150 MW bid to purchase Energy. Bidder A's bid price is now $4/kW month, lower than Generator Y's $5/kW-month offer price, so Bidder A's bid price will be used to set the Market-Clearing Price of Unforced Capacity at $4/kW month for this phase. (If the price were set at $5/kW month, then Bidder A would be charged more than it has agreed to pay for the Unforced Capacity it has purchased in the auction. In order not to charge more than Bidder A has agreed to pay, it is necessary to bring the price down to $4/kW month. That price permits the market to clear at a quantity of 100 MW.)

Example 2
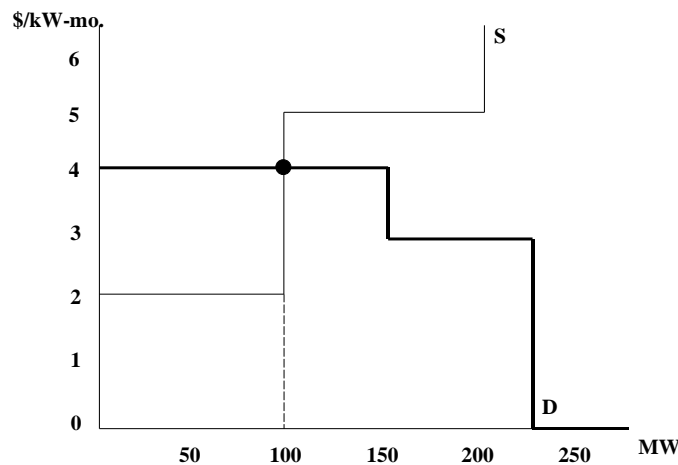
Example 3: No Locational Constraints Bind, No Partially Selected Offers or Bids, Offer Sets the Price

Now modify Example 1 so that the amount of Unforced Capacity offered from Generator X increases to 150 MW (still at a price of $2/kW month). The ISO would select the following offers and bids in this phase:

- All of the 150 MW of Unforced Capacity offered from Generator X.
- None of the 100 MW of Unforced Capacity offered from Generator Y.
- All of the 150 MW that Bidder A Bids to purchase.
- None of the 75 MW that Bidder B Bids to purchase.

If it had been necessary to acquire an additional MW of Unforced Capacity in this phase, (1) the ISO could have selected 1 MW from Generator Y, instead of 0 MW; or (2) it could have selected only 149 MW of Bidder A's 150 MW bid to purchase Energy. Since Generator Y's offer price is $5/kW month, while Bidder A's bid price is $6/kW month, the Market-Clearing Price of Unforced Capacity for this phase will be set at the lower of these, or $5/kW month. The consequences of choosing a higher price are the same as in Example 1.

Example 3
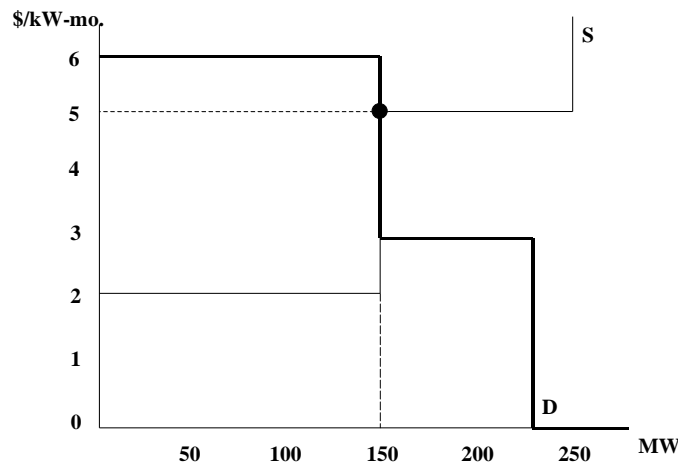
Example 4: No Locational Constraints Bind, No Partially Selected Offers or Bids, Bid Sets the Price

Next, modify Example 3 by changing the price specified by Bidder A to $4/kW month. Then the ISO would select the following offers and bids:

- All of the 150 MW of Unforced Capacity offered from Generator X.
- None of the 100 MW of Unforced Capacity offered from Generator Y.
- All of the 150 MW that Bidder A Bids to purchase.
- None of the 75 MW that Bidder B Bids to purchase.

If it had been necessary to provide an additional MW of Unforced Capacity in this phase, (1) the ISO could have selected 1 MW from Generator Y, instead of 0 MW; or (2) it could have selected only 149 MW of Bidder A's 150 MW bid. Since Generator Y's offer price is $5/kW month, while Bidder A's bid price is $4/kW month, the lower of these, or $4/kW month, will be used to set the Market-Clearing Price of Unforced Capacity for this phase.

Example 4
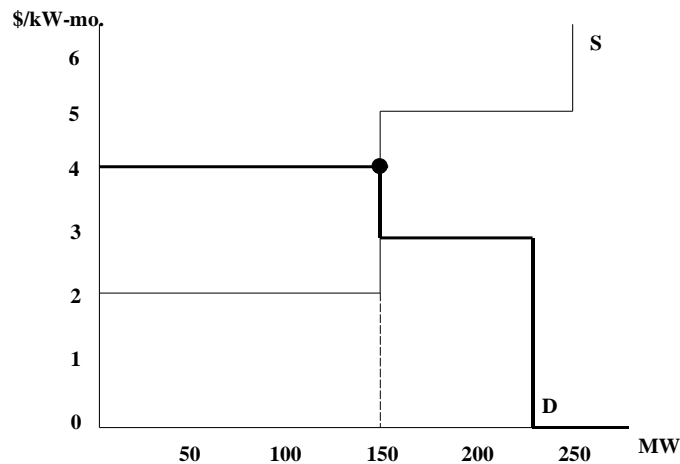
Example 5: Locality Constraint Binds

Return again to Example 1, but add the assumption that Bidder A has specified that its bid is valid for Unforced Capacity located in Locality Z only.

The ISO would select the following offers and bids in this phase:

- 75 MW of the 100 MW of Unforced Capacity offered from Generator X.
- All of the 100 MW of Unforced Capacity offered from Generator Y.
- 100 MW of the 150 MW that Bidder A Bids to purchase.
- All of the 75 MW that Bidder B Bids to purchase.

While there is more than 150 MW of Unforced Capacity available with an offer price of less than $6/kW-month (Bidder A's bid price), most of it is not located in Locality Z. Only the 100 MW offered from Generator Y at $5/kW month is located in Locality Z, so only 100 MW of Bidder A's bid was selected.

All of Generator Y's offer was selected, even though Generator X's Unforced Capacity was offered at a lower price and not all of it was selected. This means that the Locality Z constraint is binding (since Generator Y is located in Locality Z), so the ISO will calculate two different Market-Clearing Prices for this phase: one for Unforced Capacity in Locality Z and one for Unforced Capacity everywhere else.

If it had been necessary to acquire an additional MW of Unforced Capacity in this phase in Locality Z, the ISO would have had to select only 99 MW of Bidder A's 150 MW bid. (There are no alternatives in this example because Generator Y was the only Installed Capacity Supplier in Locality Z, and all of Generator Y's Unforced Capacity was selected in the auction, so none remains available to meet any additional demand in Locality Z.) Since Bidder A's bid price is $6/kW month, the Market-Clearing Price of Unforced Capacity in Locality Z in this phase will be $6/kW month.

If it had been necessary to acquire an additional MW of Unforced Capacity in this phase outside Locality Z, (1) the ISO could have selected 76 MW from Generator X, instead of 75 MW; or (2) it could have selected only 74 MW of Bidder B's 75 MW bid to purchase Energy. Since Generator X's offer price is $2/kW month, while Bidder B's bid price is $3/kW-month, the lower of these, or $2/kW month, will set the Market-Clearing Price of Unforced Capacity outside Locality Z in this phase.

Example 5

In Locality Z

Outside Locality Z
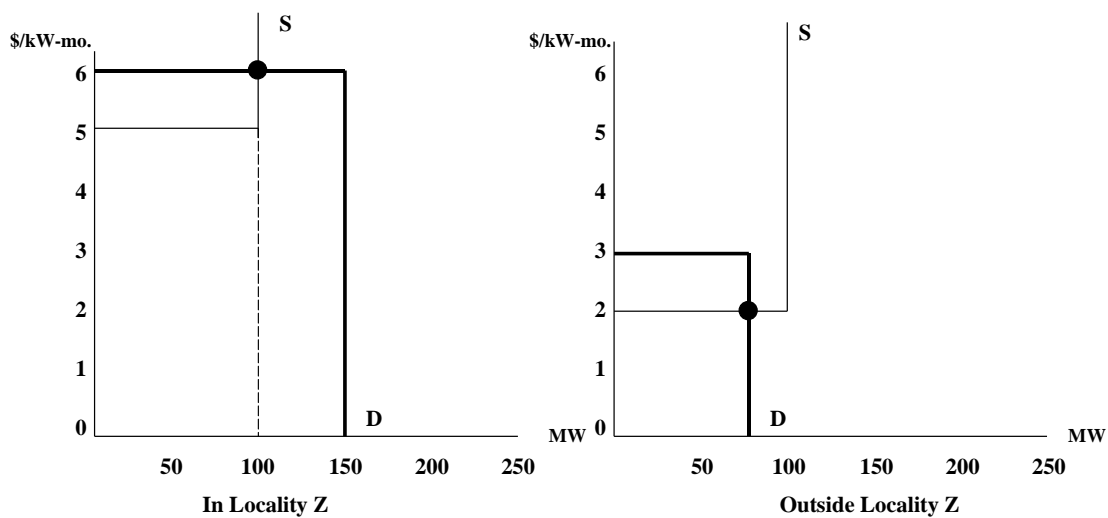
Example 6: External Control Area Constraint Binds

Again, return to Example 1, but change the locational constraint that Bidder B specified in its bid. Instead of the constraint specified in Example 1, assume that Bidder B specified that while the Unforced Capacity it is bidding to purchase could be located anywhere in the NYCA, it also could be located in External Control Areas P or Q. Bidder A will continue to require that all of its Unforced Capacity be located within the NYCA.

In addition, assume that the following new offers of Unforced Capacity are submitted into this phase:

- 50 MW of Unforced Capacity from a Generator located in External Control Area P is offered at $1/kW month.
- 50 MW of Unforced Capacity from a Generator located in External Control Area Q is offered at $2/kW month.
- The ISO would select the following offers and bids:
- All of the 100 MW of Unforced Capacity offered from Generator X.
- 50 MW of the 100 MW of Unforced Capacity offered from Generator Y.
- All of the 50 MW of Unforced Capacity offered from External Control Area P.
- 25 MW of the 50 MW of Unforced Capacity offered from External Control Area Q.
- All of the 150 MW that Bidder A Bids to purchase.
- All of the 75 MW that Bidder B Bids to purchase.

Bidder B is the only Bidder that can purchase the Unforced Capacity offered from the External Generators, since Bidder A stated that its Unforced Capacity must be located in the NYCA. Since Bidder B's $3/kW month bid price exceeds the offer prices for the Unforced Capacity from these External Generators, all of Bidder B's 75 MW bid to purchase Energy was selected in this phase.

Part of Generator Y's offer was selected, even though not all of the Unforced Capacity in External Control Area Q, which was offered at a lower price, was selected. The reason is the constraint that Bidder A placed upon its bid. This causes the External Control Area constraint to bind for External Control Areas P and Q, so the ISO will calculate two different Market-Clearing Prices for this phase: one for Unforced Capacity in External Control Areas P and Q, and one for Unforced Capacity everywhere else.

(Note that the ISO will calculate a single price that will apply to both External Control Areas P and Q. Bidder B, which is the sole purchaser of Unforced Capacity located in these External Control Areas in this phase, has stated that it will accept Unforced Capacity from either External Control Area, without any limitations on the amount that it will accept from an individual External Control Area. Therefore, Unforced Capacity located in either of these External Control Areas can be substituted for Unforced Capacity in the other External Control Area, for the purposes of this phase, so these External Control Areas constitute a single market, with a single price.)

If it had been necessary to acquire an additional MW of Unforced Capacity in this phase in External Control Areas P or Q, (1) the ISO could have selected 26 MW from External Control Area Q, instead of 25 MW; or (2) it could have selected only 74 MW of Bidder B's 75 MW bid to purchase Energy. Since the offer price from External Control Area Q is $2/kW month, while Bidder B's bid price is $3/kW month, the lower of these, or $2/kW month, will be used to set the Market-Clearing Price of Unforced Capacity for this phase in External Control Areas P and Q.

If it had been necessary to acquire an additional MW of Unforced Capacity in this phase outside External Control Areas P or Q — i.e., if it had been necessary to acquire an additional MW of Unforced Capacity in the NYCA, since there are no other External Control Areas in this example—(1) the ISO could have selected 51 MW from Generator Y, instead of 50 MW; or (2) it could have selected only 149 MW of Bidder A's 150 MW bid to purchase Energy. Since Generator Y's offer price is $5/kW month, while Bidder A's bid price is

$6/kW month, the lower of these, or $5/kW month, will be used to set the Market-Clearing Price of Unforced Capacity for this phase in the NYCA. (This price also applies to all Localities within the NYCA, since no Locality constraints are binding in this example).

Example 6

In Control Areas P and Q

NYCA
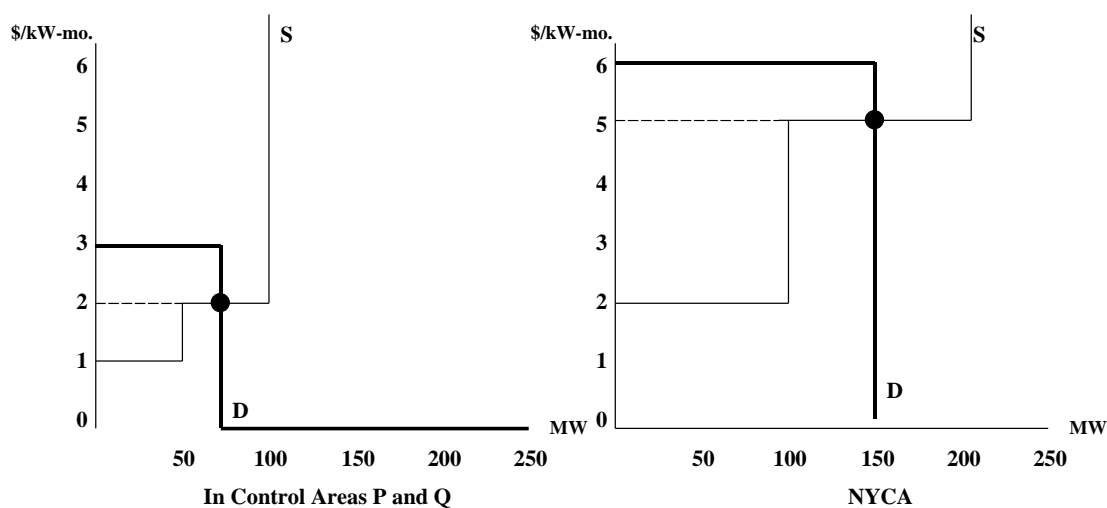
Attachment I Miscellaneous Auction Procedures

(Version 2.0)

Unless otherwise specified, a capitalized term used herein shall have the meaning specified in the ISO's Market Administration and Control Area Services Tariff, or in Attachment F of, or elsewhere in, this Manual.

Section 1: Procedures Applicable to Installed Capacity Bidders

1.1. Submission of Bid Packages

Bidders bidding to purchase Unforced Capacity must submit a complete Bid Package to the ISO in the form prescribed in Attachment F to this Manual, i.e., a completed Agreement to Purchase or Sell Unforced Capacity in the NYISO Installed Capacity Auctions ("Purchase/Sale Agreement") and a properly formatted Electronic Bid.

Purchase/Sale Agreements must be submitted to the ISO via an overnight mail service or a delivery service that requires the signature of the addressee in order to record the date and time of delivery. Purchase/Sale Agreements may not be submitted via FAX or email. Each Purchase/Sale Agreement, upon receipt, will be time stamped by the ISO.

Electronic Bids must be submitted via the Internet site maintained by the NYISO at https://icap.nyiso.com/. An Electronic Bid may contain more than one Individual Bid. An Electronic Bid must be part of a properly constituted Bid Package.

Bidders may revise their Bid Packages at any time during the bidding Period by submitting an amended Individual Bid or new Electronic Bid. If a new Electronic Bid is timely, correctly and completely submitted by the Bidder, it will completely override any previous Electronic Bid(s) and any previous Electronic Bid(s) will have no further force or effect. A newly uploaded Electronic Bid must include all Individual Bids that the Bidder intends to be in effect, including any previously submitted Individual Bids that are not being amended. The most recently received Individual Bid or Electronic Bid, as indicated by the date and time of submission reported in the ICAP Automated Market System, shall supersede any previous version of the Individual Bid or Electronic Bid being changed, and any superseded Individual Bid or Electronic Bid shall have no further force or effect.

Bidders may not submit negative dollar bids. Only bids specifying a price greater than or equal to zero will be accepted.

1.2. Invalidation of Bids

The ISO shall invalidate an Electronic Bid for any of the following reasons:

    a. The Electronic Bid is received by the ISO outside the bidding Period;
    b. The Electronic Bid does not include all required information; or
    c. The Electronic Bid is not covered by sufficient collateral.

The ISO shall invalidate an Individual Bid for any of the following reasons:

    a. The bid price is less than zero;
    b. The quantity of Unforced Capacity specified is not given to a tenth of a MW;
    c. The price is not specified to two decimal places; or
    d. There is missing information in either the price or the MW column.

Section 2: Procedures Applicable to Installed Capacity Offerors

2.1. Submission of Offer Packages

Offerors offering to sell Unforced Capacity must submit a complete Offer Package to the ISO in the form prescribed in Attachment F to this Manual, i.e., a completed Purchase/Sale Agreement and a properly formatted Electronic Offer. Offer Packages must be submitted during the Offering Period established in Attachment A, and described in Attachment F, to this Manual.

Purchase/Sale Agreements must be submitted to the ISO via an overnight mail service or a delivery service that requires the signature of the addressee in order to record the date and time of delivery. Purchase/Sale Agreements may not be submitted via FAX or email. Each Purchase/Sale Agreement, upon receipt, will be time stamped by the ISO.

Electronic Offers must be submitted via the Internet site maintained by the ISO at https://icap.nyiso.com/. An Electronic Offer may contain more than one Individual Offer. An Electronic Officer must be part of a properly constituted Offer Package.

Offerors may revise their Offer Packages at any time during the Offering Period by submitting an amended Individual Offer or new Electronic Offer. If a new Electronic Offer is timely, correctly and completely submitted by the Offeror, it will completely override any previous Electronic Offer(s) and any previous Electronic Offer(s) will have no further force or effect. A newly uploaded Electronic Offer must include all Individual Offers that the Offeror intends to be in effect, including any previously submitted Individual Offers that are not being amended. The most recently received Individual Offer or Electronic Offer, as indicated by the date and time of submission reported in the ICAP Automated Market System, shall supersede any previous version of the Individual Offer or Electronic Offer being changed, and any such superseded Individual Offer or Electronic Offer shall have no further force or effect.

2.2. Invalidation of Offers

The ISO shall invalidate an Electronic Offer for any of the following reasons:

a. The Electronic Offer is received by the ISO outside of the Offering Period; or
b. The Electronic Offer does not contain all required information.

The ISO shall invalidate an Individual Offer for any of the following reasons:

a. More than one location has been specified;
b. The Resource name does not correspond to the Resource for which the Offeror holds Unforced Capacity;
c. The offer price is less than zero;
d. The quantity of Unforced Capacity offered is not given to a tenth of a MW;
e. The quantify of Unforced Capacity offered is less than or equal to zero;
f. The quantity of Unforced Capacity offered for a Resource is greater than the amount of Unforced Capacity the Offeror is authorized to sell from that Resource;
g. The quantity of Unforced Capacity offered is greater than the quantity the Offeror is authorized to sell;
h. The price is not specified to two decimal places;
i. Missing information in either the price, MW, or Resource name columns; or
j. Non-unique prices are given for Individual Offers to sell capacity for the same Resource.

2.3. Multiple Offers from the Same Installed Capacity Supplier

Installed Capacity Suppliers may submit multiple offers to sell Unforced Capacity associated with a given Installed Capacity Supplier. However, the total amount of Unforced Capacity offered for sale from a given Installed Capacity Supplier must not exceed the total amount of Unforced Capacity that may be supplied from that Installed Capacity Supplier, as determined pursuant to Section 4 of this Manual.

Example: Valid offers to sell Unforced Capacity from an Installed Capacity Supplier that is qualified to supply 100.5 MW of Unforced Capacity. In this example, the Installed Capacity Supplier has offered the maximum allowable amount of Unforced Capacity.

Resource Name	Unforced Capacity Offered (MW)	Offer Price ($/kW month)
XYZ - ABC	50.5	10.50
XYZ - ABC	50.0	11.25

Example: Invalid offers to sell Unforced Capacity from a Resource that is qualified to sell 100.5 MW of Unforced Capacity. In this example, all offers from this Installed Capacity Supplier will be invalidated because the total Unforced Capacity offered exceeds the maximum amount of Unforced Capacity that the Installed Capacity Supplier is qualified to sell.

Resource Name	Unforced Capacity Offered (MW)	Offer Price ($/kW month)
XYZ - ABC	50.3	10.50
XYZ - ABC	50.3	11.25

2.4. Requirement that Offers be Unique

All offers to sell Unforced Capacity associated with a given Installed Capacity Supplier must be made at a unique price.

Example: Invalid offers to sell Unforced Capacity from an Installed Capacity Supplier that is qualified to sell 100 MW of Unforced Capacity. In this example, all offers to sell Unforced Capacity will be invalidated because the offer prices were not unique.

Resource Name	Unforced Capacity Offered (MW)	Offer Price ($/kW month)
XYZ ABC	60.0	11.25
XYZ ABC	40.0	11.25

2.5. Subject Generators and the Capacity Reference Price

With respect to Subject Generators (as defined below), if the price for a MW of Unforced Capacity offered in an Auction is calculated to be greater than the Capacity Reference Price (see below), then the offer for that MW of Installed Capacity would be invalidated.

Section 3: Subject Generators

3.1. Definition and Requirements

Some Installed Capacity Suppliers located within the New York City Locality are subject to a FERC-approved Unforced Capacity price cap, the translated equivalent value of the FERC and PSC-approved $105/kW-year price cap for Installed Capacity ("Subject Generators").

Subject Generators may only sell their available Unforced Capacity in one or more ISO-administered Installed Capacity Auctions.

3.2. Subject Generator List

The Resources listed below are Subject Generators:
- Arthur Kill Units 2 and 3;
- Arthur Kill GT;
- Astoria Units 3, 4 and 5;
- Astoria GTs;
- East River Generating Station;
- Gowanus GTs;
- Narrows GTs;
- Ravenswood Units 1, 2 and 3;
- Ravenswood GTs; and
- Waterside Generating Station.

Section 4: Award Notices

4.1. Electronic Distribution of Award Notices

The ISO will send each Bidder and Offeror that is selected to buy or sell Unforced Capacity an Award Notice, as defined in Attachments F to this Manual, via e-mail within five (5) business days of the conclusion of the Capability Period Auction or the Obligation Procurement Period auction.

Bidders and Offerors shall be presumed to have received Award Notices on the first business day after the Award Notices are e-mailed by the ISO.

4.2. Content of Award Notices

Award Notices sent to Bidders shall set forth the amount of Unforced Capacity, if any, Bidder is obligated to purchase, the Market Clearing Price of such Unforced Capacity, the location of the Unforced Capacity and the Total Purchase Price.

Award Notices sent to Offerors shall set forth the total amount of Unforced Capacity sold, the Market Clearing Price of such Unforced Capacity, the location of the Unforced Capacity and the Total Selling Price.

4.3. Disputes Concerning Award Notices

All disputes other than those concerning the Total Purchase Price or Total Selling Price shall be resolved pursuant to the Dispute Resolution Procedures set forth in the ISO Services Tariff.

Disputes concerning Total Purchase Price or Total Selling Price shall be resolved pursuant to the procedures set forth in Attachments F to this Manual.

Section 5: Posting of Installed Capacity Auction Results

5.1. Information Posted in Auction Results

The ISO will publicly post on the website www.nyiso.com/markets/icapinfo.html for each "Monthly Effective Period," the results of the Installed Capacity Auction and will include the following information:

1. The Market Clearing Price determined for each Locality in each Installed Capacity Auction;

2. The total amount of Unforced Capacity in each Locality, in the portion of the NYCA not included in any Locality, and in each External Control Area that was sold in each Monthly Auction;

3. The total amount of Unforced Capacity purchased in each Monthly Auction, broken down by the constraint placed upon the location of that Unforced Capacity by the Bidders placing those bids; and

4. The MW aggregate of the bids to purchase and the Offers to sell Unforced Capacity.

Attachment J   Unforced Capacity for Installed Capacity Suppliers

(Version 4.2)

Prior to the Capability Period that begins May 1, 2024:

1. Fundamental Formulae

(1-1) $\text{Adjusted Installed Capacity} = \min(\text{CRIS}, \text{DMNC}) * \text{Duration Adjustment Factor}$

(1-2) $\text{UCAP} = (1 - \text{EFORd}) * \text{Adjusted Installed Capacity}$

(1-3) $\text{EFORd} = \dfrac{f_f \times \text{FOH} + f_p \times (\text{EFOH - FOH})}{\text{SH} + f_f \times \text{FOH}}$

(1-4) $f_f = \dfrac{\dfrac{1}{r} + \dfrac{1}{T}}{\dfrac{1}{r} + \dfrac{1}{T} + \dfrac{1}{D}}$

(1-4a) $r = \text{average forced outage duration} = \dfrac{\text{FOH}}{\text{number of forced outages}}$

(1-4b) $T = \text{average time between calls for a unit to run} = \dfrac{\text{RSH}}{\text{number of attempted starts}}$

(1-4c) $D = \text{average run time} = \dfrac{\text{SH}}{\text{number of successful starts}}$

(1-5) $f_p = \dfrac{\text{SH}}{\text{AH}}$

2. Definitions

UDR	Unforced Capacity Deliverability Rights
EDR	External-to-Rest of State (ROS) Deliverability Rights
UCAP	Unforced Capacity
EFORd	Equivalent Demand Forced Outage Rate
DMNC	per Tariff definition
CRIS	per Tariff definition
ICE	Installed Capacity Equivalent as defined in the Services Tariff and in Section 3 of this Attachment J.
Adjusted Installed Capacity	per Tariff definition
Duration Adjustment Factor	per Tariff definition
Net Dependable Capacity	The gross power level that a unit can sustain during any period of time when there are no equipment, operating or regulatory restrictions and after adjusting for station service and auxiliary loads and ambient conditions.

	Average ambient temperature should reflect the average of the daily high temperatures for the month at the plant location. Only one Net Dependable Capacity for each Resource shall be reported for each month. That value may be either the Resource's DMNC for the Capability Period containing that month or that Resource's average Net Dependable Capacity for that month, at the discretion of the owner of the Resource.
f_f	full f-factor (see formula in Section 1.0)
f_p	partial f-factor (see formula in Section 1.0)
FOH	Full Forced Outage Hours
Forced Outage	An unplanned failure that requires a unit to be removed from service, or the Load on the unit to be reduced before the end of the nearest following Weekend.
EFOH	Equivalent Full Forced Outage Hours: Sum of all hours a unit was involved in an outage expressed as equivalent hours of full forced outage at its maximum net dependable capability.
SH	Service Hours: The time a unit is electrically connected to the system - Sum of all Unit Service Hours.
AH	Available Hours: The time a unit is capable of producing energy, regardless of its capacity level - Sum of all Service Hours + Reserve Shutdown Hours + Pumping Hours + Synchronous Condensing Hours.
RSH	Reserve Shutdown Hours: The time a unit is available for service but not dispatched due to economic or other reasons.
PH	Period hours equals 24 times the number of days in the reporting period.

> **Note:** For in-depth GADS Data concepts, refer to the NERC Fast Link for GADS Services at www.nerc.com.

3. Calculations

In general, all generating Resources are expected to provide the full GADS Data set defined in Attachment K. Except as noted below, a Resource that provides a full GADS Data set will have the amount of UCAP that it is qualified to supply and an Installed Capacity Equivalent calculated according to Section 3.1. A Resource that provides equivalent GADS Data will have the amount of UCAP that it is qualified to supply and an Installed Capacity Equivalent calculated according to Section 3.2. A Control Area System Resource will have the amount of UCAP it can supply calculated according to Section 3.3, an Intermittent Power Resource will have the amount of UCAP it can supply calculated according to Section 3.4, a Resource using UDRs will have its UCAP values calculated according to Section 3.5, a Resource using EDRs will have its UCAP values calculated according to Section 3.6, and an Energy Storage Resource will have its UCAP values calculated according to Section 3.7. Generators participating as Co-located Storage Resources will have the amount of UCAP that are qualified to supply according to Section 3.8, and an Aggregation will have the amount of UCAP it can supply calculated according to Section 3.9.

3.1. UCAP based on EFORd

This Section applies to Resources that submit GADS Data using the GADS reporting format in Attachment K. An Energy Limited Resource that does not want to have its UCAP based on production levels using equivalent GADS Data, using the equations in Section 3.2, will have to submit GADS Data to document its available capacity for the number of consecutive hours that correspond to its Energy Duration Limitation.

3.1.1 Procedure for calculating Unforced Capacity values for Resources without an Energy Duration Limitation.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

$$UCAP^{Q}_{gm} = (1-AEFORd_{gm})*\min(CRIS_{gm}, DMNC_{gm}) * Duration\ Adjustment\ Factor_{gm};$$

Where:

$UCAP^{Q}_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

$AEFORd_{gm}$ is the Average Equivalent Demand Forced Outage Rate calculated for Resource g that will be used to determine the amount of Unforced Capacity that the Resource will be permitted to provide in month m, as defined further below;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

$Duration\ Adjustment\ Factor_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this ICAP Manual.

If month m is in the Winter Capability Period, then $AEFORd_{gm}$ will be equal to the average of the two previous Winter Capability Period EFORd values calculated for Resource g. If month m is in the Summer Capability Period, $AEFORd_{gm}$ will be equal to the average of the two previous Summer Capability Period EFORd values calculated for Resource g. $EFORd_{gn}$, the EFORd value for Resource g for the 6-month period ending in any given month n that is used in the calculation of $AEFORd_{gm}$, will be calculated as follows:

$$EFORd_{gn} = \frac{IST_{ge}}{6} \times \frac{f_{fgbe}FOH_{gbe} + f_{pgbe}(EFOH_{gbe} - FOH_{gbe})}{(SH_{gbe} + f_{fgbe}FOH_{gbe})} + \left(1 - \frac{IST_{ge}}{6}\right)CEFORd_{g}$$

Where: f_{fgbe} *and* f_{pgbe} *are further defined below and:*

IST_{ge} is the number of months that Resource g was in service during the 6-month Capability Period ending as of time e ($IST_{ge} = 0$ if generator g was not in service as of time e; $IST_{ge} = 6$ if Resource g was in servicefor all months of the Capability Period;

FOH_{gbe} is the sum of all Full Forced Outage Hours reported for Resource g for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance

with Attachment K, Performance Record 02, columns 46-50 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

EFOH$_{gbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e*. The data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$\text{EFOH}_{gbe} = \begin{cases} 0, \text{if there were no outages for Resource g during the} \\ \text{period beginning at time b and ending at time e; and} \\ \sum_{i \in \text{OUT}_{gbe}} \frac{(\text{NDC}_{gi} - \text{NAC}_{gi})\text{H}_{gi}}{\text{NDC}_{gi}}, \text{otherwise;} \end{cases}$$

Where:

OUT$_{gbe}$ is the set of outages for Resource *g* during the period beginning at time *b* and ending at time *e*:

NDC$_{gi}$ is the Net Dependable Capacity for Resource g applicable for outage *i*, submitted in accordance with Attachment K, Performance Record 01, columns 43-48;

NAC$_{gi}$ is the Net Available Capacity for Resource *g*, applicable for outage *i*, submitted in accordance with Attachment K, Event Record 01, columns 62-67;

and

H$_{gi}$ is the time accumulated for Resource *g* applicable for outage *i* submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event).

SH$_{gbe}$ is the sum of all Service Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-20;

e is the end of the last month of the Capability Period;

b is the beginning of the first month of the Capability Period, unless the Resource had not gone into service at that time, in which case *b* is the time at which that Resource went into service; and

CEFORd$_g$ is the class-equivalent EFORd calculated by the ISO for Resources of the same class as Resource *g* based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{fgbe} = \frac{\frac{1}{r} + \frac{1}{T}}{\frac{1}{r} + \frac{1}{T} + \frac{1}{D}}$$

Where:

r is FOH$_{gbe}$ divided by the total number of GADS Data Forced Outages reported for the period beginning at time *b* and ending at time *e* in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH$_{gbe}$) divided by the number of attempted starts reported for the period beginning at time *b* and ending at time *e* for Resource *g*. RSH$_{gbe}$ is the sum of all Reserve Shutdown Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 21-25; and

D is the number of Service Hours (SH$_{gbe}$) divided by the number of successful starts reported for the period beginning at time b and ending at time *e* for Resource g; and

$$f_{pgbe} = \frac{SH_{gbe}}{AH_{gbe}}$$

Where:

AH$_{gbe}$ is the sum of all Available Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e* in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 36-40.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

If RSH = 0 (<1), set f$_f$=1;

If SH = 0, set f$_f$=1;

If FOH = 0, set 1/r = 0 and calculate f$_f$ per its equation; and

If AH = 0, set f$_p$ =1.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P{}_{gm}}{(1 - AEFORd_{gm}) * Duration\ Adjustment\ Factor_{gm}}$$

Where:

ICE$_{gm}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *m*;

UCAP$^P{}_{gm}$ is the amount of Unforced Capacity that Resource *g* supplies in month *m*;

AEFORd$_{gm}$ as above, is the Average Equivalent Demand Forced Outage Rate calculated for Resource *g* that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month *m*; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this ICAP Manual.

3.1.2   Procedure for calculating Unforced Capacity values for Resources with an Energy Duration Limitation.

Starting with the 2021/2022 Capability Year, Installed Capacity Suppliers with Energy Duration Limitations that submit GADS data for their UCAP values will be evaluated during the applicable Peak

Load Window for their UCAP values. Periods prior to the start of the 2021/2022 Capability Year used in the UCAP calculation will be calculated in accordance with section 3.1.1 of this Attachment.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

$$UCAP^Q_{gm} = (1-AEFORd_{gm})*min(CRIS_{gm}, DMNC_{gm}) *Duration\ Adjustment\ Factor_{gm};$$

Where:

$UCAP^Q_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

$AEFORd_{gm}$ is the Average Equivalent Demand Forced Outage Rate calculated for Resource g during the applicable Peak Load Window that will be used to determine the amount of Unforced Capacity that the Resource will be permitted to provide in month m, as defined further below;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this ICAP Manual.

If month m is in the Winter Capability Period, then *AEFORd$_{gm}$* will be equal to the average of the two previous Winter Capability Period EFORd values calculated for Resource g. If month m is in the Summer Capability Period, *AEFORd$_{gm}$* will be equal to the average of the two previous Summer Capability Period EFORd values calculated for Resource g. *EFORd$_{gn}$*, the EFORd value for Resource g for the 6-month period ending in any given month n that is used in the calculation of *AEFORd$_{gm}$*, will be calculated as follows:

$$EFORd_{gn} = \frac{IST_{ge}}{6} \times \frac{f_{fgbe}FOH_{gbe} + f_{pgbe}(EFOH_{gbe} - FOH_{gbe})}{(SH_{gbe} + f_{fgbe}FOH_{gbe})} + \left(1 - \frac{IST_{ge}}{6}\right)CEFORd_g$$

Where: f_{fgbe} *and* f_{pgbe} *are further defined below and:*

IST_{ge} is the number of months that Resource g was in service during the 6-month Capability Period ending as of time e (IST_{ge} = 0 if generator g was not in service as of time e; IST_{ge} = 6 if Resource g was in service for all months of the Capability Period;

FOH_{gbe} is the sum of all Full Forced Outage Hours reported for Resource g during the applicable Peak Load Window for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 46-50 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{gbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for Resource g during the applicable Peak Load Window for the period beginning at time b and ending at time e. The

data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$
EFOH_{gbe} = \begin{cases} 0, \text{if there were no outages for Resource } g \text{ during the} \\ \text{period beginning at time b and ending at time e; and} \\ \sum_{i \in OUT_{gbe}} \frac{(NDC_{gi} - NAC_{gi})H_{gi}}{NDC_{gi}}, \text{otherwise;} \end{cases}
$$

Where:

OUT_{gbe} is the set of outages for Resource g during the applicable Peak Load Window during the period beginning at time b and ending at time e;

NDC_{gi} is the Net Dependable Capacity for Resource g during the applicable Peak Load Window applicable for outage i, submitted in accordance with Attachment K, Performance Record 01, columns 43-48;

NAC_{gi} is the Net Available Capacity for Resource g during the applicable Peak Load Window, applicable for outage i, submitted in accordance with Attachment K, Event Record 01, columns 62-67;

and

H_{gi} is the time accumulated for Resource g during the applicable Peak Load Window applicable for outage i submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event);

SH_{gbe} is the sum of all Service Hours reported for Resource g during the applicable Peak Load Window for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-20;

e is the end of the last month of the Capability Period;

b is the beginning of the first month of the Capability Period, unless the Resource had not gone into service at that time, in which case b is the time at which that Resource went into service;

Peak Load Window is the time period during which a Resource with an Energy Duration Limitation must offer Energy in the Day-Ahead Market, as specified in Section 4.1.1 of this ICAP Manual. For days in which the tariff-defined Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the tariff-defined and ISO-adjusted Peak Load Windows; and

CEFORd$_g$ is the class-equivalent EFORd calculated by the ISO for Resources of the same class as Resource g based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{fgbe} = \frac{\dfrac{1}{r} + \dfrac{1}{T}}{\dfrac{1}{r} + \dfrac{1}{T} + \dfrac{1}{D}}$$

Where:

r is FOH$_{gbe}$ divided by the total number of GADS Data Forced Outages reported for the period during the applicable Peak Load Window beginning at time *b* and ending at time *e* in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH$_{gbe}$) divided by the number of attempted starts reported for the period during the applicable Peak Load Window beginning at time *b* and ending at time *e* for Resource *g*. RSH$_{gbe}$ is the sum of all Reserve Shutdown Hours reported for Resource *g* during the applicable Peak Load Window for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 21-25;

D is the number of Service Hours (SH$_{gbe}$) divided by the number of successful starts reported for the period during the applicable Peak Load Window beginning at time b and ending at time *e* for Resource g; and

$$f_{pgbe} = \frac{SH_{gbe}}{AH_{gbe}}$$

Where:

AH$_{gbe}$ is the sum of all Available Hours reported for Resource *g* during the applicable Peak Load Window for the period beginning at time *b* and ending at time *e* in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 36-40.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

- If (RSH < 1) then f_f =1;

- If (SH = 0) then f_f = 1;

- If (1/r + 1/T + 1/D) = 0 then f_f = 0;

- If [(# of FO occurrences = 0) or (FOH = 0)] then 1/r = 0;

- If [(RSH = 0) or (# of unit attempted starts = 0)] then 1/T = 0;

- If [(# of unit actual starts = 0) or (SH = 0)] then 1/D = 0;

- If AH = 0 then f_p = 0; and

- If (SH + (f_f x FOH)) = 0 then EFORd = 0.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P{}_{gm}}{(1 - AEFORd_{gm}) * Duration\ Adjustment\ Factor_{gm}}$$

Where:

> ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;
>
> $UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;
>
> $AEFORd_{gm}$ as above, is the Average Equivalent Demand Forced Outage Rate calculated for Resource g that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m; and
>
> $Duration\ Adjustment\ Factor_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this ICAP Manual.

3.2. UCAP based on equivalent GADS Data (capacity factor method)

This Section applies to Resources that submit equivalent GADS Data using the GADS reporting format in Attachment K.

3.2.1 Procedure for calculating Unforced Capacity values for Resources without an Energy Duration Limitation.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

> **Where:** $$UCAP^Q_{gm} = (1 - AOF_{gm}) * min(CRIS_{gm}, DMNC_{gm}) * Duration\ Adjustment\ Factor_{gm};$$
>
> $UCAP^Q_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;
>
> AOF_{gm} is the Average Outage Factor calculated for Resource g, as further defined below, that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month m;
>
> $CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;
>
> $DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and
>
> $Duration\ Adjustment\ Factor_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.
>
> If month m is in the Winter Capability Period, then AOF_{gm} will be equal to the average of the two previous Winter Capability Period OF values calculated for Resource g. If month m is in the Summer Capability Period, AOF_{gm} will be equal to the average of the two previous Summer Capability Period OF values calculated for Resource g. OF_{gn}, the OF value for Resource g for the 6-month period ending in any given month n that is used in the calculation of AOF_{gm}, will be calculated as follows:

$$OF_{gn} = \frac{IST_{ge}}{6} \times (1 - CF_{gbe}) + \left(1 - \frac{IST_{ge}}{6}\right)(1 - CCF_g)$$

Where:

IST_{ge} is the number of months that Resource g had been in service as of time e (0 if generator g was not in service as of time e; 6 if Resource g was in service for the full Capability Period;

CCF_g is the class-equivalent Capacity Factor for Resources of the same class as Resource g based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{gbe} = \frac{NAG_{gbe}}{\sum_{i=B}^{E} \left(NDC_{gi} \left(PH_{gi} - POH_{gi} - MOH_{gi} \right) \right)};$$

Where:

CF_{gbe} is the Capacity Factor for Resource g for the period beginning at time b and ending at time e;

NAG_{gbe} is the Net Actual Generation for Resource g for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 49-57;

NDC_{gi} is the Net Dependable Capacity for Resource g for month i. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 43-48;

PH_{gi} is the Period Hours reported for Resource g for month i. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 66-70;

POH_{gi} is the Planned Outage Hours reported for Resource g for month i. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 36-39;

MOH_{gi} is the Maintenance Outage Hours reported for Resource g for month i. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 41-45;

b is the beginning of the first monthof the Capability Period , unless the Resource had not gone into service at that time, in which case b is the time at which that Resource went into service;

e is the end of the last month of the Capability Period;

B is the month containing time b; and

E is the month containing time e.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P{}_{gm}}{\left(1 - AOF_{gm}\right) * Duration\ Adjustment\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *m*;

$UCAP^P{}_{gm}$ is the amount of Unforced Capacity that Resource *g* supplies in month *m*;

AOF_{gm}, as above, is the Average Outage Factor for Resource *g* that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month *m*; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.2.2 Procedure for calculating Unforced Capacity values for Resources with an Energy Duration Limitation.

Starting with the 2021/2022 Capability Year, Installed Capacity Suppliers with Energy Duration Limitations that submit equivalent GADS data for their UCAP values will be evaluated during the applicable Peak Load Window for their UCAP values. Periods prior to the start of the 2021/2022 Capability Year used in the UCAP calculation will be calculated in accordance with section 3.2.1 of this Attachment.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

Where: $UCAP^Q_{gm} = \left(1 - AOF_{gm}\right) * min(CRIS_{gm}, DMNC_{gm}) * Duration\ Adjustment\ Factor_{gm};$

$UCAP^Q{}_{gm}$ is the amount of Unforced Capacity that Resource *g* is qualified to provide in month *m*;

AOF_{gm} is the Average Outage Factor calculated for Resource *g* during the applicable Peak Load Window, as further defined below, that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month *m*;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource *g* for month *m* established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource *g* which is applicable for month *m*, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month *m* is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month *m* is part of a Winter Capability Period; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

If month *m* is in the Winter Capability Period, then AOF_{gm} will be equal to the average of the two previous Winter Capability Period OF values calculated for Resource *g*. If month *m* is in the Summer Capability Period, AOF_{gm} will be equal to the average of the two previous Summer

Capability Period OF values. OF_{gn}, the OF value for Resource g for the 6-month period ending in any given month n that is used in the calculation of AOF_{gm}, will be calculated as follows:

$$OF_{gn} = \frac{IST_{ge}}{6} \times (1 - CF_{gbe}) + \left(1 - \frac{IST_{ge}}{6}\right)(1 - CCF_g)$$

Where:

IST_{ge} is the number of months that Resource g had been in service as of time e (0 if generator g was not in service as of time e; 6 if Resource g was in service for the full Capability Period);

CCF_g is the class-equivalent Capacity Factor for Resources of the same class as Resource g based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{gbe} = \frac{NAG_{gbe}}{\sum_{i=B}^{E}\left(NDC_{gi}\left(PH_{gi} - POH_{gi} - MOH_{gi}\right)\right)};$$

Where:

CF_{gbe} is the Capacity Factor for Resource g during the applicable Peak Load Window for the period beginning at time b and ending at time e;

NAG_{gbe} is the Net Actual Generation for Resource g during the applicable Peak Load Window for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 49-57;

NDC_{gi} is the Net Dependable Capacity for Resource g for month i during the applicable Peak Load Window. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 43-48;

PH_{gi} is the Period Hours reported for Resource g for month i during the applicable Peak Load Window. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 66-70;

POH_{gi} is the Planned Outage Hours reported for Resource g for month i during the applicable Peak Load Window. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 41-45;

MOH_{gi} is the Maintenance Outage Hours reported for Resource g for month i during the applicable Peak Load Window. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 51-55;

b is the beginning of the first month of the Capability Period, unless the Resource had not gone into service at that time, in which case b is the time at which that Resource went into service;

e is the end of the last month of the Capability Period;

B is the month containing time b;

E is the month containing time e; and

Peak Load Window is the time period during which a Resource with an Energy Duration Limitation must offer Energy in the Day-Ahead Market, as specified in Section 4.1.1 of this ICAP Manual. For days in which the tariff-defined Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the tariff-defined and ISO-adjusted Peak Load Windows.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P{}_{gm}}{(1 - AOF_{gm}) * Duration\ Adjustment\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *m*;

$UCAP^P{}_{gm}$ is the amount of Unforced Capacity that Resource *g* supplies in month *m*;

AOF_{gm}, as above, is the Average Outage Factor for Resource *g* that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month *m*; and

Duration Adjustment Factor_{gm} is the Duration Adjustment Factor for Resource *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.3.   Calculation of UCAP for Control Area System Resources

(a) Determining the Amount of UCAP a Control Area System Resource Qualifies to Supply

$$UCAP^Q{}_{cm} = NPC_{cm} * (1 - ACAF_{cm}) * Duration\ Adjustment\ Factor_{cm}$$

Where:

$UCAP^Q{}_{cm}$ is the Unforced Capacity that the Control Area System Resource located in Control Area *c* is qualified to supply in the NYCA during month *m*;

NPC_{cm} is the Net Projected Capacity for the Control Area System Resource located in Control Area *c* for month *m*, calculated pursuant to the formula set forth in Section 4.10.3 of this Manual, repeated below for clarity:

$NPC_{cm} = CAP_{cm} + EP_{cm} + LM_{cm} - PL_{cm} - ES_{cm} - LS_{cm} - PM_{cm} - PR_{cm}$;

$ACAF_{cm}$ is the average derating factor calculated for the Control Area System Resource located in Control Area *c* that will be used to determine the amount of Unforced Capacity that the Resource will be permitted to provide in month *m*, as defined further below; and

Duration Adjustment Factor_{gm} is the Duration Adjustment Factor for Resource *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

If month *m* is in the Winter Capability Period, then $ACAF_{gm}$ will be equal to the average of the two previous Winter Capability Period CAF values calculated. If month *m* is in the Summer Capability Period, $ACAF_{gm}$ will be equal to the average of the two previous Summer Capability

Period CAF values calculated for Resource g. CAF_{gn}, the CAF value for Resource g for the 6-month period ending in any given month n that is used in the calculation of $ACAF_{gm}$, will be calculated as follows:

$$CAF_{gn} = \frac{\sum\limits_{i=b}^{e} \max\begin{pmatrix} 0, \ ICE_{ci}-(CAP_{ci}+EP_{ci}+LM_{ci}-L_{ci} \\ -ES_{ci}-LS_{ci}-PM_{ci}-FO_{ci}-OR_{ci}) \end{pmatrix}}{\sum\limits_{j=B}^{E} ICE_{cj}TH_j}$$

Where:

i is an hour in which the Control Area System Resource located in Control Area c provided Installed Capacity to the NYCA;

b is the beginning of the first month of the Capability Period, or the time at which Capacity began to be provided from Control Area c under the terms of this section, if later;

e is the end of the last month of the Capability Period;

ICE_{ci} is the Installed Capacity equivalent of the amount of Unforced Capacity supplied from the Control Area System Resource providing Installed Capacity from Control Area c during the month containing hour i;

CAP_{ci} is the actual maximum total generating Capacity in hour i in Control Area c;

EP_{ci} is the actual External firm Capacity purchases in hour i by Control Area c, other than purchases from Resources in the NYCA;

LM_{ci} is the actual amount of load management (*i.e.,* interruptible load) in hour i in Control Area c;

L_{ci} is the Load in hour i for Control Area c, including system losses;

ES_{ci} is the actual External firm Capacity sales in hour i by Control Area c, other than firm capacity sales to NYCA;

LS_{ci} is the actual losses, up to the border of the NYCA, that would have been incurred in hour i on transactions corresponding to sales of Unforced Capacity by that Control Area System Resource outside the Control Area;

PM_{ci} is the amount of generating Capacity in Control Area c that was actually unavailable in hour i due to planned maintenance;

FO_{ci} is the amount of generating Capacity in Control Area c that was actually unavailable in hour i due to forced outages;

OR_{ci} is the amount of operating reserve that was actually available for Control Area c in hour i;

E is the month containing e;

B is the month containing b;

ICE_{cj} is the Installed Capacity Equivalent of the amount of Unforced Capacity provided from the Control Area Resource associated with Control Area c during month j, and

TH_j is the total number of hours in month j in which the Control Area System Resource provided Installed Capacity to the NYCA.

(b) Determining the ICE of the Amount of UCAP Supplied

Where: $$ICE_{cm} = \frac{UCAP^P{}_{cm}}{(1-ACAF_{cm})*Duration\ Adjustment\ Factor_{gm}}$$

ICE_{cm} is the Installed Capacity equivalent of the amount of Unforced Capacity supplied from Control Area c in month m;

$UCAP^P{}_{cm}$ is the amount of Unforced Capacity supplied from Control Area c in month m;

$ACAF_{cm}$ is the Average Capacity Adjustment Factor for Control Area c for month m, as calculated above; and

$Duration\ Adjustment\ Factor_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.4.   Calculation of UCAP for Intermittent Power Resources

This section describes the general procedure for calculating Unforced Capacity values for Intermittent Power Resources which include generators that depend on wind, solar, and landfill gas for their fuel. Also see Section 4.5 of this Manual and 5.12.6(a) of the Market Administration and Control Area Services Tariff.

(a) Definitions

For purposes of this Section 3.4:

"Unforced Capacity" means that amount of generating capacity, expressed to the nearest tenth of a MW, that an Intermittent Power Resource can reasonably be expected to contribute during summer or winter peak hours, as applicable.

"Production Factor" for an Intermittent Power Resource means a factor based on historic operating data, and for facilities without historic operating data, initial Unforced Capacity will be determined using the factors defined in Section 4.5 of the ICAP Manual and in this Section 3.4.

"Installed Capacity" means the sum of the nameplate ratings of the individual generating units in the Intermittent Power Resource.

"Hourly Output" means the metered output of the Intermittent Power Resource expressed to the nearest tenth of a MW and integrated over a one-hour period.

"Summer Peak Hours" means the hours beginning 14, 15, 16, and 17 during the three-month period from June 1 through August 31, inclusive.

"Winter Peak Hours" means the hours beginning 16, 17, 18 and 19 during the three-month period from December 1 through the last day of February.

(b) Determining the Amount of UCAP an Intermittent Power Resource Qualifies to Supply

Generally, the calculation of the Production Factor for an Intermittent Power Resource for a particular Capability Period is based on its operating data for the Prior Equivalent Capability Period. For facilities with less than sixty (60) days of historic operating data in the Prior Equivalent Capability Period, the initial Unforced Capacity will use the factors in Section 4.5 of the Installed Capacity

Manual. The Production Factor, when multiplied by the current Installed Capacity yields the Unforced Capacity for that Intermittent Power Resource. This two-step process accommodates any changes in the Installed Capacity that may have occurred during the prior or current year of operation.

The following definitions are applicable to Intermittent Power Resources:

"Summer Peak Hours" means the hours beginning 13, 14, 15, 16, 17, and 18 for the 6-hour Peak Load Window and hours beginning 12, 13, 14,15, 16, 17, 18, and 19 for the 8-hour Peak Load Window during the three-month period from June 1 through August 31, inclusive.

"Winter Peak Hours" means the hours beginning 16, 17, 18, 19, 20, and 21 for the 6-hour Peak Load Window and hours beginning 14, 15, 16, 17, 18, 19, 20, and 21 for the 8-hour Peak Load Window during the three-month period from December 1 through the last day of February.

$UCAP^Q_{gm}$, the amount of Unforced Capacity that Resource g is qualified to provide in month m, is calculated as follows:

$UCAP^Q_{gm} = ProdF_{gm} * NC_{gm} * Duration\ Adjustment\ Factor_{gm}$,

where:

$ProdF_{gm}$ is the production factor used in the calculation of the amount of Unforced Capacity that supplier g is qualified to provide in month m;

NC_{gm} is the nameplate capacity of Resource g that is applicable when determining the amount of Unforced Capacity that Resource g is qualified to provide in month m; and

$Duration\ Adjustment\ Factor_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

$ProdF_{gm}$, in turn, is calculated as follows:

$$ProdF_{gm} = \sum_{h \in CPPH_{gm}} \left[\left(\frac{E_{gh}}{NC_{gh}} \right) \times WF_h \right]$$

Where:

$CPPH_{gm}$ is the set of all Summer Peak Hours during the most recent Summer Capability Period preceding the Capability Period containing month m (if month m is part of a Summer Capability Period) during which Resource g was available for commercial operation, or the set of all Winter Peak Hours during the most recent Winter Capability Period preceding the Capability Period containing month m (if month m is part of a Winter Capability Period) during which Resource g was available for commercial operation;

E_{gh} is the average amount of energy delivered to the NYCA transmission system by Resource g during hour h;

NC_{gh} is the nameplate capacity of Resource g that was applicable when determining the amount of Unforced Capacity that Resource g was qualified to provide in hour h; and

WF_h is the hourly weighting factor according to the table in section (c).

Except that for new Intermittent Power Resources for which less than sixty (60) days of production data are available to calculate $ProdF_{gm}$ using the equation above, $ProdF_{gm}$ instead will be calculated in accordance with Section 4.5 of the Installed Capacity Manual.

(c) Determining the Production Factor for Intermittent Power Resources

The production factor for Intermittent Power Resources will be calculated based on the equation in the above section, and will be subject to hourly weightings within the Peak Load Window as stated in Section 5.12.6.2 of the *NYISO Services Tariff*,

where:

Hour Beginning	Summer Peak Load Window		Winter Peak Load Window	
	6 Hour	8 Hour	6 Hour	8 Hour
12		5.00%		
13	12.50%	10.00%		
14	18.75%	17.50%		5.00%
15	18.75%	17.50%		5.00%
16	18.75%	17.50%	18.75%	17.50%
17	18.75%	17.50%	18.75%	17.50%
18	12.50%	10.00%	18.75%	17.50%
19		5.00%	18.75%	17.50%
20			12.50%	10.00%
21			12.50%	10.00%

The duration of the Peak Load Window will be dependent on resources with Energy Duration Limitations. When the system reaches 1000 MW of incremental penetration of resources with Energy Duration Limitations and the Peak Load Window shifts from 6 hours to 8 hours, the Peak Load Window for Intermittent Power Resources will shift as well. The weighting percentages will be reevaluated through a study done every four years, and will be updated accordingly.

(d) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P_{gm}}{ProdF_{gm} * Duration\ Adjustment\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

ProdF$_{gm}$ is the production factor used in the calculation of the amount of Unforced Capacity that supplier *g* is qualified to provide in month *m*; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual.*

3.5.   Calculation of UCAP for Installed Capacity Delivered over UDR Facilities

(a) Determining the Amount of UCAP a UDR Qualifies to Supply

The amount of UDRs assigned by the NYISO to each new incremental transmission facility, and any future adjustments thereto, will be based on the transmission capability, reliability, and availability of the facility, and appropriate NYSRC reliability studies.

The NYISO may request additional information as necessary and will grant UDRs to the requestor, or designated rights holder, quantified as the Installed Capacity Equivalent of the Unforced Capacity to be delivered throughout its project life to the Interconnection Point in MW.

The amount of UDRs awarded to a particular project may be adjusted periodically by the NYISO. Adjustments to such an award will reflect changes in physical characteristics and availability of the associated project.

$UCAP^{Q}_{gm}$, the amount of Unforced Capacity that Resource *g* is qualified to provide in a Locality in month *m* through the use of UDRs, is calculated as follows:

$$UCAP^{Q}_{gm} = (Resource_{ICAP} - Loss_{FL}) * P_{resource} * P_{cable} * Duration\ Adjustment\ Factor_{gm}$$

Where:

Resource$_{ICAP}$ = the sum of the applicable DMNCs for month *m* of the Resources (or portions thereof) used to supply ICAP to Resource *g* in association with a given set of UDRs*;*

Loss$_{FL}$ = cable and converter station losses at the rated UDR level;

P$_{resource}$ = one minus a weighted average of the EFORds calculated for the Resources used to supply ICAP to Resource *g* in association with a given set of UDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP;

P$_{cable}$ = one minus the cable outage rate, including cable and converter station unavailability; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^{P}_{gm}}{P_{resource} * P_{cable} * Duration\ Adjustment\ Factor_{gm}}$$

ICE$_{gm}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *m*;

$UCAP^P{}_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

$P_{resource}$ = one minus a weighted average of the EFORds calculated for the Resources used to supply ICAP to Resource g in association with a given set of UDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP;

P_{cable} = one minus the cable outage rate, including cable and converter station unavailability; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.6.   Calculation of UCAP for Installed Capacity Delivered over EDR Facilities

(a) Determining the Amount of UCAP an EDR Qualifies to Supply

The amount of EDRs assigned by the NYISO to each new incremental transmission facility, and any future adjustments thereto, will be based on the transmission capability, reliability, and availability of the facility, and appropriate NYSRC reliability studies.

The NYISO may request additional information as necessary and will grant EDRs to the requestor, or designated rights holder, quantified as the Installed Capacity Equivalent of the Unforced Capacity to be delivered throughout its project life to the NYCA interface over which it creates increased transfer capability.

The amount of EDRs awarded to a particular project may be adjusted periodically by the NYISO. Adjustments to such an award will reflect changes in physical characteristics and availability of the associated project.

$UCAP^Q{}_{gm}$, the amount of Unforced Capacity that Resource g is qualified to provide in ROS in month m through the use of EDRs, is calculated as follows:

$$UCAP^Q{}_{gm} = (Resource_{ICAP} - Loss_{FL}) * P_{resource} * P_{interface} * \text{Duration Adjustment Factor}_{gm}$$

Where:

$Resource_{ICAP}$ = the sum of the applicable DMNCs for month m of the Resources (or portions thereof) used to supply ICAP to Resource g in association with a given set of EDRs*;*

$Loss_{FL}$ = interface losses at the rated EDR level, if applicable;

$P_{resource}$ = one minus a weighted average of the EFORds calculated for the Resources used to supply ICAP to Resource g in association with a given set of EDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP;

$P_{interface}$ = one minus the interface outage rate, including interface and converter station unavailability, if applicable; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P_{gm}}{P_{resource} * P_{cable} * Duration\ Adjustment\ Factor_{gm}}$$

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

$P_{resource}$ = one minus a weighted average of the EFORds calculated for the Resources used to supply ICAP to Resource g in association with a given set of UDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP;

P_{cable} = one minus the cable outage rate, including cable and converter station unavailability; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.7.   Calculation of UCAP for Energy Storage Resources

This Section describes the procedure for calculating Unforced Capacity values for Energy Storage Resources.

3.7.1   Procedure for calculating Unforced Capacity values for Energy Storage Resources without an Energy Duration Limitation.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

$$UCAP^Q_{gm} = \left(1 - AUF_{gm}\right) * min(CRIS_{gm}, DMNC_{gm}) * Duration\ Adjustment\ Factor_{gm};$$

Where:

$UCAP^Q_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

AUF_{gm} (Average Unavailability Factor$_{gm}$) is the derating factor calculated for Resource g that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

If month *m* is in the Winter Capability Period, then *Average Unavailability Factor$_{gm}$* will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for Resource *g*. If month *m* is in the Summer Capability Period, then *Average Unavailability Factor$_{gm}$* will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for Resource *g*.

The Unavailability Factor value for Resource *g* for the 6-month period ending in any given month *n* that is used in the calculation of *Average Unavailability Factor$_{gm}$*, will be calculated as follows:

Where: $$\text{Unavailability Factor}_{gn} = 1 - \left(\frac{\text{Total Available ICAP Seconds}_{gn}}{\text{Total Expected ICAP Seconds}_{gn}} \right)$$

Total Available ICAP Seconds$_{gn}$ is the sum of *Total Available ICAP Seconds$_{gh}$* for each of the 6-month Winter Capability Period or Summer Capability Period;

Total Expected ICAP Seconds$_{gn}$ is the sum of seconds in all real-time intervals in the 6-month Winter Capability Period or Summer Capability Period in which Generator *g* was not on a planned or scheduled outage;

Where: ***Total Available ICAP Seconds$_{gn}$ and Total Expected ICAP Seconds$_{gn}$ are further defined below:***

$$\text{Total Available ICAP Seconds}_{gn} = \sum_{h=b}^{e} \text{Total Available ICAP Seconds}_{gh}$$

$$\text{Total Expected ICAP Seconds}_{gn} = \sum_{h=b}^{e} \text{Total Expected Monthly Seconds}_{gh}$$

Where:

Total Available ICAP Seconds$_{gh}$ is the sum of the Available ICAP Seconds on a monthly basis for each month *h* in the appropriate 6-month Capability Period;

Total Expected Monthly Seconds$_{gh}$ is the sum of seconds in all real-time intervals in month *h* in which Resource *g* was not on a planned or scheduled outage;

b is the beginning month in the 6-month Capability Period (e.g.May for a Summer Capability Period, or November for a Winter Capability Period); and

e is the last month in the 6-month Capability Period (e.g. October for a Summer Capability Period or April for Winter Capability Period).

Where: ***Total Available ICAP Seconds$_{gh}$ and Total Expected Monthly Seconds$_{gh}$ are further defined below:***

$$\textbf{Total Available ICAP Seconds}_{gh}$$
$$= \sum_{i=x}^{y} \begin{pmatrix} \textbf{min}\,(\mathbf{1}, \textbf{UOL Availability}_{gi}, \textbf{LOL Availability}_{gi}\ \textbf{Storage Availability}_{gi}, \\ \textbf{Energy Level Availability}_{gi}) * \textbf{Interval Seconds}_{gi} \end{pmatrix}$$

$$\textbf{Total Expected Monthly Seconds}_{gh} = \sum_{i=x}^{y} \textbf{Interval Seconds}_{gi}$$

Where:

> ***UOL Availability**$_{gi}$* measures the ratio of Resource *g's UOL$_N$* that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

> ***LOL Availability**$_{gi}$* measures the ratio of Resource *g's LOL$_N$* that is available for a given interval *i* to the negative ICAP equivalent of UCAP sold;

> ***Storage Availability**$_{gi}$* measures the ratio of Resource *g's* real-time storage limits to the ICAP equivalent of storage sold for a given interval *i*;

> ***Energy Level Availability**$_{gi}$* measures the ratio of Resource *g's* real-time Energy Level at the first interval *i* of hour *r* to the sum of its *DAM Energy$_{gr}$* and *DAM Reserves$_{gr}$* schedule for hour *r*. *Energy Level Availability$_{gi}$* will be applicable to all real-time intervals *i* occurring within hour *r*. If Resource *g* is adjusted due to a NYISO or TO reliability need, *Energy Level Availability$_{gi}$* will be 100% for all remaining real-time intervals *i* of the applicable day;

> ***Interval Seconds**$_{gi}$* is the number of seconds in each real-time interval *i* for Resource *g* in month *h,* except for real-time intervals *i* when Resource *g* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{gi}$* will be set to zero (0)*;*

> *x* is the first real-time interval in month *h*; and

> *y* is the last real-time interval in month *h.*

Where: ***UOL Availability**$_{gi}$, **LOL Availability**$_{gi}$, **Storage Availability**$_{gi}$, and **Energy Level Availability**$_{gi}$ are further defined below:*

$$UOL\ Availability_{gi} = \frac{\min(UOL_{Ngi}, ICE_{gh})}{\min(ICE_{gh}, Adjusted\ ICE_{gi})}$$

$$LOL\ Availability_{gi} = \frac{\max(LOL_{Ngi}, -ICE_{gh}, NWL_{gh})}{\max(-ICE_{gh}, -Adjusted\ ICE_{gi,}NWL_{gh})}$$

$$Storage\ Availability_{gi} = \frac{\min\big((USL_{gi} - LSL_{gi}), (24\ hours * ICE_{gh})\big)}{\min\big((24\ hours * ICE_{gh}), Adjusted\ Storage_{gi}\big)}$$

$$Energy\ Level\ Availability_{gi}$$

$$= \begin{cases} 100\%, & \text{if } Committed\ Energy\ Level_{gr} = 0 \\ \dfrac{Energy\ Level_{gr}}{Committed\ Energy\ Level_{gr}}, & \text{otherwise,} \end{cases}$$

Where:

$$Committed\ Energy\ Level_{gr} = DAM\ Energy_{gr} + DAM\ Reserves_{gr}$$

And:

> *UOL$_{Ngi}$* is the Normal Upper Operating Limit for Resource *g* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Resource *g* is adjusted down due to a NYISO or TO reliability need, the UOL$_{Ngi}$ will be set equal to the Resource's Bid UOL;

> *ICE$_{gh}$* is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *h,* measured in MW*;*

Adjusted ICE$_{gi}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies for real-time interval i, accounting for any derates that result from planned and maintenance outages while Resource g remains available for operation, measured in MW;

LOL$_{Ngi}$ is the Normal Lower Operating Limit for Resource g that is available to the Real-Time Market system, measured in MW. For real-time intervals i when Resource g is adjusted up due to a NYISO or TO reliability need, the LOL$_{Ngi}$ will be set equal to the Resource's Bid LOL;

NWL$_{gh}$ is the Normal Withdrawal Limit that Resource g supplies in month h based on its withdrawal capabilities, accounting for any derates that result from planned and maintenance outages while Resource g remains available for operation, measured in MW;

USL$_{gi}$ is the Upper Storage Limit of Resource g for each real-time interval i, measured in MWh;

LSL$_{gi}$ is the Lower Storage Limit of Resource g for each real-time interval i, measured in MWh;

Adjusted Storage$_{gi}$ is the storage capability of Resource g for real-time interval i, accounting for any derates that result from planned and maintenance outages while Resource g remains available for operation, measured in MWh;

Committed Energy Level$_{gr}$ is the sum of Resource g's *DAM Energy* and *DAM Reserves* schedule for the hour r, measured in MWh. *Committed Energy Level$_{gr}$* will be evaluated for each hour r and applicable to all real-time intervals i within that hour;

Energy Level$_{gr}$ is the Energy Level for Resource g that is available to the Real-Time Market system at the start of hour r, measured in MWh. *Energy Level$_{gr}$* will be evaluated for each hour r and applicable to all real-time intervals i within that hour;

DAM Energy$_{gr}$ is Resource g's Day Ahead Market (DAM) Energy schedule for the hour r that contains real-time interval i, measured in MW; and

DAM Reserves$_{gr}$ is Resource g's total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour r that contains real-time interval i, measured in MW.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^{P}_{gm}}{(1 - AUF_{gm}) * Duration\ Adjustment\ Factor_{gm}}$$

Where:

ICE$_{gm}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

UCAP$^{P}_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

AUF$_{gm}$ (Average Unavailability Factor$_{gm}$) as above, is the derating factor calculated for Resource g that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.7.2 Procedure for calculating Unforced Capacity values for Energy Storage Resources with an Energy Duration Limitation.

Starting with the 2021/2022 Capability Year, Energy Storage Resources that are Installed Capacity Suppliers with Energy Duration Limitations will be evaluated during the applicable Peak Load Window for their UCAP values.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

$$UCAP^Q_{gm} = (1 - AUF_{gm}) * min(CRIS_{gm}, DMNC_{gm}) * Duration\ Adjustment\ Factor_{gm};$$

Where:

$UCAP^Q_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

AUF_{gm} *(Average Unavailability Factor$_{gm}$)* is the derating factor calculated for Resource g that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

If month m is in the Winter Capability Period, then *Average Unavailability Factor$_{gm}$* will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for Resource g. If month m is in the Summer Capability Period, then *Average Unavailability Factor$_{gm}$* will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for Resource g.

The Unavailability Factor value for Resource g for the 6-month period ending in any given month n that is used in the calculation of *Average Unavailability Factor$_{gm}$*, will be calculated as follows:

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

Total Available ICAP Seconds$_{gn}$ is the sum of *Total Available ICAP Seconds$_{gh}$* for each of the 6-month Winter Capability Period or Summer Capability Period;

Total Expected ICAP Seconds$_{gn}$ is the sum of seconds in all real-time intervals in the 6-month Winter Capability Period or Summer Capability Period in which Generator g was not on a planned or scheduled outage;

Where: *Total Available ICAP Seconds$_{gn}$ and Total Expected ICAP Seconds$_{gn}$ are further defined below:*

$$Total\ Available\ ICAP\ Seconds_{gn} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{gh}$$

$$Total\ Expected\ ICAP\ Seconds_{gn} = \sum_{h=b}^{e} Total\ Expected\ Monthly\ Seconds_{gh}$$

Where:

Total Available ICAP Seconds$_{gh}$ is the sum of the Available ICAP Seconds on a monthly basis for each month *h* in the appropriate 6-month Capability Period;

Total Expected Monthly Seconds$_{gh}$ is the sum of seconds in all real-time intervals in month *h* in which Resource *g* was not on a planned or scheduled outage;

b is the beginning month in the 6-month Capability Period (e.g. May for a Summer Capability Period, or November for a Winter Capability Period);

e is the last month in the 6-month Capability Period (e.g. October for a Summer Capability Period or April for Winter Capability Period); and

Peak Load Window is the time period during which a Resource with an Energy DurationLimitation must offer Energy in the Day-Ahead Market, as specified in Section 4.1.1 of this ICAP Manual. For days in which the tariff-defined Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the tariff-defined and ISO-adjusted Peak Load Windows. Total Available ICAP Seconds$_{gh}$ and Total Expected Monthly Seconds$_{gh}$ are further defined below:

Where: **Total Available ICAP Seconds$_{gh}$ and Total Expected Monthly Seconds$_{gh}$ are further defined below:**

$$Total\ Available\ ICAP\ Seconds_{gh}$$
$$= \sum_{i=x}^{y} \left(min\left(1, UOL\ Availability_{gi},\ Storage\ Availability_{gi}, Energy\ Level\ Availability_{gi}\right) \right.$$
$$\left. * Interval\ Seconds_{gi}\right)$$

$$Total\ Expected\ Monthly\ Seconds_{gh} = \sum_{i=x}^{y} Interval\ Seconds_{gi}$$

Where:

UOL Availability$_{gi}$ measures the ratio of Resource *g's* UOL_N that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Storage Availability$_{gi}$ measures the ratio of Resource *g's* real-time storage limits to the ICAP equivalent of storage sold for a given interval *i*;

Energy Level Availability$_{gi}$ measures the ratio of Resource *g's* real-time Energy Level at the first interval *i* of hour *r* during the applicable Peak Load Window to the sum of its *DAM Energy$_{gr}$* and *DAM Reserves$_{gr}$* schedule for hour *r*. *Energy Level Availability$_{gi}$* will be applicable to all real-time intervals *i* occurring within hour *r*. If Resource *g* is adjusted due to a NYISO or TO reliability

need, *Energy Level Availability$_{gi}$* will be 100% for all remaining real-time intervals *i* of the applicable day;

Interval Seconds$_{gi}$ is the number of seconds in each real-time interval *i* for Resource *g* in month *h* during the applicable Peak Load Window, except for real-time intervals *i* when Resource *g* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{gi}$* will be set to zero (0);

x is the first real-time interval in month *h*; and

y is the last real-time interval in month *h*.

Where: ***UOL Availability$_{gi}$, Storage Availability$_{gi}$, and Energy Level Availability$_{gi}$ are further defined below:***

$$UOL\ Availability_{gi} = \frac{\min(UOL_{Ngi}, ICE_{gh})}{\min(ICE_{gh}, Adjusted\ ICE_{gi})}$$

$$Storage\ Availability_{gi}$$
$$= \frac{\min\big((USL_{gi} - LSL_{gi}), (Energy\ Duration\ Limitation_g * ICE_{gh})\big)}{\min\big((Energy\ Duration\ Limitation_g * ICE_{gh}), Adjusted\ Storage_{gi}\big)}$$

$$Energy\ Level\ Availability_{gi}$$

$$= \begin{cases} 100\%, & \text{if } Committed\ Energy\ Level_{gr} = 0 \\ \dfrac{Energy\ Level_{gr}}{Committed\ Energy\ Level_{gr}}, & \text{otherwise,} \end{cases}$$

Where:

$$Committed\ Energy\ Level_{gr} = DAM\ Energy_{gr} + DAM\ Reserves_{gr}$$

And:

UOL$_{Ngi}$ is the Normal Upper Operating Limit for Resource *g* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Resource *g* is adjusted down due to a NYISO or TO reliability need, the UOL$_{Ngi}$ will be set equal to the Resource's Bid UOL;

ICE$_{gh}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *h,* measured in MW;

Adjusted ICE$_{gi}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Resource *g* remains available for operation, measured in MW;

USL$_{gi}$ is the Upper Storage Limit of Resource *g* for each real-time interval *i,* measured in MWh;

LSL$_{gi}$ is the Lower Storage Limit of Resource *g* for each real-time interval *i,* measured in MWh;

Adjusted Storage$_{gi}$ is the storage capability of Resource *g* for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Resource *g* remains available for operation, measured in MWh;

Committed Energy Level$_{gr}$ is the sum of Resource *g*'s *DAM Energy* and *DAM Reserves* schedule for the hour *r* during the applicable Peak Load Window, measured in MWh. *Committed Energy*

Level$_{gr}$ will be evaluated for each hour r and applicable to all real-time intervals i within that hour;

Energy Level$_{gr}$ is the Energy Level for Resource g that is available to the Real-Time Market system at the start of hour r during the applicable Peak Load Window, measured in MWh. *Energy Level*$_{gr}$ will be evaluated for each hour r and applicable to all real-time intervals i within that hour;

DAM Energy$_{gr}$ is Resource g's Day Ahead Market (DAM) Energy schedule for the hour r during the applicable Peak Load Window that contains real-time interval i, measured in MW; and

DAM Reserves$_{gr}$ is Resource g's total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour r during the applicable Peak Load Window that contains real-time interval i, measured in MW.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P_{gm}}{\left(1 - AUF_{gm}\right) * Duration\ Adjustment\ Factor_{gm}}$$

Where:

ICE$_{gm}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

UCAP^P$_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

AUF$_{gm}$ *(Average Unavailability Factor*$_{gm}$*)* as above, is the derating factor calculated for Resource g that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.8. Calculation of UCAP for Generators participating as Co-located Storage Resources

This Section describes the procedure for calculating Unforced Capacity values for Generators that are participating in the NYISO Installed Capacity market as Co-located Storage Resources.

3.8.1 Procedure for calculating Unforced Capacity values for an Intermittent Power Resource that is participating in the NYISO Installed Capacity market as Co-located Storage Resources

The weighted Capacity Factor calculation for an IPR in a CSR will be considered on a real-time intervals basis. The Capacity Factor for a given interval is the ratio of (1) the minimum of the Resource's output and the real-time CSR Injection Scheduling Limit to (2) the minimum of the Resource's nameplate capacity and registered CSR Injection Scheduling Limit. The hourly Capacity Factor is the summation of all of the individual interval capacity factors multiplied by its corresponding interval weighting.

(a) Determining the Amount of UCAP an Intermittent Power Resource participating as Co-located Storage Resources Qualifies to Supply

$UCAP^Q_{gm}$, the amount of Unforced Capacity that Resource g is qualified to provide in month m, is calculated as follows:

$$UCAP^Q_{gm} \; = \; ProdF_{gm} \; * \; NC_{gm} * Duration \; Adjustment \; Factor_{gm}$$

The monthly *Production Factor* ($ProdF_{gm}$) for Resource g and month m is calculated as follows:

$$ProdF_{gm} = \sum_{h \in CPPH_{gm}} \left[WF_h \times Average \; Capacity \; Factor_{gh} \right]$$

Where:

$CPPH_{gm}$ is the set of all Summer Peak Hours (as defined in Section 3.4(c) above) during the Summer Capability Period preceding the Capability Period containing month m (if month m is part of a Summer Capability Period) during which Resource g was available for commercial operation, or the set of all Winter Peak Hours (as defined in Section 3.4(c) above) during the Winter Capability Period preceding the Capability Period containing month m (if month m is part of a Winter Capability Period) during which Resource g was available for commercial operation;

WF_h is the hourly weighting factor for Peak Hour h according to the table in Section 3.4(c) of this Installed Capacity Manual Attachment J; and

Average Capacity Factor$_{gh}$ is the average capacity factor for Resource g in Peak Hour h, which is calculated by averaging the value of *Capacity Factor$_{gh}$* for all occurrences of Peak Hour h contained within *CPPH$_{gm}$*.

Capacity Factor$_{gh}$ is calculated as follows;

$$Capacity\ Factor_{gh} = \sum_{i \in h} \omega_i \left(\frac{\min(E_{gi},\ IL_{Ngi})}{\min(NC_{gi},\ IL_{Pgi})} \right)$$

Where:

E_{gi} is the amount of energy delivered to the NYCA transmission system by Resource g during interval i;

IL_{Ngi} is the Injection Scheduling Limit for the CSR that includes Resource g for RTD interval i ;

NC_{gi} is the nameplate capacity of Resource g that was applicable when determining the amount of Unforced Capacity that Resource g was qualified to provide during interval i;

IL_{Pgi} is the registered Physical Injection Scheduling Limit for the CSR that includes Resource g for RTD interval i; and

ω_i is the fraction of hour h that is included in interval i.

(b) Determining the ICE of the Amount of UCAP Supplied

The ICE of the Amount of UCAP Supplied for Intermittent Power Resources participating as part of a Co-located Storage Resource is calculated as follows:

$$ICE_{gm} = \frac{UCAP^P_{gm}}{ProdF_{gm} * Duration\ Adjustment\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

$ProdF_{gm}$ is the production factor used in the calculation of the amount of Unforced Capacity that Resource g is qualified to provide in month m; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual.*

3.8.2 Procedure for calculating Unforced Capacity values for an Energy Storage Resource that is participating in the NYISO Installed Capacity Market as Co-located Storage Resources

Unforced Capacity for an Energy Storage Resource that is participating in the NYISO Installed Capacity Market as part of a Co-located Storage Resource will be calculated in accordance with the procedure described in Section 3.7 of this Installed Capacity Manual Attachment J for the AUF_{gm} (*Average Unavailability Factor$_{gm}$*), with the amendments described below.

(a) Determining the Amount of UCAP a Co-Located Energy Storage Resource Qualifies to Supply

$$UCAP_{gm}^{Q} = (1 - AILUF_{gm}) * (1 - ARUF_{gm}) * min(CRIS_{gm}, DMNC_{gm}) * Duration\ Adjustment\ Factor_{gm};$$

Where:

$UCAP^{Q}_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

$AILUF_{gm}$ *(Average Injection Limit Unavailability Factor)* is the Injection Scheduling Limit (IL) derating factor for the CSR that includes Resource g that will be used to determine the amount of Unforced Capacity that Resource g will be permitted to provide in month m;

$ARUF_{gm}$ *(Average Resource Unavailability Factor*) is the derating factor calculated for Resource g that will be used to determine the amount of Unforced Capacity that Resource g will be permitted to provide in month m, and is calculated using the same equation that is used to calculate the value of AUF_{gm} in Section 3.7.2 of this Installed Capacity Manual Attachment J;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

Duration Adjustment Factor$_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

If month m is in the Winter Capability Period, then $AILUF_{gm}$ will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for Resource g. If month m is in the Summer Capability Period, then $AILUF_{gm}$ will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for Resource g.

The CSR Injection Scheduling Limit Unavailability Factor value for Resource g for the 6-month period ending in any given month n that is used in the calculation of $AILUF_{gm}$ will be calculated as follows:

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

Where:

Total Available Injection Limit ICAP Seconds$_{gn}$ is the sum of Total Available ICAP Seconds$_{gh}$ for each of the 6- month Winter Capability Period or Summer Capability Period for the CSR that includes Resource *g*; and

Total Expected Injection Limit ICAP Seconds$_{gn}$ is the sum of seconds in all real-time intervals in the 6-month Winter Capability Period or Summer Capability Period in which the Point-of-Injection for the CSR that includes Resource *g* was not on a planned or scheduled outage.

Where: **Total Available Injection Limit ICAP Seconds$_{gn}$ and Total Expected Injection Limit ICAP Seconds$_{gn}$ are further defined below:**

$$Total\ Available\ Injection\ Limit\ ICAP\ Seconds_{gn}$$

$$= \sum_{h=b}^{e} Total\ Available\ Injection\ Limit\ ICAP\ Seconds_{gh}$$

$$Total\ Expected\ Injection\ Limit\ ICAP\ Seconds_{gn}$$

$$= \sum_{h=b}^{e} Total\ Expected\ Injection\ Limit\ ICAP\ Seconds_{gh}$$

Where:

Total Available Injection Limit ICAP Seconds$_{gh}$ is the sum of the Available ICAP Seconds on a monthly basis for each month h for the CSR that includes Resource *g* in the appropriate 6-month Capability Period;

Total Expected Injection Limit ICAP Seconds$_{gh}$ is the sum of seconds in all real-time intervals in month *h* in which the Point-of-Injection for the CSR that includes Resource *g* was not on a planned or scheduled outage;

b is the beginning month in the 6-month Capability Period (e.g. May for a Summer Capability Period, or November for a Winter Capability Period); and

e is the last month in the 6-month Capability Period (e.g. October for a Summer Capability Period or April for Winter Capability Period).

Where: **Total Available Injection Limit ICAP Seconds$_{gh}$ and Total Expected Injection Limit ICAP Seconds$_{gh}$ are further defined below:**

$$Total\ Available\ Injection\ Limit\ ICAP\ Seconds_{gh}\ =\ \sum_{i=x}^{y}\left(min\left(1, IL\ Availability_{gi}\right)\right)$$

$$Total\ Expected\ Injection\ Limit\ ICAP\ Seconds_{gh}\ =\ \sum_{i=x}^{y} Interval\ Seconds_{gi}$$

Where:

    Total Available Injection Limit ICAP Seconds$_{gh}$ is the sum of the Available ICAP Seconds for the CSR that includes Resource *g* on a monthly basis for each interval *i* in a given month *h*;

    IL Availability$_{gi}$ measures the ratio of the real-time Injection Scheduling Limit for the CSR that includes Resource *g* that is available for a given interval *i* to the registered CSR Physical Injection Scheduling Limit;

    Interval Seconds$_{gi}$ is the number of seconds in each real-time interval *i* for the CSR that includes Resource *g* in month *h*, except for real-time intervals *i* when the Point-of-Injection is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{gi}$* will be set to zero (0);

    x is the first real-time interval in month *h*; and

    y is the last real-time interval in month *h*.

Where: *IL Availability$_{gi}$ is further defined below:*

$$IL\ Availability_{gi} = \frac{IL_{Ngi}}{IL_{Pgi}}$$

And:

    IL$_{Ngi}$ is the Injection Scheduling Limit for the CSR that includes Resource *g* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when the Injection Scheduling Limit is adjusted down due to a NYISO or TO reliability need, the value of *IL$_{Ngi}$* will be set equal to the Resource's Bid CSR Injection Scheduling Limit; and

    IL$_{Pgi}$ is the registered Physical Injection Scheduling Limit for the CSR that includes Resource g for RTD interval *i*.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP_{gm}^P}{(1 - AILUF_{gm}) * (1 - ARUF_{gm}) * Duration\ Adjustment\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

$AILUF_{gm}$ is the Injection Scheduling Limit (IL) derating factor of <u>the CSR that includes</u> Resource g that will be used to determine the amount of Unforced Capacity that Resource g will be permitted to provide in month m;

$ARUF_{gm}$ as above, is the derating factor calculated for Resource g that will be used to determine the amount of Unforced Capacity that Resource g will be permitted to provide in month m, as calculated using the same equation that is used to calculate the value of AUF_{gm} in Section 3.7.2 of this Installed Capacity Manual Attachment J; and

$Duration\ Adjustment\ Factor_{gm}$ is the Duration Adjustment Factor for Resource g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9   Calculation of UCAP for Aggregations

This Section describes the procedure for calculating Unforced Capacity values for Aggregations. Aggregations can either be 1) 'DER' Aggregations, which may be comprised of a heterogenous combination of technology types, or one or more Demand Side Resources, or 2) 'Single Resource Type' Aggregations ("SRT," henceforth referred to using the applicable technology-type classification, e.g., 'Solar Aggregation' or 'ESR Aggregation').

Aggregation Unforced Capacity adheres to the following formula:

$$AggregationUCAPMW_{a,m}$$
$$= (Aggregation\ ICAP\ MW_{a,m} * Duration\ Adjustment\ Factor_{am}) *$$
$$* (100\% - AggregationDeratingFactor_{a,m})$$

As illustrated in the following sections, the inputs considered in an Aggregation's Unforced Capacity value calculation may vary depending on Aggregation Type, whether the Aggregation elects an Energy Duration Limitation ("EDL"), and whether the Aggregator chooses to 'time-stack' individual DER within an Aggregation to satisfy a minimum duration of 2,4, 6, or 8 hours for the Aggregation. Key concepts as applied throughout this section 3.9 include:

- Adjusted ICAP = Aggregation ICAP * DAF
- Duration Adjustment Factor (DAF) 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 this *ICAP Manual* and Section 5.12.14 of the *ISO Services Tariff.*
- An Aggregation's ICAP MW is the sum of all individual DER ICAP MWs for a given auction month. Importantly, the ICAP MW for each individual DER is a function of several variables, including:
  - Type of Aggregation in which the DER participates.
  - 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
  - *This is not a tariff-defined term, it is used in the NYISO's Aggregation System to inform the total MW capability of an individual DER and ultimately the Aggregation – this value reflects the Demand Reduction, Injection, and Withdrawal capabilities of the individual DER, and may be less than or equal to the CRIS or DMNC for a given Capability Period.*
- Derating Factor – the Derating Factor for a given Aggregation is calculated consistent with the type of Aggregation. For 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 a 'Single Resource Type' Generator Aggregation. For Availability-based Aggregation types (DER; ESR) and Production-based Aggregation types (Wind, Solar, Landfill Gas), the Derating Factor calculation employs an Aggregation-level average of historic production data. 'Single Resource Type' LESR Aggregations are not permitted to participate in the ISO-administered Capacity market.
  - o Please refer to the ICAP Manual and Services Tariff Section 5.12 for more information regarding the requirements applicable to DER when switching from one Aggregation to another. DER historic data is carried over when switching to a new Aggregation of the same 'type' as its previous Aggregation. DER availability data is replaced with the default class average for the given 'type' when the DER moves to an Aggregation of a new 'type.'

The following subsections outline the procedure for calculating the Unforced Capacity values for:

1. DER Aggregations without Demand Reduction capability and without an EDL (3.9.1)
2. DER Aggregations without Demand Reduction capability and with an EDL (3.9.2)
3. DER Aggregations with Demand Reduction capability without an EDL (3.9.3)
4. DER Aggregations with Demand Reduction capability with an EDL (3.9.4)
5. ESR Aggregations without an EDL (3.9.5)
6. ESR Aggregations with an EDL (3.9.6)
7. Generator Aggregations (EFORd based on GADS data) (3.9.7)
8. Energy Limited Resource (ELR) Aggregations (EFORd based on GADS data) (3.9.8)
9. Generator Aggregations (AOF based on GADS-equivalent data) (3.9.9)
10. Energy Limited Resource (ELR) Aggregations (AOF based on GADS-equivalent data) (3.9.10)
11. Intermittent Power Resource (IPR) Aggregations (3.9.11)

Additional information on Aggregations can be found in Market Administration and Control Area Services Tariff Section 4.1.10 and in the Aggregation Manual (https://www.nyiso.com/manuals-tech-bulletins-user-guides).

3.9.1 Procedure for calculating Unforced Capacity values for DER Aggregations without Demand Reduction and without an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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* in month *m,* which is calculated by summing the ICAP MW values for all individual DER comprising the Aggregation.

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation *a* in month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

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*;

Where:

$$AUF_{am} = \left(1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MW_{am}}\right)\right)$$

The Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all DER comprising the Aggregation.

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation *a* for month *m*,

Aggregation DER Contributions$_{am}$ is the sum of MW contributions from each individual DER *d* in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAPMW_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MW$_{dm}$ is the ICAP MW for each individual DER *d* which is applicable for month *m,* and is calculated as follows:

$$ICAP_{dm} = min\left(DMNC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm}\right)$$

DMNC $_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER *d* for month *m*;

CRIS $_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER *d* for month *m;*

Total Supply Declared Value $_{dm}$ is the MW amount reflecting the Injection capability of the DER *d*, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month *m;*

And:

AUF$_{dm}$ is the Average Unavailability Factor value for the individual DER *d* in a given month *m*. If month *m* is in the Winter Capability Period, then AUF$_{dm}$ will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for the DER *d*. If month *m* is in the Summer Capability Period, then AUF$_{dm}$ will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for the DER *d*. AUF$_{dm}$ is calculated as follows:

$$AUF_{dm} = \frac{\sum_n Unavailability\ Factor_{an}}{12}$$

Where:

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation *a* that contains the DER *d* in month *n.*

n represents each of the historical 12 months included in the two Winter Capability Periods preceding month *m*, if *m* is a month in the Winter Capability Period, and the two Summer Capability Periods preceding month *m*, if *m* is a month in the Summer Capability Period.

The Unavailability Factor value for each individual DER *d* for each month in the calculation of AUF*d$_m$*, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds$_{an}$ for month *n;*

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and Total Expected ICAP Seconds$_{an}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$\text{Total Expected ICAP Seconds}_{an} = \sum_{h=b}^{e} \text{Total Expected ICAP Seconds}_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour h in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour h in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

Where: Total Available ICAP Seconds$_{ah}$ and Total Expected ICAP Seconds$_{ah}$ are further defined below:

$$\text{Total Available ICAP Seconds}_{ah} = \sum_{i=x}^{y} (min(1, \text{UOL Availability}_{ai}) \times \text{Interval Seconds}_{ai})$$

$$\text{Total Expected ICAP Seconds}_{ah} = \sum_{i=x}^{y} \text{Interval Seconds}_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL_N that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, Interval Seconds$_{ai}$ will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability$_{ai}$, is further defined below:

$$\text{UOL Availability}_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, \text{Adjusted } ICE_{ai})}$$

Where:

UOL_{Nai} is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the *UOL_{Nai}* will be set equal to the Aggregation's Bid UOL;

ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^{P}{}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} (Average Unavailability Factor_{am}) as above, 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*;

Duration Adjustment Factor_{am} as above, is the Duration Adjustment Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9.2 Procedure for calculating Unforced Capacity values for DER Aggregations without Demand Reduction and with an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 of consecutive sustained output from all individual DER comprising the Aggregation;

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual.*

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*;

Where:

$$AUF_{am} = 1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MWh_{am}}\right)$$

ICAP MWh$_{am}$ is the summation of each *ICAP MWh*$_{dm}$ contribution in Aggregation *a* for month *m*;

Aggregation DER Contributions$_{am}$ is the MWh contribution from all DERs *d* in Aggregation *a* for month *m*; and is calculated as follows:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MWh_{dm} \times (1 - AUF_{dm})$$

Where:

$ICAP\ MWh_{dm}$ is the contribution of each DER's ICAP MW in Aggregation *a* for month *m*, multiplied by the number of hours that the DER *d* will contribute to the Aggregation time-stacking.

Where:

ICAP MWh$_{dm}$ *is further defined below:*

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

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER d for month m; for an Aggregation that has an EDL and is time-stacking, the DMNC is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER d for month m;

$Total\ Supply\ Declared\ Value_{dm}$ is the MW amount reflecting the Total capability of the DER d, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month m;

Elected Timestacking hour(s) is the declared number of hours that a DER will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on the composite of DERs comprising the Aggregation.

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

$$AUF_{dm} = \frac{\sum_n Unavailability\ Factor\ _{an}}{12}$$

Where:

$Unavailability\ Factor_{am}$ is the Unavailability Factor for Aggregation a that contains the DER d in month n.

n represents each of the 12 months included in the previous two Capability Periods (summer or winter) depending on the value of m.

The Unavailability Factor value for each individual DER d for each month in the calculation of AUF_{dm}, will be calculated based on historic unavailability of the Aggregation:

Where:

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

$Total\ Available\ ICAP\ Seconds_{an}$ is the sum of Total Available ICAP Seconds of Aggregation a in month n;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time intervals in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *h* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

The measurement of UOL Unavailability for each DER *d* participating in a DER Aggregation with an EDL is a function of the hours corresponding to the Aggregation's duration limitation and the Day Ahead and Real Time schedules of the Aggregation. Please refer to ICAP Manual Section 4.5.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s *UOL$_N$* that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: *UOL Availability$_{ai}$*, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL_{Nai} is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the UOL_{Nai} will be set equal to the Aggregation's Bid UOL;

ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE\ _{am} = \left(\frac{UCAP^{P}_{am}}{(1 - AUF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

$ICE\ _{am}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} *(Average Unavailability Factor_{am})* as above, 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*;

Duration Adjustment Factor_{am} as above, is the Duration Adjustment Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9.3   Procedure for calculating Unforced Capacity values for DER Aggregations with Demand Reduction without an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 in month m, which is calculated by summing the ICAP MW values for all individual DER comprising the Aggregation.

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation a in month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

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;

Where:

$$AUF_{am} = \left(1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MW_{am}}\right)\right)$$

The Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all DER comprising the Aggregation.

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation a for month m,

Aggregation DER Contributions$_{am}$ is the sum of MW contributions from each individual DER in Aggregation a for month m; and is calculated as follows:

Where:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MW_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MW$_{dm}$ is the summation of ICAP MW for each individual injection capable and demand reduction capable DER d which is applicable for month m, and is calculated uniquely for each DER depending on the capabilities of the DER:
1) If the DER is capable of only injection:

$$ICAP\ MW_{dm} = min(DMNC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm})$$

2) If the DER is capable of only demand reduction:

$$ICAP\ MW_{dm} = min(DMNC_{dm},\ Total\ Supply\ Declared\ Value_{dm})$$

3) If the DER is capable of both injection and demand reduction:

$$ICAP\ MW_{dm} = min\big(Demand\ Reduction\ DMNC_{dm,},$$
$$Demand\ Reduction\ MW\ Declared\ Value_{dm}\big) +$$
$$min\big(Injection\ DMNC_{dm,}, CRIS_{dm}, Injection\ MW\ Declared\ Value_{dm}\big)$$

Where:

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER *d* for month *m*;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER *d* for month *m*;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the total capability of the DER *d*, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month *m*;

Demand Reduction DMNC MW$_{dm}$ is the demonstrated amount of Demand Reduction only during a DMNC test by DER *d* for month *m*;

Demand Reduction MW Declared Value$_{dm}$ is the declared MW amount reflecting only the demand reduction capability of a DER *d* for month *m*;

Injection DMNC$_{dm}$ is the demonstrated amount of injection only during a DMNC test by DER *d* for month *m*;

Injection MW Declared Value$_{dm}$ is the declared MW amount reflecting only the injection capability of a DER *d* for month *m*;

And:

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

$$AUF_{dm} = \frac{\sum_n Unavailability\ Factor_{an}}{12}$$

Where:

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation *a* that contains the DER *d* in month *n*

n represents each of the 12 months included in the previous two Capability Periods (Summer or Winter) depending on the value of *m*.

The Unavailability Factor value for each individual DER *d* for each month in the calculation of *AUF$_{dm}$*, will be calculated based on historic unavailability of the Aggregation:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds of Aggregation *a* in month *n*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time intervals in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *h* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: *UOL Availability$_{ai}$*, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the *UOL$_{Nai}$* will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE$_{am}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

UCAP$^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF$_{am}$ (Average Unavailability Factor$_{am}$) as above, 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*;

Duration Adjustment Factor$_{am}$ as above, is the Duration Adjustment Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9.4 Procedure for calculating Unforced Capacity values for DER Aggregations with Demand Reduction and with an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 of consecutive sustained output from all individual DER comprising the Aggregation;

$Duration\ Adjustment\ Factor_{am}$ is the Duration Adjustment Factor for Aggregation a which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual.*

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;

Where:

$$AUF_{am} = 1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MWh_{am}}\right)$$

$ICAP\ MWh_{am}$ is the summation of each $ICAP\ MWh_{dm}$ contribution in Aggregation a for month m,

$Aggregation\ DER\ Contributions_{am}$ is the MWh contribution from all DERs in Aggregation a for month m; and is calculated as follows:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MWh_{dm} \times (1 - AUF_{dm})$$

Where:

$ICAP\ MWh_{dm}$ is the summation of ICAP MW for each individual injection capable and demand reduction capable DER d which is applicable for month m, and is calculated uniquely for each DER d depending on the capabilities of the DER:

1) If the DER is capable of only injection:

$$ICAP\ MW_{dm} = min(DMNC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm})$$

2) If the DER is capable of only demand reduction:

$$ICAP\ MW_{dm} = min(DMNC_{dm,},\ Total\ Supply\ Declared\ Value_{dm})$$

3) If the DER is capable of both injection and demand reduction:

$$ICAP\ MW_{dm} = min\big(Demand\ Reduction\ DMNC_{dm,},$$
$$Demand\ Reduction\ MW\ Declared\ Value_{dm}\big) +$$
$$min\big(Injection\ DMNC_{dm,}, CRIS_{dm}, Injection\ MW\ Declared\ Value_{dm}\big)$$

To inform the following:
$$ICAP\ MWh = ICAP\ MW_{dm}\ x\ (Elected\ Timestacking\ hour(s))$$

Where:

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER d for month m based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER d for month m;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Total capability of the DER d, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month m;

Demand Reduction DMNC MW$_{dm}$ is the demonstrated amount of Demand Reduction only during a DMNC test by DER d based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2 for the month m.

Demand Reduction MW Declared Value$_{dm}$ is the declared MW amount reflecting only the demand reduction capability of a DER d for the month m

Injection DMNC$_{dm}$ is the demonstrated amount of injection only during a DMNC test by DER d based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2 for the month m.

Injection MW Declared Value$_{dm}$ is the declared MW amount reflecting only the injection capability of a DER d for the month m

Elected Timestacking hour(s) is the declared number of hours that a DER will contribute to the Aggregation's total time stacked duration– value must be a whole number greater than or equal to 1.

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

$$AUF_{dm} = \frac{\sum_n Unavailability\ Factor_{an}}{12}$$

Where:

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation *a* that contains the DER *d* in month *n*.

n represents each of the 12 months included in the previous two Capability Periods (Summer or Winter) depending on the value of *m*.

The Unavailability Factor value for each individual DER *d* for each month in the calculation of *AUF$_{dm}$*, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds of Aggregation *a* in month *n*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time intervals in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *h* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

The measurement of UOL Unavailability for each DER *d* participating in a DER Aggregation with an EDL is a function of the hours corresponding to the Aggregation's duration limitation and the Day Ahead and Real Time schedules of the Aggregation. Please refer to ICAP Manual Section 4.5.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability$_{ai}$, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the *UOL$_{Nai}$* will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i,* accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE $_{am}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^p{}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} *(Average Unavailability Factor$_{am}$)* as above, 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*;

Duration Adjustment Factor$_{am}$ as above, is the Duration Adjustment Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 *a*;

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*;

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*;

Where:

$$AUF_{am} = \left(1 - \left(\frac{Aggregation\ ESR\ Contributions_{am}}{ICAPMW_{am}}\right)\right)$$

The Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all ESR comprising the Aggregation.

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation *a* for month *m*;*Aggregation ESR Contributions$_{am}$* is the MW contribution from all ESR *d* in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ ESR\ Contributions_{am} = \sum_{d \in a_m} ICAPMW_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MW$_{dm}$ is the ICAP MW for each individual ESR *d* which is applicable for month *m*; and is calculated as follows:

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

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual ESR *d* for month *m*;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ESR *d* for month *m;*

Total Supply Declared Value $_{dm}$ is the MW amount reflecting the Injection capability of the ESR d, and may be equal to or less than the *ESR CRIS* or *ESR DMNC* for the month m;

And:

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

$$AUF_{dm} = \frac{\sum_n Unavailability\ Factor_{an}}{12}$$

Where:

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation a that contains the ESR d in month n.

n represents each of the 12 months included in the previous two Capability Periods (summer or winter) depending on the value of m.

The Unavailability Factor value for each individual ESR d for each month in the calculation of AUF_{dm}, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of *Total Available ICAP Seconds$_{an}$* for each month m;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time in month n in which Aggregation a was not on a planned or scheduled outage;

Where: *Total Available ICAP Seconds$_{an}$* and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour i in the month n;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah}$$
$$= \sum_{i=x}^{y}(min(1, UOL\ Availability_{ai}, LOL\ Availability_{ai}, Storage\ Availability_{ai}, Energy\ Level\ Availability_{ai})$$
$$\times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

LOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s LOL$_N$ that is available for a given interval *i* to the negative ICAP equivalent of UCAP sold;

Storage Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time storage limits to the ICAP equivalent of storage sold for a given interval *i*;

Energy Level Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time Energy Level at the first interval *i* of hour *r* to the sum of its *DAM Energy$_{ar}$* and *DAM Reserves$_{ar}$* schedule for hour *r*. *Energy Level Availability$_{ai}$* will be applicable to all real-time intervals *i* occurring within hour *r*. If Aggregation *a* is adjusted due to a NYISO or TO reliability need, *Energy Level Availability$_{ai}$* will be 100% for all remaining real-time intervals *i* of the applicable day;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: *UOL Availability$_{ai}$*, *LOL Availability$_{ai}$*, *Storage Availability$_{ai}$*, and *Energy Level Availability$_{ai}$* are further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

$$LOL\ Availability_{ai} = \frac{max(LOL_{Nai}, -ICE_{ah}, NWL_{ai})}{max(-ICE_{ai}, -Adjusted\ ICE_{ai}, NWL_{ai})}$$

$$Storage\ Availability_{ai} = \frac{min((USL_{ai} - LSL_{ai}), (24\ hours\ \times ICE_{ai})}{min((24\ hours\ \times ICE_{ai}), Adjusted\ Storage_{ai})}$$

$$\text{Energy Level Availability}_{ai} = \begin{cases} 100\% \text{ if Committed Energy Level}_{ai} = 0 \\ \dfrac{\text{Energy Level}_{ar}}{\text{Committed Energy Level}_{ar}}, \text{otherwise}, \end{cases}$$

Where:

$$\text{Committed Energy Level}_{\boldsymbol{ar}} = DAM\ Energy_{ar} + DAM\ Reserves_{ar}$$

And:

UOL_{Nai} is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the UOL_{Nai} will be set equal to the Aggregation's Bid UOL;

ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i,* measured in MW;

Adjusted ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

LOL_{Nai} is the Normal Lower Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted up due to a NYISO or TO reliability need, the LOL_{Nai} will be set equal to the Aggregation's Bid LOL;

NWL_{ai} is the Normal Withdrawal Limit that Aggregation *a* supplies in month containing interval *i* based on its withdrawal capabilities, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

USL_{ai} is the Upper Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

LSL_{ai} is the Lower Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

Adjusted Storage$_{ai}$ is the storage capability of Aggregation *a* for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MWh;

Committed Energy Level$_{ar}$ is the sum of Aggregation *a*'s *DAM Energy* and *DAM Reserves* schedule for the hour *r* containing interval *i*, measured in MWh. *Committed Energy Level*$_{ar}$ will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

Energy Level$_{ar}$ is the Energy Level for Aggregation *a* that is available to the Real-Time Market system at the start of the hour *r* containing interval *i*, measured in MWh. *Energy Level*$_{ar}$ will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

DAM Energy$_{ar}$ is Aggregation *a*'s Day Ahead Market (DAM) Energy schedule for the hour *r* that contains real-time interval *i*, measured in MW; and

DAM Reserves$_{ar}$ is Aggregation *a*'s total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour *r* that contains real-time interval *i*, measured in MW.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} *(Average Unavailability Factor$_{am}$)* as above, 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*;

Duration Adjustment Factor$_{am}$ as above, is the Duration Adjustment Factor for Aggregation *a*, which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9.6   Procedure for calculating Unforced Capacity values for ESR Aggregations with an EDL

Starting with the 2021/2022 Capability Year, Energy Storage Resources that are Installed Capacity Suppliers with Energy Duration Limitations will be evaluated during the applicable Peak Load Window for their UCAP values.

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 of consecutive sustained output from all individual ESR comprising the Aggregation;

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

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*;

Where:

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

ICAP MWh_{am} is the summation of each *ICAP MWh_{dm}* contribution in Aggregation *a* for month *m*;

Aggregation ESR Contributions_{am} is the MWh contribution from all ESRs in Aggregation *a* for month *m*; and is calculated as follows:

$$Aggregation\ ESR\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MWh_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MWh_{dm} is the summation of ICAP MW for each individual ESR *d* which is applicable for month *m*, multiplied by the number of hours that the ESR *d* will contribute to the Aggregation time-stacking, and is calculated as follows:

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

DMNC_{dm} is the Demonstrated Maximum Net Capability for the individual ESR *d* for month *m*; for an Aggregation that has an EDL and is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.:

CRIS_{dm} is the Capacity Resource Interconnection Service Value for the individual ESR *d* for month *m*;

Total Supply Declared Value_{dm} is the MW amount reflecting the Injection capability of the ESR *d*, 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 an ESR will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on all ESRs comprising the Aggregation.

AUF_{dm} is the Average Unavailability Factor value for the individual ESR *d* in a given month *m*. If month *m* is in the Winter Capability Period, then *AUF_{dm}* will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for the ESR *d*. If month *m* is in the Summer Capability Period, then *AUF_{dm}* will be equal to the average of the two

previous Summer Capability Period Unavailability Factor values calculated for the ESR d. AUF_{dm} is calculated as follows:

$$AUF_{dm} = \frac{\sum_n Unavailability\ Factor_{an}}{12}$$

Where:

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation a that contains the ESR d in months n.

n represents each of the 12 months included in the previous two Capability Periods (summer or winter) depending on the value of m. The Unavailability Factor value for each individual ESR d for each month in the calculation of AUF_{dm}, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of *Total Available ICAP Seconds$_{an}$* for each month m;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time in month n in which Aggregation a was not on a planned or scheduled outage;

Where: *Total Available ICAP Seconds$_{an}$* and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour h in the month n;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour h in the month n in which Aggregation a was not on a planned or scheduled outage;

b is the beginning hour of month n; and

e is the last hour of month n.

Peak Load Window is the time period during which an ESR Aggregation with an Energy Duration Limitation must offer Energy in the Day-Ahead Market, as specified in Section 4.1.1 of this ICAP Manual. For days in which the tariff-defined Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the

calculation will be those that overlap between the tariff-defined and ISO-adjusted Peak Load Windows.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah}$$
$$= \sum_{i=x}^{y}(min(1, UOL\ Availability_{ai}, Storage\ Availability_{ai}, Energy\ Level\ Availability_{ai})$$
$$\times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Storage Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time storage limits to the ICAP equivalent of storage sold for a given interval *i*;

Energy Level Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time Energy Level at the first interval *i* of hour *r* to the sum of its *DAM Energy$_{ar}$* and *DAM Reserves$_{ar}$* schedule for hour *r*. *Energy Level Availability$_{ai}$* will be applicable to all real-time intervals *i* occurring within hour *r*. If Aggregation *a* is adjusted due to a NYISO or TO reliability need, *Energy Level Availability$_{ai}$* will be 100% for all remaining real-time intervals *i* of the applicable day;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: *UOL Availability$_{ai}$*, *Storage Availability$_{ai}$*, and *Energy Level Availability$_{ai}$* are further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

$$Storage\ Availability_{ai} = \frac{min((USL_{ai} - LSL_{ai}), (Energy\ Duration\ Limitation_a \times ICE_{ai})}{min((Energy\ Duration\ Limitation_a \times ICE_{ai}), Adjusted\ Storage_{ai})}$$

$$Energy\ Level\ Availability_{ai} = \begin{cases} 100\%\ if\ Committed\ Energy\ Level_{ar} = 0 \\ \dfrac{Energy\ Level_{ar}}{Committed\ Energy\ Level_{ar}}, otherwise, \end{cases}$$

Where:

$$Committed\ Energy\ Level_{ar} = DAM\ Energy_{ar} + DAM\ Reserves_{ar}$$

And:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the UOL$_{Nai}$ will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i,* measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

USL$_{ai}$ is the Upper Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

LSL$_{ai}$ is the Lower Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

Adjusted Storage$_{ai}$ is the storage capability of Aggregation *a* for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MWh;

Committed Energy Level$_{ar}$ is the sum of Aggregation *a*'s *DAM Energy* and *DAM Reserves* schedule for the hour *r* containing interval *i*, measured in MWh. *Committed Energy Level$_{ar}$* will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

Energy Level$_{ar}$ is the Energy Level for Aggregation *a* that is available to the Real-Time Market system at the start of the hour *r* containing interval *i*, measured in MWh. *Energy Level$_{ar}$* will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

DAM Energy$_{ar}$ is Aggregation *a*'s Day Ahead Market (DAM) Energy schedule for the hour *r* that contains real-time interval *i*, measured in MW; and

DAM Reserves$_{ar}$ is Aggregation *a*'s total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour *r* that contains real-time interval *i*, measured in MW.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m;

$UCAP^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation a supplies in month m;

AUF_{am} (*Average Unavailability Factor$_{am}$*) as above, 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;

Duration Adjustment Factor$_{am}$ as above, is the Duration Adjustment Factor for Aggregation a, which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9.7 Procedure for calculating Unforced Capacity values for Generator Aggregations (EFORd based on GADS data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - AEFORd_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ 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 for month m which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation a which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

$AEFORd_{am}$ (*Average Equivalent Demand Forced Outage Rate$_{am}$*) 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; The Average Equivalent Demand Forced Outage Rate applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all facilities comprising the Aggregation.

Where:

$$AEFORd_{am} = 1 - \left(\frac{Aggregation\ Facility\ Contributions_{am}}{ICAP\ MW_{am}} \right)$$

$ICAP\ MW_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation a for month m;

AggregationFacility Contributions$_{am}$ is the MW contribution from all facilities f in Aggregation a for month m; and is calculated as follows:

$$Aggregation\ Facility\ Contributions_{am} = \sum_{f \in a} ICAPMW_{fm} \times (1 - AEFORd_{fm})$$

Where:

$ICAP\ MW_{fm}$ is the ICAP MW for each individual facility f which is applicable for month m; and is calculated as follows:

$$ICAP\ MW_{fm} = min\left(DMNC_{fm,}, CRIS_{fm}, Total\ Supply\ Declared\ Value_{fm}\right)$$

$DMNC_{fm}$ is the Demonstrated Maximum Net Capability for the individual facility f for month m;

$CRIS_{fm}$ is the Capacity Resource Interconnection Service Value for the individual facility f for month m;

$Total\ Supply\ Declared\ Value_{fm}$ is the MW amount reflecting the Injection capability of the facility f for month m, and may be equal to or less than the *facility CRIS* or *facility DMNC* for the month m;

And:

$AEFORd_{fm}$ is the Average Equivalent Demand Forced Outage Rate for the individual facility f. The $AEFORd_{fm}$ value for each individual facility f for month m, will be calculated based on historic unavailability of the assets z comprising the facility f, weighted based on the nameplate MW values of each asset:

$$AEFORd_{fm} = \frac{\sum_{z \in f}(AEFORd_{zm} * NC_{zm})}{\sum_{z \in f}(NC_{zm})}$$

Where:

NC_{zm} is the nameplate capacity MW rating of asset z in month m

$AEFORd_{zm}$ is the Average Equivalent Demand Forced Outage Rate for asset z in for month m, calculated as follows:

$$AEFORd_{zm} = \frac{\sum_n EFORd_{zn}}{2}$$

Where:

$EFORd_{zn}$ is the Equivalent Demand Forced Outage Rate for asset z within facility f for the 6-month period ending in any given month n.

n represents each of the 6-month periods included in the previous two Capability Periods (Summer or Winter) depending on the value of m.

Where:

$$EFORd_{zn} = \frac{IST_{ze}}{6} \times \frac{f_{fzbe}FOH_{zbe} + f_{pzbe}(EFOH_{zbe} - FOH_{zbe})}{(SH_{zbe} + f_{fzbe}FOH_{zbe})} + \left(1 - \frac{IST_{ze}}{6}\right)CEFORd_z$$

f_{fzbe} and f_{pzbe} are further defined below and:

IST_{ze} is the number of months that asset z was in service during the 6-month Capability Period ending as of time e (IST_{ze} = 0 if asset z was not in service as of time e; IST_{ze} = 6 if asset z was in service for all months of the Capability Period;

FOH_{zbe} is the sum of all Full Forced Outage Hours reported for asset z for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 40-43 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{zbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for asset z for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$EFOH_{zbe} = \begin{cases} 0, \text{ if there were no outages for asset z during the} \\ \text{period beginning at time b and ending at time e; and} \\ \sum_{i \in OUTzbe} \dfrac{(NDC_{zi} - NAC_{zi})H_{zi}}{NDC_{zi}}, \text{otherwise;} \end{cases}$$

OUT_{zbe} is the set of outages for asset z during the period beginning at time b and ending at time e;

NDC_{zi} is the Net Dependable Capacity for asset z during the applicable Peak Load Window applicable for outage i, submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

NAC_{zi} is the Net Available Capacity for asset z during the applicable for outage i, submitted in accordance with Attachment K, Event Record 01, columns 60-63;

And:

H_{zi} is the time accumulated for asset z during the applicable for outage i submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event);

SH_{zbe} is the sum of all Service Hours reported for asset z for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-19;

e is the end of the last month of the Capability Period;

b is the beginning of the first month of the Capability Period, unless the asset had not gone into service at that time, in which case b is the time at which that asset went into service;

$CEFORd_z$ is the class equivalent EFORd calculated by the ISO for resources of the same class as asset z based on NERC class averages for similar resources. Where no similar resource exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{\text{fzbe}} = \cfrac{\cfrac{1}{r} + \cfrac{1}{T}}{\cfrac{1}{r} + \cfrac{1}{T} + \cfrac{1}{D}}$$

r is FOH_{zbe} divided by the total number of GADS Data Forced Outages reported for the period beginning at time *b* and ending at time *e* in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH_{gbe}) divided by the number of attempted starts reported for the period beginning at time *b* and ending at time *e* for asset *z*. RSH_{zbe} is the sum of all Reserve Shutdown Hours reported for asset *z* for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 20-23;

D is the number of Service Hours *(SH_{zbe})* divided by the number of successful starts reported for the period beginning at time b and ending at time *e* for asset z; and

$$f_{\text{pzbe}} = \frac{SH_{zbe}}{AH_{zbe}}$$

AH_{zbe} is the sum of all Available Hours reported for asset *z* for the period beginning at time *b* and ending at time *e* in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 32-35.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

- If RSH < 1 then f_f =1;

- If SH = 0 then f_f = 1;

- If FOH = 0, set $1/r$ = 0 and calculate f_f per its equation; and

- If AH = 0 then f_p = 0

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AEFORd_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$AEFORd_{am}$ *(Average Equivalent Demand Forced Outage Rate$_{am}$)* as above, 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*;

Duration Adjustment Factor$_{am}$ as above, is the Duration Adjustment Factor for Aggregation g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9.8 Procedure for calculating Unforced Capacity values for Energy Limited Resource (ELR) Aggregations (EFORd based on GADS data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AEFORd_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^Q{}_{am}$ 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 for month m which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation a which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual.*

$AEFORd_{am}$ *(Average Equivalent Demand Forced Outage Rate$_{am}$)* 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;

Where:

$$AEFORd_{am} = 1 - \left(\frac{Aggregation\ ELR\ Contributions_{am}}{ICAP\ MWh_{am}}\right)$$

The Average Equivalent Demand Forced Outage Rate applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all Energy Limited Resources (ELR) comprising the Aggregation.

$ICAP\ MWh_{am}$ is the summation of each ELR's ICAP MW contribution in Aggregation a for month m, multiplied by the number of hours that the ELR will contribute to the Aggregation time-stacking.

Aggregation ELR Contributions$_{am}$ is the MWh contribution from all Energy Limited Resources in Aggregation a for month m; and is calculated as follows:

Where:

$$Aggregation\ ELR\ Contributions_{am} = \sum_{d \in a} ICAP\ MWh_{dm} \times (1 - AEFORd_{dm})$$

Where:

ICAP MWh$_{dm}$ is the summation of ICAP MWh for each individual ELR *d*, which is applicable for month *m*, and is calculated as follows:

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

DMNC $_{dm}$ is the Demonstrated Maximum Net Capability for the individual ELR d for month *m*; for an Aggregation that has an EDL and is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.

CRIS$_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ELR d for month *m*;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Injection capability of the ELR *d*, and may be equal to or less than the *ELR CRIS* or *ELR DMNC* for the month *m*;

Elected Timestacking hour(s) is the declared number of hours that an ELR will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Equivalent Demand Forced Outage Rate applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on all ELRs comprising the Aggregation.

And:

AEFORd$_{dm}$ is the Average Equivalent Demand Forced Outage Rate for the individual ELR *d.* The *AEFORd$_{dm}$* value for each individual ELR *d* for month *m*, will be calculated based on historic unavailability of the assets *z* comprising the ELR *d*, weighted based on the nameplate MW values of each asset:

$$AEFORd_{dm} = \frac{\sum_{z \in d}(AEFORd_{zm} * NC_{zm})}{\sum_{z \in d}(NC_{zm})}$$

Where:

NC$_{zm}$ is the nameplate capacity MW rating of asset *z* in month *m*

AEFORd$_{zm}$ is the Average Equivalent Demand Forced Outage Rate for asset z in for month *m*, calculated as follows:

$$AEFORd_{zm} = \frac{\sum_{n} EFORd_{zn}}{2}$$

Where:

EFORd$_{zn}$ is the Equivalent Demand Forced Outage Rate for asset *z* within ELR *d* for the 6-month period ending in any given month *n*.

n represents each of the 6 month periods included in the previous two Capability Periods (Summer or Winter) depending on the value of *m.*

Where:

$$AssetEFORd_{zn} = \frac{IST_{ze}}{6} \times \frac{f_{fzbe}FOH_{zbe} + f_{pzbe}(EFOH_{zbe} - FOH_{zbe})}{(SH_{zbe} + f_{fzbe}FOH_{zbe})} + \left(1 - \frac{IST_{ze}}{6}\right)CEFORd_z$$

f_{fzbe} and f_{pzbe} are further defined below and:

IST_{ze} is the number of months that asset *z* was in service during the 6-month Capability Period ending as of time *e* (IST_{ze} = 0 if asset *z* was not in service as of time *e*; IST_{ze} = 6 if asset *z* was in service for all months of the Capability Period;

FOH_{zbe} is the sum of all Full Forced Outage Hours reported for asset *z* during the applicable Peak Load Window for the period beginning at time *b* and ending at time *e*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 40-43 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{zbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for asset *z* during the applicable Peak Load Window for the period beginning at time *b* and ending at time *e*. The data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$EFOH_{zbe} = \begin{cases} 0, \text{ if there were no outages for asset z during the} \\ \text{period beginning at time b and ending at time e; and} \\ \sum_{i \in OUTzbe} \frac{(NDC_{zi} - NAC_{zi})H_{zi}}{NDC_{zi}}, \text{ otherwise;} \end{cases}$$

OUT_{zbe} is the set of outages for asset *z* during the applicable Peak Load Window during the period beginning at time *b* and ending at time *e*;

NDC_{zi} is the Net Dependable Capacity for asset z during the applicable Peak Load Window applicable for outage *i*, submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

NAC_{zi} is the Net Available Capacity for asset *z* during the applicable Peak Load Window, applicable for outage *i*, submitted in accordance with Attachment K, Event Record 01, columns 60-63;

and

H_{zi} is the time accumulated for asset *z* during the applicable Peak Load Window applicable for outage *i* submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event);

SH_{zbe} is the sum of all Service Hours reported for asset *z* during the applicable Peak Load Window for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-19;

e is the end of the last month of the Capability Period;

b is the beginning of the first month of the Capability Period, unless the asset had not gone into service at that time, in which case *b* is the time at which that asset went into service;

Peak Load Window is the time period during which an asset with an Energy Duration Limitation must offer Energy in the Day-Ahead Market, as specified in Section 4.1.1 of this ICAP Manual. For days in which the tariff-defined Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the tariff-defined and ISO-adjusted Peak Load Windows; and

CEFORd$_g$ is the class-equivalent EFORd calculated by the ISO for assets of the same class as asset *z* based on NERC class averages for similar assets. Where no similar assets exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{\text{fzbe}} = \frac{\dfrac{1}{r} + \dfrac{1}{T}}{\dfrac{1}{r} + \dfrac{1}{T} + \dfrac{1}{D}}$$

r is FOH$_{\text{zbe}}$ divided by the total number of GADS Data Forced Outages reported for the period during the applicable Peak Load Window beginning at time *b* and ending at time *e* in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (*RSH$_{gbe}$*) divided by the number of attempted starts reported for the period during the applicable Peak Load Window beginning at time *b* and ending at time *e* for asset *z*. *RSH$_{zbe}$* is the sum of all Reserve Shutdown Hours reported for asset *z* during the applicable Peak Load Window for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 20-23;

D is the number of Service Hours (*SH$_{zbe}$*) divided by the number of successful starts reported for the period during the applicable Peak Load Window beginning at time b and ending at time *e* for asset z; and

$$f_{\text{pzbe}} = \frac{SH_{zbe}}{AH_{zbe}}$$

AH$_{zbe}$ is the sum of all Available Hours reported for asset *z* during the applicable Peak Load Window for the period beginning at time *b* and ending at time *e* in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 32-35.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

- If (RSH < 1) then f$_f$ =1;

- If (SH = 0) then f$_f$ = 1;

- If (1/r + 1/T + 1/D) = 0 then f$_f$ = 0;

- If [(# of FO occurrences = 0) or (FOH = 0)] then 1/r = 0;

- If [(RSH = 0) or (# of unit attempted starts = 0)] then 1/T = 0;

- If [(# of unit actual starts = 0) or (SH = 0)] then 1/D = 0;

- If AH = 0 then f_p = 0; and

- If (SH + (f_f x FOH)) = 0 then EFORd = 0.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^P}{(1 - AEFORd_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^P{}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$AEFORd_{am}$ *(Average Equivalent Demand Forced Outage Rate$_{am}$)* as above, 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*;

Duration Adjustment Factor$_{am}$ as above, is the Duration Adjustment Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9.9 Procedure for calculating Unforced Capacity values for Generator Aggregations (AOF based on GADS-equivalent data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^Q = (1 - AOF_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^Q{}_{am}$ 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* for month *m* which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

AOF$_{am}$ (Average Outage 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*; The Average Outage Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all facilities comprising the Aggregation.

Where:

$$AOF_{am} = 1 - \left(\frac{Aggregation\ Facility\ Contributions_{am}}{ICAP\ MW_{am}} \right)$$

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation *a* for month *m*;

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

Where:

$$Aggregation\ Facility\ Contributions_{am} = \sum_{f \in a} ICAPMW_{fm} \times (1 - AOF_{fm})$$

Where:

ICAP MW$_{fm}$ is the ICAP MW for each individual facility *f* which is applicable for month *m*; and is calculated as follows:

$$ICAP\ MW_{fm} = min\left(DMNC_{fm,}, CRIS_{fm}, Total\ Supply\ Declared\ Value_{fm} \right)$$

DMNC$_{fm}$ is the Demonstrated Maximum Net Capability for the individual facility *f* for month *m*;

CRIS$_{fm}$ is the Capacity Resource Interconnection Service Value for the individual facility *f* for month *m*;

Total Supply Declared Value$_{fm}$ is the MW amount reflecting the Injection capability of the facility *f* for month *m*, and may be equal to or less than the *facility CRIS* or *facility DMNC* for the month *m*;

And:

AOF$_{fm}$ is the Average Outage Factor for the individual facility *f*. The *AOF$_{fm}$* value for each individual facility *f* for month *m*, will be calculated based on historic unavailability of the assets *z* comprising the facility *f*, weighted based on the nameplate MW values of each asset:

$$AOF_{fm} = \frac{\sum_{z \in f}(AOF_{zm} * NC_{zm})}{\sum_{z \in f}(NC_{zm})}$$

Where:

NC_{zm} is the nameplate capacity MW rating of asset z in month m

AOF_{zm} is the Average Outage Factor for asset z in for month m, calculated as follows:

$$AOF_{zm} = \frac{\sum_n OF_{zn}}{2}$$

Where:

OF_{zn} is the Outage Factor for asset z within facility f for the 6-month period ending in any given month n.

n represents each of the 6 month periods included in the previous two Capability Periods (Summer or Winter) depending on the value of m.

$$OF_{zn} = \frac{IST_{ze}}{6} \times (1 - CF_{zbe}) + \left(1 - \frac{IST_{ze}}{6}\right)(1 - CCF_z)$$

IST_{ze} is the number of months that asset z had been in service as of time e (0 if asset z was not in service as of time e; 6 if asset z was in service for the full Capability Period;

CCF_z is the class-equivalent Capacity Factor for assets of the same class as asset z based on NERC class averages for similar assets. Where no similar asset exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{zbe} = \frac{NAG_{zbe}}{\sum_{i=B}^{E}(NDC_{zi}(PH_{zi} - POH_{zi} - MOH_{zi}))};$$

CF_{zbe} is the Capacity Factor for asset z for the period beginning at time b and ending at time e;

NAG_{zbe} is the Net Actual Generation for asset a for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 39-45;

NDC_{zi} is the Net Dependable Capacity for asset z for month i. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

PH_{zi} is the Period Hours reported for asset z for month i. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 56-59;

POH_{zi} is the Planned Outage Hours reported for asset z for month i. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 36-39;

MOH_{zi} is the Maintenance Outage Hours reported for asset z for month i. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 44-47;

b is the beginning of the first month of the Capability Period , unless the asset had not gone into service at that time, in which case b is the time at which that asset went into service;

e is the end of the last month of the Capability Period;

B is the month containing time b; and

E is the month containing time e.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP^{P}_{am}}{(1 - AOF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m;

$UCAP^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation a supplies in month m;

AOF_{am} *(Average Outage Factor$_{am}$)* as above, 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;

Duration Adjustment Factor$_{am}$ as above, is the Duration Adjustment Factor for Aggregation g which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9.10 Procedure for calculating Unforced Capacity values for Energy Limited Resource (ELR) Aggregations (AOF based on GADS-equivalent data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^{Q}_{am} = (1 - AOF_{am}) * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 for month m which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation a which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

AOF$_{am}$ (Average Outage 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*;

Where:

$$AOF_{am} = 1 - \left(\frac{Aggregation\ ELR\ Contributions_{am}}{ICAP\ MWh_{am}}\right)$$

The Average Outage Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all Energy Limited Resources (ELR) comprising the Aggregation.

ICAP MWh$_{am}$ is the summation of each ELR's ICAP MW contribution in Aggregation *a* for month *m*, multiplied by the number of hours that the ELR *d* will contribute to the Aggregation time-stacking.

Aggregation ELR Contributions$_{am}$ is the MW contribution from all Energy Limited Resources *d* in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ ELR\ Contributions_{am} = \sum_{d \in a} ICAP\ MWh_{dm} \times AOF_{dm}$$

Where:

ICAP MWh$_{dm}$ is the summation of ICAP MWh for each individual ELR *d*, which is applicable for month *m*, and is calculated as follows:

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

DMNC $_{dm}$ is the Demonstrated Maximum Net Capability for the individual ELR d for month *m*; for an Aggregation that has an EDL and is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.

CRIS$_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ELR d for month *m*;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Injection capability of the ELR *d*, and may be equal to or less than the *ELR CRIS* or *ELR DMNC* for the month *m*;

Elected Timestacking hour(s) is the declared number of hours that an ELR will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Outage Factor applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on all ELRs comprising the Aggregation.

And:

AOF_{dm} is the Average Outage Factor for the individual ELR d. The AOF_{dm} value for each individual ELR d for month m, will be calculated based on historic unavailability of the assets z comprising the ELR d, weighted based on the nameplate MW values of each asset:

$$AOF_{dm} = \frac{\sum_{z \in d}(AOF_{zm} * NC_{zm})}{\sum_{z \in d}(NC_{zm})}$$

Where:

NC_{zm} is the nameplate capacity MW rating of asset z in month m

AOF_{zm} is the Average Outage Factor for asset z in for month m, calculated as follows:

$$AOF_{zm} = \frac{\sum_n OF_{zn}}{2}$$

Where:

OF_{zn} is the Outage Factor for asset z within ELR d for the 6-month period ending in any given month n.

n represents each of the 6 month periods included in the previous two Capability Periods (Summer or Winter) depending on the value of m.

Where:

$$OF_{zn} = \frac{IST_{ze}}{6} \times (1 - CF_{zbe}) + \left(1 - \frac{IST_{ze}}{6}\right)(1 - CCF_z)$$

IST_{ze} is the number of months that asset z had been in service as of time e (0 if generator g was not in service as of time e; 6 if asset z was in service for the full Capability Period;

CCF_z is the class-equivalent Capacity Factor for assets of the same class as asset z based on NERC class averages for similar assets. Where no similar asset exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{zbe} = \frac{NAG_{zbe}}{\sum_{i=B}^{E}(NDC_{zi}(PH_{zi} - POH_{zi} - MOH_{zi}))};$$

CF_{zbe} is the Capacity Factor for asset z for the period beginning at time b and ending at time e;

NAG_{zbe} is the Net Actual Generation for asset *a* for the period beginning at time *b* and ending at time *e*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 39-45;

NDC_{zi} is the Net Dependable Capacity for asset *z* for month *i*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

PH_{zi} is the Period Hours reported for asset *z* for month *i*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 56-59;

POH_{zi} is the Planned Outage Hours reported for asset *z* for month *i*. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 36-39;

MOH_{zi} is the Maintenance Outage Hours reported for asset *z* for month *i*. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 44-47;

b is the beginning of the first month of the Capability Period , unless the asset had not gone into service at that time, in which case *b* is the time at which that asset went into service;

e is the end of the last month of the Capability Period;

B is the month containing time *b*; and

E is the month containing time *e*.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AOF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AOF_{am} *(Average Outage Factor_{am}$)* as above, 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*;

Duration Adjustment Factor_{am} as above, is the Duration Adjustment Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 4.1.1 of this *ICAP Manual*.

3.9.11 Procedure for calculating Unforced Capacity values for Intermittent Power Resource (IPR) Aggregations

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = ProdF_{am} * (ICAP_{am} * Duration\ Adjustment\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ is the amount of Unforced Capacity that Aggregation a is qualified to provide in month m;

$ICAP_{am}$ is the total ICAP of Aggregation a that is applicable when determining the amount of Unforced Capacity that Aggregation a is qualified to provide in month m;

Duration Adjustment Factor$_{am}$ is the Duration Adjustment Factor for Aggregation a which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

$ProdF_{am}$ is the production 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;

Where:

$$ProdF_{am} = \left(\frac{Aggregation\ IPR\ Contributions_{am}}{ICAP\ MW_{am}}\right)$$

The Production Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all IPR comprising the Aggregation.

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation a for month m,

Aggregation IPR Contributions$_{am}$ is the sum of MW contributions from each individual IPR d in Aggregation a for month m; and is calculated as follows:

Where:

$$Aggregation\ IPR\ Contributions_{am} = \sum_{d \in a} ICAP_{dm} \times ProdF_{dm}$$

Where:

$ICAP_{dm}$ is the ICAP MW for each individual IPR d which is applicable for month m, and is calculated as follows:

$$ICAP\ MW_{dm} = min\left(NC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm}\right)$$

NC_{dm} is the nameplate capacity for the individual IPR d for month m;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual IPR d for month m;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Injection capability of the IPR d, and may be equal to or less than the *IPR CRIS* or *IPR DMNC* for the month m;

And:

$ProdF_{dm}$ is the Production Factor value for the individual IPR d for month m, expressed as an average of the monthly Production Factors for the Aggregation in the applicable historic months of the applicable prior like Capability Period.

$$ProdF_{dm} = \frac{\sum_n ProdF_{an}}{3}$$

Where:

$ProdF_{an}$ is the production factor for Aggregation a that contained the IPR d in month n;

n represents each of the three months included in the previous like Summer or Winter Peak Hours (December 1 through the last day of February, or June 1 through August 31, inclusive) depending on the value of m.

The Production Factor value for each individual IPR d for each month n in the calculation of $ProdF_{dm}$, will be calculated based on historic production of the Aggregation:

$$ProdF_{an} = \sum_{h \in CPPH_{an}} \left[\left(\frac{E_{ah}}{NC_{ah}} \right) \times WF_h \right]$$

Where:

$CPPH_{an}$ is the set of all Summer Peak Hours during the most recent Summer Capability Period preceding the Capability Period containing month n (if month m is part of a Summer Capability Period) during which Aggregation a was available for commercial operation, or the set of all Winter Peak Hours during the most recent Winter Capability Period preceding the Capability Period containing month n (if month m is part of a Winter Capability Period) during which Aggregation a was available for commercial operation;

"Summer Peak Hours" means the hours beginning 13, 14, 15, 16, 17, and 18 for the 6-hour Peak Load Window and hours beginning 12, 13, 14,15, 16, 17, 18, and 19 for the 8-hour Peak Load Window;

"Winter Peak Hours" means the hours beginning 16, 17, 18, 19, 20, and 21 for the 6-hour Peak Load Window and hours beginning 14, 15, 16, 17, 18, 19, 20, and 21 for the 8-hour Peak Load Window;

E_{ah} is the average amount of energy delivered to the NYCA transmission system by Aggregation a during hour h by all IPRs within the Aggregation;

NC_{ah} is the nameplate capacity of Aggregation a that was applicable when determining the amount of Unforced Capacity that Aggregation a was qualified to provide in hour h; and

WF_h is the hourly weighting factor according to the table in section (b).

Except that for new Intermittent Power Resource Aggregations for which less than sixty (60) days of production data are available to calculate $ProdF_{an}$ using the equation above, $ProdF_{an}$ instead will be calculated in accordance with Section 4.5 of the Installed Capacity Manual.

(b) Determining the Production Factor for Intermittent Power Resource Aggregations

The production factor for Intermittent Power Resources will be calculated based on the equation in the above section, and will be subject to hourly weightings within the Peak Load Window as stated in Section 5.12.6.2 of the NYISO Services Tariff,

Where:

Hour Beginning	Summer Peak Load Window		Winter Peak Load Window	
	6 Hour	8 Hour	6 Hour	8 Hour
12		5.00%		
13	12.50%	10.00%		
14	18.75%	17.50%		5.00%
15	18.75%	17.50%		5.00%
16	18.75%	17.50%	18.75%	17.50%
17	18.75%	17.50%	18.75%	17.50%
18	12.50%	10.00%	18.75%	17.50%
19		5.00%	18.75%	17.50%
20			12.50%	10.00%
21			12.50%	10.00%

The duration of the Peak Load Window will be dependent on resources with Energy Duration Limitations. When the system reaches 1000 MW of incremental penetration of resources with Energy Duration Limitations and the Peak Load Window shifts from 6 hours to 8 hours, the Peak Load Window for Intermittent Power Resources will shift as well. The weighting percentages will be reevaluated through a study done every four years, and will be updated accordingly.

(c) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP^P_{am}}{(ProdF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

> ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m;
>
> $UCAP^P_{am}$ is the amount of Unforced Capacity that Aggregation a supplies in month m;
>
> $Duration\ Adjustment\ Factor_{am}$ is the Duration Adjustment Factor for Aggregation a which is applicable for month m, pursuant to Section 4.1.1 of this *ICAP Manual*.

ProdF_{am} is the production 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*;

Starting with the Capability Period that begins May 1, 2024:

4. Fundamental Formulae

(4-1) $\text{Adjusted Installed Capacity} = \min(\text{CRIS}, \text{DMNC}) * \text{Capacity Accreditation Factor}$

(4-2) $\text{UCAP} = (1 - \text{EFORd}) * \text{Adjusted Installed Capacity}$

(4-3) $\text{EFORd} = \dfrac{f_f \times \text{FOH} + f_p \times (\text{EFOH - FOH})}{\text{SH} + f_f \times \text{FOH}}$

(4-4) $f_f = \dfrac{\dfrac{1}{r} + \dfrac{1}{T}}{\dfrac{1}{r} + \dfrac{1}{T} + \dfrac{1}{D}}$

(4-4a) $r = \text{average forced outage duration} = \dfrac{\text{FOH}}{\text{number of forced outages}}$

(4-4b) $T = \text{average time between calls for a unit to run} = \dfrac{\text{RSH}}{\text{number of attempted starts}}$

(4-4c) $D = \text{average run time} = \dfrac{\text{SH}}{\text{number of successful starts}}$

(4-5) $f_p = \dfrac{\text{SH}}{\text{AH}}$

5. Definitions

UDR	Unforced Capacity Deliverability Rights
EDR	External-to-Rest of State (ROS) Deliverability Rights
UCAP	Unforced Capacity
EFORd	Equivalent Demand Forced Outage Rate
DMNC	per Tariff definition
CRIS	per Tariff definition
ICE	Installed Capacity Equivalent as defined in the Services Tariff and in Section 6 of this Attachment J.
Adjusted Installed Capacity	per Tariff definition
Capacity Accreditation Factor	per Tariff definition
Net Dependable Capacity	The gross power level that a unit can sustain during any period of time when there are no equipment, operating or regulatory restrictions and after

adjusting for station service and auxiliary loads and ambient conditions. Average ambient temperature should reflect the average of the daily high temperatures for the month at the plant location. Only one Net Dependable Capacity for each Resource shall be reported for each month. That value may be either the Resource's DMNC for the Capability Period containing that month or that Resource's average Net Dependable Capacity for that month, at the discretion of the owner of the Resource.

f_f	full f-factor (see formula in Section 1.0)
f_p	partial f-factor (see formula in Section 1.0)
FOH	Full Forced Outage Hours
Forced Outage	An unplanned failure that requires a unit to be removed from service, or the Load on the unit to be reduced before the end of the nearest following Weekend.
ICAP Obligation Hours	The hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual.
EFOH	Equivalent Full Forced Outage Hours: Sum of all hours a unit was involved in an outage expressed as equivalent hours of full forced outage at its maximum net dependable capability.
SH	Service Hours: The time a unit is electrically connected to the system - Sum of all Unit Service Hours.
AH	Available Hours: The time a unit is capable of producing energy, regardless of its capacity level - Sum of all Service Hours + Reserve Shutdown Hours + Pumping Hours + Synchronous Condensing Hours.
RSH	Reserve Shutdown Hours: The time a unit is available for service but not dispatched due to economic or other reasons.
PH	Period hours equals 24 times the number of days in the reporting period.

Note: For in-depth GADS Data concepts, refer to the NERC Fast Link for GADS Services at www.nerc.com.

6. Calculations

In general, all generating are expected to provide the full GADS Data set defined in Attachment K. Except as noted below, a Resource that provides a full GADS Data set will have the amount of UCAP that it is qualified to supply and an Installed Capacity Equivalent calculated according to Section 6.1. A Resource that provides equivalent GADS Data will have the amount of UCAP that it is qualified to supply and an Installed Capacity Equivalent calculated according to Section 6.2. A Control Area System Resource will have the amount of UCAP it can supply calculated according to Section 6.3, an Intermittent Power Resource or Limited Control Run of River Hydro Resource will have the amount of UCAP it can supply calculated according to Section 6.4, a Resource using UDRs will have its UCAP values calculated according to Section 6.5, a Resource using EDRs will have its UCAP values calculated according to Section 6.6, and an Energy Storage Resource will have its UCAP values calculated according to Section 6.7. Generators participating as Co-located Storage

Resources will have the amount of UCAP that are qualified to supply according to Section 6.8, and an Aggregation will have the amount of UCAP it can supply calculated according to Section 6.9.

6.1. UCAP based on EFORd

This Section applies to Resources that submit GADS Data using the GADS reporting format in Attachment K. An Energy Limited Resource that does not want to have its UCAP based on production levels using equivalent GADS Data, using the equations in Section 6.2, will have to submit GADS Data to document its available capacity for the number of consecutive hours that correspond to its Energy Duration Limitation.

6.1.1 Procedure for calculating Unforced Capacity values for Resources without an Energy Duration Limitation.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

$$UCAP^Q_{gm} = (1\text{-}AEFORd_{gm})*\min(CRIS_{gm}, DMNC_{gm}) *Capacity\ Accreditation\ Factor_{gm};$$

Where:

$UCAP^Q_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

$AEFORd_{gm}$ is the Average Equivalent Demand Forced Outage Rate calculated for Resource g that will be used to determine the amount of Unforced Capacity that the Resource will be permitted to provide in month m, as defined further below;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

If month m is in the Winter Capability Period, then *AEFORd$_{gm}$* will be equal to the average of the two previous Winter Capability Period EFORd values calculated for Resource g. If month m is in the Summer Capability Period, *AEFORd$_{gm}$* will be equal to the average of the two previous Summer Capability Period EFORd values calculated for Resource g. *EFORd$_{gn}$*, the EFORd value for Resource g for the 6-month period ending in any given month n that is used in the calculation of *AEFORd$_{gm}$*, will be calculated as follows:

$$EFORd_{gn} = \frac{IST_{ge}}{6} \times \frac{f_{fgbe}FOH_{gbe} + f_{pgbe}(EFOH_{gbe} - FOH_{gbe})}{(SH_{gbe} + f_{fgbe}FOH_{gbe})} + \left(1 - \frac{IST_{ge}}{6}\right)CEFORd_g$$

Where: f_{fgbe} *and* f_{pgbe} *are further defined below and:*

IST_{ge} is the number of months that Resource g was in service during the 6-month Capability Period ending as of time e (IST_{ge} = 0 if generator g was not in service as of time e; IST_{ge} = 6 if Resource g was in servicefor all months of the Capability Period;

FOH_{gbe} is the sum of all Full Forced Outage Hours reported for Resource g for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 46-50and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{gbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for Resource g for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$
EFOH_{gbe} = \begin{cases} 0, \text{if there were no outages for Resource g during the} \\ \text{period beginning at time b and ending at time e; and} \\ \sum_{i \in OUT_{gbe}} \frac{(NDC_{gi} - NAC_{gi})H_{gi}}{NDC_{gi}}, \text{otherwise;} \end{cases}
$$

>   **Where:**

OUT_{gbe} is the set of outages for Resource g during the period beginning at time b and ending at time e:

NDC_{gi} is the Net Dependable Capacity for Resource g applicable for outage i, submitted in accordance with Attachment K, Performance Record 01, columns 43-48;

NAC_{gi} is the Net Available Capacity for Resource g, applicable for outage i, submitted in accordance with Attachment K, Event Record 01, columns 62-67;

and

> H_{gi} is the time accumulated for Resource g applicable for outage i submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event).

> SH_{gbe} is the sum of all Service Hours reported for Resource g for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-20;

> e is the end of the last month of the Capability Period;

> b is the beginning of the first month of the Capability Period, unless the Resource had not gone into service at that time, in which case b is the time at which that Resource went into service; and

> $CEFORd_g$ is the class-equivalent EFORd calculated by the ISO for Resources of the same class as Resource g based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{fgbe} = \frac{\dfrac{1}{r} + \dfrac{1}{T}}{\dfrac{1}{r} + \dfrac{1}{T} + \dfrac{1}{D}}$$

Where:

r is FOH_{gbe} divided by the total number of GADS Data Forced Outages reported for the period beginning at time *b* and ending at time *e* in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH_{gbe}) divided by the number of attempted starts reported for the period beginning at time *b* and ending at time *e* for Resource *g*. RSH_{gbe} is the sum of all Reserve Shutdown Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 21-25; and

D is the number of Service Hours (SH_{gbe}) divided by the number of successful starts reported for the period beginning at time b and ending at time *e* for Resource g; and

$$f_{pgbe} = \frac{SH_{gbe}}{AH_{gbe}}$$

Where:

AH_{gbe} is the sum of all Available Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e* in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 36-40.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

If RSH = 0 (<1), set f_f =1;

If SH = 0, set f_f =1;

If FOH = 0, set 1/r = 0 and calculate f_f per its equation; and

If AH = 0, set f_p =1.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^{P}{}_{gm}}{(1 - AEFORd_{gm}) * Capacity\ Accreditation\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *m*;

$UCAP^{P}{}_{gm}$ is the amount of Unforced Capacity that Resource *g* supplies in month *m*;

AEFORd_{gm} as above, is the Average Equivalent Demand Forced Outage Rate calculated for Resource *g* that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month *m*; and

Capacity Accreditation Factor_{gm} is the Capacity Accreditation Factor for Resource *g* which is applicable for month *m*, pursuant to Section 7.2 of this ICAP Manual.

6.1.2   Procedure for calculating Unforced Capacity values for Resources with an Energy Duration Limitation.

Starting with the 2024/2025 Capability Year, Installed Capacity Suppliers with Energy Duration Limitations that submit GADS data for their UCAP values will be evaluated during the applicable ICAP Obligation Hours for their UCAP values. Periods prior to the start of the 2024/2025 Capability Year used in the UCAP calculation will be calculated in accordance with section 6.1.1 of this Attachment.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

$$UCAP^{Q}_{gm} = (1\text{-}AEFORd_{gm})*min(CRIS_{gm}, DMNC_{gm}) *Capacity\ Accreditation\ Factor_{gm};$$

Where:

UCAP^{Q}_{gm} is the amount of Unforced Capacity that Resource *g* is qualified to provide in month *m*;

AEFORd_{gm} is the Average Equivalent Demand Forced Outage Rate calculated for Resource *g* during the applicable ICAP Obligation Hours that will be used to determine the amount of Unforced Capacity that the Resource will be permitted to provide in month *m*, as defined further below;

CRIS_{gm} is the Capacity Resource Interconnection Service value for Resource *g* for month *m* established pursuant to the applicable deliverability requirements of NYISO OATT;

DMNC_{gm} is the DMNC rating for Resource *g* which is applicable for month *m*, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month *m* is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month *m* is part of a Winter Capability Period; and

Capacity Accreditation Factor_{gm} is the Capacity Accreditation Factor for Resource *g* which is applicable for month *m*, pursuant to Section 7.2 of this ICAP Manual.

If month *m* is in the Winter Capability Period, then *AEFORd_{gm}* will be equal to the average of the two previous Winter Capability Period EFORd values calculated for Resource *g*. If month *m* is in the Summer Capability Period, *AEFORd_{gm}* will be equal to the average of the two previous Summer Capability Period EFORd values calculated for Resource *g*. *EFORd_{gn}*, the EFORd value for Resource *g* for the 6-month period ending in any given month *n* that is used in the calculation of *AEFORd_{gm}*, will be calculated as follows:

$$EFORd_{gn} = \frac{IST_{ge}}{6} \times \frac{f_{fgbe}FOH_{gbe} + f_{pgbe}(EFOH_{gbe} - FOH_{gbe})}{(SH_{gbe} + f_{fgbe}FOH_{gbe})} + \left(1 - \frac{IST_{ge}}{6}\right)CEFORd_{g}$$

Where: *f_{fgbe} and f_{pgbe} are further defined below and:*

IST_{ge} is the number of months that Resource g was in service during the 6-month Capability Period ending as of time e ($IST_{ge} = 0$ if generator g was not in service as of time e; $IST_{ge} = 6$ if Resource g was in service for all months of the Capability Period;

FOH_{gbe} is the sum of all Full Forced Outage Hours reported for Resource g during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 46-50 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{gbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for Resource g during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$\text{EFOH}_{gbe} = \begin{cases} 0, \text{if there were no outages for Resource g during the} \\ \text{period beginning at time b and ending at time e; and} \\ \sum_{i \in \text{OUT}_{gbe}} \frac{(\text{NDC}_{gi} - \text{NAC}_{gi})\text{H}_{gi}}{\text{NDC}_{gi}}, \text{otherwise;} \end{cases}$$

Where:

OUT_{gbe} is the set of outages for Resource g during the applicable ICAP Obligation Hours during the period beginning at time b and ending at time e;

NDC_{gi} is the Net Dependable Capacity for Resource g during the applicable ICAP Obligation Hours applicable for outage i, submitted in accordance with Attachment K, Performance Record 01, columns 43-48;

NAC_{gi} is the Net Available Capacity for Resource g during the applicable ICAP Obligation Hours, applicable for outage i, submitted in accordance with Attachment K, Event Record 01, columns 62-67;

and

H_{gi} is the time accumulated for Resource g during the applicable ICAP Obligation Hours applicable for outage i submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event);

SH_{gbe} is the sum of all Service Hours reported for Resource g during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16--20;

e is the end of the last month of the Capability Period;

b is the beginning of the first month of the Capability Period, unless the Resource had not gone into service at that time, in which case b is the time at which that Resource went into service;

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in

which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window; and

CEFORd$_g$ is the class-equivalent EFORd calculated by the ISO for Resources of the same class as Resource *g* based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{fgbe} = \frac{\dfrac{1}{r} + \dfrac{1}{T}}{\dfrac{1}{r} + \dfrac{1}{T} + \dfrac{1}{D}}$$

> ***Where:***

r is FOH$_{gbe}$ divided by the total number of GADS Data Forced Outages reported for the period during the applicable ICAP Obligation Hours beginning at time *b* and ending at time *e* in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH$_{gbe}$) divided by the number of attempted starts reported for the period during the applicable ICAP Obligation Hours beginning at time *b* and ending at time *e* for Resource *g*. RSH$_{gbe}$ is the sum of all Reserve Shutdown Hours reported for Resource *g* during the applicable ICAP Obligation Hours for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 21-25;

D is the number of Service Hours (SH$_{gbe}$) divided by the number of successful starts reported for the period during the applicable ICAP Obligation Hours beginning at time b and ending at time *e* for Resource g; and

$$f_{pgbe} = \frac{SH_{gbe}}{AH_{gbe}}$$

> ***Where:***

AH$_{gbe}$ is the sum of all Available Hours reported for Resource *g* during the applicable ICAP Obligation Hours for the period beginning at time *b* and ending at time *e* in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 36-40.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

- If (RSH < 1) then f$_f$ =1;

- If (SH = 0) then f$_f$ = 1;

- If (1/r + 1/T + 1/D) = 0 then f$_f$ = 0;

- If [(# of FO occurrences = 0) or (FOH = 0)] then 1/r = 0;

- If [(RSH = 0) or (# of unit attempted starts = 0)] then 1/T = 0;

- If [(# of unit actual starts = 0) or (SH = 0)] then 1/D = 0;

- If AH = 0 then f_p = 0; and

- If (SH + (f_f x FOH)) = 0 then EFORd = 0.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P{}_{gm}}{(1 - AEFORd_{gm}) * Capacity\ Accreditation\ Factor_{gm}}$$

> *Where:*

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P{}_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

$AEFORd_{gm}$ as above, is the Average Equivalent Demand Forced Outage Rate calculated for Resource g that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m; and

$Capacity\ Accreditation\ Factor_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

6.2. UCAP based on equivalent GADS Data (capacity factor method)

This Section applies to Resources that submit equivalent GADS Data using the GADS reporting format in Attachment K.

6.2.1 Procedure for calculating Unforced Capacity values for Resources without an Energy Duration Limitation.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

> *Where:* $UCAP^Q_{gm} = (1 - AOF_{gm}) * min(CRIS_{gm}, DMNC_{gm}) * Capacity\ Accreditation\ Factor_{gm};$

$UCAP^Q{}_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

AOF_{gm} is the Average Outage Factor calculated for Resource g, as further defined below, that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month m;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource *g* which is applicable for month *m*, pursuant to Section 7.2 of this ICAP Manual.

If month *m* is in the Winter Capability Period, then *AOF$_{gm}$* will be equal to the average of the two previous Winter Capability Period OF values calculated for Resource *g*. If month *m* is in the Summer Capability Period, *AOF$_{gm}$* will be equal to the average of the two previous Summer Capability Period OF values calculated for Resource *g*. *OF$_{gn}$*, the OF value for Resource *g* for the 6-month period ending in any given month *n* that is used in the calculation of *AOF$_{gm}$*, will be calculated as follows:

$$OF_{gn} = \frac{IST_{ge}}{6} \times (1 - CF_{gbe}) + \left(1 - \frac{IST_{ge}}{6}\right)(1 - CCF_g)$$

Where:

IST$_{ge}$ is the number of months that Resource *g* had been in service as of time *e* (0 if generator *g* was not in service as of time *e*; 6 if Resource *g* was in service for the full Capability Period;

CCF$_g$ is the class-equivalent Capacity Factor for Resources of the same class as Resource *g* based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{gbe} = \frac{NAG_{gbe}}{\displaystyle\sum_{i=B}^{E}\left(NDC_{gi}\left(PH_{gi} - POH_{gi} - MOH_{gi}\right)\right)};$$

Where:

CF$_{gbe}$ is the Capacity Factor for Resource *g* for the period beginning at time *b* and ending at time *e*;

NAG$_{gbe}$ is the Net Actual Generation for Resource *g* for the period beginning at time *b* and ending at time *e*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 49-57;

NDC$_{gi}$ is the Net Dependable Capacity for Resource *g* for month *i*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 43-48;

PH$_{gi}$ is the Period Hours reported for Resource *g* for month *i*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 66-70;

POH$_{gi}$ is the Planned Outage Hours reported for Resource *g* for month *i*. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 41-45;

MOH$_{gi}$ is the Maintenance Outage Hours reported for Resource *g* for month *i*. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 51-55;

b is the beginning of the first monthof the Capability Period , unless the Resource had not gone into service at that time, in which case b is the time at which that Resource went into service;

e is the end of the last month of the Capability Period;

B is the month containing time b; and

E is the month containing time e.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P{}_{gm}}{(1 - AOF_{gm}) * Capacity\ Accreditation\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P{}_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

AOF_{gm}, as above, is the Average Outage Factor for Resource g that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month m; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

6.2.2 Procedure for calculating Unforced Capacity values for Resources with an Energy Duration Limitation.

Starting with the 2024/2025 Capability Year, Installed Capacity Suppliers with Energy Duration Limitations that submit equivalent GADS data for their UCAP values will be evaluated during the applicable ICAP Obligation Hours for their UCAP values. Periods prior to the start of the 2024/2025 Capability Year used in the UCAP calculation will be calculated in accordance with section 6.2.1 of this Attachment.

(a) Determining the Amount of UCAP a Resource Qualifies to Supply

Where: $\quad UCAP^Q_{gm} = (1 - AOF_{gm}) * min(CRIS_{gm}, DMNC_{gm}) *$ *Capacity Accreditation Factor$_{gm}$;*

$UCAP^Q{}_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

AOF_{gm} is the Average Outage Factor calculated for Resource g during the applicable ICAP Obligation Hours, as further defined below, that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month m;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO

procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

If month m is in the Winter Capability Period, then AOF_{gm} will be equal to the average of the two previous Winter Capability Period OF values calculated for Resource g. If month m is in the Summer Capability Period, AOF_{gm} will be equal to the average of the two previous Summer Capability Period OF values. OF_{gn}, the OF value for Resource g for the 6-month period ending in any given month n that is used in the calculation of AOF_{gm}, will be calculated as follows:

$$OF_{gn} = \frac{IST_{ge}}{6} \times (1 - CF_{gbe}) + \left(1 - \frac{IST_{ge}}{6}\right)(1 - CCF_g)$$

> ### Where:

IST_{ge} is the number of months that Resource g had been in service as of time e (0 if generator g was not in service as of time e; 6 if Resource g was in service for the full Capability Period);

CCF_g is the class-equivalent Capacity Factor for Resources of the same class as Resource g based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{gbe} = \frac{NAG_{gbe}}{\sum\limits_{i=B}^{E}\left(NDC_{gi}(PH_{gi} - POH_{gi} - MOH_{gi})\right)};$$

> ### Where:

CF_{gbe} is the Capacity Factor for Resource g during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e;

NAG_{gbe} is the Net Actual Generation for Resource g during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 49-57;

NDC_{gi} is the Net Dependable Capacity for Resource g for month i during the applicable ICAP Obligation Hours. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 43-48;

PH_{gi} is the Period Hours reported for Resource g for month i during the applicable ICAP Obligation Hours. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 66-70;

POH_{gi} is the Planned Outage Hours reported for Resource g for month i during the applicable ICAP Obligation Hours. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 41-45;

MOH_{gi} is the Maintenance Outage Hours reported for Resource g for month i during the applicable ICAP Obligation Hours. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 51-55;

b is the beginning of the first month of the Capability Period, unless the Resource had not gone into service at that time, in which case b is the time at which that Resource went into service;

e is the end of the last month of the Capability Period;

B is the month containing time b;

E is the month containing time e; and

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window;.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P_{gm}}{(1 - AOF_{gm}) * Capacity\ Accreditation\ Factor_{gm}}$$

> *Where:*

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

AOF_{gm}, as above, is the Average Outage Factor for Resource g that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month m; and

$Capacity\ Accreditation\ Factor_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

6.3. Calculation of UCAP for Control Area System Resources

(a) Determining the Amount of UCAP a Control Area System Resource Qualifies to Supply

$$UCAP^Q_{cm} = NPC_{cm} * (1\text{-}ACAF_{cm}) * Capacity\ Accreditation\ Factor_{cm}$$

> *Where:*

$UCAP^Q_{cm}$ is the Unforced Capacity that the Control Area System Resource located in Control Area c is qualified to supply in the NYCA during month m;

NPC_{cm} is the Net Projected Capacity for the Control Area System Resource located in Control Area c for month m, calculated pursuant to the formula set forth in Section 4.10.3 of this Manual, repeated below for clarity:

$NPC_{cm} = CAP_{cm} + EP_{cm} + LM_{cm} - PL_{cm} - ES_{cm} - LS_{cm} - PM_{cm} - PR_{cm}$;

$ACAF_{cm}$ is the average derating factor calculated for the Control Area System Resource located in Control Area c that will be used to determine the amount of Unforced Capacity that the Resource will be permitted to provide in month m, as defined further below; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

If month m is in the Winter Capability Period, then $ACAF_{gm}$ will be equal to the average of the two previous Winter Capability Period CAF values calculated. If month m is in the Summer Capability Period, $ACAF_{gm}$ will be equal to the average of the two previous Summer Capability Period CAF values calculated for Resource g. CAF_{gn}, the CAF value for Resource g for the 6-month period ending in any given month n that is used in the calculation of $ACAF_{gm}$, will be calculated as follows:

$$CAF_{gn} = \frac{\sum_{i=b}^{e} \max\left(\begin{matrix} 0,\ ICE_{ci} - (CAP_{ci} + EP_{ci} + LM_{ci} - L_{ci} \\ - ES_{ci} - LS_{ci} - PM_{ci} - FO_{ci} - OR_{ci}) \end{matrix} \right)}{\sum_{j=B}^{E} ICE_{cj} TH_j}$$

Where:

i is an hour in which the Control Area System Resource located in Control Area c provided Installed Capacity to the NYCA;

b is the beginning of the first month of the Capability Period, or the time at which Capacity began to be provided from Control Area c under the terms of this section, if later;

e is the end of the last month of the Capability Period;

ICE_{ci} is the Installed Capacity equivalent of the amount of Unforced Capacity supplied from the Control Area System Resource providing Installed Capacity from Control Area c during the month containing hour i;

CAP_{ci} is the actual maximum total generating Capacity in hour i in Control Area c;

EP_{ci} is the actual External firm Capacity purchases in hour i by Control Area c, other than purchases from Resources in the NYCA;

LM_{ci} is the actual amount of load management (*i.e.,* interruptible load) in hour i in Control Area c;

L_{ci} is the Load in hour i for Control Area c, including system losses;

ES_{ci} is the actual External firm Capacity sales in hour i by Control Area c, other than firm capacity sales to NYCA;

LS_{ci} is the actual losses, up to the border of the NYCA, that would have been incurred in hour i on transactions corresponding to sales of Unforced Capacity by that Control Area System Resource outside the Control Area;

PM_{ci} is the amount of generating Capacity in Control Area c that was actually unavailable in hour i due to planned maintenance;

FO_{ci} is the amount of generating Capacity in Control Area c that was actually unavailable in hour i due to forced outages;

OR_{ci} is the amount of operating reserve that was actually available for Control Area c in hour i;

E is the month containing e;

B is the month containing b;

ICE_{cj} is the Installed Capacity Equivalent of the amount of Unforced Capacity provided from the Control Area Resource associated with Control Area c during month j, and

TH_j is the total number of hours in month j in which the Control Area System Resource provided Installed Capacity to the NYCA.

(b) Determining the ICE of the Amount of UCAP Supplied

$$\textit{Where:} \qquad ICE_{cm} = \frac{UCAP^P{}_{cm}}{(1 - ACAF_{cm}) * Capacity\ Accreditation\ Factor_{gm}}$$

ICE_{cm} is the Installed Capacity equivalent of the amount of Unforced Capacity supplied from Control Area c in month m;

$UCAP^P{}_{cm}$ is the amount of Unforced Capacity supplied from Control Area c in month m;

$ACAF_{cm}$ is the Average Capacity Adjustment Factor for Control Area c for month m, as calculated above; and

$Capacity\ Accreditation\ Factor_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

6.4.   Calculation of UCAP for Intermittent Power Resources and Limited Control Run of River Hydro Resources

This section describes the general procedure for calculating Unforced Capacity values for Intermittent Power Resources, which include generators that depend on wind, solar, and landfill gas for their fuel, and Limited Control Run of River Hydro Resources. Also see Section 4.5 of this Manual and 5.12.6 of the Market Administration and Control Area Services Tariff.

(a) Definitions

For purposes of this Section 6.4:

"Summer Peak Hours" means the Peak Load Window hours for the applicable Summer Capability Period, posted to the NYISO Capacity Accreditation web page in accordance with Section 7.3 of this *ICAP Manual,* during the three-month period from June 1 through August 31, inclusive.

"Winter Peak Hours" means the Peak Load Window hours for the applicable Winter Capability Period, posted to the NYISO Capacity Accreditation web page in accordance with Section 7.3 of this *ICAP Manual,* during the three-month period from December 1 through the last day of February.

(b) Determining the Amount of UCAP an Intermittent Power Resource or Limited Control Run of River Hydro Resource Qualifies to Supply

Generally, the calculation of Unforced Capacity for an Intermittent Power Resource or Limited Control Run of River Hydro Resource for a particular Capability Period is based on three components: 1) the minimum of the Resource's nameplate capacity and Capacity Resource Interconnection Service value, 2) the resource specific derating factor, and 3) the Resource's assigned Capacity Accreditation Factor. For facilities with less than sixty (60) days of historic operating data in the Prior Equivalent Capability Period, the initial Unforced Capacity will be calculated according to Section 4.5 of the Installed Capacity Manual.

$$UCAP^{Q}_{gm} = min(NC_{gm}, CRIS_{gm}) * (1 - RSDF_{gm}) * Capacity\ Accreditation\ Factor_{gm},$$

> **Where:**

$UCAP^{Q}_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

NC_{gm} is the nameplate capacity of Resource g that is applicable when determining the amount of Unforced Capacity that Resource g is qualified to provide in month m;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual;

$RSDF_{gm}$ is the resource specific derating factor of Resource g that is applicable when determining the amount of Unforced Capacity that Resource g is qualified to provide in month m. Until there are at least three (3) Resources within NYCA that comprise a single Capacity Accreditation Resource Class with at least sixty (60) days of historic operating data in the Prior Equivalent Capability Period Peak Load Window, Resources in that Capacity Accreditation Resource Class will have a derating factor of zero. The $RSDF_{gm}$ compares the *Average Capacity Factor$_{gm}$* of Resource g for month m to the *Average Capacity Factor$_{rm}$* for month m of the Representative Unit r used to calculate the *Capacity Accreditation Factor$_{gm}$*. The $RSDF_{gm}$ for Resource g for month m will be calculated using one of two approaches, as indicated below, in order to minimize the difference between $UCAP^{Q}_{gm}$ and the Adjusted Installed Capacity of Resource g for month m.

If $| ACFD_{gm}| < | CAF_{gm} * (1 - ACFR_{gm})|$, then $RSDF_{gm} = \frac{-ACFD_{gm}}{CAF_{gm}}$; otherwise, $RSDF_{gm} = 1 - ACFR_{gm}$.

> **Where:**

CAF_{gm} is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual;

$ACFD_{gm}$ is the average capacity factor difference of Resource g for month m. $ACFD_{gm}$ is calculated as:

$$ACFD_{gm} = Average\ Capacity\ Factor_{gm} – Average\ Capacity\ Factor_{rm}$$

$ACFR_{gm}$ is the average capacity factor ratio of Resource g for month m. $ACFR_{gm}$ is calculated as:

$$ACFR_{gm} = \frac{Average\ Capacity\ Factor_{gm}}{Average\ Capacity\ Factor_{rm}}$$

Average Capacity Factor$_{gm}$ is the average capacity factor for Resource *g* for month *m*, which is calculated according to section I below; and

Average Capacity Factor$_{rm}$ is the average capacity factor for the Representative Unit *r* used to calculate the *Capacity Accreditation Factor$_{gm}$* for month *m*. The *Average Capacity Factor$_{rm}$* is calculated according to section I below.

I   Determining the Average Capacity Factors for Intermittent Power Resources and Limited Control Run of River Hydro Resources

The Average Capacity Factor for an Intermittent Power Resource or Limited Control Run of River Hydro Resource *g* for month *m* will be calculated according to equation (a) below.

$$\text{(a)}\ \textbf{\textit{Average Capacity Factor}}_{\textbf{\textit{g}}\text{m}} = \frac{1}{H}\sum_{h\in CPPH_{gm}}\frac{E_{gh}}{NC_{gh}}$$

Where:

CPPH$_{gm}$ is the set of all Summer Peak Hours during the two most recent Summer Capability Periods preceding the Capability Period containing month *m* (if month *m* is part of a Summer Capability Period) during which Resource *g* was available for commercial operation, or the set of all Winter Peak Hours during the two most recent Winter Capability Periods preceding the Capability Period containing month *m* (if month *m* is part of a Winter Capability Period) during which Resource *g* was available for commercial operation;

H is the total number of hours in *CPPH$_{gm}$*;

E$_{gh}$ is the total amount of energy delivered to the NYCA transmission system by Resource *g* during hour *h*; and

NC$_{gh}$ is the nameplate capacity of Resource *g* that was applicable when determining the amount of Unforced Capacity that Resource *g* was qualified to provide in hour *h*.

The Average Capacity Factor for a Representative Unit *r* for month *m* will be calculated according to equation (b) below. Until there are at least three (3) Resources within a capacity zone that comprise a single Capacity Accreditation Resource Class with at least sixty (60) days of historic operating data in the Prior Equivalent Capability Period Peak Load Window, the Average Capacity Factor of the Representative Unit will consider the total amount of energy delivered to the NYCA transmission system by existing units in other capacity zone(s) within the same Capacity Accreditation Resource Class.

$$\text{(b)}\ \textbf{\textit{Average Capacity Factor}}_{\textbf{\textit{r}}\text{m}} = \frac{1}{H}\sum_{h\in CPPH_m}\frac{E_{rh}}{NC_{rh}}$$

Where:

CPPH$_m$ is the set of all Summer Peak Hours during the two most recent Summer Capability Periods preceding the Capability Period containing month *m* (if month *m* is part of a Summer Capability Period), or the set of all Winter Peak Hours during the two most recent Winter

Capability Periods preceding the Capability Period containing month *m* (if month *m* is part of a Winter Capability Period);

H is the total number of hours in CPPH$_m$;

E$_{rh}$ is the total amount of energy delivered to the NYCA transmission system by all Resources operating in hour *h* that 1) meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Resource *g* is assigned for month *m* and 2) are located in the same capacity region (*i.e.,* Rest of State, G-J Locality (excluding Load Zone J), NYC Locality, or Long Island Locality) as Resource *g*, if at least three units are existing Installed Capacity Suppliers in Seasons in which there are less than three units that meet (1) and (2), the total amount of energy delivered to the NYCA transmission system by all Resources in NYCA operating in hour h that meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Resource *g* is assigned for month *m*; and

NC$_{rh}$ is the sum of the nameplate capacity of all Resources operating in hour *h* that 1) meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Resource *g* is assigned for month *m* and 2) are located in the same capacity region (*i.e.,* Rest of State, G-J Locality (excluding Load Zone J), NYC Locality, or Long Island Locality) as Resource *g* if at least three units are existing Installed Capacity Suppliers; in Seasons in which there are less than three units that meet (1) and (2), the total amount of energy delivered to the NYCA transmission system by all Resources in NYCA operating in hour h that meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Resource *g* is assigned for month *m*.

(c) **Determining the ICE of the Amount of UCAP Supplied**

$$ICE_{gm} = \frac{UCAP_{gm}^{P}}{(1 - RSDF_{gm}) * Capacity\ Accreditation\ Factor_{gm}}$$

Where:

ICE$_{gm}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *m*;

UCAP$^P_{gm}$ is the amount of Unforced Capacity that Resource *g* supplies in month *m*;

RSDF$_{gm}$ is the resource specific derating factor of Resource *g* that is applicable when determining the amount of Unforced Capacity that Resource *g* is qualified to provide in month *m*; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource *g* which is applicable for month *m*, pursuant to Section 7.2 of this ICAP Manual.

6.5. Calculation of UCAP for Installed Capacity Delivered over UDR Facilities

(d) Determining the Amount of UCAP a UDR Qualifies to Supply

The amount of UDRs assigned by the NYISO to each new incremental transmission facility, and any future adjustments thereto, will be based on the transmission capability, reliability, and availability of the facility, and appropriate NYSRC reliability studies.

The NYISO may request additional information as necessary and will grant UDRs to the requestor, or designated rights holder, quantified as the Installed Capacity Equivalent of the Unforced Capacity to be delivered throughout its project life to the Interconnection Point in MW.

The amount of UDRs awarded to a particular project may be adjusted periodically by the NYISO. Adjustments to such an award will reflect changes in physical characteristics and availability of the associated project.

$UCAP^Q{}_{gm}$, the amount of Unforced Capacity that Resource g is qualified to provide in a Locality in month m through the use of UDRs, is calculated as follows:

$$UCAPQ_{gm} = (Resource_{ICAP} - Loss_{FL}) * P_{resource} * Capacity\ Accreditation\ Factor_{resource} * P_{cable}$$

Where:

$Resource_{ICAP}$ = the sum of the applicable DMNCs for month m of the Resources (or portions thereof) used to supply ICAP to Resource g in association with a given set of UDRs;

$Loss_{FL}$ = cable and converter station losses at the rated UDR level;

$P_{resource}$ = one minus a weighted average of the EFORds calculated for the Resources used to supply ICAP to Resource g in association with a given set of UDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP;

$Capacity\ Accreditation\ Factor_{resource}$ = weighted average of the Capacity Accreditation Factors for the individual Resources used to supply ICAP to Resource g in association with a given set of UDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP. The Capacity Accreditation Factor of the individual Resources used to supply ICAP to Resource g in association with a given set of UDRs corresponds to the Capacity Accreditation Factor of the Capacity Accreditation Resource Class that each Resource individually would be assigned pursuant to Section 7.2 of this *ICAP Manual,* and

P_{cable} = one minus the cable outage rate, including cable and converter station unavailability.

(e) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P{}_{gm}}{P_{resource} * Capacity\ Accreditation\ Factor_{resource} * P_{cable}}$$

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P{}_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

$P_{resource}$ = one minus a weighted average of the EFORds calculated for the Resources used to supply ICAP to Resource g in association with a given set of UDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP;

Capacity Accreditation Factor$_{resource}$ = weighted average of the Capacity Accreditation Factors for the individual Resources used to supply ICAP to Resource g in association with a given set of UDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP. The Capacity Accreditation Factor of the individual Resources used to supply ICAP to Resource g in association with a given set of UDRs corresponds to the Capacity Accreditation Factor of the Capacity Accreditation Resource Class that each Resource individually would be assigned pursuant to Section 7.2 of this *ICAP Manual,* and

P_{cable} = one minus the cable outage rate, including cable and converter station unavailability.

6.6. Calculation of UCAP for Installed Capacity Delivered over EDR Facilities

(f) Determining the Amount of UCAP an EDR Qualifies to Supply

The amount of EDRs assigned by the NYISO to each new incremental transmission facility, and any future adjustments thereto, will be based on the transmission capability, reliability, and availability of the facility, and appropriate NYSRC reliability studies.

The NYISO may request additional information as necessary and will grant EDRs to the requestor, or designated rights holder, quantified as the Installed Capacity Equivalent of the Unforced Capacity to be delivered throughout its project life to the NYCA interface over which it creates increased transfer capability.

The amount of EDRs awarded to a particular project may be adjusted periodically by the NYISO. Adjustments to such an award will reflect changes in physical characteristics and availability of the associated project.

UCAPQ$_{gm}$, the amount of Unforced Capacity that Resource g is qualified to provide in ROS in month m through the use of EDRs, is calculated as follows:

$$UCAPQ_{gm} = (Resource_{ICAP} - Loss_{FL}) * P_{resource} * Capacity\ Accreditation\ Factor_{resource} * P_{interface}$$

Where:

$Resource_{ICAP}$ = the sum of the applicable DMNCs for month m of the Resources (or portions thereof) used to supply ICAP to Resource g in association with a given set of EDRs*;*

$Loss_{FL}$ = interface losses at the rated EDR level, if applicable;

$P_{resource}$ = one minus a weighted average of the EFORds calculated for the Resources used to supply ICAP to Resource g in association with a given set of EDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP;

Capacity Accreditation Factor$_{resource}$ = weighted average of the Capacity Accreditation Factors for the individual Resources used to supply ICAP to Resource g in association with a given set of EDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP. The Capacity Accreditation Factor of the individual Resources used to supply ICAP to Resource g in association with a given set of EDRs correspond to the

Capacity Accreditation Factor of the Capacity Accreditation Resource Class that each Resource individually would be assigned pursuant to Section 7.2 of this *ICAP Manual*, and

$P_{interface}$ = one minus the interface outage rate, including interface and converter station unavailability, if applicable.

(g) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP_{gm}^{P}}{P_{resource} * Capacity\ Accreditation\ Factor_{resource} * P_{cable}}$$

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P{}_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

$P_{resource}$ = one minus a weighted average of the EFORds calculated for the Resources used to supply ICAP to Resource g in association with a given set of UDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP;

Capacity Accreditation Factor$_{resource}$ = weighted average of the Capacity Accreditation Factors for the individual Resources used to supply ICAP to Resource g in association with a given set of EDRs, with the weights proportional to the DMNC of each Resource (or portion thereof) thereby used to supply ICAP. The Capacity Accreditation Factor of the individual Resources used to supply ICAP to Resource g in association with a given set of EDRs correspond to the Capacity Accreditation Factor of the Capacity Accreditation Resource Class that each Resource individually would be assigned pursuant to Section 7.2 of this *ICAP Manual*, and

P_{cable} = one minus the cable outage rate, including cable and converter station unavailability.

6.7.   Calculation of UCAP for Energy Storage Resources

This Section describes the procedure for calculating Unforced Capacity values for Energy Storage Resources.

6.7.1   Procedure for calculating Unforced Capacity values for Energy Storage Resources without an Energy Duration Limitation.

(h) Determining the Amount of UCAP a Resource Qualifies to Supply

$$UCAP_{gm}^{Q} = (1 - AUF_{gm}) * min(CRIS_{gm}, DMNC_{gm}) * Capacity\ Accreditation\ Factor_{gm};$$

> *Where:*

$UCAP^Q{}_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

AUF_{gm} *(Average Unavailability Factor$_{gm}$)* is the derating factor calculated for Resource g that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

If month m is in the Winter Capability Period, then *Average Unavailability Factor$_{gm}$* will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for Resource g. If month m is in the Summer Capability Period, then *Average Unavailability Factor$_{gm}$* will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for Resource g.

The Unavailability Factor value for Resource g for the 6-month period ending in any given month n that is used in the calculation of *Average Unavailability Factor$_{gm}$*, will be calculated as follows:

$$\textbf{Where:} \qquad \textbf{\textit{Unavailability Factor}}_{gn} = 1 - \left(\frac{\textbf{\textit{Total Available ICAP Seconds}}_{gn}}{\textbf{\textit{Total Expected ICAP Seconds}}_{gn}} \right)$$

Total Available ICAP Seconds$_{gn}$ is the sum of *Total Available ICAP Seconds$_{gh}$* for each of the 6-month Winter Capability Period or Summer Capability Period;

Total Expected ICAP Seconds$_{gn}$ is the sum of seconds in all real-time intervals in the 6-month Winter Capability Period or Summer Capability Period in which Generator g was not on a planned or scheduled outage;

> **Where:** **Total Available ICAP Seconds$_{gn}$ and Total Expected ICAP Seconds$_{gn}$ are further defined below:**

$$Total\ Available\ ICAP\ Seconds_{gn} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{gh}$$

$$Total\ Expected\ ICAP\ Seconds_{gn} = \sum_{h=b}^{e} Total\ Expected\ Monthly\ Seconds_{gh}$$

> **Where:**

Total Available ICAP Seconds$_{gh}$ is the sum of the Available ICAP Seconds on a monthly basis for each month h in the appropriate 6-month Capability Period;

Total Expected Monthly Seconds$_{gh}$ is the sum of seconds in all real-time intervals in month h in which Resource g was not on a planned or scheduled outage;

b is the beginning month in the 6-month Capability Period (e.g.May for a Summer Capability Period, or November for a Winter Capability Period); and

e is the last month in the 6-month Capability Period (e.g. October for a Summer Capability Period or April for Winter Capability Period).

> **Where:** **Total Available ICAP Seconds$_{gh}$ and Total Expected Monthly Seconds$_{gh}$ are further defined below:**

$$Total\ Available\ ICAP\ Seconds_{gh}$$
$$= \sum_{i=x}^{y} \begin{pmatrix} min\ (1, UOL\ Availability_{gi}, LOL\ Availability_{gi}\ Storage\ Availability_{gi}, \\ Energy\ Level\ Availability_{gi}) * Interval\ Seconds_{gi} \end{pmatrix}$$

$$Total\ Expected\ Monthly\ Seconds_{gh} = \sum_{i=x}^{y} Interval\ Seconds_{gi}$$

> **Where:**

UOL Availability$_{gi}$ measures the ratio of Resource *g's UOL$_N$* that is available for a given interval *I* to the ICAP equivalent of UCAP sold;

LOL Availability$_{gi}$ measures the ratio of Resource *g's LOL$_N$* that is available for a given interval *I* to the negative ICAP equivalent of UCAP sold;

Storage Availability$_{gi}$ measures the ratio of Resource *g's* real-time storage limits to the ICAP equivalent of storage sold for a given interval *I*;

Energy Level Availability$_{gi}$ measures the ratio of Resource *g's* real-time Energy Level at the first interval *I* of hour *r* to the sum of its *DAM Energy$_{gr}$* and *DAM Reserves$_{gr}$* schedule for hour *r*. *Energy Level Availability$_{gi}$* will be applicable to all real-time intervals *I* occurring within hour *r*. If Resource *g* is adjusted due to a NYISO or TO reliability need, *Energy Level Availability$_{gi}$* will be 100% for all remaining real-time intervals *I* of the applicable day;

Interval Seconds$_{gi}$ is the number of seconds in each real-time interval *I* for Resource *g* in month *h*, except for real-time intervals *I* when Resource *g* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{gi}$* will be set to zero (0);

x is the first real-time interval in month *h*; and

y is the last real-time interval in month *h*.

> **Where:** **UOL Availability$_{gi}$, LOL Availability$_{gi}$, Storage Availability$_{gi}$, and Energy Level Availability$_{gi}$ are further defined below:**

$$UOL\ Availability_{gi} = \frac{\min(UOL_{Ngi}, ICE_{gh})}{\min(ICE_{gh}, Adjusted\ ICE_{gi})}$$

$$LOL\ Availability_{gi} = \frac{\max(LOL_{Ngi}, -ICE_{gh}, NWL_{gh})}{\max\ (-ICE_{gh}, -Adjusted\ ICE_{gi}, NWL_{gh})}$$

$$Storage\ Availability_{gi} = \frac{\min\big((USL_{gi} - LSL_{gi}), (24\ hours * ICE_{gh})\big)}{\min\big((24\ hours * ICE_{gh}), Adjusted\ Storage_{gi}\big)}$$

Energy Level Availability$_{gi}$

$$= \begin{cases} 100\%, & \text{if } Committed\ Energy\ Level_{gr} = 0 \\ \dfrac{Energy\ Level_{gr}}{Committed\ Energy\ Level_{gr}}, & \text{otherwise,} \end{cases}$$

Where:

$$Committed\ Energy\ Level_{gr} = DAM\ Energy_{gr} + DAM\ Reserves_{gr}$$

And:

UOL_{Ngi} is the Normal Upper Operating Limit for Resource *g* that is available to the Real-Time Market system, measured in MW. For real-time intervals *I* when Resource *g* is adjusted down due to a NYISO or TO reliability need, the UOL_{Ngi} will be set equal to the Resource's Bid UOL;

ICE_{gh} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *h*, measured in MW;

Adjusted ICE_{gi} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies for real-time interval *I*, accounting for any derates that result from planned and maintenance outages while Resource *g* remains available for operation, measured in MW;

LOL_{Ngi} is the Normal Lower Operating Limit for Resource *g* that is available to the Real-Time Market system, measured in MW. For real-time intervals *I* when Resource *g* is adjusted up due to a NYISO or TO reliability need, the LOL_{Ngi} will be set equal to the Resource's Bid LOL;

NWL_{gh} is the Normal Withdrawal Limit that Resource *g* supplies in month *h* based on its withdrawal capabilities, accounting for any derates that result from planned and maintenance outages while Resource *g* remains available for operation, measured in MW;

USL_{gi} is the Upper Storage Limit of Resource *g* for each real-time interval *I,* measured in MWh;

LSL_{gi} is the Lower Storage Limit of Resource *g* for each real-time interval *I,* measured in MWh;

Adjusted Storage$_{gi}$ is the storage capability of Resource *g* for real-time interval *I*, accounting for any derates that result from planned and maintenance outages while Resource *g* remains available for operation, measured in MWh;

Committed Energy Level$_{gr}$ is the sum of Resource *g*'s *DAM Energy* and *DAM Reserves* schedule for the hour *r*, measured in MWh. *Committed Energy Level*$_{gr}$ will be evaluated for each hour *r* and applicable to all real-time intervals *I* within that hour;

Energy Level$_{gr}$ is the Energy Level for Resource *g* that is available to the Real-Time Market system at the start of hour *r*, measured in MWh. *Energy Level*$_{gr}$ will be evaluated for each hour *r* and applicable to all real-time intervals *I* within that hour;

DAM Energy$_{gr}$ is Resource *g*'s Day Ahead Market (DAM) Energy schedule for the hour *r* that contains real-time interval *I,* measured in MW; and

DAM Reserves$_{gr}$ is Resource *g*'s total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour *r* that contains real-time interval *I,* measured in MW.

(i) **Determining the ICE of the Amount of UCAP Supplied**

$$ICE_{gm} = \frac{UCAP^P_{gm}}{(1 - AUF_{gm}) * Capacity\ Accreditation\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

AUF_{gm} *(Average Unavailability Factor$_{gm}$)* as above, is the derating factor calculated for Resource g that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

6.7.2 Procedure for calculating Unforced Capacity values for Energy Storage Resources with an Energy Duration Limitation.

Starting with the 2024/2025 Capability Year, Energy Storage Resources that are Installed Capacity Suppliers with Energy Duration Limitations will be evaluated during the applicable ICAP Obligation Hours for their UCAP values.

(j) **Determining the Amount of UCAP a Resource Qualifies to Supply**

$$UCAP^Q_{gm} = (1 - AUF_{gm}) * min(CRIS_{gm}, DMNC_{gm}) * Capacity\ Accreditation\ Factor_{gm};$$

Where:

$UCAP^Q_{gm}$ is the amount of Unforced Capacity that Resource g is qualified to provide in month m;

AUF_{gm} *(Average Unavailability Factor$_{gm}$)* is the derating factor calculated for Resource g that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month m;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource g for month m established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource g which is applicable for month m, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month m is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month m is part of a Winter Capability Period; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

If month m is in the Winter Capability Period, then *Average Unavailability Factor$_{gm}$* will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for Resource g. If month m is in the Summer Capability Period, then *Average*

Unavailability Factor$_{gm}$ will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for Resource *g*.

The Unavailability Factor value for Resource *g* for the 6-month period ending in any given month *n* that is used in the calculation of *Average Unavailability Factor$_{gm}$*, will be calculated as follows:

Where: $$\textbf{Unavailability Factor}_{gn} = 1 - \left(\frac{\textit{Total Available ICAP Seconds}_{gn}}{\textit{Total Expected ICAP Seconds}_{gn}}\right)$$

Total Available ICAP Seconds$_{gn}$ is the sum of *Total Available ICAP Seconds$_{gh}$* for each of the 6-month Winter Capability Period or Summer Capability Period;

Total Expected ICAP Seconds$_{gn}$ is the sum of seconds in all real-time intervals in the 6-month Winter Capability Period or Summer Capability Period in which Generator *g* was not on a planned or scheduled outage;

Where: **Total Available ICAP Seconds$_{gn}$ and Total Expected ICAP Seconds$_{gn}$ are further defined below:**

$$Total\ Available\ ICAP\ Seconds_{gn} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{gh}$$

$$Total\ Expected\ ICAP\ Seconds_{gn} = \sum_{h=b}^{e} Total\ Expected\ Monthly\ Seconds_{gh}$$

Where:

Total Available ICAP Seconds$_{gh}$ is the sum of the Available ICAP Seconds on a monthly basis for each month *h* in the appropriate 6-month Capability Period;

Total Expected Monthly Seconds$_{gh}$ is the sum of seconds in all real-time intervals in month *h* in which Resource *g* was not on a planned or scheduled outage;

b is the beginning month in the 6-month Capability Period (e.g. May for a Summer Capability Period, or November for a Winter Capability Period);

e is the last month in the 6-month Capability Period (e.g. October for a Summer Capability Period or April for Winter Capability Period); and

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window.

Total Available ICAP Seconds$_{gh}$ and Total Expected Monthly Seconds$_{gh}$ are further defined below:

Where: **Total Available ICAP Seconds$_{gh}$ and Total Expected Monthly Seconds$_{gh}$ are further defined below:**

$$\textbf{\textit{Total Available ICAP Seconds}}_{gh}$$

$$= \sum_{i=x}^{y} \left(\textbf{\textit{min}} \left(\textbf{1}, \textbf{\textit{UOL Availability}}_{gi}, \; \textbf{\textit{Storage Availability}}_{gi}, \textbf{\textit{Energy Level Availability}}_{gi} \right) \right.$$
$$\left. * \textbf{\textit{Interval Seconds}}_{gi} \right)$$

$$\textbf{\textit{Total Expected Monthly Seconds}}_{gh} = \sum_{i=x}^{y} \textbf{\textit{Interval Seconds}}_{gi}$$

Where:

UOL Availability$_{gi}$ measures the ratio of Resource *g's* UOL_N that is available for a given interval *I* to the ICAP equivalent of UCAP sold;

Storage Availability$_{gi}$ measures the ratio of Resource *g's* real-time storage limits to the ICAP equivalent of storage sold for a given interval *I*;

Energy Level Availability$_{gi}$ measures the ratio of Resource *g's* real-time Energy Level at the first interval *I* of hour *r* during the applicable ICAP Obligation Hours to the sum of its *DAM Energy*$_{gr}$ and *DAM Reserves*$_{gr}$ schedule for hour *r*. *Energy Level Availability*$_{gi}$ will be applicable to all real-time intervals *I* occurring within hour *r*. If Resource *g* is adjusted due to a NYISO or TO reliability need, *Energy Level Availability*$_{gi}$ will be 100% for all remaining real-time intervals *I* of the applicable day;

Interval Seconds$_{gi}$ is the number of seconds in each real-time interval *I* for Resource *g* in month *h* during the applicable ICAP Obligation Hours*,* except for real-time intervals *I* when Resource *g* is fully unavailable due to a planned or maintenance outage, *Interval Seconds*$_{gi}$ will be set to zero (0)*;*

x is the first real-time interval in month *h*; and

y is the last real-time interval in month *h.*

Where: **UOL Availability**$_{gi}$**, Storage Availability**$_{gi}$**, and Energy Level Availability**$_{gi}$ **are further defined below:**

$$UOL\ Availability_{gi} = \frac{\min(UOL_{Ngi}, ICE_{gh})}{\min(ICE_{gh}, Adjusted\ ICE_{gi})}$$

$$Storage\ Availability_{gi}$$
$$= \frac{\min\big((USL_{gi} - LSL_{gi}), (Energy\ Duration\ Limitation_g * ICE_{gh})\big)}{\min\big((Energy\ Duration\ Limitation_g * ICE_{gh}), Adjusted\ Storage_{gi}\big)}$$

$$Energy\ Level\ Availability_{gi}$$

$$= \begin{cases} 100\%, & \text{if } Committed\ Energy\ Level_{gr} = 0 \\ \dfrac{Energy\ Level_{gr}}{Committed\ Energy\ Level_{gr}}, & \text{otherwise,} \end{cases}$$

Where:

$$Committed\ Energy\ Level_{gr} = DAM\ Energy_{gr} + DAM\ Reserves_{gr}$$

And:

UOL_{Ngi} is the Normal Upper Operating Limit for Resource g that is available to the Real-Time Market system, measured in MW. For real-time intervals I when Resource g is adjusted down due to a NYISO or TO reliability need, the UOL_{Ngi} will be set equal to the Resource's Bid UOL;

ICE_{gh} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month h, measured in MW;

Adjusted ICE_{gi} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies for real-time interval I, accounting for any derates that result from planned and maintenance outages while Resource g remains available for operation, measured in MW;

USL_{gi} is the Upper Storage Limit of Resource g for each real-time interval I, measured in MWh;

LSL_{gi} is the Lower Storage Limit of Resource g for each real-time interval I, measured in MWh;

Adjusted Storage$_{gi}$ is the storage capability of Resource g for real-time interval I, accounting for any derates that result from planned and maintenance outages while Resource g remains available for operation, measured in MWh;

Committed Energy Level$_{gr}$ is the sum of Resource g's *DAM Energy* and *DAM Reserves* schedule for the hour r during the applicable ICAP Obligation Hours, measured in MWh. *Committed Energy Level*$_{gr}$ will be evaluated for each hour r and applicable to all real-time intervals I within that hour;

Energy Level$_{gr}$ is the Energy Level for Resource g that is available to the Real-Time Market system at the start of hour r during the applicable ICAP Obligation Hours, measured in MWh. *Energy Level*$_{gr}$ will be evaluated for each hour r and applicable to all real-time intervals I within that hour;

DAM Energy$_{gr}$ is Resource g's Day Ahead Market (DAM) Energy schedule for the hour r during the applicable ICAP Obligation Hours that contains real-time interval I, measured in MW; and

DAM Reserves$_{gr}$ is Resource g's total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour r during the applicable ICAP Obligation Hours that contains real-time interval I, measured in MW.

(k) **Determining the ICE of the Amount of UCAP Supplied**

$$ICE_{gm} = \frac{UCAP^P_{gm}}{(1 - AUF_{gm}) * Capacity\ Accreditation\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

AUF_{gm} *(Average Unavailability Factor$_{gm}$)* as above, is the derating factor calculated for Resource *g* that will be used to determine the amount of Unforced Capacity that resource will be permitted to provide in month *m*; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource *g* which is applicable for month *m*, pursuant to Section 7.2 of this ICAP Manual.

6.8.   Calculation of UCAP for Generators participating as Co-located Storage Resources

This Section describes the procedure for calculating Unforced Capacity values for Generators that are participating in the NYISO Installed Capacity market as Co-located Storage Resources.

6.8.1   Procedure for calculating Unforced Capacity values for an Intermittent Power Resource that is participating in the NYISO Installed Capacity market as Co-located Storage Resources

(l) **Definitions**

For purposes of this Section 6.8:

"Summer Peak Hours" means the Peak Load Window hours for the applicable Summer Capability Period, posted to the NYISO Capacity Accreditation web page in accordance with Section 7.3 of this *ICAP Manual,* during the three-month period from June 1 through August 31, inclusive.

"Winter Peak Hours" means the Peak Load Window hours for the applicable Winter Capability Period, posted to the NYISO Capacity Accreditation web page in accordance with Section 7.3of this *ICAP Manual,* during the three-month period from December 1 through the last day of February.

(m) **Determining the Amount of UCAP an Intermittent Power Resource participating as a Co-located Storage Resource Qualifies to Supply**

Generally, the calculation of Unforced Capacity for an Intermittent Power Resource, participating as Co-located Storage Resource, for a particular Capability Period is based on three components: 1) the minimum of the Resource's nameplate capacity and Capacity Resource Interconnection Service value, 2) the resource specific derating factor, and 3) the Resource's assigned Capacity Accreditation Factor. For facilities with less than sixty (60) days of historic operating data in the Prior Equivalent Capability Period, the initial Unforced Capacity will be calculated according to Section 4.5 of the Installed Capacity Manual.

$$UCAP^Q_{gm} = min(NC_{gm}, CRIS_{gm}) * (1 – RSDF_{gm}) * Capacity\ Accreditation\ Factor_{gm},$$

Where:

$UCAP^Q_{gm}$ is the amount of Unforced Capacity that Resource *g* is qualified to provide in month *m*;

NC_{gm} is the nameplate capacity of Resource *g* that is applicable when determining the amount of Unforced Capacity that Resource *g* is qualified to provide in month *m*;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource *g* for month *m* established pursuant to the applicable deliverability requirements of NYISO OATT;

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource *g* which is applicable for month *m*, pursuant to Section 7.2 of this ICAP Manual;

$RSDF_{gm}$ is the resource specific derating factor of Resource g that is applicable when determining the amount of Unforced Capacity that Resource g is qualified to provide in month m. Until there are at least three (3) Resources within NYCA that comprise a single Capacity Accreditation Resource Class with at least sixty (60) days of historic operating data in the Prior Equivalent Capability Period Peak Load Window, Resources in that Capacity Accreditation Resource Class will have a derating factor of zero. The $RSDF_{gm}$ compares the *Average Capacity Factor_{gm}* of Resource g for month m to the *Average Capacity Factor_{rm}* for month m of the Representative Unit r used to calculate the *Capacity Accreditation Factor_{gm}*. The $RSDF_{gm}$ for Resource g for month m will be calculated using one of two approaches, as indicated below, in order to minimize the difference between $UCAP^Q_{gm}$ and the Adjusted Installed Capacity of Resource g for month m.

If $| ACFD_{gm} | < | CAF_{gm} * (1 - ACFR_{gm}) |$, then $RSDF_{gm} = \frac{-ACFD_{gm}}{CAF_{gm}}$; otherwise, $RSDF_{gm} = 1 - ACFR_{gm}$.

> **Where:**

CAF_{gm} is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual;

$ACFD_{gm}$ is the average capacity factor difference of Resource g for month m. $ACFD_{gm}$ is calculated as:

$$ACFD_{gm} = \textit{Average Capacity Factor}_{gm} - \textit{Average Capacity Factor}_{rm}$$

$ACFR_{gm}$ is the average capacity factor ratio of Resource g for month m. $ACFR_{gm}$ is calculated as:

$$ACFD_{gm} = \frac{\textit{Average Capacity Factor}_{gm}}{\textit{Average Capacity Factor}_{rm}}$$

Average Capacity Factor_{gm} is the average capacity factor for Resource g for month m, which is calculated according to section (c) below; and

Average Capacity Factor_{rm} is the average capacity factor for the Representative Unit r used to calculate the *Capacity Accreditation Factor_{gm}* for month m. The *Average Capacity Factor_{rm}* is calculated according to section (c) below.

(c)   Determining the Average Capacity Factors for Intermittent Power Resources participating as Co-located Storage Resources

The *Average Capacity Factor_{gm}* for an Intermittent Power Resource g participating as a Co-located Storage Resource for month m will be calculated by averaging the value of *Capacity Factor_{gh}* for all occurrences of Peak Hour h contained within $CPPH_{gm}$. The calculation of *Average Capacity Factor_{gm}* is further defined below:

$$\textit{Average Capacity Factor}_{gm} = \frac{1}{H}\sum_{h \in CPPH_{gm}} \textit{Capacity Factor}_{gh}$$

> **Where:**

$CPPH_{gm}$ is the set of all Summer Peak Hours during the two most recent Summer Capability Periods preceding the Capability Period containing month m (if month m is part of a Summer Capability Period) during which Resource g was available for commercial operation, or the set of all Winter Peak

Hours during the two most recent Winter Capability Periods preceding the Capability Period containing month m (if month m is part of a Winter Capability Period) during which Resource g was available for commercial operation.

H is the total number of hours in CPPH$_{gm}$.

The *Capacity Factor$_{gh}$* for an IPR in a CSR will be considered on a real-time intervals basis. The Capacity Factor for a given interval is the ratio of (1) the minimum of the Resource's output and the real-time CSR Injection Scheduling Limit to (2) the minimum of the Resource's nameplate capacity and registered CSR Injection Scheduling Limit. The hourly Capacity Factor is the summation of all of the individual interval capacity factors multiplied by its corresponding interval weighting.

Capacity Factor$_{gh}$ is calculated as follows;

$$Capacity\ Factor_{gh} = \sum_{i \in h} \omega_i \left(\frac{\min(E_{gi},\ IL_{Ngi})}{\min(NC_{gi},\ IL_{Pgi})} \right)$$

Where:

E_{gi} is the amount of energy delivered to the NYCA transmission system by Resource g during interval i;

IL_{Ngi} is the Injection Scheduling Limit for <u>the CSR that includes</u> Resource g for RTD interval i ;

NC_{gi} is the nameplate capacity of Resource g that was applicable when determining the amount of Unforced Capacity that Resource g was qualified to provide during interval i;

IL_{Pgi} is the registered Physical Injection Scheduling Limit for <u>the CSR that includes</u> Resource g for RTD interval i; and

ω_i is the fraction of hour h that is included in interval i.

The average capacity factor for a Representative Unit r for month m will be calculated according to equation (b) below. Until there are at least three (3) Resources within a capacity zone that comprise a single Capacity Accreditation Resource Class with at least sixty (60) days of historic operating data in the Prior Equivalent Capability Period Peak Load Window, the Average Capacity Factor of the Representative Unit will consider the total amount of energy delivered to the NYCA transmission system by existing units in other capacity zone(s) within the same Capacity Accreditation Resource Class.

$$\text{(a)}\ \textbf{\textit{Average Capacity Factor}}_{rm} = \frac{1}{H} \sum_{h \in CPPH_m} \frac{E_{rh}}{NC_{rh}}$$

Where:

$CPPH_m$ is the set of all Summer Peak Hours during the two most recent Summer Capability Periods preceding the Capability Period containing month m (if month m is part of a Summer Capability Period), or the set of all Winter Peak Hours during the two most recent Winter

Capability Periods preceding the Capability Period containing month m (if month m is part of a Winter Capability Period);

H is the total number of hours in $CPPH_m$;

E_{rh} is the total amount of energy delivered to the NYCA transmission system by all Resources operating in hour h that 1) meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Resource g is assigned for month m and 2) are located in the same capacity region (*i.e.,* Rest of State, G-J Locality (excluding Load Zone J), NYC Locality, or Long Island Locality) as Resource g if at least three units are existing Installed Capacity Suppliers; in Seasons in which there are less than three units that meet (1) and (2), the total amount of energy delivered to the NYCA transmission system by all Resources in NYCA operating in hour h that meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Resource g is assigned for month m; and

NC_{rh} is the sum of the nameplate capacity of all Resources operating in hour h that 1) meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Resource g is assigned for month m and 2) are located in the same capacity region (*i.e.,* Rest of State, G-J Locality (excluding Load Zone J), NYC Locality, or Long Island Locality) as Resource g if at least three units are existing Installed Capacity Suppliers; in Seasons in which there are less than three units that meet (1) and (2), the total amount of energy delivered to the NYCA transmission system by all Resources in NYCA operating in hour h that meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Resource g is assigned for month m.

(d) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP^P_{gm}}{(1 - RSDF_{gm}) * Capacity\ Accreditation\ Factor_{gm}}$$

Where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource g supplies in month m;

$UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource g supplies in month m;

$RSDF_{gm}$ is the resource specific derating factor of Resource g that is applicable when determining the amount of Unforced Capacity that Resource g is qualified to provide in month m; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource g which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual.

6.8.2 **Procedure for calculating Unforced Capacity values for an Energy Storage Resource that is participating in the NYISO Installed Capacity Market as Co-located Storage Resources**

Unforced Capacity for an Energy Storage Resource that is participating in the NYISO Installed Capacity Market as part of a Co-located Storage Resource will be calculated in accordance with the procedure described in Section 6.7 of this Installed Capacity Manual Attachment J for the AUF_{gm} (*Average Unavailability Factor$_{gm}$*), with the amendments described below.

(a) Determining the Amount of UCAP a Co-Located Energy Storage Resource Qualifies to Supply

$$UCAP_{gm}^{Q} = (1 - AILUF_{gm}) * (1 - ARUF_{gm}) * min(CRIS_{gm}, DMNC_{gm}) * Capacity\ Accreditation\ Factor_{gm};$$

Where:

$UCAP^{Q}_{gm}$ is the amount of Unforced Capacity that Resource *g* is qualified to provide in month *m*;

$AILUF_{gm}$ *(Average Injection Limit Unavailability Factor)* is the Injection Scheduling Limit (IL) derating factor for <u>the CSR that includes</u> Resource *g* that will be used to determine the amount of Unforced Capacity that Resource *g* will be permitted to provide in month *m;*

$ARUF_{gm}$ *(Average Resource Unavailability Factor)* is the derating factor calculated for Resource *g* that will be used to determine the amount of Unforced Capacity that Resource *g* will be permitted to provide in month *m*, and is calculated using the same equation that is used to calculate the value of AUF_{gm} in Section 6.7.2 of this Installed Capacity Manual Attachment J;

$CRIS_{gm}$ is the Capacity Resource Interconnection Service value for Resource *g* for month *m* established pursuant to the applicable deliverability requirements of NYISO OATT;

$DMNC_{gm}$ is the DMNC rating for Resource *g* which is applicable for month *m*, which shall be the most recent Summer DMNC rating for that Resource calculated in accordance with ISO procedures if month *m* is part of a Summer Capability Period, or the most recent Winter DMNC rating for the Resource calculated in accordance with ISO procedures if month *m* is part of a Winter Capability Period; and

Capacity Accreditation Factor$_{gm}$ is the Capacity Accreditation Factor for Resource *g* which is applicable for month *m*, pursuant to Section 7.2 of this ICAP Manual.

If month *m* is in the Winter Capability Period, then $AILUF_{gm}$ will be equal to the average of the two previous Winter Capability Period Unavailability Factor values calculated for Resource *g*. If month *m* is in the Summer Capability Period, then $AILUF_{gm}$ will be equal to the average of the two previous Summer Capability Period Unavailability Factor values calculated for Resource g.

The CSR Injection Scheduling Limit Unavailability Factor value for Resource *g* for the 6-month period ending in any given month *n* that is used in the calculation of <u>$AILUF_{gm}$</u> will be calculated as follows:

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

Where:

Total Available Injection Limit ICAP Seconds$_{gn}$ is the sum of Total Available ICAP Seconds$_{gh}$ for each of the 6- month Winter Capability Period or Summer Capability Period for the CSR that includes Resource *g*; and

Total Expected Injection Limit ICAP Seconds$_{gn}$ is the sum of seconds in all real-time intervals in the 6-month Winter Capability Period or Summer Capability Period in which the Point-of-Injection for the CSR that includes Resource *g* was not on a planned or scheduled outage.

Where: ***Total Available Injection Limit ICAP Seconds$_{gn}$ and Total Expected Injection Limit ICAP Seconds$_{gn}$ are further defined below:***

$$\textbf{Total Available Injection Limit ICAP Seconds}_{gn}$$

$$= \sum_{h=b}^{e} \textbf{Total Available Injection Limit ICAP Seconds}_{gh}$$

$$\textbf{Total Expected Injection Limit ICAP Seconds}_{gn}$$

$$= \sum_{h=b}^{e} \textbf{Total Expected Injection Limit ICAP Seconds}_{gh}$$

Where:

Total Available Injection Limit ICAP Seconds$_{gh}$ is the sum of the Available ICAP Seconds on a monthly basis for each month h for the CSR that includes Resource *g* in the appropriate 6-month Capability Period;

Total Expected Injection Limit ICAP Seconds$_{gh}$ is the sum of seconds in all real-time intervals in month *h* in which the Point-of-Injection for the CSR that includes Resource *g* was not on a planned or scheduled outage;

b is the beginning month in the 6-month Capability Period (e.g. May for a Summer Capability Period, or November for a Winter Capability Period); and

e is the last month in the 6-month Capability Period (e.g. October for a Summer Capability Period or April for Winter Capability Period).

Where: ***Total Available Injection Limit ICAP Seconds$_{gh}$ and Total Expected Injection Limit ICAP Seconds$_{gh}$ are further defined below:***

$$\textbf{Total Available Injection Limit ICAP Seconds}_{gh} \; = \; \sum_{i=x}^{y} \left(\textbf{\textit{min}} \left(\textbf{1}, \textbf{\textit{IL Availability}}_{gi} \right) \right)$$

$$Total\ Expected\ Injection\ Limit\ ICAP\ Seconds_{gh} = \sum_{i=x}^{y} Interval\ Seconds_{gi}$$

Where:

Total Available Injection Limit ICAP Seconds$_{gh}$ is the sum of the Available ICAP Seconds for the CSR that includes Resource *g* on a monthly basis for each interval *i* in a given month *h*;

IL Availability$_{gi}$ measures the ratio of the real-time Injection Scheduling Limit for the CSR that includes Resource *g* that is available for a given interval *i* to the registered CSR Physical Injection Scheduling Limit;

Interval Seconds$_{gi}$ is the number of seconds in each real-time interval *i* for the CSR that includes Resource *g* in month *h*, except for real-time intervals *i* when the Point-of-Injection is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{gi}$* will be set to zero (0);

x is the first real-time interval in month *h*; and

y is the last real-time interval in month *h*.

Where: **IL Availability$_{gi}$ is further defined below:**

$$IL\ Availability_{gi} = \frac{IL_{Ngi}}{IL_{Pgi}}$$

And:

IL$_{Ngi}$ is the Injection Scheduling Limit for the CSR that includes Resource *g* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when the Injection Scheduling Limit is adjusted down due to a NYISO or TO reliability need, the value of *IL$_{Ngi}$* will be set equal to the Resource's Bid CSR Injection Scheduling Limit; and

IL$_{Pgi}$ is the registered Physical Injection Scheduling Limit for the CSR that includes Resource g for RTD interval *i*.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{gm} = \frac{UCAP_{gm}^{P}}{\left(1 - AILUF_{gm}\right) * \left(1 - ARUF_{gm}\right) * Capacity\ Accreditation\ Factor_{gm}}$$

Where:

ICE$_{gm}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Resource *g* supplies in month *m*;

$UCAP^P_{gm}$ is the amount of Unforced Capacity that Resource *g* supplies in month *m*;

$AILUF_{gm}$ is the Injection Scheduling Limit (IL) derating factor of <u>the CSR that includes</u> Resource *g* that will be used to determine the amount of Unforced Capacity that Resource *g* will be permitted to provide in month *m;*

$ARUF_{gm}$ as above, is the derating factor calculated for Resource *g* that will be used to determine the amount of Unforced Capacity that Resource *g* will be permitted to provide in month *m*, as calculated using the same equation that is used to calculate the value of AUF_{gm} in Section 6.7.2 of this Installed Capacity Manual Attachment J; and

- *Capacity Accreditation Factor$_{gm}$* is the Capacity Accreditation Factor for Resource *g* which is applicable for month *m*, pursuant to Section 7.2 of this ICAP Manual. 'Single Resource Type' LESR Aggregations are not permitted to participate in the ISO-administered Capacity market.
  - o Please refer to the ICAP Manual and Services Tariff Section 5.12 for more information regarding the requirements applicable to DER when switching from one Aggregation to another. DER historic data is carried over when switching to a new Aggregation of the same 'type' as its previous Aggregation. DER availability data is replaced with the default class average for the given 'type' when the DER moves to an Aggregation of a new 'type.'

The following subsections outline the procedure for calculating the Unforced Capacity values for:

1. DER Aggregations without Demand Reduction capability and without an EDL (6.9.1)
2. DER Aggregations without Demand Reduction capability and with an EDL (6.9.2)
3. DER Aggregations with Demand Reduction capability without an EDL (6.9.3)
4. DER Aggregations with Demand Reduction capability with an EDL (6.9.4)
5. ESR Aggregations without an EDL (6.9.5)
6. ESR Aggregations with an EDL (6.9.6)
7. Generator Aggregations (EFORd based on GADS data) (6.9.7)
8. Energy Limited Resource (ELR) Aggregations (EFORd based on GADS data) (6.9.8)
9. Generator Aggregations (AOF based on GADS-equivalent data) (6.9.9)
10. Energy Limited Resource (ELR) Aggregations (AOF based on GADS-equivalent data) (6.9.10)
11. Intermittent Power Resource (IPR) Aggregations (6.9.11)

Additional information on Aggregations can be found in Market Administration and Control Area Services Tariff Section 4.1.10 and in the Aggregation Manual (https://www.nyiso.com/manuals-tech-bulletins-user-guides).

6.8.3 Procedure for calculating Unforced Capacity values for DER Aggregations without Demand Reduction and without an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - AUF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ 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* in month *m,* which is calculated by summing the ICAP MW values for all individual DER comprising the Aggregation.

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* in month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

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*;

Where:

$$AUF_{am} = \left(1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MW_{am}}\right)\right)$$

The Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all DER comprising the Aggregation.

ICAP MW$_{am}$ is the summation of each *ICAP MW*$_{dm}$ contribution in Aggregation *a* for month *m*,

Aggregation DER Contributions$_{am}$ is the sum of MW contributions from each individual DER *d* in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAPMW_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MW$_{dm}$ is the ICAP MW for each individual DER *d* which is applicable for month *m*, and is calculated as follows:

$$ICAP_{dm} = min\left(DMNC_{dm}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm}\right)$$

DMNC$_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER *d* for month *m*;

CRIS$_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER *d* for month *m*;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Injection capability of the DER *d*, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month *m*;

And:

AUF$_{dm}$ is the Seasonal Unavailability Factor value for the individual DER *d* in a given month *m*. If month *m* is in the Winter Capability Period, then *AUF*$_{dm}$ will be equal to the sum of *DER Contribution to Unavailability Factor*$_{dn}$ of the two previous Winter Capability Period values calculated for the DER *d*. If month *m* is in the Summer Capability Period, then *AUF*$_{dm}$ will be equal to the sum of *DER Contribution to Unavailability Factor*$_{dn}$ of the two previous Summer Capability Period values calculated for the DER *d*. *AUF*$_{dm}$ is calculated as follows:

$$AUF_{dm} = \sum_{n} DER\ Contribution\ to\ Unavailability\ Factor\ _{dn}$$

Where:

$$DER\ Contribution\ to\ Unavailability\ Factor\ _{dn}$$
$$= Unavailability\ Factor_{an} * \frac{DER\ to\ Aggregation\ Ratio_{dn}}{\sum_{n} DER\ to\ Aggregation\ Ratio\ _{dn}}$$

Where:

$$DER\ to\ Aggregation\ Ratio\ _{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}$$

Where:

DER Contribution to Unavailability Factor$_{dn}$ is the DER *d* contribution to Aggregation *a* in month *n*.

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation *a* that contains the DER *d* in month *n.*

DER to Aggregation Ratio$_{dn}$ is the ICAP MW for DER *d* in month *n* divided by the ICAP MW of Aggregation *a* that contains DER *d* in month *n.*

ICAP MW$_{dn}$ is the ICAP MW for each individual DER *d* which is applicable for month *n.*

ICAP MW$_{an}$ is the summation of each *ICAP MW$_{dn}$* contribution in Aggregation *a* for month *n.*

n represents each of the historical 12 months included in the two Winter Capability Periods preceding month *m*, if *m* is a month in the Winter Capability Period, and the two Summer Capability Periods preceding month *m*, if *m* is a month in the Summer Capability Period.

The Unavailability Factor value for each individual DER *d* for each month in the calculation of *AUF$_{dm}$,* will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds$_{an}$ for month *n*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and Total Expected ICAP Seconds$_{an}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour h in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour h in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability$_{ai}$, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the UOL$_{Nai}$ will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE$_{am}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

UCAP^{P}$_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF$_{am}$ (Average Unavailability Factor$_{am}$) as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.8.4 Procedure for calculating Unforced Capacity values for DER Aggregations without Demand Reduction and with an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 of consecutive sustained output from all individual DER comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation a which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual.*

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 when electing to time stack. When not electing to time stack, refer to the calculation for *AUF$_{am}$* in Section 6.9.1;

Where:

$$AUF_{am} = 1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MWh_{am}} \right)$$

ICAP MWh$_{am}$ is the summation of each *ICAP MWh$_{dm}$* contribution in Aggregation a for month m;

Aggregation DER Contributions$_{am}$ is the MWh contribution from all DERs d in Aggregation a for month m; and is calculated as follows:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MWh_{dm} \times (1 - AUF_{dm})$$

Where:

$ICAP\ MWh_{dm}$ is the contribution of each DER's ICAP MW in Aggregation a for month m, multiplied by the number of hours that the DER d will contribute to the Aggregation time-stacking.

Where:

ICAP MWh$_{dm}$ is further defined below:

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

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER d for month m; for an Aggregation that has an EDL and is time-stacking, the DMNC is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER d for month m;

Total Supply Declared Value $_{dm}$ is the MW amount reflecting the Total capability of the DER d, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month m;

Elected Timestacking hour(s) is the declared number of hours that a DER will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on the composite of DERs comprising the Aggregation.

AUF_{dm} is the Seasonal Unavailability Factor value for the individual DER d in a given month m. If month m is in the Winter Capability Period, then AUF_{dm} will be equal to the sum of *DER Contribution to Unavailability Factor$_{dn}$* of the two previous Winter Capability Period values calculated for the DER d. If month m is in the Summer Capability Period, then AUF_{dm} will be equal to the sum of *DER Contribution to Unavailability Factor$_{dn}$* of the two previous Summer Capability Period values calculated for the DER d. AUF_{dm} is calculated as follows:

$$AUF_{dm} = \sum_n DER\ Contribution\ to\ Unavailability\ Factor_{dn}$$

Where:

$$DER\ Contribution\ to\ Unavailability\ Factor_{dn} = Unavailability\ Factor_{an} * \frac{DER\ to\ Aggregation\ Ratio_{dn}}{\sum_n DER\ to\ Aggregation\ Ratio_{dn}}$$

Where:

$$DER\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MWh_{dn}}{ICAP\ MWh_{an}}, when\ time\ stacking\ or$$

$$DER\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}, when\ not\ time\ stacking$$

Where:

DER Contribution to Unavailability Factor $_{dn}$ is the DER d contribution to Aggregation a in month n.

Unavailability Factor$_{am}$ is the Unavailability Factor for Aggregation a that contains the DER d in month n.

DER to Aggregation Ratio$_{dn}$ is the ICAP MW for DER d in month n divided by the ICAP MW of Aggregation a that contains DER d in month n, when not time stacking.

DER to Aggregation Ratio$_{dn}$ is the ICAP MWh for DER d in month n divided by the ICAP MWh of Aggregation a that contains DER d in month n, when time stacking.

ICAP MWh$_{dn}$ is the contribution of each DER's ICAP MW in Aggregation a for month n, multiplied by the number of hours that the DER d will contribute to the Aggregation time-stacking.

ICAP MWh$_{an}$ is the summation of each *ICAP MWh*$_{dn}$ contribution in Aggregation a for month n,

ICAP MW$_{dn}$ is the ICAP MW for each individual DER d which is applicable for month n,

ICAP MW$_{an}$ is the summation of each *ICAP MW*$_{dn}$ contribution in Aggregation a for month n,

n represents each of the 12 months included in the previous two Capability Periods (summer or winter) depending on the value of *m.*

The Unavailability Factor value for each individual DER d for each month in the calculation of *AUF*$_{dm}$, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds of Aggregation a in month n;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time intervals in month n in which Aggregation a was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and *Total Expected ICAP Seconds*$_{an}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour h in the month n;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour h in the month n in which Aggregation a was not on a planned or scheduled outage;

b is the beginning hour of month n; and

e is the last hour of month *n*.

The measurement of UOL Unavailability for each DER *d* participating in a DER Aggregation with an EDL is a function of the hours corresponding to the Aggregation's duration limitation and the Day Ahead and Real Time schedules of the Aggregation. Please refer to ICAP Manual Section 4.5.

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y}(min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s *UOL$_N$* that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, Interval Seconds$_{ai}$ will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability$_{ai}$, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the *UOL$_{Nai}$* will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})}\right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF$_{am}$ (Average Unavailability Factor$_{am}$) as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.8.5 Procedure for calculating Unforced Capacity values for DER Aggregations with Demand Reduction without an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

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

Where:

$UCAP^{Q}_{am}$ 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* in month *m*, which is calculated by summing the ICAP MW values for all individual DER comprising the Aggregation.

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* in month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

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*;

Where:

$$AUF_{am} = \left(1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MW_{am}}\right)\right)$$

The Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all DER comprising the Aggregation.

ICAP MW_{am} is the summation of each *ICAP MW_{dm}* contribution in Aggregation *a* for month *m*,

Aggregation DER Contributions_{am} is the sum of MW contributions from each individual DER in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MW_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MW_{dm} is the summation of ICAP MW for each individual injection capable and demand reduction capable DER *d* which is applicable for month *m,* and is calculated uniquely for each DER depending on the capabilities of the DER:
4) If the DER is capable of only injection:

$$ICAP\ MW_{dm} = min(DMNC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm})$$

5) If the DER is capable of only demand reduction:

$$ICAP\ MW_{dm} = min(DMNC_{dm}, \ Total\ Supply\ Declared\ Value_{dm})$$

6) If the DER is capable of both injection and demand reduction:

$$ICAP\ MW_{dm} = min(Demand\ Reduction\ DMNC_{dm,},$$
$$Demand\ Reduction\ MW\ Declared\ Value_{dm}) +$$
$$min(Injection\ DMNC_{dm,}, CRIS_{dm}, Injection\ MW\ Declared\ Value_{dm})$$

Where:

DMNC_{dm} is the Demonstrated Maximum Net Capability for the individual DER *d* for month *m*;

CRIS_{dm} is the Capacity Resource Interconnection Service Value for the individual DER *d* for month *m*;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the total capability of the DER *d*, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month *m;*

Demand Reduction DMNC MW$_{dm}$ is the demonstrated amount of Demand Reduction only during a DMNC test by DER *d* for month *m;*

Demand Reduction MW Declared Value$_{dm}$ is the declared MW amount reflecting only the demand reduction capability of a DER *d* for month *m;*

Injection DMNC$_{dm}$ is the demonstrated amount of injection only during a DMNC test by DER *d* for month *m;*

Injection MW Declared Value$_{dm}$ is the declared MW amount reflecting only the injection capability of a DER *d* for month *m;*

And:

AUF$_{dm}$ is the Seasonal Unavailability Factor value for the individual DER *d* in a given month *m*. If month *m* is in the Winter Capability Period, then AUF$_{dm}$ will be equal to the sum of *DER Contribution to Unavailability Factor$_{dn}$* of the two previous Winter Capability Period values calculated for the DER *d*. If month *m* is in the Summer Capability Period, then AUF$_{dm}$ will be equal to the sum of *DER Contribution to Unavailability Factor$_{dn}$* of the two previous Summer Capability Period values calculated for the DER *d*. AUF$_{dm}$ is calculated as follows:

$$AUF_{dm} = \sum_n DER\ Contribution\ to\ Unavailability\ Factor_{dn}$$

Where:

$$DER\ Contribution\ to\ Unavailability\ Factor_{dn} = Unavailability\ Factor_{an} * \frac{DER\ to\ Aggregation\ Ratio_{dn}}{\sum_n DER\ to\ Aggregation\ Ratio_{dn}}$$

Where:

$$DER\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}$$

Where:

DER Contribution to Unavailability Factor$_{dn}$ is the DER d contribution to Aggregation *a* in month *n*.

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation *a* that contains the DER *d* in month *n*

DER to Aggregation Ratio$_{dn}$ is the ICAP MW for DER d in month *n* divided by the ICAP MW of Aggregation *a* that contains DER *d* in month *n*.

ICAP MW$_{dn}$ is the ICAP MW for each individual DER *d* which is applicable for month *n*.

ICAP MW$_{an}$ is the summation of each ICAP MW$_{dn}$ contribution in Aggregation *a* for month *n*.

n represents each of the 12 months included in the previous two Capability Periods (Summer or Winter) depending on the value of *m*.

The Unavailability Factor value for each individual DER *d* for each month in the calculation of AUF$_{dm}$, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds of Aggregation *a* in month *n*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time intervals in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *h* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability_{ai} measures the ratio of Aggregation *a*'s UOL_N that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds_{ai} is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds_{ai}* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability_{ai}, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL_{Nai} is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the *UOL_{Nai}* will be set equal to the Aggregation's Bid UOL;

ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP^P_{am}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} *(Average Unavailability Factor_{am})* as above, 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*;

Capacity Accreditation Factor_{am} as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.8.6 **Procedure for calculating Unforced Capacity values for DER Aggregations with Demand Reduction and with an EDL**

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^Q = (1 - AUF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ 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 of consecutive sustained output from all individual DER comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

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* when electing to time stack. When not electing to time stack, refer to the calculation for *AUF$_{am}$* in Section 6.9.3;

Where:

$$AUF_{am} = 1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MWh_{am}}\right)$$

ICAP MWh$_{am}$ is the summation of each *ICAP MWh$_{dm}$* contribution in Aggregation *a* for month *m*,

Aggregation DER Contributions$_{am}$ is the MWh contribution from all DERs in Aggregation *a* for month *m*; and is calculated as follows:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MWh_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MWh$_{dm}$ is the summation of ICAP MW for each individual injection capable and demand reduction capable DER *d* which is applicable for month *m,* and is calculated uniquely for each DER *d* depending on the capabilities of the DER:
1) If the DER is capable of only injection:

$$ICAP\ MW_{dm} = min(DMNC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm})$$

2) If the DER is capable of only demand reduction:

$$ICAP\ MW_{dm} = min(DMNC_{dm,},\ Total\ Supply\ Declared\ Value_{dm})$$

3) If the DER is capable of both injection and demand reduction:

$$ICAP\ MW_{dm} = min(Demand\ Reduction\ DMNC_{dm,},$$
$$Demand\ Reduction\ MW\ Declared\ Value_{dm}) +$$
$$min(Injection\ DMNC_{dm,}, CRIS_{dm}, Injection\ MW\ Declared\ Value_{dm})$$

To inform the following:
$$ICAP\ MWh = \ ICAP\ MW_{dm}\ x\ (Elected\ Timestacking\ hour(s))$$

Where:

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER *d* for month *m* based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER *d* for month *m;*

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Total capability of the DER *d*, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month *m;*

Demand Reduction DMNC MW$_{dm}$ is the demonstrated amount of Demand Reduction only during a DMNC test by DER *d* based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2 for month *m*.

Demand Reduction MW Declared Value$_{dm}$ is the declared MW amount reflecting only the demand reduction capability of a DER *d* for month *m*

Injection DMNC$_{dm}$ is the demonstrated amount of injection only during a DMNC test by DER *d* based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2 for month *m*.

Injection MW Declared Value$_{dm}$ is the declared MW amount reflecting only the injection capability of a DER *d* for month *m*

Elected Timestacking hour(s) is the declared number of hours that a DER will contribute to the Aggregation's total time stacked duration– value must be a whole number greater than or equal to 1.

AUF_{dm} is the Seasonal Unavailability Factor value for the individual DER *d* in a given month *m*. If month *m* is in the Winter Capability Period, then AUF_{dm} will be equal to sum of $DER\ Contribution\ to\ Unavailability\ Factor_{dn}$ of the two previous Winter Capability Period values calculated for the DER *d*. If month *m* is in the Summer Capability Period, then AUF_{dm} will be equal to sum of $DER\ Contribution\ to\ Unavailability\ Factor_{dn}$ of the two previous Summer Capability Period values calculated for the DER *d*. AUF_{dm} is calculated as follows:

$$AUF_{dm} = \sum_n DER\ Contribution\ to\ Unavailability\ Factor\ _{dn}$$

Where:

$$DER\ Contribution\ to\ Unavailability\ Factor\ _{dn}$$
$$= Unavailability\ Factor_{an} * \frac{DER\ to\ Aggregation\ Ratio_{dn}}{\sum_n DER\ to\ Aggregation\ Ratio\ _{dn}}$$

Where:

$$DER\ to\ Aggregation\ Ratio\ _{dn} = \frac{ICAP\ MWh_{dn}}{ICAP\ MWh_{an}}\ ,when\ time\ stacking\ or$$

$$DER\ to\ Aggregation\ Ratio\ _{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}\ ,\ when\ not\ time\ stacking$$

Where:

DER Contribution to Unavailability Factor $_{dn}$ is the DER d contribution to Aggregation a in month n.

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation a that contains the DER d in month n.

DER to Aggregation Ratio$_{dn}$ is the ICAP MW for DER d in month n divided by the ICAP MW of Aggregation a that contains DER d in month n, when not time stacking.

DER to Aggregation Ratio$_{dn}$ is the ICAP MWh for DER d in month n divided by the ICAP MWh of Aggregation a that contains DER d in month n, when time stacking.

ICAP MWh_{dn} is the contribution of each DER's ICAP MW in Aggregation a for month n, multiplied by the number of hours that the DER d will contribute to the Aggregation time-stacking.

ICAP MWh$_{an}$ is the summation of each ICAP MWh$_{dn}$ contribution in Aggregation a for month n.

ICAP MW$_{dn}$ is the ICAP MW for each individual DER d which is applicable for month n.

ICAP MW$_{an}$ is the summation of each ICAP MW$_{dn}$ contribution in Aggregation a for month n.

n represents each of the 12 months included in the previous two Capability Periods (Summer or Winter) depending on the value of m.

The Unavailability Factor value for each individual DER *d* for each month in the calculation of *AUF$_{dm}$*, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds of Aggregation *a* in month *n*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time intervals in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *h* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

 b is the beginning hour of month *n*; and

 e is the last hour of month *n*.

The measurement of UOL Unavailability for each DER *d* participating in a DER Aggregation with an EDL is a function of the hours corresponding to the Aggregation's duration limitation and the Day Ahead and Real Time schedules of the Aggregation. Please refer to ICAP Manual Section 4.5.

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability$_{ai}$, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the *UOL$_{Nai}$* will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE$_{am}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

UCAP$^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF$_{am}$ (Average Unavailability Factor$_{am}$) as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 a;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation a which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual*;

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;

Where:

$$AUF_{am} = \left(1 - \left(\frac{Aggregation\ ESR\ Contributions_{am}}{ICAPMW_{am}}\right)\right)$$

The Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all ESR comprising the Aggregation.

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation a for month m;*Aggregation ESR Contributions$_{am}$* is the MW contribution from all ESR d in Aggregation a for month m; and is calculated as follows:

Where:

$$Aggregation\ ESR\ Contributions_{am} = \sum_{d \in a_m} ICAPMW_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MW$_{dm}$ is the ICAP MW for each individual ESR d which is applicable for month m; and is calculated as follows:

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

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual ESR d for month m;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ESR d for month m;

Total Supply Declared Value $_{dm}$ is the MW amount reflecting the Injection capability of the ESR *d*, and may be equal to or less than the *ESR CRIS* or *ESR DMNC* for the month *m;*

And:

AUF$_{dm}$ is the Seasonal Unavailability Factor value for the individual ESR *d* in a given month *m*. If month *m* is in the Winter Capability Period, then *AUF$_{dm}$* will be equal to the sum of the *ESR Contribution to Unavailability Factor$_{dn}$* of the two previous Winter Capability Period values calculated for the ESR *d*. If month *m* is in the Summer Capability Period, then *AUF$_{dm}$* will be equal to the sum of the *ESR Contribution to Unavailability Factor$_{dn}$* of the two previous Summer Capability Period values calculated for the ESR *d* *AUF$_{dm}$* is calculated as follows:

$$AUF_{dm} = \sum_{n} ESR\ Contribution\ to\ Unavailability\ Factor\ _{dn}$$

Where

$$ESR\ Contribution\ to\ Unavailability\ Factor_{dn}$$
$$= Unavailability\ Factor_{an} * \frac{ESR\ to\ Aggregation\ Ratio_{dn}}{\sum_{n} ESR\ to\ Aggregation\ Ratio\ _{dn}}$$

Where

$$ESR\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}$$

Where:

ESR Contribution to Unavailability Factor$_{dn}$ is the ESR d contribution to Aggregation *a* in month *n*.

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation *a* that contains the ESR *d* in month *n*.

ESR to Aggregation Ratio$_{dn}$ is the ICAP MW for ESR *d* in month *n* divided by the ICAP MW of Aggregation *a* that contains ESR *d* in month *n*.

ICAP MW$_{dn}$ is the ICAP MW for each individual ESR *d* which is applicable for month *n*.

ICAP MW$_{an}$ is the summation of each *ICAP MW$_{dn}$* contribution in Aggregation *a* for month *n*.

n represents each of the 12 months included in the previous two Capability Periods (summer or winter) depending on the value of *m.*

The Unavailability Factor value for each individual ESR *d* for each month in the calculation of *AUF$_{dm}$*, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of *Total Available ICAP Seconds*$_{an}$ for each month *m*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where: *Total Available ICAP Seconds*$_{an}$ and *Total Expected ICAP Seconds*$_{an}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *i* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

Where: *Total Available ICAP Seconds*$_{ah}$ and *Total Expected ICAP Seconds*$_{ah}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah}$$
$$= \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}, LOL\ Availability_{ai}, Storage\ Availability_{ai}, Energy\ Level\ Availability_{ai})$$
$$\times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ai} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

LOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s LOL$_N$ that is available for a given interval *i* to the negative ICAP equivalent of UCAP sold;

Storage Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time storage limits to the ICAP equivalent of storage sold for a given interval *i*;

Energy Level Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time Energy Level at the first interval *i* of hour *r* to the sum of its *DAM Energy*$_{ar}$ and *DAM Reserves*$_{ar}$ schedule for hour *r*. *Energy Level Availability*$_{ai}$ will be applicable to all real-time intervals *i* occurring within hour *r*.

If Aggregation *a* is adjusted due to a NYISO or TO reliability need, *Energy Level Availability$_{ai}$* will be 100% for all remaining real-time intervals *i* of the applicable day;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: *UOL Availability$_{ai}$*, *LOL Availability$_{ai}$*, *Storage Availability$_{ai}$*, and *Energy Level Availability$_{ai}$* are further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

$$LOL\ Availability_{ai} = \frac{max(LOL_{Nai}, -ICE_{ah}, NWL_{ai})}{max(-ICE_{ai}, -Adjusted\ ICE_{ai}, NWL_{ai})}$$

$$Storage\ Availability_{ai} = \frac{min((USL_{ai} - LSL_{ai}), (24\ hours\ \times ICE_{ai})}{min((24\ hours\ \times ICE_{ai}), Adjusted\ Storage_{ai})}$$

$$Energy\ Level\ Availability_{ai} = \begin{cases} 100\%\ \text{if Committed Energy Level}_{ar} = 0 \\ \dfrac{\text{Energy Level}_{ar}}{\text{Committed Energy Level}_{ar}}, \text{otherwise,} \end{cases}$$

Where:

$$Committed\ Energy\ Level_{ar} = DAM\ Energy_{ar} + DAM\ Reserves_{ar}$$

And:

UOL_{Nai} is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the UOL_{Nai} will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i,* measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

LOL_{Nai} is the Normal Lower Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted up due to a NYISO or TO reliability need, the LOL_{Nai} will be set equal to the Aggregation's Bid LOL;

NWL$_{ai}$ is the Normal Withdrawal Limit that Aggregation *a* supplies in month containing interval *i* based on its withdrawal capabilities, accounting for any derates that result from

planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

USL_{ai} is the Upper Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

LSL_{ai} is the Lower Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

Adjusted Storage_{ai} is the storage capability of Aggregation *a* for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MWh;

Committed Energy Level_{ar} is the sum of Aggregation *a*'s *DAM Energy* and *DAM Reserves* schedule for the hour *r* containing interval *i*, measured in MWh. *Committed Energy Level_{ar}* will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

Energy Level_{ar} is the Energy Level for Aggregation *a* that is available to the Real-Time Market system at the start of the hour *r* containing interval *i*, measured in MWh. *Energy Level_{ar}* will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

DAM Energy_{ar} is Aggregation *a*'s Day Ahead Market (DAM) Energy schedule for the hour *r* that contains real-time interval *i*, measured in MW; and

DAM Reserves_{ar} is Aggregation *a*'s total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour *r* that contains real-time interval *i*, measured in MW.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

UCAP^{P}_{am} as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} (Average Unavailability Factor_{am}) as above, 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*;

Capacity Accreditation Factor_{am} as above, is the Capacity Accreditation Factor for Aggregation *a*, which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 of consecutive sustained output from all individual ESR comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual.*

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* when electing to time stack. When not electing to time stack, refer to the calculation for *AUF$_{am}$* in Section 6.9.5;

Where:

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

ICAP MWh$_{am}$ is the summation of each *ICAP MWh$_{dm}$* contribution in Aggregation *a* for month *m;*

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

$$Aggregation\ ESR\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MWh_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MWh$_{dm}$ is the summation of ICAP MW for each individual ESR *d* which is applicable for month *m*, multiplied by the number of hours that the ESR *d* will contribute to the Aggregation time-stacking, and is calculated as follows:

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

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual ESR *d* for month *m*; for an Aggregation that has an EDL and is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.:

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ESR d for month m;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Injection capability of the ESR d, 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 an ESR will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on all ESRs comprising the Aggregation.

AUF_{dm} is the Average Unavailability Factor value for the individual ESR d in a given month m. If month m is in the Winter Capability Period, then AUF_{dm} will be equal to the sum of *ESR Contribution to Unavailability Factor*$_{dn}$ of the two previous Winter Capability Period values calculated for the ESR d. If month m is in the Summer Capability Period, then AUF_{dm} will be equal to the sum of *ESR Contribution to Unavailability Factor*$_{dn}$ of the two previous Summer Capability Period values calculated for the ESR d. AUF_{dm} is calculated as follows:

$$AUF_{dm} = \sum_n ESR\ Contribution\ to\ Unavailability\ Factor\ _{dn}$$

Where:

$$ESR\ Contribution\ to\ Unavailability\ Factor\ _{dn} = Unavailability\ Factor_{an} * \frac{ESR\ to\ Aggregation\ Ratio_{dn}}{\sum_n ESR\ to\ Aggregation\ Ratio\ _{dn}}$$

Where:

$$ESR\ to\ Aggregation\ Ratio\ _{dn} = \frac{ICAP\ MWh_{dn}}{ICAP\ MWh_{an}}\ , when\ time\ stacking\ or$$

$$ESR\ to\ Aggregation\ Ratio\ _{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}\ , when\ not\ time\ stacking$$

Where:

ESR Contribution to Unavailability Factor $_{dn}$ is the ESR d contribution to Aggregation a in month n.

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation a that contains the ESR d in months n.

ESR to Aggregation Ratio$_{dn}$ is the ICAP MW for ESR d in month n divided by the ICAP MW of Aggregation a that contains ESR d in month n, when not time stacking.

ESR to Aggregation Ratio$_{dn}$ is the ICAP MWh for ESR *d* in month *n* divided by the ICAP MWh of Aggregation *a* that contains ESR *d* in month *n,* when time stacking.

ICAP MWh$_{dn}$ is the contribution of each ESR's ICAP MW in Aggregation *a* for month *n,* multiplied by the number of hours that the ESR *d* will contribute to the Aggregation time-stacking.

ICAP MWh$_{an}$ is the summation of each *ICAP MWh$_{dn}$* contribution in Aggregation *a* for month *n.*

ICAP MW$_{dn}$ is the ICAP MW for each individual ESR *d* which is applicable for month *n.*

ICAP MW$_{an}$ is the summation of each *ICAP MW$_{dn}$* contribution in Aggregation *a* for month *n.*

The Unavailability Factor value for each individual ESR *d* for each month in the calculation of *AUF$_{dm}$*, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of *Total Available ICAP Seconds$_{an}$* for each month *m*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where: *Total Available ICAP Seconds$_{an}$* and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *h* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah}$$
$$= \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}, Storage\ Availability_{ai}, Energy\ Level\ Availability_{ai})$$
$$\times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Storage Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time storage limits to the ICAP equivalent of storage sold for a given interval *i*;

Energy Level Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time Energy Level at the first interval *i* of hour *r* during the applicable ICAP Obligation Hours to the sum of its *DAM Energy$_{ar}$* and *DAM Reserves$_{ar}$* schedule for hour *r*. *Energy Level Availability$_{ai}$* will be applicable to all real-time intervals *i* occurring within hour *r*. If Aggregation *a* is adjusted due to a NYISO or TO reliability need, *Energy Level Availability$_{ai}$* will be 100% for all remaining real-time intervals *i* of the applicable day;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n* during the applicable ICAP Obligation Hours, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: *UOL Availability$_{ai}$*, *Storage Availability$_{ai}$*, and *Energy Level Availability$_{ai}$* are further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

$$Storage\ Availability_{ai} = \frac{min((USL_{ai} - LSL_{ai}), (Energy\ Duration\ Limitation_a \times ICE_{ai})}{min((Energy\ Duration\ Limitation_a \times ICE_{ai}), Adjusted\ Storage_{ai})}$$

$$Energy\ Level\ Availability_{ai} = \begin{cases} 100\% \text{ if Committed Energy Level}_{ar} = 0 \\ \dfrac{\text{Energy Level}_{ar}}{\text{Committed Energy Level}_{ar}}, \text{otherwise,} \end{cases}$$

Where:

$$Committed\ Energy\ Level_{ar} = DAM\ Energy_{ar} + DAM\ Reserves_{ar}$$

And:

UOL_{Nai} is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the UOL_{Nai} will be set equal to the Aggregation's Bid UOL;

ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i,* measured in MW;

Adjusted ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

USL_{ai} is the Upper Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

LSL_{ai} is the Lower Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

Adjusted Storage_{ai} is the storage capability of Aggregation *a* for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MWh;

Committed Energy Level_{ar} is the sum of Aggregation *a*'s *DAM Energy* and *DAM Reserves* schedule for the hour *i* during the applicable ICAP Obligation Hours, measured in MWh. *Committed Energy Level_{ar}* will be evaluated for each hour containing interval *i* and applicable to all real-time intervals *i* within that hour;

Energy Level_{ar} is the Energy Level for Aggregation *a* that is available to the Real-Time Market system at the start of the hour *r* during the applicable ICAP Obligation Hours, measured in MWh. *Energy Level_{ar}* will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

DAM Energy_{ar} is Aggregation *a*'s Day Ahead Market (DAM) Energy schedule for the hour *r* during the applicable ICAP Obligation Hours that contains real-time interval *i*, measured in MW; and

DAM Reserves_{ar} is Aggregation *a*'s total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour *r* during the applicable ICAP Obligation Hours that contains real-time interval *i*, measured in MW.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^P{}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} *(Average Unavailability Factor$_{am}$)* as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *a,* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.8.9   Procedure for calculating Unforced Capacity values for Generator Aggregations (EFORd based on GADS data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AEFORd_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 for month m which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation a which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual*.

AEFORd$_{am}$ (Average Equivalent Demand Forced Outage Rate$_{am}$) 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; The Average Equivalent Demand Forced Outage Rate applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all facilities comprising the Aggregation.

Where:

$$AEFORd_{am} = 1 - \left(\frac{Aggregation\ Facility\ Contributions_{am}}{ICAP\ MW_{am}}\right)$$

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation a for month m;

AggregationFacility Contributions$_{am}$ is the MW contribution from all facilities f in Aggregation a for month m; and is calculated as follows:

$$Aggregation\ Facility\ Contributions_{am} = \sum_{f \in a} ICAPMW_{fm} \times (1 - AEFORd_{fm})$$

Where:

ICAP MW$_{fm}$ is the ICAP MW for each individual facility f which is applicable for month m; and is calculated as follows:

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

DMNC$_{fm}$ is the Demonstrated Maximum Net Capability for the individual facility f for month m;

$CRIS_{fm}$ is the Capacity Resource Interconnection Service Value for the individual facility f for month m;

Total Supply Declared Value$_{fm}$ is the MW amount reflecting the Injection capability of the facility f for month m, and may be equal to or less than the *facility CRIS* or *facility DMNC* for the month m;

And:

$AEFORd_{fm}$ is the Average Equivalent Demand Forced Outage Rate for the individual facility f. The $AEFORd_{fm}$ value for each individual facility f for month m, will be calculated based on historic unavailability of the assets z comprising the facility f, weighted based on the nameplate MW values of each asset:

$$AEFORd_{fm} = \frac{\sum_{z \in f}(AEFORd_{zm} * NC_{zm})}{\sum_{z \in f}(NC_{zm})}$$

Where:

NC_{zm} is the nameplate capacity MW rating of asset z in month m

$AEFORd_{zm}$ is the Average Equivalent Demand Forced Outage Rate for asset z in for month m, calculated as follows:

$$AEFORd_{zm} = \frac{\sum_n EFORd_{zn}}{2}$$

Where:

$EFORd_{zn}$ is the Equivalent Demand Forced Outage Rate for asset z within facility f for the 6-month period ending in any given month n.

n represents each of the 6 month periods included in the previous two Capability Periods (Summer or Winter) depending on the value of m.

Where:

$$EFORd_{zn} = \frac{IST_{ze}}{6} \times \frac{f_{fzbe}FOH_{zbe} + f_{pzbe}(EFOH_{zbe} - FOH_{zbe})}{(SH_{zbe} + f_{fzbe}FOH_{zbe})} + \left(1 - \frac{IST_{ze}}{6}\right)CEFORd_z$$

f_{fzbe} and f_{pzbe} are further defined below and:

IST_{ze} is the number of months that asset z was in service during the 6-month Capability Period ending as of time e (IST_{ze} = 0 if asset z was not in service as of time e; IST_{ze} = 6 if asset z was in service for all months of the Capability Period;

FOH_{zbe} is the sum of all Full Forced Outage Hours reported for asset z for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 40-43 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{zbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for asset z for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$EFOH_{zbe} = \begin{cases} 0, \text{ if there were no outages for asset z during the} \\ \text{period beginning at time b and ending at time e; and} \\ \sum_{i \in OUTzbe} \dfrac{(NDC_{zi} - NAC_{zi})H_{zi}}{NDC_{zi}}, \text{ otherwise;} \end{cases}$$

OUT_{zbe} is the set of outages for asset z during the period beginning at time b and ending at time e;

NDC_{zi} is the Net Dependable Capacity for asset z during the applicable Peak Load Window applicable for outage i, submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

NAC_{zi} is the Net Available Capacity for asset z during the applicable for outage i, submitted in accordance with Attachment K, Event Record 01, columns 60-63;

And:

H_{zi} is the time accumulated for asset z during the applicable for outage i submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event);

SH_{zbe} is the sum of all Service Hours reported for asset z for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-19;

e is the end of the last month of the Capability Period;

b is the beginning of the first month of the Capability Period, unless the asset had not gone into service at that time, in which case b is the time at which that asset went into service;

$CEFORd_z$ is the class-equivalent EFORd calculated by the ISO for resources of the same class as asset z based on NERC class averages for similar resources. Where no similar resource exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{fzbe} = \frac{\dfrac{1}{r} + \dfrac{1}{T}}{\dfrac{1}{r} + \dfrac{1}{T} + \dfrac{1}{D}}$$

r is FOH_{zbe} divided by the total number of GADS Data Forced Outages reported for the period beginning at time b and ending at time e in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH$_{gbe}$) divided by the number of attempted starts reported for the period beginning at time b and ending at time e for asset z. RSH$_{zbe}$ is the sum of all Reserve Shutdown Hours reported for asset z for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 20-23;

D is the number of Service Hours (SH$_{zbe}$) divided by the number of successful starts reported for the period beginning at time b and ending at time e for asset z; and

$$f_{\text{pzbe}} = \frac{SH_{zbe}}{AH_{zbe}}$$

AH$_{zbe}$ is the sum of all Available Hours reported for asset z for the period beginning at time b and ending at time e in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 32-35.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

- If RSH < 1 then f_f =1;

- If SH = 0 then f_f = 1;

- If FOH = 0, set $1/r$ = 0 and calculate f_f per its equation; and

- If AH = 0 then f_p = 0

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP^P_{am}}{(1 - AEFORd_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m;

$UCAP^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation a supplies in month m;

$AEFORd_{am}$ *(Average Equivalent Demand Forced Outage Rate$_{am}$)* as above, 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;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation g which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual*.

6.8.10 Procedure for calculating Unforced Capacity values for Energy Limited Resource (ELR) Aggregations (EFORd based on GADS data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - AEFORd_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

UCAP$^{Q}_{am}$ 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* for month *m* which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

AEFORd$_{am}$ (Average Equivalent Demand Forced Outage Rate$_{am}$) is the Derating Factor calculated for Aggregation *a* during the applicable ICAP Obligation Hours that will be used to determine the amount of Unforced Capacity that an Aggregation will be permitted to provide in month *m*;

Where:

$$AEFORd_{am} = 1 - \left(\frac{Aggregation\ ELR\ Contributions_{am}}{ICAP\ MWh_{am}}\right)$$

The Average Equivalent Demand Forced Outage Rate applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all Energy Limited Resources (ELR) comprising the Aggregation.

ICAP MWh$_{am}$ is the summation of each ELR's ICAP MW contribution in Aggregation *a* for month *m*, multiplied by the number of hours that the ELR will contribute to the Aggregation time-stacking.

Aggregation ELR Contributions$_{am}$ is the MWh contribution from all Energy Limited Resources in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ ELR\ Contributions_{am} = \sum_{d \in a} ICAP\ MWh_{dm} \times (1 - AEFORd_{dm})$$

Where:

ICAP MWh$_{dm}$ is the summation of ICAP MWh for each individual ELR *d*, which is applicable for month *m*, and is calculated as follows:

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

DMNC $_{dm}$ is the Demonstrated Maximum Net Capability for the individual ELR d for month *m*; for an Aggregation that has an EDL and is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.

CRIS$_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ELR d for month *m*;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Injection capability of the ELR *d*, and may be equal to or less than the *ELR CRIS* or *ELR DMNC* for the month *m;*

Elected Timestacking hour(s) is the declared number of hours that an ELR will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Equivalent Demand Forced Outage Rate applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on all ELRs comprising the Aggregation.

And:

AEFORd$_{dm}$ is the Average Equivalent Demand Forced Outage Rate for the individual ELR *d*. The *AEFORd$_{dm}$* value for each individual ELR *d* for month *m*, will be calculated based on historic unavailability of the assets *z* comprising the ELR *d*, weighted based on the nameplate MW values of each asset:

$$AEFORd_{dm} = \frac{\sum_{z \in d}(AEFORd_{zm} * NC_{zm})}{\sum_{z \in d}(NC_{zm})}$$

Where:

NC$_{zm}$ is the nameplate capacity MW rating of asset *z* in month *m*

AEFORd$_{zm}$ is the Average Equivalent Demand Forced Outage Rate for asset z in for month *m*, calculated as follows:

$$AEFORd_{zm} = \frac{\sum_n EFORd_{zn}}{2}$$

Where:

EFORd$_{zn}$ is the Equivalent Demand Forced Outage Rate for asset *z* within ELR *d* for the 6-month period during the applicable ICAP Obligation Hours ending in any given month *n.*

n represents each of the 6 month periods during the applicable ICAP Obligation Hours included in the previous two Capability Periods (Summer or Winter) depending on the value of *m.*

Where:

$$AssetEFORd_{zn} = \frac{IST_{ze}}{6} \times \frac{f_{fzbe}FOH_{zbe} + f_{pzbe}(EFOH_{zbe} - FOH_{zbe})}{(SH_{zbe} + f_{fzbe}FOH_{zbe})} + \left(1 - \frac{IST_{ze}}{6}\right)CEFORd_z$$

f$_{fzbe}$ and f$_{pzbe}$ are further defined below and:

IST_{ze} is the number of months that asset z was in service during the 6-month Capability Period ending as of time e (IST_{ze} = 0 if asset z was not in service as of time e; IST_{ze} = 6 if asset z was in service for all months of the Capability Period;

FOH_{zbe} is the sum of all Full Forced Outage Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 40-43 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{zbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$EFOH_{zbe} = \begin{cases} 0, \text{ if there were no outages for asset z during the} \\ \quad \text{period beginning at time b and ending at time e; and} \\ \displaystyle\sum_{i \in OUTzbe} \frac{(NDC_{zi} - NAC_{zi})H_{zi}}{NDC_{zi}}, \text{ otherwise;} \end{cases}$$

OUT_{zbe} is the set of outages for asset z during the applicable ICAP Obligation Hours during the period beginning at time b and ending at time e;

NDC_{zi} is the Net Dependable Capacity for asset z during the applicable ICAP Obligation Hours applicable for outage i, submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

NAC_{zi} is the Net Available Capacity for asset z during the applicable ICAP Obligation Hours, applicable for outage i, submitted in accordance with Attachment K, Event Record 01, columns 60-63;

and

H_{zi} is the time accumulated for asset z during the applicable ICAP Obligation Hours applicable for outage i submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event);

SH_{zbe} is the sum of all Service Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-19;

e is the end of the last month of the Capability Period;

b is the beginning of the first month of the Capability Period, unless the asset had not gone into service at that time, in which case b is the time at which that asset went into service;

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the

ICAP Obligation Hours based on the ISO-adjusted Peak Load Window; and

$CEFORd_g$ is the class-equivalent EFORd calculated by the ISO for assets of the same class as asset z based on NERC class averages for similar assets. Where no similar assets exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{fzbe} = \frac{\frac{1}{r} + \frac{1}{T}}{\frac{1}{r} + \frac{1}{T} + \frac{1}{D}}$$

r is FOH_{zbe} divided by the total number of GADS Data Forced Outages reported for the period during the applicable ICAP Obligation Hours beginning at time b and ending at time e in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH_{gbe}) divided by the number of attempted starts reported for the period during the applicable ICAP Obligation Hours beginning at time b and ending at time e for asset z. RSH_{zbe} is the sum of all Reserve Shutdown Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 20-23;

D is the number of Service Hours (SH_{zbe}) divided by the number of successful starts reported for the period during the applicable ICAP Obligation Hours beginning at time b and ending at time e for asset z; and

$$f_{pzbe} = \frac{SH_{zbe}}{AH_{zbe}}$$

AH_{zbe} is the sum of all Available Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 32-35.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

- If (RSH < 1) then f_f =1;

- If (SH = 0) then f_f = 1;

- If $(1/r + 1/T + 1/D) = 0$ then f_f = 0;

- If [(# of FO occurrences = 0) or (FOH = 0)] then $1/r$ = 0;

- If [(RSH = 0) or (# of unit attempted starts = 0)] then $1/T$ = 0;

- If [(# of unit actual starts = 0) or (SH = 0)] then $1/D$ = 0;

- If AH = 0 then f_p = 0; and

- If (SH + (f_f x FOH)) = 0 then EFORd = 0.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP^P_{am}}{(1 - AEFORd_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^P{}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$AEFORd_{am}$ *(Average Equivalent Demand Forced Outage Rate$_{am}$)* as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual.*

6.8.11 Procedure for calculating Unforced Capacity values for Generator Aggregations (AOF based on GADS-equivalent data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - AOF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^Q{}_{am}$ 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* for month *m* which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual.*

AOF_{am} *(Average Outage 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*; The Average Outage Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all facilities comprising the Aggregation.

Where:

$$AOF_{am} = 1 - \left(\frac{Aggregation\ Facility\ Contributions_{am}}{ICAP\ MW_{am}} \right)$$

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation *a* for month *m*;

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

Where:

$$Aggregation\ Facility\ Contributions_{am} = \sum_{f \in a} ICAPMW_{fm} \times (1 - AOF_{fm})$$

Where:

ICAP MW$_{fm}$ is the ICAP MW for each individual facility *f* which is applicable for month *m*; and is calculated as follows:

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

DMNC$_{fm}$ is the Demonstrated Maximum Net Capability for the individual facility *f* for month *m*;

CRIS$_{fm}$ is the Capacity Resource Interconnection Service Value for the individual facility *f* for month *m*;

Total Supply Declared Value$_{fm}$ is the MW amount reflecting the Injection capability of the facility *f* for month *m*, and may be equal to or less than the *facility CRIS* or *facility DMNC* for the month *m*;

And:

AOF$_{fm}$ is the Average Outage Factor for the individual facility *f*. The *AOF$_{fm}$* value for each individual facility *f* for month *m*, will be calculated based on historic unavailability of the assets *z* comprising the facility *f*, weighted based on the nameplate MW values of each asset:

$$AOF_{fm} = \frac{\sum_{z \in f}(AOF_{zm} * NC_{zm})}{\sum_{z \in f}(NC_{zm})}$$

Where:

NC$_{zm}$ is the nameplate capacity MW rating of asset *z* in month *m*

AOF_{zm} is the Average Outage Factor for asset z in for month *m*, calculated as follows:

$$AOF_{zm} = \frac{\sum_n OF_{zn}}{2}$$

Where:

OF_{zn} is the Outage Factor for asset *z* within facility *f* for the 6-month period ending in any given month *n.*

n represents each of the 6 month periods included in the previous two Capability Periods (Summer or Winter) depending on the value of *m.*

$$OF_{zn} = \frac{IST_{ze}}{6} \times (1 - CF_{zbe}) + \left(1 - \frac{IST_{ze}}{6}\right)(1 - CCF_z)$$

IST_{ze} is the number of months that asset *z* had been in service as of time *e* (0 if asset *z* was not in service as of time *e*; 6 if asset *z* was in service for the full Capability Period;

CCF_z is the class-equivalent Capacity Factor for assets of the same class as asset *z* based on NERC class averages for similar assets. Where no similar asset exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{zbe} = \frac{NAG_{zbe}}{\sum_{i=B}^{E}(NDC_{zi}(PH_{zi} - POH_{zi} - MOH_{zi}))};$$

CF_{zbe} is the Capacity Factor for asset *z* for the period beginning at time *b* and ending at time *e*;

NAG_{zbe} is the Net Actual Generation for asset *a* for the period beginning at time *b* and ending at time *e*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 39-45;

NDC_{zi} is the Net Dependable Capacity for asset *z* for month *i*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

PH_{zi} is the Period Hours reported for asset *z* for month *i*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 56-59;

POH_{zi} is the Planned Outage Hours reported for asset *z* for month *i*. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 36-39;

MOH_{zi} is the Maintenance Outage Hours reported for asset *z* for month *i*. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 44-47;

b is the beginning of the first month of the Capability Period , unless the asset had not gone into service at that time, in which case *b* is the time at which that asset went into service;

e is the end of the last month of the Capability Period;

B is the month containing time *b*; and

E is the month containing time *e*.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP^P_{am}}{(1 - AOF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AOF_{am} *(Average Outage Factor$_{am}$)* as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.8.12 Procedure for calculating Unforced Capacity values for Energy Limited Resource (ELR) Aggregations (AOF based on GADS-equivalent data)

Starting with the 2024/2025 Capability Year, Installed Capacity Suppliers with Energy Duration Limitations that submit equivalent GADS data for their UCAP values will be evaluated during the applicable ICAP Obligation Hours for their UCAP values.

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - AOF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ 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* for month *m* which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

AOF$_{am}$ (Average Outage Factor$_{am}$) is the Derating Factor calculated for Aggregation *a* during the applicable ICAP Obligation Hours, that will be used to determine the amount of Unforced Capacity that an Aggregation will be permitted to provide in month *m*;

Where:

$$AOF_{am} = 1 - \left(\frac{Aggregation\ ELR\ Contributions_{am}}{ICAP\ MWh_{am}}\right)$$

The Average Outage Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all Energy Limited Resources (ELR) comprising the Aggregation.

ICAP MWh$_{am}$ is the summation of each ELR's ICAP MW contribution in Aggregation *a* for month *m*, multiplied by the number of hours that the ELR *d* will contribute to the Aggregation time-stacking.

Aggregation ELR Contributions$_{am}$ is the MW contribution from all Energy Limited Resources *d* in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ ELR\ Contributions_{am} = \sum_{d \in a} ICAP\ MWh_{dm} \times (1 - AOF_{dm})$$

Where:

ICAP MWh$_{dm}$ is the summation of ICAP MWh for each individual ELR *d*, which is applicable for month *m*, and is calculated as follows:

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

DMNC $_{dm}$ is the Demonstrated Maximum Net Capability for the individual ELR d for month *m*; for an Aggregation that has an EDL and is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.

CRIS$_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ELR d for month *m*;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Injection capability of the ELR *d*, and may be equal to or less than the *ELR CRIS* or *ELR DMNC* for the month *m*;

Elected Timestacking hour(s) is the declared number of hours that an ELR will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Outage Factor applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on all ELRs comprising the Aggregation.

And:

AOF_{dm} is the Average Outage Factor for the individual ELR d. The AOF_{dm} value for each individual ELR d for month m, will be calculated based on historic unavailability of the assets z comprising the ELR d, weighted based on the nameplate MW values of each asset:

$$AOF_{dm} = \frac{\sum_{z \in d}(AOF_{zm} * NC_{zm})}{\sum_{z \in d}(NC_{zm})}$$

Where:

NC_{zm} is the nameplate capacity MW rating of asset z in month m

AOF_{zm} is the Average Outage Factor for asset z in for month m, calculated as follows:

$$AOF_{zm} = \frac{\sum_n OF_{zn}}{2}$$

Where:

OF_{zn} is the Outage Factor for asset z within ELR d for the 6-month period during the ICAP Obligation Hours ending in any given month n.

n represents each of the 6 month periods during ICAP Obligation Hours included in the previous two Capability Periods (Summer or Winter) depending on the value of m.

Where:

$$OF_{zn} = \frac{IST_{ze}}{6} \times (1 - CF_{zbe}) + \left(1 - \frac{IST_{ze}}{6}\right)(1 - CCF_z)$$

IST_{ze} is the number of months that asset z had been in service as of time e (0 if generator g was not in service as of time e; 6 if asset z was in service for the full Capability Period;

CCF_z is the class-equivalent Capacity Factor for assets of the same class as asset z based on NERC class averages for similar assets. Where no similar asset exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{zbe} = \frac{NAG_{zbe}}{\sum_{i=B}^{E}(NDC_{zi}(PH_{zi} - POH_{zi} - MOH_{zi}))};$$

CF_{zbe} is the Capacity Factor for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e;

NAG_{zbe} is the Net Actual Generation for asset a during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 39-45;

NDC_{zi} is the Net Dependable Capacity for asset z for month i during the applicable ICAP Obligation Hours. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

PH_{zi} is the Period Hours reported for asset z for month i during the applicable ICAP Obligation Hours. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 56-59;

POH_{zi} is the Planned Outage Hours reported for asset z for month i during the applicable ICAP Obligation Hours. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 36-39;

MOH_{zi} is the Maintenance Outage Hours reported for asset z for month i during the applicable ICAP Obligation Hours. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 44-47;

b is the beginning of the first month of the Capability Period , unless the asset had not gone into service at that time, in which case b is the time at which that asset went into service;

e is the end of the last month of the Capability Period;

B is the month containing time b; and

E is the month containing time e.

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AOF_{am}) * (Capacity\ Accreditation\ Factor_{am})}\right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AOF_{am} *(Average Outage Factor$_{am}$)* as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

This section describes the general procedure for calculating Unforced Capacity values for Intermittent Power Resources, which include generators that depend on wind, solar, and landfill gas for their fuel. Also see Section 4.5 of this Manual and 5.12.6 of the Market Administration and Control Area Services Tariff.

(a) Definitions

For purposes of this sub-section 6.9.11:

"Summer Peak Hours" means the Peak Load Window hours for the applicable Summer Capability Period, posted to the NYISO Capacity Accreditation web page in accordance with Section 7.3 of this ICAP Manual, during the three-month period from June 1 through August 31, inclusive.

"Winter Peak Hours" means the Peak Load Window hours for the applicable Winter Capability Period, posted to the NYISO Capacity Accreditation web page in accordance with Section 7.3 of this ICAP Manual, during the three-month period from December 1 through the last day of February.

(b) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - RSDF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ is the amount of Unforced Capacity that Aggregation a is qualified to provide in month m;

$ICAP_{am}$ is the total ICAP of Aggregation a that is applicable when determining the amount of Unforced Capacity that Aggregation a is qualified to provide in month m;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation a which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual*.

$RSDF_{am}$ is the resource specific derating factor of Aggregation a that is applicable when determining the amount of Unforced Capacity that Aggregation a is qualified to provide in month m.

Where:

$$RSDF_{am} = \left(1 - \frac{Aggregation\ IPR\ Contributions_{am}}{ICAP\ MW_{am}}\right)$$

The Resource Specific Derating Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all IPR comprising the Aggregation.

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation a for month m,

Aggregation IPR Contributions$_{am}$ is the sum of MW contributions from each individual IPR d in Aggregation a for month m; and is calculated as follows:

Where:

$$Aggregation\ IPR\ Contributions_{am} = \sum_{d \in a_m} ICAP_{dm} \times (1 - RSDF_{dm})$$

Where:

$ICAP_{dm}$ is the ICAP MW for each individual IPR d which is applicable for month m, and is calculated as follows:

$$ICAP\ MW_{dm} = min(NC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm})$$

NC_{dm} is the nameplate capacity for the individual IPR d for month m;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual IPR d for month m;

$Total\ Supply\ Declared\ Value_{dm}$ is the MW amount reflecting the Injection capability of the IPR d, and may be equal to or less than the *IPR CRIS* or *IPR DMNC* for the month m;

And:

$RSDF_{dm}$ is the Seasonal Resource Specific Derating Factor value for the individual IPR d for month m, expressed as the sum of *IPR Contribution to RSDF$_{dn}$* for the applicable historic months of the applicable prior two like Capability Periods.

$$RSDF_{dm} = \sum_n IPR\ Contribution\ to\ RSDF_{dn}$$

Where:

$$IPR\ Contribution\ to\ RSDF_{dn} = RSDF_{an} * \frac{IPR\ to\ Aggregation\ Ratio_{dn}}{\sum_n IPR\ to\ Aggregation\ Ratio_{dn}}$$

Where:

$$IPR\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}$$

Where:

$IPR\ Contribution\ to\ RSDF_{dn}$ is the IPR d contribution to Aggregation a in month n.

$RSDF_{an}$ is the Aggregation specific derating factor for Aggregation a that contained the IPR d in month n;

$IPR\ to\ Aggregation\ Ratio_{dn}$ is the ICAP MW for IPR d in month n divided by the ICAP MW of Aggregation a that contains IPR d in month n.

$ICAP\ MW_{dn}$ is the ICAP MW for individual IPR d which is applicable for month n.

$ICAP\ MW_{an}$ is the summation of each $ICAP\ MW_{dn}$ contribution in Aggregation a for month n.

n represents each of the three months included in the previous two like Summer or Winter Peak Hours (December 1 through the last day of February, or June 1 through August 31, inclusive) depending on the value of m.

The $RSDF_{an}$ compares the Average Capacity Factor$_{an}$ of Aggregation a for month n to the Average Capacity Factor$_{rn}$ for month n of the Representative IPR r used to calculate the Capacity Accreditation Factor$_{am}$. The $RSDF_{an}$ for Aggregation a for month n will be calculated using one of two approaches, as indicated below, in order to minimize the difference between $UCAP_{am}^{Q}$ and the Adjusted Installed Capacity of Aggregation a for month m:

If $|\ ACFD_{an}| < |\ CAF_{am} * (1 - ACFR_{an})|$, then $RSDF_{an} = \frac{-ACDF_{an}}{CAF_{am}}$; otherwise, $RSDF_{an} = 1 - ACFR_{an}$.

Where:

CAF_{am} is the Capacity Accreditation Factor for Aggregation a which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual;

$ACFD_{an}$ is the average capacity factor difference of Aggregation a for month n. ACFD$_{an}$ is calculated as:

ACFD$_{an}$ = Average Capacity Factor$_{an}$ – Average Capacity Factor$_{rn}$

$ACFR_{an}$ is the average capacity factor ratio of Aggregation a for month n. ACFR$_{an}$ is calculated as:

$$ACFR_{an} = \frac{Average\ Capacity\ Factor_{an}}{Average\ Capacity\ Factor_{rn}}$$

Average Capacity Factor$_{an}$ is the average capacity factor for Aggregation a for month n, which is calculated according to section (I) below; and

Average Capacity Factor$_{rn}$ is the average capacity factor for the Representative IPR r used to calculate the *Capacity Accreditation Factor$_{am}$* for month m. The *Average Capacity Factor$_{rn}$* is calculated according to section (I) below.

(I) Determining the Average Capacity Factors for Intermittent Power Resources

The Average Capacity Factor for an Aggregation a for month n will be calculated according to equation (a) below.

$$\textbf{(a) Average Capacity Factor}_{an} = \frac{1}{H}\sum_{h=1}^{H \in CPPH_{an}} \frac{E_{ah}}{NC_{ah}}$$

Where:

$CPPH_{an}$ is the set of all Summer Peak Hours during the two most recent Summer Capability Periods preceding the Capability Period containing month m (if month m is part of a Summer Capability Period) during which Aggregation a was available for commercial operation, or the set of all Winter Peak Hours during the two most recent Winter Capability Periods preceding the Capability Period containing month m (if month m is part of a Winter Capability Period) during which Aggregation a was available for commercial operation;

H is the total number of hours in $CPPH_{an}$;

E_{ah} is the average amount of energy delivered to the NYCA transmission system by Aggregation a during hour h; and

NC_{ah} is the nameplate capacity of Aggregation a that was applicable when determining the amount of Unforced Capacity that Aggregation a was qualified to provide in hour h.

The Average Capacity Factor for a Representative IPR r for month n will be calculated according to equation (b) below.

$$\text{(b) } \boldsymbol{Average\ Capacity\ Factor_{rn}} = \frac{1}{H}\sum_{h=1}^{H \in CPPH_n}\frac{E_{rh}}{NC_{rh}}$$

Where:

$CPPH_n$ is the set of all Summer Peak Hours during the two most recent Summer Capability Periods preceding the Capability Period containing month m (if month m is part of a Summer Capability Period), or the set of all Winter Peak Hours during the two most recent Winter Capability Periods preceding the Capability Period containing month m (if month m is part of a Winter Capability Period);

H is the total number of hours in $CPPH_n$;

E_{rh} is the average amount of energy delivered to the NYCA transmission system by all Resources operating in hour h that 1) meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Aggregation a is assigned for month m and 2) are located in the same capacity region (i.e., Rest of State, G-J Locality (excluding Load Zone J), NYC Locality, or Long Island Locality) as Aggregation a; and

NC_{rh} is the sum of the nameplate capacity of all Resources operating in hour h that 1) meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Aggregation a is assigned for month m and 2) are located in the same capacity region (i.e., Rest of State, G-J Locality (excluding Load Zone J), NYC Locality, or Long Island Locality) as Aggregation a.

(c) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - RSDF_{am}) * (Capacity\ Accreditation\ Factor_{am})}\right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m;

UCAP$^p_{am}$ is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

RSDF$_{am}$ is the Resource specific derating factor calculated for Aggregation *a* that will be used to determine the amount of Unforced Capacity that Aggregation *a* will be permitted to provide in month *m*;

6.9   Calculation of UCAP for Aggregations

This Section describes the procedure for calculating Unforced Capacity values for Aggregations. Aggregations can either be 1) 'DER' Aggregations, which may be comprised of a heterogenous combination of technology types, or one or more Demand Side Resources, or 2) 'Single Resource Type' Aggregations ("SRT," henceforth referred to using the applicable technology-type classification, e.g., 'Solar Aggregation' or 'ESR Aggregation').

Aggregation Unforced Capacity adheres to the following formula:

$$Aggregation\ UCAPMW_{a,m}$$
$$= \left(Aggregation\ ICAP\ MW_{a,m} * Capacity\ Accreditation\ Factor_{am}\right) *$$
$$* \left(100\% - AggregationDeratingFactor_{a,m}\right)$$

As illustrated in the following sections, the inputs considered in an Aggregation's Unforced Capacity value calculation may vary depending on Aggregation Type, whether the Aggregation elects an Energy Duration Limitation ("EDL"), and whether the Aggregator chooses to 'time-stack' individual DER within an Aggregation to satisfy a minimum duration of 2,4, 6, or 8 hours for the Aggregation. Key concepts as applied throughout this section 6.9 include:

- Adjusted ICAP = Aggregation ICAP * CAF
- Capacity Accreditation Factor (CAF) is the Capacity Accreditation Factor expressed as a percentage, for an Aggregation *a* which is applicable for the month *m*, pursuant to Section 7.2.1 of this *ICAP Manual* and Section 5.12.14 of the *ISO Services Tariff.*
- An Aggregation's ICAP MW is the sum of all individual DER ICAP MWs for a given auction month. Importantly, the ICAP MW for each individual DER is a function of several variables, including:
  - Type of Aggregation in which the DER participates.
  - Demand Side Resource participation within the DER.
  - Time-stacking, dependent on the presence of an EDL.
  - DMNC MW
  - CRIS MW
  - Total Supply Declared Value MW
    - *This is not a tariff-defined term, it is used in the NYISO's Aggregation System to inform the total MW capability of an individual DER and ultimately the Aggregation – this value reflects the Demand Reduction, Injection, and Withdrawal capabilities of the individual DER, and may be less than or equal to the CRIS or DMNC for a given Capability Period.*
- Derating Factor – the Derating Factor for a given Aggregation is calculated consistent with the type of Aggregation. For 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 a 'Single Resource Type' Generator Aggregation. For Availability-based Aggregation types (DER; ESR) and capacity-factor-based Aggregation types (Wind, Solar, Landfill Gas), the Derating Factor calculation employs a MW-weighted Aggregation-level average. 'Single Resource Type' LESR Aggregations are not permitted to participate in the ISO-administered Capacity market.
  - Please refer to the ICAP Manual and Services Tariff Section 5.12 for more information regarding the requirements applicable to DER when switching from one Aggregation to another. DER historic data is carried over when switching to a new Aggregation of the same

‘type’ as its previous Aggregation. DER availability data is replaced with the default class average for the given ‘type’ when the DER moves to an Aggregation of a new ‘type.’

The following subsections outline the procedure for calculating the Unforced Capacity values for:

12. DER Aggregations without Demand Reduction capability and without an EDL (6.9.1)
13. DER Aggregations without Demand Reduction capability and with an EDL (6.9.2)
14. DER Aggregations with Demand Reduction capability without an EDL (6.9.3)
15. DER Aggregations with Demand Reduction capability with an EDL (6.9.4)
16. ESR Aggregations without an EDL (6.9.5)
17. ESR Aggregations with an EDL (6.9.6)
18. Generator Aggregations (EFORd based on GADS data) (6.9.7)
19. Energy Limited Resource (ELR) Aggregations (EFORd based on GADS data) (6.9.8)
20. Generator Aggregations (AOF based on GADS-equivalent data) (6.9.9)
21. Energy Limited Resource (ELR) Aggregations (AOF based on GADS-equivalent data) (6.9.10)
22. Intermittent Power Resource (IPR) Aggregations (6.9.11)

Additional information on Aggregations can be found in Market Administration and Control Area Services Tariff Section 4.1.10 and in the Aggregation Manual (https://www.nyiso.com/manuals-tech-bulletins-user-guides).

6.9.1 Procedure for calculating Unforced Capacity values for DER Aggregations without Demand Reduction and without an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 in month m, which is calculated by summing the ICAP MW values for all individual DER comprising the Aggregation.

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation a in month m, pursuant to Section 7.2 of this *ICAP Manual.*

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;

Where:

$$AUF_{am} = \left(1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MW_{am}}\right)\right)$$

The Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all DER comprising the Aggregation.

$ICAP\ MW_{am}$ is the summation of each $ICAP\ MW_{dm}$ contribution in Aggregation a for month m,

Aggregation DER Contributions$_{am}$ is the sum of MW contributions from each individual DER d in Aggregation a for month m; and is calculated as follows:

Where:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAPMW_{dm} \times (1 - AUF_{dm})$$

Where:

$ICAP\ MW_{dm}$ is the ICAP MW for each individual DER d which is applicable for month m, and is calculated as follows:

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

DMNC $_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER *d* for month *m*;

CRIS $_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER *d* for month *m*;

Total Supply Declared Value $_{dm}$ is the MW amount reflecting the Injection capability of the DER *d*, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month *m*;

And:

AUF $_{dm}$ is the Seasonal Unavailability Factor value for the individual DER *d* in a given month *m*. If month *m* is in the Winter Capability Period, then *AUF* $_{dm}$ will be equal to the sum of *DER Contribution to Unavailability Factor* $_{dn}$ of the two previous Winter Capability Period values calculated for the DER *d*. If month *m* is in the Summer Capability Period, then *AUF* $_{dm}$ will be equal to the sum of *DER Contribution to Unavailability Factor* $_{dn}$ of the two previous Summer Capability Period values calculated for the DER *d*. *AUF* $_{dm}$ is calculated as follows:

$$AUF_{dm} = \sum_{n} DER\ Contribution\ to\ Unavailability\ Factor\ _{dn}$$

Where:

$$DER\ Contribution\ to\ Unavailability\ Factor\ _{dn}$$
$$= Unavailability\ Factor_{an} * \frac{DER\ to\ Aggregation\ Ratio_{dn}}{\sum_{n} DER\ to\ Aggregation\ Ratio\ _{dn}}$$

Where:

$$DER\ to\ Aggregation\ Ratio\ _{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}$$

Where:

DER Contribution to Unavailability Factor $_{dn}$ is the DER *d* contribution to Aggregation *a* in month *n*.

Unavailability Factor $_{an}$ is the Unavailability Factor for Aggregation *a* that contains the DER *d* in month *n*.

DER to Aggregation Ratio $_{dn}$ is the ICAP MW for DER *d* in month *n* divided by the ICAP MW of Aggregation *a* that contains DER *d* in month *n*.

ICAP MW $_{dn}$ is the ICAP MW for each individual DER *d* which is applicable for month *n*.

ICAP MW $_{an}$ is the summation of each *ICAP MW* $_{dn}$ contribution in Aggregation *a* for month *n*.

n represents each of the historical 12 months included in the two Winter Capability Periods preceding month *m*, if *m* is a month in the Winter Capability Period, and the two Summer Capability Periods preceding month *m*, if *m* is a month in the Summer Capability Period.

The Unavailability Factor value for each individual DER *d* for each month in the calculation of AUF_{dm}, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds$_{an}$ for month *n*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and Total Expected ICAP Seconds$_{an}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour h in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour h in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

Where: *Total Available ICAP Seconds*$_{ah}$ and *Total Expected ICAP Seconds*$_{ah}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability$_{ai}$, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the UOL$_{Nai}$ will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})}\right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

UCAP$^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF$_{am}$ (Average Unavailability Factor$_{am}$) as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.9.2 Procedure for calculating Unforced Capacity values for DER Aggregations without Demand Reduction and with an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - AUF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ 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 of consecutive sustained output from all individual DER comprising the Aggregation;

$Capacity\ Accreditation\ Factor_{am}$ is the Capacity Accreditation Factor for Aggregation a which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual*.

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 when electing to time stack. When not electing to time stack, refer to the calculation for AUF_{am} in Section 6.9.1;

Where:

$$AUF_{am} = 1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MWh_{am}} \right)$$

ICAP MWh$_{am}$ is the summation of each *ICAP MWh$_{dm}$* contribution in Aggregation a for month m;

Aggregation DER Contributions$_{am}$ is the MWh contribution from all DERs d in Aggregation a for month m; and is calculated as follows:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MWh_{dm} \times (1 - AUF_{dm})$$

Where:

$ICAP\ MWh_{dm}$ is the contribution of each DER's ICAP MW in Aggregation a for month m, multiplied by the number of hours that the DER d will contribute to the Aggregation time-stacking.

Where:

ICAP MWh$_{dm}$ is further defined below:

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

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER d for month m; for an Aggregation that has an EDL and is time-stacking, the DMNC is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER d for month m;

Total Supply Declared Value $_{dm}$ is the MW amount reflecting the Total capability of the DER d, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month m;

Elected Timestacking hour(s) is the declared number of hours that a DER will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on the composite of DERs comprising the Aggregation.

AUF_{dm} is the Seasonal Unavailability Factor value for the individual DER d in a given month m. If month m is in the Winter Capability Period, then AUF_{dm} will be equal to the sum of *DER Contribution to Unavailability Factor*$_{dn}$ of the two previous Winter Capability Period values calculated for the DER d. If month m is in the Summer Capability Period, then AUF_{dm} will be equal to the sum of *DER Contribution to Unavailability Factor*$_{dn}$ of the two previous Summer Capability Period values calculated for the DER d. AUF_{dm} is calculated as follows:

$$AUF_{dm} = \sum_n DER\ Contribution\ to\ Unavailability\ Factor_{dn}$$

Where:

$$DER\ Contribution\ to\ Unavailability\ Factor_{dn} = Unavailability\ Factor_{an} * \frac{DER\ to\ Aggregation\ Ratio_{dn}}{\sum_n DER\ to\ Aggregation\ Ratio_{dn}}$$

Where:

$$DER\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MWh_{dn}}{ICAP\ MWh_{an}}, when\ time\ stacking\ or$$

$$DER\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}, when\ not\ time\ stacking$$

Where:

DER Contribution to Unavailability Factor $_{dn}$ is the DER d contribution to Aggregation a in month n.

Unavailability Factor$_{am}$ is the Unavailability Factor for Aggregation a that contains the DER d in month n.

DER to Aggregation Ratio$_{dn}$ is the ICAP MW for DER d in month *n* divided by the ICAP MW of Aggregation *a* that contains DER *d* in month *n,* when not time stacking.

DER to Aggregation Ratio$_{dn}$ is the ICAP MWh for DER d in month *n* divided by the ICAP MWh of Aggregation *a* that contains DER *d* in month *n,* when time stacking.

ICAP MWh$_{dn}$ is the contribution of each DER's ICAP MW in Aggregation *a* for month *n,* multiplied by the number of hours that the DER *d* will contribute to the Aggregation time-stacking.

ICAP MWh$_{an}$ is the summation of each *ICAP MWh*$_{dn}$ contribution in Aggregation *a* for month *n,*

ICAP MW$_{dn}$ is the ICAP MW for each individual DER *d* which is applicable for month *n,*

ICAP MW$_{an}$ is the summation of each *ICAP MW*$_{dn}$ contribution in Aggregation *a* for month *n,*

n represents each of the 12 months included in the previous two Capability Periods (summer or winter) depending on the value of *m.*

The Unavailability Factor value for each individual DER *d* for each month in the calculation of *AUF*$_{dm}$, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds of Aggregation *a* in month *n*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time intervals in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and *Total Expected ICAP Seconds*$_{an}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *h* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

The measurement of UOL Unavailability for each DER *d* participating in a DER Aggregation with an EDL is a function of the hours corresponding to the Aggregation's duration limitation and the Day Ahead and Real Time schedules of the Aggregation. Please refer to ICAP Manual Section 4.5.

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s *UOL$_N$* that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, Interval Seconds$_{ai}$ will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability$_{ai}$, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the *UOL$_{Nai}$* will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} (Average Unavailability Factor_{am}) as above, 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*;

Capacity Accreditation Factor_{am} as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.9.3 Procedure for calculating Unforced Capacity values for DER Aggregations with Demand Reduction without an EDL

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

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

Where:

$UCAP^{Q}_{am}$ 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* in month *m*, which is calculated by summing the ICAP MW values for all individual DER comprising the Aggregation.

Capacity Accreditation Factor_{am} is the Capacity Accreditation Factor for Aggregation *a* in month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

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*;

Where:

$$AUF_{am} = \left(1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MW_{am}}\right)\right)$$

The Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all DER comprising the Aggregation.

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation *a* for month *m*,

Aggregation DER Contributions$_{am}$ is the sum of MW contributions from each individual DER in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MW_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MW$_{dm}$ is the summation of ICAP MW for each individual injection capable and demand reduction capable DER *d* which is applicable for month *m*, and is calculated uniquely for each DER depending on the capabilities of the DER:

7) If the DER is capable of only injection:

$$ICAP\ MW_{dm} = min\left(DMNC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm}\right)$$

8) If the DER is capable of only demand reduction:

$$ICAP\ MW_{dm} = min(DMNC_{dm}, Total\ Supply\ Declared\ Value_{dm})$$

9) If the DER is capable of both injection and demand reduction:

$$ICAP\ MW_{dm} = min\left(Demand\ Reduction\ DMNC_{dm,}, Demand\ Reduction\ MW\ Declared\ Value_{dm}\right) + min\left(Injection\ DMNC_{dm,}, CRIS_{dm}, Injection\ MW\ Declared\ Value_{dm}\right)$$

Where:

DMNC$_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER *d* for month *m*;

CRIS$_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER *d* for month *m*;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the total capability of the DER *d*, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month *m;*

Demand Reduction DMNC MW$_{dm}$ is the demonstrated amount of Demand Reduction only during a DMNC test by DER *d* for month *m;*

Demand Reduction MW Declared Value$_{dm}$ is the declared MW amount reflecting only the demand reduction capability of a DER *d* for month *m;*

Injection DMNC$_{dm}$ is the demonstrated amount of injection only during a DMNC test by DER *d* for month *m;*

Injection MW Declared Value$_{dm}$ is the declared MW amount reflecting only the injection capability of a DER *d* for month *m;*

And:

AUF$_{dm}$ is the Seasonal Unavailability Factor value for the individual DER *d* in a given month *m*. If month *m* is in the Winter Capability Period, then AUF$_{dm}$ will be equal to the sum of *DER Contribution to Unavailability Factor$_{dn}$* of the two previous Winter Capability Period values calculated for the DER *d*. If month *m* is in the Summer Capability Period, then AUF$_{dm}$ will be equal to the sum of *DER Contribution to Unavailability Factor$_{dn}$* of the two previous Summer Capability Period values calculated for the DER *d*. AUF$_{dm}$ is calculated as follows:

$$AUF_{dm} = \sum_n DER\ Contribution\ to\ Unavailability\ Factor_{dn}$$

Where:

$$DER\ Contribution\ to\ Unavailability\ Factor_{dn} = Unavailability\ Factor_{an} * \frac{DER\ to\ Aggregation\ Ratio_{dn}}{\sum_n DER\ to\ Aggregation\ Ratio_{dn}}$$

Where:

$$DER\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}$$

Where:

DER Contribution to Unavailability Factor$_{dn}$ is the DER d contribution to Aggregation *a* in month *n*.

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation *a* that contains the DER *d* in month *n*

DER to Aggregation Ratio$_{dn}$ is the ICAP MW for DER d in month *n* divided by the ICAP MW of Aggregation *a* that contains DER *d* in month *n*.

$ICAP\ MW_{dn}$ is the ICAP MW for each individual DER d which is applicable for month n.

$ICAP\ MW_{an}$ is the summation of each $ICAP\ MW_{dn}$ contribution in Aggregation a for month n.

n represents each of the 12 months included in the previous two Capability Periods (Summer or Winter) depending on the value of m.

The Unavailability Factor value for each individual DER d for each month in the calculation of AUF_{dm}, will be calculated based on historic unavailability of the Aggregation:

Where:

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

$Total\ Available\ ICAP\ Seconds_{an}$ is the sum of Total Available ICAP Seconds of Aggregation a in month n;

$Total\ Expected\ ICAP\ Seconds_{an}$ is the sum of seconds in all real-time intervals in month n in which Aggregation a was not on a planned or scheduled outage;

Where:

$Total\ Available\ ICAP\ Seconds_{an}$ and $Total\ Expected\ ICAP\ Seconds_{an}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

$Total\ Available\ ICAP\ Seconds_{ah}$ is the sum of the Available ICAP Seconds for each hour h in the month n;

$Total\ Expected\ ICAP\ Seconds_{ah}$ is the sum of seconds in all real-time intervals for each hour h in the month n in which Aggregation a was not on a planned or scheduled outage;

b is the beginning hour of month n; and

e is the last hour of month n.

Where: $Total\ Available\ ICAP\ Seconds_{ah}$ and $Total\ Expected\ ICAP\ Seconds_{ah}$ are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability$_{ai}$, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the *UOL$_{Nai}$* will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE$_{am}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

UCAP$^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF$_{am}$ (Average Unavailability Factor$_{am}$) as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.9.4 **Procedure for calculating Unforced Capacity values for DER Aggregations with Demand Reduction and with an EDL**

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - AUF_{am}) * (ICAP_{\ am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ 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 of consecutive sustained output from all individual DER comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

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* when electing to time stack. When not electing to time stack, refer to the calculation for AUF_{am} in Section 6.9.3;

Where:

$$AUF_{am} = 1 - \left(\frac{Aggregation\ DER\ Contributions_{am}}{ICAP\ MWh_{am}} \right)$$

ICAP MWh$_{am}$ is the summation of each *ICAP MWh$_{dm}$* contribution in Aggregation *a* for month *m*,

Aggregation DER Contributions$_{am}$ is the MWh contribution from all DERs in Aggregation *a* for month *m*; and is calculated as follows:

$$Aggregation\ DER\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MWh_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MWh$_{dm}$ is the summation of ICAP MW for each individual injection capable and demand reduction capable DER *d* which is applicable for month *m*, and is calculated uniquely for each DER *d* depending on the capabilities of the DER:
4) If the DER is capable of only injection:

$$ICAP\ MW_{dm} = min(DMNC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm})$$

5) If the DER is capable of only demand reduction:

$$ICAP\ MW_{dm} = min(DMNC_{dm,},\ Total\ Supply\ Declared\ Value_{dm})$$

6) If the DER is capable of both injection and demand reduction:

$$ICAP\ MW_{dm} = min(Demand\ Reduction\ DMNC_{dm,},$$
$$Demand\ Reduction\ MW\ Declared\ Value_{dm}) +$$
$$min(Injection\ DMNC_{dm,}, CRIS_{dm}, Injection\ MW\ Declared\ Value_{dm})$$

To inform the following:
$$ICAP\ MWh = ICAP\ MW_{dm}\ x\ (Elected\ Timestacking\ hour(s))$$

Where:

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual DER *d* for month *m* based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual DER *d* for month *m;*

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Total capability of the DER *d*, and may be equal to or less than the *DER CRIS* or *DER DMNC* for the month *m;*

Demand Reduction DMNC MW$_{dm}$ is the demonstrated amount of Demand Reduction only during a DMNC test by DER *d* based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2 for month *m*.

Demand Reduction MW Declared Value$_{dm}$ is the declared MW amount reflecting only the demand reduction capability of a DER *d* for month *m*

Injection DMNC$_{dm}$ is the demonstrated amount of injection only during a DMNC test by DER *d* based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2 for month *m*.

Injection MW Declared Value$_{dm}$ is the declared MW amount reflecting only the injection capability of a DER *d* for month *m*

Elected Timestacking hour(s) is the declared number of hours that a DER will contribute to the Aggregation's total time stacked duration– value must be a whole number greater than or equal to 1.

AUF_{dm} is the Seasonal Unavailability Factor value for the individual DER *d* in a given month *m*. If month *m* is in the Winter Capability Period, then AUF_{dm} will be equal to sum of *DER Contribution to Unavailability Factor* $_{dn}$ of the two previous Winter Capability Period values calculated for the DER *d*. If month *m* is in the Summer Capability Period, then AUF_{dm} will be

equal to sum of *DER Contribution to Unavailability Factor $_{dn}$* of the two previous Summer Capability Period values calculated for the DER *d*. *AUF$_{dm}$* is calculated as follows:

$$AUF_{dm} = \sum_n DER\ Contribution\ to\ Unavailability\ Factor_{dn}$$

Where:

$$DER\ Contribution\ to\ Unavailability\ Factor_{dn}$$
$$= Unavailability\ Factor_{an} * \frac{DER\ to\ Aggregation\ Ratio_{dn}}{\sum_n DER\ to\ Aggregation\ Ratio_{dn}}$$

Where:

$$DER\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MWh_{dn}}{ICAP\ MWh_{an}}, when\ time\ stacking\ or$$

$$DER\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}, when\ not\ time\ stacking$$

Where:

DER Contribution to Unavailability Factor $_{dn}$ is the DER *d* contribution to Aggregation *a* in month *n*.

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation *a* that contains the DER *d* in month *n*.

DER to Aggregation Ratio$_{dn}$ is the ICAP MW for DER d in month *n* divided by the ICAP MW of Aggregation *a* that contains DER *d* in month *n*, when not time stacking.

DER to Aggregation Ratio$_{dn}$ is the ICAP MWh for DER d in month *n* divided by the ICAP MWh of Aggregation *a* that contains DER *d* in month *n*, when time stacking.

ICAP MWh$_{dn}$ is the contribution of each DER's ICAP MW in Aggregation *a* for month *n*, multiplied by the number of hours that the DER *d* will contribute to the Aggregation time-stacking.

ICAP MWh$_{an}$ is the summation of each *ICAP MWh$_{dn}$* contribution in Aggregation *a* for month *n*.

ICAP MW$_{dn}$ is the ICAP MW for each individual DER *d* which is applicable for month *n*.

ICAP MW$_{an}$ is the summation of each *ICAP MW$_{dn}$* contribution in Aggregation *a* for month *n*.

n represents each of the 12 months included in the previous two Capability Periods (Summer or Winter) depending on the value of *m*.

The Unavailability Factor value for each individual DER *d* for each month in the calculation of *AUF$_{dm}$*, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of Total Available ICAP Seconds of Aggregation *a* in month *n*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time intervals in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where:

Total Available ICAP Seconds$_{an}$ and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *h* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

The measurement of UOL Unavailability for each DER *d* participating in a DER Aggregation with an EDL is a function of the hours corresponding to the Aggregation's duration limitation and the Day Ahead and Real Time schedules of the Aggregation. Please refer to ICAP Manual Section 4.5.

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}) \times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: UOL Availability$_{ai}$, is further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

Where:

UOL$_{Nai}$ is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the *UOL$_{Nai}$* will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i*, measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i,* accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE$_{am}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

UCAP$^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF$_{am}$ (Average Unavailability Factor$_{am}$) as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.9.5   **Procedure for calculating Unforced Capacity values for ESR Aggregations without an EDL**

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AUF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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 *a*;

Capacity Accreditation Factor_{am} is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*;

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*;

Where:

$$AUF_{am} = \left(1 - \left(\frac{Aggregation\ ESR\ Contributions_{am}}{ICAPMW_{am}}\right)\right)$$

The Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all ESR comprising the Aggregation.

ICAP MW_{am} is the summation of each *ICAP MW_{dm}* contribution in Aggregation *a* for month *m*;*Aggregation ESR Contributions_{am}* is the MW contribution from all ESR *d* in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ ESR\ Contributions_{am} = \sum_{d \in a_m} ICAPMW_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MW_{dm} is the ICAP MW for each individual ESR *d* which is applicable for month *m*; and is calculated as follows:

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

$DMNC_{dm}$ is the Demonstrated Maximum Net Capability for the individual ESR *d* for month *m*;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ESR *d* for month *m;*

Total Supply Declared Value $_{dm}$ is the MW amount reflecting the Injection capability of the ESR *d*, and may be equal to or less than the *ESR CRIS* or *ESR DMNC* for the month *m*;

And:

AUF_{dm} is the Seasonal Unavailability Factor value for the individual ESR *d* in a given month *m*. If month *m* is in the Winter Capability Period, then AUF_{dm} will be equal to the sum of the *ESR Contribution to Unavailability Factor$_{dn}$* of the two previous Winter Capability Period values calculated for the ESR *d*. If month *m* is in the Summer Capability Period, then AUF_{dm} will be equal to the sum of the *ESR Contribution to Unavailability Factor$_{dn}$* of the two previous Summer Capability Period values calculated for the ESR *d* AUF_{dm} is calculated as follows:

$$AUF_{dm} = \sum_{n} ESR\ Contribution\ to\ Unavailability\ Factor_{dn}$$

Where

$$ESR\ Contribution\ to\ Unavailability\ Factor_{dn}$$
$$= Unavailability\ Factor_{an} * \frac{ESR\ to\ Aggregation\ Ratio_{dn}}{\sum_{n} ESR\ to\ Aggregation\ Ratio_{dn}}$$

Where

$$ESR\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}$$

Where:

ESR Contribution to Unavailability Factor$_{dn}$ is the ESR d contribution to Aggregation *a* in month *n*.

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation *a* that contains the ESR *d* in month *n*.

ESR to Aggregation Ratio$_{dn}$ is the ICAP MW for ESR *d* in month *n* divided by the ICAP MW of Aggregation *a* that contains ESR *d* in month *n*.

ICAP MW$_{dn}$ is the ICAP MW for each individual ESR *d* which is applicable for month *n*.

ICAP MW$_{an}$ is the summation of each *ICAP MW$_{dn}$* contribution in Aggregation *a* for month *n*.

n represents each of the 12 months included in the previous two Capability Periods (summer or winter) depending on the value of *m*.

The Unavailability Factor value for each individual ESR *d* for each month in the calculation of AUF_{dm}, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds_{an} is the sum of *Total Available ICAP Seconds_{an}* for each month *m*;

Total Expected ICAP Seconds_{an} is the sum of seconds in all real-time in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where: *Total Available ICAP Seconds_{an}* and *Total Expected ICAP Seconds_{an}* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds_{ah} is the sum of the Available ICAP Seconds for each hour *i* in the month *n*;

Total Expected ICAP Seconds_{ah} is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

Where: *Total Available ICAP Seconds_{ah}* and *Total Expected ICAP Seconds_{ah}* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah}$$
$$= \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}, LOL\ Availability_{ai}, Storage\ Availability_{ai}, Energy\ Level\ Availability_{ai})$$
$$\times Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ai} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability_{ai} measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

LOL Availability_{ai} measures the ratio of Aggregation *a*'s LOL$_N$ that is available for a given interval *i* to the negative ICAP equivalent of UCAP sold;

Storage Availability_{ai} measures the ratio of Aggregation *a*'s real-time storage limits to the ICAP equivalent of storage sold for a given interval *i*;

Energy Level Availability_{ai} measures the ratio of Aggregation *a*'s real-time Energy Level at the first interval *i* of hour *r* to the sum of its *DAM Energy_{ar}* and *DAM Reserves_{ar}* schedule for hour *r*. *Energy Level Availability_{ai}* will be applicable to all real-time intervals *i* occurring within hour *r*.

If Aggregation *a* is adjusted due to a NYISO or TO reliability need, *Energy Level Availability$_{ai}$* will be 100% for all remaining real-time intervals *i* of the applicable day;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n*, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: *UOL Availability$_{ai}$*, *LOL Availability$_{ai}$*, *Storage Availability$_{ai}$*, and *Energy Level Availability$_{ai}$* are further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

$$LOL\ Availability_{ai} = \frac{max(LOL_{Nai}, -ICE_{ah}, NWL_{ai})}{max(-ICE_{ai}, -Adjusted\ ICE_{ai}, NWL_{ai})}$$

$$Storage\ Availability_{ai} = \frac{min((USL_{ai} - LSL_{ai}), (24\ hours\ \times ICE_{ai})}{min((24\ hours\ \times ICE_{ai}), Adjusted\ Storage_{ai})}$$

$$Energy\ Level\ Availability_{ai} = \begin{cases} 100\%\ \text{if Committed Energy Level}_{ar} = 0 \\ \dfrac{\text{Energy Level}_{ar}}{\text{Committed Energy Level}_{ar}}, \text{otherwise,} \end{cases}$$

Where:

$$Committed\ Energy\ Level_{ar} = DAM\ Energy_{ar} + DAM\ Reserves_{ar}$$

And:

UOL_{Nai} is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the UOL_{Nai} will be set equal to the Aggregation's Bid UOL;

ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i,* measured in MW;

Adjusted ICE$_{ai}$ is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

LOL_{Nai} is the Normal Lower Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted up due to a NYISO or TO reliability need, the LOL_{Nai} will be set equal to the Aggregation's Bid LOL;

NWL$_{ai}$ is the Normal Withdrawal Limit that Aggregation *a* supplies in month containing interval *i* based on its withdrawal capabilities, accounting for any derates that result from

planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

USL_{ai} is the Upper Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

LSL_{ai} is the Lower Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

Adjusted Storage_{ai} is the storage capability of Aggregation *a* for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MWh;

Committed Energy Level_{ar} is the sum of Aggregation *a*'s *DAM Energy* and *DAM Reserves* schedule for the hour *r* containing interval *i*, measured in MWh. *Committed Energy Level_{ar}* will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

Energy Level_{ar} is the Energy Level for Aggregation *a* that is available to the Real-Time Market system at the start of the hour *r* containing interval *i*, measured in MWh. *Energy Level_{ar}* will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

DAM Energy_{ar} is Aggregation *a*'s Day Ahead Market (DAM) Energy schedule for the hour *r* that contains real-time interval *i*, measured in MW; and

DAM Reserves_{ar} is Aggregation *a*'s total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour *r* that contains real-time interval *i*, measured in MW.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

UCAP^{P}_{am} as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} (Average Unavailability Factor_{am}) as above, 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*;

Capacity Accreditation Factor_{am} as above, is the Capacity Accreditation Factor for Aggregation *a,* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual.*

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - AUF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ 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 of consecutive sustained output from all individual ESR comprising the Aggregation;

Capacity Accreditation Factor_am is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual.*

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* when electing to time stack. When not electing to time stack, refer to the calculation for *AUF_am* in Section 6.9.5;

Where:

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

ICAP MWh_am is the summation of each *ICAP MWh_dm* contribution in Aggregation *a* for month *m;*

Aggregation ESR Contributions_am is the MWh contribution from all ESRs in Aggregation *a* for month *m*; and is calculated as follows:

$$Aggregation\ ESR\ Contributions_{am} = \sum_{d \in a_m} ICAP\ MWh_{dm} \times (1 - AUF_{dm})$$

Where:

ICAP MWh_dm is the summation of ICAP MW for each individual ESR *d* which is applicable for month *m*, multiplied by the number of hours that the ESR *d* will contribute to the Aggregation time-stacking, and is calculated as follows:

$$
\begin{aligned}
ICAP\ MWh_{dm} \\
= \left(min\big(DMNC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm}\big)\right) x(Elected\ Timestacking\ hour(s))
\end{aligned}
$$

DMNC_dm is the Demonstrated Maximum Net Capability for the individual ESR *d* for month *m*; for an Aggregation that has an EDL and is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.:

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ESR d for month m;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Injection capability of the ESR d, 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 an ESR will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Unavailability Factor applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on all ESRs comprising the Aggregation.

AUF$_{dm}$ is the Average Unavailability Factor value for the individual ESR d in a given month m. If month m is in the Winter Capability Period, then *AUF$_{dm}$* will be equal to the sum of *ESR Contribution to Unavailability Factor$_{dn}$* of the two previous Winter Capability Period values calculated for the ESR d. If month m is in the Summer Capability Period, then *AUF$_{dm}$* will be equal to the sum of *ESR Contribution to Unavailability Factor$_{dn}$* of the two previous Summer Capability Period values calculated for the ESR d. *AUF$_{dm}$* is calculated as follows:

$$AUF_{dm} = \sum_n ESR\ Contribution\ to\ Unavailability\ Factor_{dn}$$

Where:

$$ESR\ Contribution\ to\ Unavailability\ Factor_{dn} = Unavailability\ Factor_{an} * \frac{ESR\ to\ Aggregation\ Ratio_{dn}}{\sum_n ESR\ to\ Aggregation\ Ratio_{dn}}$$

Where:

$$ESR\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MWh_{dn}}{ICAP\ MWh_{an}}, when\ time\ stacking\ or$$

$$ESR\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}, when\ not\ time\ stacking$$

Where:

ESR Contribution to Unavailability Factor $_{dn}$ is the ESR d contribution to Aggregation a in month n.

Unavailability Factor$_{an}$ is the Unavailability Factor for Aggregation a that contains the ESR d in months n.

ESR to Aggregation Ratio$_{dn}$ is the ICAP MW for ESR d in month n divided by the ICAP MW of Aggregation a that contains ESR d in month n, when not time stacking.

ESR to Aggregation Ratio$_{dn}$ is the ICAP MWh for ESR d in month *n* divided by the ICAP MWh of Aggregation *a* that contains ESR *d* in month *n,* when time stacking.

ICAP MWh$_{dn}$ is the contribution of each ESR's ICAP MW in Aggregation *a* for month *n,* multiplied by the number of hours that the ESR *d* will contribute to the Aggregation time-stacking.

ICAP MWh$_{an}$ is the summation of each *ICAP MWh$_{dn}$* contribution in Aggregation *a* for month *n.*

ICAP MW$_{dn}$ is the ICAP MW for each individual ESR *d* which is applicable for month *n.*

ICAP MW$_{an}$ is the summation of each *ICAP MW$_{dn}$* contribution in Aggregation *a* for month *n.*

The Unavailability Factor value for each individual ESR *d* for each month in the calculation of *AUF$_{dm}$*, will be calculated based on historic unavailability of the Aggregation:

Where:

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

Total Available ICAP Seconds$_{an}$ is the sum of *Total Available ICAP Seconds$_{an}$* for each month *m*;

Total Expected ICAP Seconds$_{an}$ is the sum of seconds in all real-time in month *n* in which Aggregation *a* was not on a planned or scheduled outage;

Where: *Total Available ICAP Seconds$_{an}$* and *Total Expected ICAP Seconds$_{an}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Available\ ICAP\ Seconds_{ah}$$

$$Total\ Expected\ ICAP\ Seconds_{an} = \sum_{h=b}^{e} Total\ Expected\ ICAP\ Seconds_{ah}$$

Where:

Total Available ICAP Seconds$_{ah}$ is the sum of the Available ICAP Seconds for each hour *h* in the month *n*;

Total Expected ICAP Seconds$_{ah}$ is the sum of seconds in all real-time intervals for each hour *h* in the month *n* in which Aggregation *a* was not on a planned or scheduled outage;

b is the beginning hour of month *n*; and

e is the last hour of month *n*.

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window.

Where: *Total Available ICAP Seconds$_{ah}$* and *Total Expected ICAP Seconds$_{ah}$* are further defined below:

$$Total\ Available\ ICAP\ Seconds_{ah}$$
$$= \sum_{i=x}^{y} (min(1, UOL\ Availability_{ai}, Storage\ Availability_{ai}, Energy\ Level\ Availability_{ai})$$
$$\times\ Interval\ Seconds_{ai})$$

$$Total\ Expected\ ICAP\ Seconds_{ah} = \sum_{i=x}^{y} Interval\ Seconds_{ai}$$

Where:

UOL Availability$_{ai}$ measures the ratio of Aggregation *a*'s UOL$_N$ that is available for a given interval *i* to the ICAP equivalent of UCAP sold;

Storage Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time storage limits to the ICAP equivalent of storage sold for a given interval *i*;

Energy Level Availability$_{ai}$ measures the ratio of Aggregation *a*'s real-time Energy Level at the first interval *i* of hour *r* during the applicable ICAP Obligation Hours to the sum of its *DAM Energy$_{ar}$* and *DAM Reserves$_{ar}$* schedule for hour *r*. *Energy Level Availability$_{ai}$* will be applicable to all real-time intervals *i* occurring within hour *r*. If Aggregation *a* is adjusted due to a NYISO or TO reliability need, *Energy Level Availability$_{ai}$* will be 100% for all remaining real-time intervals *i* of the applicable day;

Interval Seconds$_{ai}$ is the number of seconds in each real-time interval *i* for Aggregation *a* in month *n* during the applicable ICAP Obligation Hours, except for real-time intervals *i* when Aggregation *a* is fully unavailable due to a planned or maintenance outage, *Interval Seconds$_{ai}$* will be set to zero (0);

x is the first real-time interval in month *n*; and
y is the last real-time interval in month *n*.

Where: *UOL Availability$_{ai}$, Storage Availability$_{ai}$,* and *Energy Level Availability$_{ai}$* are further defined below:

$$UOL\ Availability_{ai} = \frac{min(UOL_{Nai}, ICE_{ai})}{min(ICE_{ai}, Adjusted\ ICE_{ai})}$$

$$Storage\ Availability_{ai} = \frac{min((USL_{ai} - LSL_{ai}), (Energy\ Duration\ Limitation_a \times ICE_{ai})}{min((Energy\ Duration\ Limitation_a \times ICE_{ai}), Adjusted\ Storage_{ai})}$$

$$Energy\ Level\ Availability_{ai} = \begin{cases} 100\%\ \text{if Committed Energy Level}_{ar} = 0 \\ \dfrac{\text{Energy Level}_{ar}}{\text{Committed Energy Level}_{ar}}, \text{otherwise,} \end{cases}$$

Where:

$$Committed\ Energy\ Level_{ar} = DAM\ Energy_{ar} + DAM\ Reserves_{ar}$$

And:

UOL_{Nai} is the Normal Upper Operating Limit for Aggregation *a* that is available to the Real-Time Market system, measured in MW. For real-time intervals *i* when Aggregation *a* is adjusted down due to a NYISO or TO reliability need, the UOL_{Nai} will be set equal to the Aggregation's Bid UOL;

ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in the month containing interval *i,* measured in MW;

Adjusted ICE_{ai} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MW;

USL_{ai} is the Upper Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

LSL_{ai} is the Lower Storage Limit of Aggregation *a* for each real-time interval *i*, measured in MWh;

Adjusted Storage$_{ai}$ is the storage capability of Aggregation *a* for real-time interval *i*, accounting for any derates that result from planned and maintenance outages while Aggregation *a* remains available for operation, measured in MWh;

Committed Energy Level$_{ar}$ is the sum of Aggregation *a*'s *DAM Energy* and *DAM Reserves* schedule for the hour *i* during the applicable ICAP Obligation Hours, measured in MWh. *Committed Energy Level*$_{ar}$ will be evaluated for each hour containing interval *i* and applicable to all real-time intervals *i* within that hour;

Energy Level$_{ar}$ is the Energy Level for Aggregation *a* that is available to the Real-Time Market system at the start of the hour *r* during the applicable ICAP Obligation Hours, measured in MWh. *Energy Level*$_{ar}$ will be evaluated for each hour *r* containing interval *i* and applicable to all real-time intervals *i* within that hour;

DAM Energy$_{ar}$ is Aggregation *a*'s Day Ahead Market (DAM) Energy schedule for the hour *r* during the applicable ICAP Obligation Hours that contains real-time interval *i*, measured in MW; and

DAM Reserves$_{ar}$ is Aggregation *a*'s total Day Ahead Market (DAM) Reserves schedule, excluding regulation, for the hour *r* during the applicable ICAP Obligation Hours that contains real-time interval *i*, measured in MW.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AUF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AUF_{am} *(Average Unavailability Factor$_{am}$)* as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *a,* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.9.7 Procedure for calculating Unforced Capacity values for Generator Aggregations (EFORd based on GADS data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AEFORd_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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* for month *m* which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

AEFORd$_{am}$ (Average Equivalent Demand Forced Outage Rate$_{am}$) 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*; The Average Equivalent Demand Forced Outage Rate applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all facilities comprising the Aggregation.

Where:

$$AEFORd_{am} = 1 - \left(\frac{Aggregation\ Facility\ Contributions_{am}}{ICAP\ MW_{am}}\right)$$

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation *a* for month *m;*

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

$$Aggregation\ Facility\ Contributions_{am} = \sum_{f \in a} ICAPMW_{fm} \times (1 - AEFORd_{fm})$$

Where:

ICAP MW$_{fm}$ is the ICAP MW for each individual facility *f* which is applicable for month *m*; and is calculated as follows:

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

DMNC$_{fm}$ is the Demonstrated Maximum Net Capability for the individual facility *f* for month *m*;

$CRIS_{fm}$ is the Capacity Resource Interconnection Service Value for the individual facility f for month m;

Total Supply Declared Value$_{fm}$ is the MW amount reflecting the Injection capability of the facility f for month m, and may be equal to or less than the *facility CRIS* or *facility DMNC* for the month m;

And:

$AEFORd_{fm}$ is the Average Equivalent Demand Forced Outage Rate for the individual facility f. The $AEFORd_{fm}$ value for each individual facility f for month m, will be calculated based on historic unavailability of the assets z comprising the facility f, weighted based on the nameplate MW values of each asset:

$$AEFORd_{fm} = \frac{\sum_{z \in f}(AEFORd_{zm} * NC_{zm})}{\sum_{z \in f}(NC_{zm})}$$

Where:

NC_{zm} is the nameplate capacity MW rating of asset z in month m

$AEFORd_{zm}$ is the Average Equivalent Demand Forced Outage Rate for asset z in for month m, calculated as follows:

$$AEFORd_{zm} = \frac{\sum_n EFORd_{zn}}{2}$$

Where:

$EFORd_{zn}$ is the Equivalent Demand Forced Outage Rate for asset z within facility f for the 6-month period ending in any given month n.

n represents each of the 6 month periods included in the previous two Capability Periods (Summer or Winter) depending on the value of m.

Where:

$$EFORd_{zn} = \frac{IST_{ze}}{6} \times \frac{f_{fzbe}FOH_{zbe} + f_{pzbe}(EFOH_{zbe} - FOH_{zbe})}{(SH_{zbe} + f_{fzbe}FOH_{zbe})} + \left(1 - \frac{IST_{ze}}{6}\right)CEFORd_z$$

f_{fzbe} and f_{pzbe} are further defined below and:

IST_{ze} is the number of months that asset z was in service during the 6-month Capability Period ending as of time e (IST_{ze} = 0 if asset z was not in service as of time e; IST_{ze} = 6 if asset z was in service for all months of the Capability Period;

FOH_{zbe} is the sum of all Full Forced Outage Hours reported for asset z for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 40-43 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{zbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for asset z for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$EFOH_{zbe} = \begin{cases} 0, \text{ if there were no outages for asset z during the} \\ \text{period beginning at time b and ending at time e; and} \\ \displaystyle\sum_{i \in OUTzbe} \frac{(NDC_{zi} - NAC_{zi})H_{zi}}{NDC_{zi}}, \text{otherwise;} \end{cases}$$

OUT_{zbe} is the set of outages for asset z during the period beginning at time b and ending at time e;

NDC_{zi} is the Net Dependable Capacity for asset z during the applicable Peak Load Window applicable for outage i, submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

NAC_{zi} is the Net Available Capacity for asset z during the applicable for outage i, submitted in accordance with Attachment K, Event Record 01, columns 60-63;

And:

H_{zi} is the time accumulated for asset z during the applicable for outage i submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event);

SH_{zbe} is the sum of all Service Hours reported for asset z for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-19;

e is the end of the last month of the Capability Period;

b is the beginning of the first month of the Capability Period, unless the asset had not gone into service at that time, in which case b is the time at which that asset went into service;

$CEFORd_z$ is the class-equivalent EFORd calculated by the ISO for resources of the same class as asset z based on NERC class averages for similar resources. Where no similar resource exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{fzbe} = \frac{\dfrac{1}{r} + \dfrac{1}{T}}{\dfrac{1}{r} + \dfrac{1}{T} + \dfrac{1}{D}}$$

r is FOH_{zbe} divided by the total number of GADS Data Forced Outages reported for the period beginning at time b and ending at time e in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH$_{gbe}$) divided by the number of attempted starts reported for the period beginning at time b and ending at time e for asset z. RSH$_{zbe}$ is the sum of all Reserve Shutdown Hours reported for asset z for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 20-23;

D is the number of Service Hours (SH$_{zbe}$) divided by the number of successful starts reported for the period beginning at time b and ending at time e for asset z; and

$$f_{\text{pzbe}} = \frac{SH_{zbe}}{AH_{zbe}}$$

AH$_{zbe}$ is the sum of all Available Hours reported for asset z for the period beginning at time b and ending at time e in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 32-35.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

- If RSH < 1 then f_f =1;

- If SH = 0 then f_f = 1;

- If FOH = 0, set 1/r = 0 and calculate f_f per its equation; and

- If AH = 0 then f_p = 0

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AEFORd_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m;

$UCAP^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation a supplies in month m;

$AEFORd_{am}$ (*Average Equivalent Demand Forced Outage Rate$_{am}$*) as above, 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;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation g which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual*.

6.9.8 Procedure for calculating Unforced Capacity values for Energy Limited Resource (ELR) Aggregations (EFORd based on GADS data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AEFORd_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

UCAP^Q_{am} 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* for month *m* which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Capacity Accreditation Factor_{am} is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual.*

AEFORd_{am} (Average Equivalent Demand Forced Outage Rate_{am}) is the Derating Factor calculated for Aggregation *a* during the applicable ICAP Obligation Hours that will be used to determine the amount of Unforced Capacity that an Aggregation will be permitted to provide in month *m*;

Where:

$$AEFORd_{am} = 1 - \left(\frac{Aggregation\ ELR\ Contributions_{am}}{ICAP\ MWh_{am}}\right)$$

The Average Equivalent Demand Forced Outage Rate applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all Energy Limited Resources (ELR) comprising the Aggregation.

ICAP MWh_{am} is the summation of each ELR's ICAP MW contribution in Aggregation *a* for month *m*, multiplied by the number of hours that the ELR will contribute to the Aggregation time-stacking.

Aggregation ELR Contributions_{am} is the MWh contribution from all Energy Limited Resources in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ ELR\ Contributions_{am} = \sum_{d \in a} ICAP\ MWh_{dm} \times (1 - AEFORd_{dm})$$

Where:

ICAP MWh_{dm} is the summation of ICAP MWh for each individual ELR *d*, which is applicable for month *m*, and is calculated as follows:

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

DMNC_{dm} is the Demonstrated Maximum Net Capability for the individual ELR d for month *m*; for an Aggregation that has an EDL and is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.

CRIS_{dm} is the Capacity Resource Interconnection Service Value for the individual ELR d for month *m*;

Total Supply Declared Value_{dm} is the MW amount reflecting the Injection capability of the ELR *d*, and may be equal to or less than the *ELR CRIS* or *ELR DMNC* for the month *m;*

Elected Timestacking hour(s) is the declared number of hours that an ELR will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Equivalent Demand Forced Outage Rate applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on all ELRs comprising the Aggregation.

And:

AEFORd_{dm} is the Average Equivalent Demand Forced Outage Rate for the individual ELR *d*. The *AEFORd_{dm}* value for each individual ELR *d* for month *m*, will be calculated based on historic unavailability of the assets *z* comprising the ELR *d*, weighted based on the nameplate MW values of each asset:

$$AEFORd_{dm} = \frac{\sum_{z \in d}(AEFORd_{zm} * NC_{zm})}{\sum_{z \in d}(NC_{zm})}$$

Where:

NC_{zm} is the nameplate capacity MW rating of asset *z* in month *m*

AEFORd_{zm} is the Average Equivalent Demand Forced Outage Rate for asset z in for month *m*, calculated as follows:

$$AEFORd_{zm} = \frac{\sum_n EFORd_{zn}}{2}$$

Where:

EFORd_{zn} is the Equivalent Demand Forced Outage Rate for asset *z* within ELR *d* for the 6-month period during the applicable ICAP Obligation Hours ending in any given month *n.*

n represents each of the 6 month periods during the applicable ICAP Obligation Hours included in the previous two Capability Periods (Summer or Winter) depending on the value of *m.*

Where:

$$AssetEFORd_{zn} = \frac{IST_{ze}}{6} \times \frac{f_{fzbe}FOH_{zbe} + f_{pzbe}(EFOH_{zbe} - FOH_{zbe})}{(SH_{zbe} + f_{fzbe}FOH_{zbe})} + \left(1 - \frac{IST_{ze}}{6}\right)CEFORd_z$$

f_{fzbe} and *f_{pzbe}* are further defined below and:

IST_{ze} is the number of months that asset z was in service during the 6-month Capability Period ending as of time e (IST_{ze} = 0 if asset z was not in service as of time e; IST_{ze} = 6 if asset z was in service for all months of the Capability Period;

FOH_{zbe} is the sum of all Full Forced Outage Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 40-43 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{zbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$
EFOH_{zbe} = \begin{cases} 0, \text{ if there were no outages for asset z during the} \\ \text{period beginning at time b and ending at time e; and} \\ \sum_{i \in OUT_{zbe}} \frac{(NDC_{zi} - NAC_{zi})H_{zi}}{NDC_{zi}}, \text{otherwise;} \end{cases}
$$

OUT_{zbe} is the set of outages for asset z during the applicable ICAP Obligation Hours during the period beginning at time b and ending at time e;

NDC_{zi} is the Net Dependable Capacity for asset z during the applicable ICAP Obligation Hours applicable for outage i, submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

NAC_{zi} is the Net Available Capacity for asset z during the applicable ICAP Obligation Hours, applicable for outage i, submitted in accordance with Attachment K, Event Record 01, columns 60-63;

and

H_{zi} is the time accumulated for asset z during the applicable ICAP Obligation Hours applicable for outage i submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event);

SH_{zbe} is the sum of all Service Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-19;

e is the end of the last month of the Capability Period;

b is the beginning of the first month of the Capability Period, unless the asset had not gone into service at that time, in which case b is the time at which that asset went into service;

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the

ICAP Obligation Hours based on the ISO-adjusted Peak Load Window; and

$CEFORd_g$ is the class-equivalent EFORd calculated by the ISO for assets of the same class as asset z based on NERC class averages for similar assets. Where no similar assets exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_{\text{fzbe}} = \frac{\frac{1}{r} + \frac{1}{T}}{\frac{1}{r} + \frac{1}{T} + \frac{1}{D}}$$

r is FOH$_{\text{zbe}}$ divided by the total number of GADS Data Forced Outages reported for the period during the applicable ICAP Obligation Hours beginning at time b and ending at time e in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH$_{\text{gbe}}$) divided by the number of attempted starts reported for the period during the applicable ICAP Obligation Hours beginning at time b and ending at time e for asset z. RSH$_{\text{zbe}}$ is the sum of all Reserve Shutdown Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 20-23;

D is the number of Service Hours (SH$_{\text{zbe}}$) divided by the number of successful starts reported for the period during the applicable ICAP Obligation Hours beginning at time b and ending at time e for asset z; and

$$f_{\text{pzbe}} = \frac{SH_{zbe}}{AH_{zbe}}$$

AH$_{\text{zbe}}$ is the sum of all Available Hours reported for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 32-35.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

- If (RSH < 1) then f_f =1;

- If (SH = 0) then f_f = 1;

- If (1/r + 1/T + 1/D) = 0 then f_f = 0;

- If [(# of FO occurrences = 0) or (FOH = 0)] then 1/r = 0;

- If [(RSH = 0) or (# of unit attempted starts = 0)] then 1/T = 0;

- If [(# of unit actual starts = 0) or (SH = 0)] then 1/D = 0;

- If AH = 0 then f_p = 0; and

- If (SH + (f_f x FOH)) = 0 then EFORd = 0.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP^P_{am}}{(1 - AEFORd_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$UCAP^P_{am}$ as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

$AEFORd_{am}$ *(Average Equivalent Demand Forced Outage Rate$_{am}$)* as above, 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*;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

6.9.9 Procedure for calculating Unforced Capacity values for Generator Aggregations (AOF based on GADS-equivalent data)

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - AOF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ 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* for month *m* which is calculated by taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

AOF_{am} *(Average Outage 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*; The Average Outage Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all facilities comprising the Aggregation.

Where:

$$AOF_{am} = 1 - \left(\frac{Aggregation\ Facility\ Contributions_{am}}{ICAP\ MW_{am}}\right)$$

ICAP MW$_{am}$ is the summation of each *ICAP MW$_{dm}$* contribution in Aggregation *a* for month *m*;

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

Where:

$$Aggregation\ Facility\ Contributions_{am} = \sum_{f \in a} ICAPMW_{fm} \times (1 - AOF_{fm})$$

Where:

ICAP MW$_{fm}$ is the ICAP MW for each individual facility *f* which is applicable for month *m*; and is calculated as follows:

$$ICAP_{fm} = min\left(DMNC_{fm,}, CRIS_{fm}, Total\ Supply\ Declared\ Value_{fm}\right)$$

DMNC$_{fm}$ is the Demonstrated Maximum Net Capability for the individual facility *f* for month *m*;

CRIS$_{fm}$ is the Capacity Resource Interconnection Service Value for the individual facility *f* for month *m*;

Total Supply Declared Value$_{fm}$ is the MW amount reflecting the Injection capability of the facility *f* for month *m*, and may be equal to or less than the *facility CRIS* or *facility DMNC* for the month *m*;

And:

AOF$_{fm}$ is the Average Outage Factor for the individual facility *f*. The *AOF$_{fm}$* value for each individual facility *f* for month *m*, will be calculated based on historic unavailability of the assets *z* comprising the facility *f*, weighted based on the nameplate MW values of each asset:

$$AOF_{fm} = \frac{\sum_{z \in f}(AOF_{zm} * NC_{zm})}{\sum_{z \in f}(NC_{zm})}$$

Where:

NC$_{zm}$ is the nameplate capacity MW rating of asset *z* in month *m*

AOF_{zm} is the Average Outage Factor for asset z in for month m, calculated as follows:

$$AOF_{zm} = \frac{\sum_n OF_{zn}}{2}$$

Where:

OF_{zn} is the Outage Factor for asset z within facility f for the 6-month period ending in any given month n.

n represents each of the 6 month periods included in the previous two Capability Periods (Summer or Winter) depending on the value of m.

$$OF_{zn} = \frac{IST_{ze}}{6} \times (1 - CF_{zbe}) + \left(1 - \frac{IST_{ze}}{6}\right)(1 - CCF_z)$$

IST_{ze} is the number of months that asset z had been in service as of time e (0 if asset z was not in service as of time e; 6 if asset z was in service for the full Capability Period;

CCF_z is the class-equivalent Capacity Factor for assets of the same class as asset z based on NERC class averages for similar assets. Where no similar asset exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{zbe} = \frac{NAG_{zbe}}{\sum_{i=B}^{E}(NDC_{zi}(PH_{zi} - POH_{zi} - MOH_{zi}))};$$

CF_{zbe} is the Capacity Factor for asset z for the period beginning at time b and ending at time e;

NAG_{zbe} is the Net Actual Generation for asset a for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 39-45;

NDC_{zi} is the Net Dependable Capacity for asset z for month i. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

PH_{zi} is the Period Hours reported for asset z for month i. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 56-59;

POH_{zi} is the Planned Outage Hours reported for asset z for month i. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 36-39;

MOH_{zi} is the Maintenance Outage Hours reported for asset z for month i. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 44-47;

b is the beginning of the first month of the Capability Period , unless the asset had not gone into service at that time, in which case b is the time at which that asset went into service;

e is the end of the last month of the Capability Period;

B is the month containing time b; and

E is the month containing time e.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AOF_{am}) * (Duration\ Adjustment\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m;

$UCAP^{P}_{am}$ as above, is the amount of Unforced Capacity that Aggregation a supplies in month m;

AOF_{am} *(Average Outage Factor$_{am}$)* as above, 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;

Capacity Accreditation Factor$_{am}$ as above, is the Capacity Accreditation Factor for Aggregation g which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual*.

6.9.10 Procedure for calculating Unforced Capacity values for Energy Limited Resource (ELR) Aggregations (AOF based on GADS-equivalent data)

Starting with the 2021/2022 Capability Year, Installed Capacity Suppliers with Energy Duration Limitations that submit equivalent GADS data for their UCAP values will be evaluated during the applicable ICAP Obligation Hours for their UCAP values.

(a) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP_{am}^{Q} = (1 - AOF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^{Q}_{am}$ 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* for month *m* which is calculatedby taking the minimum of consecutive sustained output from all individual Generators comprising the Aggregation;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation *a* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

AOF$_{am}$ (Average Outage Factor$_{am}$) is the Derating Factor calculated for Aggregation *a* during the applicable ICAP Obligation Hours, that will be used to determine the amount of Unforced Capacity that an Aggregation will be permitted to provide in month *m*;

Where:

$$AOF_{am} = 1 - \left(\frac{Aggregation\ ELR\ Contributions_{am}}{ICAP\ MWh_{am}}\right)$$

The Average Outage Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all Energy Limited Resources (ELR) comprising the Aggregation.

ICAP MWh$_{am}$ is the summation of each ELR's ICAP MW contribution in Aggregation *a* for month *m*, multiplied by the number of hours that the ELR *d* will contribute to the Aggregation time-stacking.

Aggregation ELR Contributions$_{am}$ is the MW contribution from all Energy Limited Resources *d* in Aggregation *a* for month *m*; and is calculated as follows:

Where:

$$Aggregation\ ELR\ Contributions_{am} = \sum_{d \in a} ICAP\ MWh_{dm} \times (1 - AOF_{dm})$$

Where:

ICAP MWh$_{dm}$ is the summation of ICAP MWh for each individual ELR *d*, which is applicable for month *m*, and is calculated as follows:

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

DMNC $_{dm}$ is the Demonstrated Maximum Net Capability for the individual ELR d for month *m*; for an Aggregation that has an EDL and is based on the rules detailed in ICAP Manual Sections 4.2.2.1 and 4.2.2.2.

CRIS$_{dm}$ is the Capacity Resource Interconnection Service Value for the individual ELR d for month *m*;

Total Supply Declared Value$_{dm}$ is the MW amount reflecting the Injection capability of the ELR *d*, and may be equal to or less than the *ELR CRIS* or *ELR DMNC* for the month *m*;

Elected Timestacking hour(s) is the declared number of hours that an ELR will contribute to the Aggregation's total time stacked duration – value must be a whole number greater than or equal to 1.

When an Aggregation is time-stacking, the Average Outage Factor applied to the Aggregation-level reflects the ratio of total available MWhs and the total nameplate MWhs each based on all ELRs comprising the Aggregation.

And:

AOF_{dm} is the Average Outage Factor for the individual ELR *d.* The AOF_{dm} value for each individual ELR *d* for month *m*, will be calculated based on historic unavailability of the assets *z* comprising the ELR *d*, weighted based on the nameplate MW values of each asset:

$$AOF_{dm} = \frac{\sum_{z \in d}(AOF_{zm} * NC_{zm})}{\sum_{z \in d}(NC_{zm})}$$

Where:

NC_{zm} is the nameplate capacity MW rating of asset *z* in month *m*

AOF_{zm} is the Average Outage Factor for asset z in for month *m*, calculated as follows:

$$AOF_{zm} = \frac{\sum_n OF_{zn}}{2}$$

Where:

OF_{zn} is the Outage Factor for asset *z* within ELR *d* for the 6-month period during the ICAP Obligation Hours ending in any given month *n.*

n represents each of the 6 month periods during ICAP Obligation Hours included in the previous two Capability Periods (Summer or Winter) depending on the value of *m.*

Where:

$$OF_{zn} = \frac{IST_{ze}}{6} \times (1 - CF_{zbe}) + \left(1 - \frac{IST_{ze}}{6}\right)(1 - CCF_z)$$

IST_{ze} is the number of months that asset *z* had been in service as of time *e* (0 if generator *g* was not in service as of time *e*; 6 if asset *z* was in service for the full Capability Period;

CCF_z is the class-equivalent Capacity Factor for assets of the same class as asset z based on NERC class averages for similar assets. Where no similar asset exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on; and

$$CF_{zbe} = \frac{NAG_{zbe}}{\sum_{i=B}^{E}(NDC_{zi}(PH_{zi} - POH_{zi} - MOH_{zi}))};$$

CF_{zbe} is the Capacity Factor for asset z during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e;

NAG_{zbe} is the Net Actual Generation for asset a during the applicable ICAP Obligation Hours for the period beginning at time b and ending at time e. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 39-45;

NDC_{zi} is the Net Dependable Capacity for asset z for month i during the applicable ICAP Obligation Hours. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

PH_{zi} is the Period Hours reported for asset z for month i during the applicable ICAP Obligation Hours. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 56-59;

POH_{zi} is the Planned Outage Hours reported for asset z for month i during the applicable ICAP Obligation Hours. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 36-39;

MOH_{zi} is the Maintenance Outage Hours reported for asset z for month i during the applicable ICAP Obligation Hours. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 44-47;

b is the beginning of the first month of the Capability Period , unless the asset had not gone into service at that time, in which case b is the time at which that asset went into service;

e is the end of the last month of the Capability Period;

B is the month containing time b; and

E is the month containing time e.

ICAP Obligation Hours are the hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual. For days in which the Peak Load Window has been adjusted by the ISO, pursuant to Section 4.1.1 of this ICAP Manual, the real-time intervals used in the calculation will be those that overlap between the Resource's ICAP Obligation Hours if the Peak Load Window had not been adjusted and the ICAP Obligation Hours based on the ISO-adjusted Peak Load Window;

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^{P}}{(1 - AOF_{am}) * (Capacity\ Accreditation\ Factor_{am})}\right)$$

Where:

ICE _{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

UCAP^P_{am} as above, is the amount of Unforced Capacity that Aggregation *a* supplies in month *m*;

AOF_{am} (Average Outage Factor_{am}) as above, 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*;

Capacity Accreditation Factor_{am} as above, is the Capacity Accreditation Factor for Aggregation *g* which is applicable for month *m*, pursuant to Section 7.2 of this *ICAP Manual*.

This section describes the general procedure for calculating Unforced Capacity values for Intermittent Power Resources, which include generators that depend on wind, solar, and landfill gas for their fuel. Also see Section 4.5 of this Manual and 5.12.6 of the Market Administration and Control Area Services Tariff.

(b) Definitions

For purposes of this sub-section 6.9.11:

"Summer Peak Hours" means the Peak Load Window hours for the applicable Summer Capability Period, posted to the NYISO Capacity Accreditation web page in accordance with Section 7.3 of this ICAP Manual, during the three-month period from June 1 through August 31, inclusive.

"Winter Peak Hours" means the Peak Load Window hours for the applicable Winter Capability Period, posted to the NYISO Capacity Accreditation web page in accordance with Section 7.3 of this ICAP Manual, during the three-month period from December 1 through the last day of February.

(b) Determining the Amount of UCAP an Aggregation Qualifies to Supply

$$UCAP^Q_{am} = (1 - RSDF_{am}) * (ICAP_{am} * Capacity\ Accreditation\ Factor_{am})$$

Where:

$UCAP^Q_{am}$ is the amount of Unforced Capacity that Aggregation a is qualified to provide in month m;

$ICAP_{am}$ is the total ICAP of Aggregation a that is applicable when determining the amount of Unforced Capacity that Aggregation a is qualified to provide in month m;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation a which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual*.

$RSDF_{am}$ is the resource specific derating factor of Aggregation a that is applicable when determining the amount of Unforced Capacity that Aggregation a is qualified to provide in month m.

Where:

$$RSDF_{am} = \left(1 - \frac{Aggregation\ IPR\ Contributions_{am}}{ICAP\ MW_{am}}\right)$$

The Resource Specific Derating Factor applied to the Aggregation-level reflects the ratio of total available MWs and the total ICAP MWs each based on the composite of all IPR comprising the Aggregation.

ICAP MW$_{am}$ is the summation of each *ICAP MW*$_{dm}$ contribution in Aggregation a for month m,

Aggregation IPR Contributions$_{am}$ is the sum of MW contributions from each individual IPR d in Aggregation a for month m; and is calculated as follows:

Where:

$$Aggregation\ IPR\ Contributions_{am} = \sum_{d \in a_m} ICAP_{dm} \times (1 - RSDF_{dm})$$

Where:

$ICAP_{dm}$ is the ICAP MW for each individual IPR d which is applicable for month m, and is calculated as follows:

$$ICAP\ MW_{dm} = min(NC_{dm,}, CRIS_{dm}, Total\ Supply\ Declared\ Value_{dm})$$

NC_{dm} is the nameplate capacity for the individual IPR d for month m;

$CRIS_{dm}$ is the Capacity Resource Interconnection Service Value for the individual IPR d for month m;

$Total\ Supply\ Declared\ Value_{dm}$ is the MW amount reflecting the Injection capability of the IPR d, and may be equal to or less than the *IPR CRIS* or *IPR DMNC* for the month m;

And:

$RSDF_{dm}$ is the Seasonal Resource Specific Derating Factor value for the individual IPR d for month m, expressed as the sum of *IPR Contribution to RSDF$_{dn}$* for the applicable historic months of the applicable prior two like Capability Periods.

$$RSDF_{dm} = \sum_n IPR\ Contribution\ to\ RSDF_{dn}$$

Where:

$$IPR\ Contribution\ to\ RSDF_{dn} = RSDF_{an} * \frac{IPR\ to\ Aggregation\ Ratio_{dn}}{\sum_n IPR\ to\ Aggregation\ Ratio_{dn}}$$

Where:

$$IPR\ to\ Aggregation\ Ratio_{dn} = \frac{ICAP\ MW_{dn}}{ICAP\ MW_{an}}$$

Where:

$IPR\ Contribution\ to\ RSDF_{dn}$ is the IPR d contribution to Aggregation a in month n.

$RSDF_{an}$ is the Aggregation specific derating factor for Aggregation a that contained the IPR d in month n;

$IPR\ to\ Aggregation\ Ratio_{dn}$ is the ICAP MW for IPR d in month n divided by the ICAP MW of Aggregation a that contains IPR d in month n.

$ICAP\ MW_{dn}$ is the ICAP MW for individual IPR d which is applicable for month n.

$ICAP\ MW_{an}$ is the summation of each $ICAP\ MW_{dn}$ contribution in Aggregation a for month n.

n represents each of the three months included in the previous two like Summer or Winter Peak Hours (December 1 through the last day of February, or June 1 through August 31, inclusive) depending on the value of m.

The $RSDF_{an}$ compares the Average Capacity Factor$_{an}$ of Aggregation a for month n to the Average Capacity Factor$_{rn}$ for month n of the Representative IPR r used to calculate the Capacity Accreditation Factor$_{am}$. The $RSDF_{an}$ for Aggregation a for month n will be calculated using one of two approaches, as indicated below, in order to minimize the difference between $UCAP_{am}^{Q}$ and the Adjusted Installed Capacity of Aggregation a for month m:

If $|ACFD_{an}| < |CAF_{am} * (1 - ACFR_{an})|$, then $RSDF_{an} = \frac{-ACDF_{an}}{CAF_{am}}$; otherwise, $RSDF_{an} = 1 - ACFR_{an}$.

Where:

CAF_{am} is the Capacity Accreditation Factor for Aggregation a which is applicable for month m, pursuant to Section 7.2 of this ICAP Manual;

$ACFD_{an}$ is the average capacity factor difference of Aggregation a for month n. ACFD$_{an}$ is calculated as:

$$ACFD_{an} = Average\ Capacity\ Factor_{an} - Average\ Capacity\ Factor_{rn}$$

$ACFR_{an}$ is the average capacity factor ratio of Aggregation a for month n. ACFR$_{an}$ is calculated as:

$$ACFR_{an} = \frac{Average\ Capacity\ Factor_{an}}{Average\ Capacity\ Factor_{rn}}$$

Average Capacity Factor$_{an}$ is the average capacity factor for Aggregation a for month n, which is calculated according to section (I) below; and

Average Capacity Factor$_{rn}$ is the average capacity factor for the Representative IPR r used to calculate the *Capacity Accreditation Factor$_{am}$* for month m. The *Average Capacity Factor$_{rn}$* is calculated according to section (I) below.

(I) Determining the Average Capacity Factors for Intermittent Power Resources

The Average Capacity Factor for an Aggregation a for month n will be calculated according to equation (a) below.

$$(b)\ Average\ Capacity\ Factor_{an} = \frac{1}{H} \sum_{h=1}^{H \in CPPH_{an}} \frac{E_{ah}}{NC_{ah}}$$

Where:

$CPPH_{an}$ is the set of all Summer Peak Hours during the two most recent Summer Capability Periods preceding the Capability Period containing month m (if month m is part of a Summer Capability Period) during which Aggregation a was available for commercial operation, or the set of all Winter Peak Hours during the two most recent Winter Capability Periods preceding the Capability Period containing month m (if month m is part of a Winter Capability Period) during which Aggregation a was available for commercial operation;

H is the total number of hours in $CPPH_{an}$;

E_{ah} is the average amount of energy delivered to the NYCA transmission system by Aggregation a during hour h; and

NC_{ah} is the nameplate capacity of Aggregation a that was applicable when determining the amount of Unforced Capacity that Aggregation a was qualified to provide in hour h.

The Average Capacity Factor for a Representative IPR r for month n will be calculated according to equation (b) below.

$$(b)\ \textbf{\textit{Average Capacity Factor}}_{rn} = \frac{1}{H}\sum_{h=1}^{H \in CPPH_n} \frac{E_{rh}}{NC_{rh}}$$

Where:

$CPPH_n$ is the set of all Summer Peak Hours during the two most recent Summer Capability Periods preceding the Capability Period containing month m (if month m is part of a Summer Capability Period), or the set of all Winter Peak Hours during the two most recent Winter Capability Periods preceding the Capability Period containing month m (if month m is part of a Winter Capability Period);

H is the total number of hours in $CPPH_n$;

E_{rh} is the average amount of energy delivered to the NYCA transmission system by all Resources operating in hour h that 1) meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Aggregation a is assigned for month m and 2) are located in the same capacity region (i.e., Rest of State, G-J Locality (excluding Load Zone J), NYC Locality, or Long Island Locality) as Aggregation a; and

NC_{rh} is the sum of the nameplate capacity of all Resources operating in hour h that 1) meet the assignment criteria posted on the NYISO Capacity Accreditation web page for the Capacity Accreditation Resource Class to which Aggregation a is assigned for month m and 2) are located in the same capacity region (i.e., Rest of State, G-J Locality (excluding Load Zone J), NYC Locality, or Long Island Locality) as Aggregation a.

(c) Determining the ICE of the Amount of UCAP Supplied

$$ICE_{am} = \left(\frac{UCAP_{am}^P}{(1 - RSDF_{am}) * (Capacity\ Accreditation\ Factor_{am})} \right)$$

Where:

ICE_{am} is the Installed Capacity Equivalent of the amount of Unforced Capacity that Aggregation a supplies in month m;

$UCAP^{P}{}_{am}$ is the amount of Unforced Capacity that Aggregation a supplies in month m;

Capacity Accreditation Factor$_{am}$ is the Capacity Accreditation Factor for Aggregation a which is applicable for month m, pursuant to Section 7.2 of this *ICAP Manual*.

RSDF$_{am}$ is the Resource specific derating factor calculated for Aggregation a that will be used to determine the amount of Unforced Capacity that Aggregation a will be permitted to provide in month m;

Attachment K   Reportable Operating Data

(Version 2.1)

GADS Data Reporting Requirements

Forced Outage

An unplanned failure that requires a unit to be removed from service, or the Load on the unit to be reduced before the end of the nearest following Weekend.

Maintenance Outage

A scheduled outage or derating that can be deferred beyond the end of the nearest following Weekend but that requires the unit to be removed from service or the Load reduced before the next Planned Outage.

> **Note:** Any Resource that notifies the ISO that it can defer its outage beyond the end of the next following Weekend, but requests a maintenance outage before the end of the next following Weekend, will have its maintenance outage request granted by the ISO unless the ISO has specific reliability concerns that require the ISO to deny such a request.

Weekend

The period of time that begins every Friday at 10:01:00 PM and ends the following Monday at 8:00:59 AM.

NERC-GADS data or data equivalent to GADS Data for each Generator is to be provided to the ISO by the 20th of the month following the month for which the data applies.

See Section 4.4 of the ICAP Manual for the general Operating Data reporting requirements and the following pages for detailed Operating Data Reporting Requirements.

The input formats for NERC-GADS data can also be found on the NERC web-site at:

https://www.nerc.com/pa/RAPA/gads/Pages/GeneratingAvailabilityDataSystem-(GADS).aspx

The Data Reporting Instructions are also located there.

The form on the following page delineates the Performance File and Event File data layouts. The data must be submitted electronically to the ISO through the GADS Portal (https://gads.nyiso.com/PortalNYISO). For inquires related to NYISO GADS, users may contact the NYISO at gads_info@nyiso.com.

For Distributed Energy Resources (DERs) that have an NMC of 100 kW or less, all NYISO GADS data submissions should be on a kW basis and will be interpreted to be kW values for NYISO's GADS purposes

The pages following the Performance File and Event File data layouts further define GADS Data or data equivalent to GADS Data. All data will be used for internal ISO reliability studies and for calculating Unforced Capacity ("UCAP") values.

NERC - GADS (Required for EFORd Calculations)

PERFORMANCE FILE LAYOUT

125 Columns per RECORD

RECORD 01

| 0 | 5 | | | | | | ... | | | 0 | 1 |

Record Code 1-2
Utility Code 3-5
Unit Code 6-8

Year 9-12
Month 13-14
Revision Code 15

Gross Max. Cap. 16-21
Gross Dep. Cap. 22-27
Gross Actual Gen. 28-36

Net Max. Cap. 37-42
Net Dep. Cap. 43-48
Net Actual Gen. 49-57

Unit Loading 58
Att. Unit Starts 59-61
Act. Unit Starts 62-64

(Blank Columns 65-98)

Verbal Description 99-123

Record Number 124-125

125 Columns per RECORD

RECORD 02

| 0 | 5 | | | | | | ... | | | 0 | 2 |

Record Code 1-2
Utility Code 3-5
Unit Code 6-8

Year 9-12
Month 13-14
Revision Code 15

Unit Service Hrs. 16-20
Reserve Shutdown 21-25
Pumping Hrs. 26-30

Synch. Cond. Hrs. 31-35
Available Hrs. 36-40
Planned Outage Hrs. 41-45

Forced Outage Hrs. 46-50
Maint. Outage Hrs. 51-55
Ext. of Sched. Outages 56-60

Unavailable Hours 61-65
Period Hours 66-70
Inactive Hours 71-75

(Blank Columns 76-123)

Record Number 124-125

*   Do not zero-fill or asterisk-fill unused data fields.
** Columns 1-15 link the records together as a monthly report.
*** Columns 124-125 identify the component records.

EVENT FILE LAYOUT

82 Columns per RECORD

RECORD 01

| 0 | 7 | | | | | | ... | | | 0 | 1 |

Record Code 1-2
Utility Code 3-5
Unit Code 6-8

Year 9-12
Event Number 13-16
Revision Code 17

Event Type 18-19
Start of Event 20-27

(Blank Columns 28-47)

End of Event 48-55
Gross Avail. Cap 56-61
Net Avail. Cap 62-67

(Blank Column 68)
Dominant Derating Code 69

(Blank Columns 70-80)
Record Number 81-82

82 Columns per RECORD

RECORD 02

| 0 | 7 | | | | | | ... | | | 0 | 2 |

Record Code 1-2
Utility Code 3-5
Unit Code 6-8

Year 9-12
Event Number 13-16
Revision Code 17

Event Type 18-19
System Component Cause Code 20-23
Cause Code Amplification Code 24- 25

(Blank Columns 42-49)

Verbal Description 50-80

Record Number 81-82

*   Do not zero-fill or asterisk-fill unused data fields.
*** Columns 81-82 identify the component records.

Required Fields for NYISO GADS Data

	(05) Format		(07) Format	
	Performance Record (01) Columns	Performance Record (02) Columns	Event Record (01) Columns	Event Record (02) Columns
Record Code	1-2	1-2	1-2	1-2
Utility Code	3-5	3-5	3-5	3-5
Unit Code	6-8	6-8	6-8	6-8
Year	9-12	9-12	9-12	9-12
Revision Code	15	15	17	17
Record Number	124-125	124-125	81-82	81-82
(Performance Only)				
Month	13-14	13-14		
Net Maximum Capacity	37-42			
Net Dependable Capacity	43-48			
Net Actual Generation	49-57			
Unit Loading (Optional)	58			
Attempted Unit Starts	59-61			
Actual Unit Starts	62-64			
Service Hours		16-20		
Reserve Shutdown Hours		21-25		
Pumping Hours		26-30		
Synch. Condensing Hours		31-35		
Available Hours		36-40		
Planned Outage		41-45		
Forced Outage		46-50		
Maintenance Outage		51-55		
Ext. of Sched. Outages		56-60		
Unavailable Hours		61-65		
Period Hours		66-70		
Inactive Hours		71-75		
(Event Only)				
Event Number			13-16	13-16
Event Type			18-19	18-19
Start Date/Time			20-27	
End Date/Time			48-55	
Net Available Capacity			62-67	
System / Comp. Cause Code				20-23
Cause Code Amplification Code				24-25
Verbal Description				50-80

NYISO-GADS Reporting Requirements

The minimum dataset for data equivalent to GADS Data and will result in UCAP based on actual production, with allowance for scheduled outages. The full dataset will result in UCAP based on $EFOR_d$. See Attachment I for the actual calculation methodology.

Performance Data

Card 01	Full dataset	Minimum dataset
Card Code	Required	Required
Utility Code	Required (Assigned)	Required (Assigned)
Unit Code	Required (Assigned)	Required (Assigned)
Year	Required	Required
Report Period (Month)	Required	Required
Record Revision Code	Voluntary	Voluntary
Gross Maximum Capacity	Voluntary	Voluntary
Gross Dependable Capacity	Voluntary	Voluntary

Gross (MWhr) Actual Generation	Voluntary	Voluntary
Net Maximum Capacity	Required	Required
Net Dependable Capacity	Required	Required
Net (MWhr) Actual Generation	Required	Required
Typical Unit Loading Characteristics	Voluntary	Voluntary
Attempted Unit Starts	Required	Required
Actual Unit Starts	Required	Required
Record Number	Required	Required

Card 02	*Full dataset*	*Minimum dataset*
Card Code	Required	Required
Utility Code	Required (Assigned)	Required (Assigned)
Unit Code	Required (Assigned)	Required (Assigned)
Year	Required	Required
Report Period (Month)	Required	Required
Record Revision Code	Voluntary	Voluntary
Unit Service Hours (SH)	Required	Required
Reserve Shutdown Hours (RH)	Required	Required
Pumping Hours	Required (if applicable)	Required (if applicable)
Synchronous Condensing Hours	Required (if applicable)	Required (if applicable)
Available Hours (AH)	Required	Required
Planned Outage Hours (POH)	Required	Required
Forced Outage Hours & Startup Failure Hours	Required	Required
Maintenance Outage Hours (MOH)	Required	Required
Extension of Scheduled Outage Hours (SEH)	Required	Required
Unavailable Hours (UH)	Required	Required
Period Hours	Required	Required
Record Number	Required	Required

Card 03	*Full dataset*	*Minimum dataset*
	Not Required	*Not Required*

Card 04	*Full dataset*	*Minimum dataset*
	Not Required	*Not Required*

Event Report Data

Card 01	*Full dataset*	*Minimum dataset*
Card Code	Required	-
Utility Code	Required (Assigned)	-

Unit Code	Required (Assigned)	-
Year	Required	-
Event Number	Required	-
Record Revision Code	Voluntary	-
Event Type	Required	-
Start of Event	Required	-
End of Event	Required	-
Gross Available Capacity as Result of Event	-	-
Net Available Capacity as Result of Event	Required	-
Record Number	Required	-

Card 02	*Full dataset*	*Minimum dataset*
Card Code	Required	-
Utility Code	Required (Assigned)	-
Unit Code	Required (Assigned)	-
Year	Required	-
Event Number	Required	-
Record Revision Code	Required	-
Event Type	Required	-
System Component Cause Code	Required	-
Cause Code Amplification Code	Required	-
Verbal Description	Voluntary	-
Record Number	Required	-

Cards 03-99	*Full dataset*	*Minimum dataset*
Provide additional event data on system /component events.	*Not Required*	*Not Required*

Attachment L Revisions in Transmission Owner Installed Capacity Data Submittals

(Version 1.0)

This Attachment establishes the process and procedures associated with the reporting of LSE Load data to the ISO by the Transmission Owners. It discusses how this data is used to calculate LSE's Minimum Unforced Capacity Requirements each month and the financial reconciliation associated with customer-switching among LSEs.

Details

Transmission Owners are required to provide two data submittals each month documenting LSE customer-switching and Load obligations. The first submittal is used for an initial financial reconciliation of customer-switching in the current month and for establishing an LSE's Installed Capacity obligation as of the first of the following month. The second data submittal will be used for a final financial reconciliation of Load-shifts in a designated previous month. Additional customer-switching adjustments requiring a financial reconciliation will be handled on a case-by-case basis.

Data Submittal One

In the first data submittal, Transmission Owners will provide (1) the daily shifts in Load obligations for each Load-serving entity (LSE) occurring in the current month and (2) the Load obligation of LSEs for the first day of the following month. This submittal should contain the best available information at the time of the data submittal. For example, Transmission Owner A would submit customer-switching data for August in early August as well as the final Load obligation for September 1. See the applicable Capability Period on the Installed Capacity (ICAP) Market page of the NYISO website (https://www.nyiso.com/installed-capacity-market) for the data submittal schedule.

The ISO will use this data for two purposes:

1. To set each LSE's Minimum Unforced Capacity Requirement and Locational Unforced Capacity Requirement for the following month (and any remaining months in the Capability Period).
2. To perform an initial financial reconciliation of Load-shifts occurring in the course of the current month. That is, an initial reconciliation would be conducted for August customer-switching based on data received in the month of August.

This reconciliation would credit customer-losing and bill Load-gaining LSEs based on the clearing price for the current month's Unforced Capacity in the prior month's Installed Capacity auction.

Example A: 10 MW of Load-shifts from LSE A to LSE B on June 5th. First, this 10 MW of Load is equivalent to 11 MW of Unforced Capacity shifting based on a reserve requirement of 10%. LSE A then is credited for 9.166 (11 MW * 25 days / 30) MWs (weighted average) of Unforced Capacity; LSE B is billed for 9.166 MWs of Unforced Capacity. A Market-Clearing Price for June Unforced Capacity in the May auction of $3.00 per kW-month translates into $3,000.00 per MW-month ($3.00/kW-month * 1,000). Therefore, LSE A is credited $27,500 ($3.00/kW-month * 1000 kW * 9.166 MWs); LSE B is billed $27,500 ($3.00 /kW-month * 1000 kW * 9.166 MWs).

This initial financial reconciliation can also be used by the ISO to address those cases in which an LSE's Load obligation for the current month was set too high or too low causing the LSE to have purchased too much or too little Unforced Capacity for the entire month. In these cases, an LSE would be billed or credited for an entire month of Unforced Capacity.

Example B: Based on the best available data at the time, Transmission Owner A submits a report in early May indicating that LSE A will be serving 110 MW of Load on June 1; and that LSE B will be serving 90 MW of Load on June 1.However, due to the uncertainties of Retail Access, Data Submittal One for June indicates that LSE A actually served 100 MW on June 1, or 10 MW less than projected. Similarly, Data Submittal One for June indicated that LSE B actually served 100 MW on June 1, or 10 MW more than projected. Recall that this 10 MW of Load is equivalent to 11 MW in Unforced Capacity. Using the market clearing price in the above example ($3.00/kW-month), LSE A would be credited $33,000 $3.00/kW-month * 1000 kW * 11 MW * 30 days); LSE B would be billed the same $33,000.

Data Submittal Two

In the second data submittal, Transmission Owners will provide for a designated prior month (1) the actual Load obligation of each LSE for the first day of the designated month and (2) the daily shifts in Load obligations for each LSE documented to have actually occurred. For example, Transmission Owner A would submit in late August actual customer-switching data for May and the actual Load obligation for May 1. These "true-up" transactions would then be included in the September Unforced Capacity billing. See the applicable Capability Period on the Installed Capacity (ICAP) Market page of the NYISO website (https://www.nyiso.com/installed-capacity-market) for data submittal dates.

This data will be used to true-up the customer-switching adjustments that were made based on the initial customer-switching provided in Data Submittal One. Any credits or bills would then be net of the prior bills and credits calculated based on the customer-switching reported in Data Submittal One.

Example C: In Example A, it is reported in Data Submittal One for the month of June (based on the best available data at the time) that on June 5th a 10 MW Load (equivalent to 11 MW of Unforced Capacity) is scheduled to shift from LSE A to LSE B. This shift results in LSE A being credited $27,500 and LSE B being billed $27,500.

However, in Data Submittal Two, the Transmission Owner reports that this 10 MW Load (11 MW of Unforced Capacity) actually shifted from LSE A to LSE C - not LSE B. In this case, LSE A would not be affected (since it had already been credited for the $27,500 it was due); LSE B would now be credited $27,500 since it had been initially billed this amount for a Load-shift which did not occur; LSE C would now be billed the $27,500 since in retrospect it had actually assumed the 10 MW Load (11 MW of Unforced Capacity) obligation.

Standardization of Customer Switching Documentation

Transmission Owners will be required to provide electronic data submittals in the format below that will also be available on the ISO Web Site. A PDF version of the required format can be found below. The data submittal will consist of an Excel workbook containing a separate worksheet for each LSE's data. Transmission Owners should complete the worksheets for each Load-serving entity, adding sheets as necessary. Transmission Owners will be required to provide each LSE a copy of the pertinent Excel worksheet.

Schedule

See the applicable Capability Period on the Installed Capacity (ICAP) Market page of the NYISO website (https://www.nyiso.com/installed-capacity-market).

Attachment M Procedure to Apply for a Capacity Limited Resource (CLR), Energy Limited Resource (ELR), Ambient Condition-Dependent Classification and/or for an Energy Duration Limitation

(Version 3.2)

Generation resources must submit specific operating data and supporting documentation to be considered for CLR/ELR status. Units claiming a UOL_N less than their ICAP equivalent must register as an ELR or a CLR with the NYISO. In addition, units whose output varies with ambient conditions must also register with the NYISO. Installed Capacity Suppliers with an Energy Duration Limitation, including ELR units, shall elect an Energy Duration Limitation and inform the ISO by August 1 preceding the upcoming Capability Year, pursuant to Section 4.1.1 of this *ICAP Manual*. For ELR units, information supporting the unit's ELR designation must be provided in writing and must be received via electronic email at participation@nyiso.com by August 1 of a given Capability Year. Refer to "Energy Supplier Upper Operating Limits," below, for a detailed discussion of bidding, scheduling and applicable settlement rules for ELR and CLR resources.

Registration

To register a unit as an Installed Capacity Supplier with an Energy Duration Limitation and/or a CLR, ELR, or as an Ambient Condition-dependent unit, NYISO Customers must submit the following information to the NYISO Stakeholder Services Department by US mail or courier delivery or electronic email at participation@nyiso.com:

1. A letter requesting registration of specifically identified resources as Energy Duration Limited, and/or CLR, ELR, or as Ambient Condition-dependent.

2. Installed Capacity Suppliers with an Energy Duration Limitation shall provide:

    a. Prior to the Capability year that begins May 1, 2024,

    1. A detailed explanation of why the unit is not able to provide Energy for 24 hours each day. Data should be submitted to show attainable MWhs for a 24-hour period associated with duration limiting factors. This data should include the sustained maximum net output for the number of hours that correspond to its elected Energy Duration Limitation during the applicable Peak Load Window as determined in accordance with Section 4.1.1 of this *ICAP Manual*, and data on the unit's degradation, as applicable. This data will be analyzed by the NYISO in order to verify operating limits and ICAP obligations; and

    2. If the unit with an Energy Duration Limitation qualifies as an ELR resource, it shall comply with the submission requirements for ELR units below; and

    3. If the unit with an Energy Duration Limitation is Ambient Condition-dependent, it shall comply with the submission requirements for Ambient Condition-dependent units, below; and

    4. Further data or other information as may be requested by the NYISO to better understand the operating characteristics of the unit.

    b. Starting with the Capability Year that begins May 1, 2024,

    1. A detailed explanation of why the unit is not able to provide Energy for 24 hours each day. Data should be submitted to show attainable MWhs for a 24-hour period associated with duration limiting factors. If the unit has elected an Energy Duration Limitation less

than or equal in length to the number of hours comprising the applicable Peak Load Window, this data should include the sustained maximum net output for the number of hours that correspond to its elected Energy Duration Limitation during the applicable Peak Load Window as determined in accordance with Section 7.3 of this *ICAP Manual*, and data on the unit's degradation, as applicable. If the unit has elected an Energy Duration Limitation greater in length than the number of hours comprising the applicable Peak Load Window, the data should include the sustained maximum net output for the number of hours that correspond to its elected Energy Duration Limitation during the entirety of the Peak Load Window and for additional hours immediately preceding and following the Peak Load Window covering the remaining hours of the unit's Energy Duration Limitation that are not captured in the Peak Load Window, and data on the unit's degradation, as applicable. The number of additional hours both preceding and following the Peak Load Window for which the unit must demonstrate sustained maximum net output shall be determined by subtracting the length of the Peak Load Window from the Energy Duration Limitation and dividing the result by two. This data will be analyzed by the NYISO in order to verify operating limits and ICAP obligations; and

2. If the unit with an Energy Duration Limitation qualifies as an ELR resource, it shall comply with the submission requirements for ELR units below; and

3. If the unit with an Energy Duration Limitation is Ambient Condition-dependent, it shall comply with the submission requirements for Ambient Condition-dependent units, below; and

4. Further data or other information as may be requested by the NYISO to better understand the operating characteristics of the unit.

3.   CLR units shall provide:

a.   A detailed description of how the unit can increase load from a normal upper operating limit (UOL_N) to an emergency upper operating limit (UOL_E). The emergency limit could be removal of the last HP feedwater heater. This data will be analyzed by the NYISO in order to verify operating limits and Installed Capacity (ICAP) obligations;

b.   If the unit is time-limited at its UOL_E then the unit shall define the time limitation and include a brief explanation of the reason why operating at this load on a continuing basis is detrimental.

c.   A description of the limiting factor that establishes the UOL_N;

d.   If the CLR also is Ambient Condition-dependent, it shall comply with the submission requirements for Ambient Condition-dependent units, below; and

e.   Any further data or other information as may be requested by the NYISO to better understand the operating characteristics of the unit.

4.   ELR units shall provide:

a.   A detailed explanation of why the unit is not able to run at full load for 24 hrs a day. Data should be submitted to show attainable MWH's for a 24 hr. period with associated limiting factors. This data should include, as applicable, environmental restrictions for NOx, SO2, etc. This data will be analyzed by the MMP in order to verify operating limits and ICAP obligations; and

b.   If the ELR also is Ambient Condition-dependent, it shall comply with the submission requirements for Ambient Condition-dependent units, below; and

c.   Further data or other information as may be requested by the NYISO to better understand the operating characteristics of the unit.

5. Ambient Condition-Dependent Units shall provide:

    a. An operating curve for each unit consisting of UOL_N values versus the significantly impacting variable (UOL_N represents the upper MW limit at which a unit is able to operate on a regular and continuous basis.) If emergency energy will be offered the curve for each unit shall also indicate the UOL_E values versus the significantly impacting variable.

    b. An output factor equation as described in section 1.3.1 Output Factor Equation Requirement

All units seeking special status shall also submit contact information including name, address, phone, fax, and email for the individual qualified to discuss the particular circumstances for each unit and a letter from a Licensed Professional Engineer certifying the accuracy of the submitted information for each unit.

Applicants must include the PTIDs and names contained in OASIS for their resources in all documentation submitted to the NYISO. Applicants must also provide electronic versions of each unit's UOL_N and UOL_E curves in spreadsheet format.

Information should be submitted to the NYISO Stakeholder Services Department at:

> NYISO Stakeholder Services Department
>
> 10 Krey Blvd
>
> Rensselaer, NY 12144

Energy Supplier Upper Operating Limits

Energy suppliers must specify both a Normal and an Emergency Upper Operating limit in their Day-Ahead and Real-Time offers. A special protocol exists for scheduling the capacity above the Normal Upper Operating Limit. Specific settlement conditions may also apply.

Details

Normal and Emergency Upper Operating Limits (UOL_N and UOL_E)

All energy Suppliers are required to specify both a Normal Upper Operating Limit (UOL_N) and an Emergency Upper Operating Limit (UOL_E) in their Day-Ahead ("DA") and Real-Time ("RT") offers. The UOL_N defines the unit's operating limit under normal system conditions; the UOL_E defines the unit's operating limit achievable at the request of the ISO during extraordinary conditions. Both limits should reflect the unit's achievable capacity. The specified value of UOL_E in the DA and RT offers must be greater than or equal to value specified for UOL_N.

The following terms are used in this Attachment:

> ***ICAP obligation*** — The capacity a capacity supplier is required to bid into the DA Market ("DAM") which, as a general matter, equals the ICAP equivalent of its UCAP sales less any capacity that has been derated for that day's DAM as defined in the ISO Procedures,[1] prorated by the share of the derated resource committed to provide ICAP to New York (i.e., multiplied by $UCAP^P_{gm}$ / $UCAP^Q_{gm}$ as defined in Attachment J of this Manual).
>
> ***Ambient Condition-dependent units*** — Units that may be unable to reach the ICAP equivalent of their UCAP sales due to changes in ambient air temperature. Ambient Condition-dependent units are not automatically considered CLR units. Their dependency on ambient conditions must be registered with the NYISO if the unit will be bidding into the DAM a UOL_N that is less than the ICAP obligation.

Daily energy limit — The energy equivalent of a unit's ICAP obligation over the number of consecutive hours that correspond to its elected Energy Duration Limitation.[2]

ICAP Obligation Hours — The hours that an Installed Capacity Supplier must bid their ICAP obligation (ICAP Equivalent of UCAP Sold or Certified in the most recent ICAP Spot Market Auction) into the DAM. The ICAP obligation hours for Installed Capacity Suppliers with Energy Duration Limitations are described in Sections 4.8.1 and 4.8.2 of this ICAP Manual.

Capacity Suppliers registered with the NYISO as Capacity Limited Resources (CLR), Energy Limited Resources (ELR) or as Ambient Condition-dependent units may bid a UOL_N below their ICAP obligation as described in the applicable sections below. All other Capacity Suppliers should bid a UOL_N that is at least equal to their ICAP obligation and a UOL_E at least equal to their ICAP obligation unless the capacity of the unit has been derated for that day's DAM as defined in the ISO Procedures. The procedures for registering with the NYISO, including details on the required operating data and supporting documentation, is described in above under "Procedure to Apply for a Capacity Limited Resource (CLR), Energy Limited Resource (ELR) or Ambient Condition-Dependent Classification."

1.1. Capacity-Limited Resource (CLR)

A Capacity Limited Resource (CLR) is an energy supplier that is able to take extraordinary measures to reliably increase its output above its UOL_N and has sold UCAP based on taking those extraordinary measures. It is defined in the tariff as:

> *A resource that is constrained in its ability to supply energy above its Normal Upper Operating Limit by operational or plant configuration characteristics.*[3]

To register as a CLR unit, the unit operator must describe the operational or plant configuration changes that can be taken to increase output. Examples of a CLR include, but are not limited to, a steam plant that has the ability to remove its top feedwater heater from service. An Ambient Condition-dependent unit that is not able to take extraordinary measures to reliably increase its output above UOL_N is not considered a CLR unit. However, its dependency on ambient conditions must be registered with the NYISO if the unit will be bid into the DAM with a UOL_N that is less than its ICAP obligation.

UOL_N and UOL_E in the CLR Offer

The UOL_E submitted for the CLR resource must be: (i) greater than or equal to that of UOL_N in both the DA and RT offer; (ii) achievable at the request of the NYISO under extraordinary conditions; and (iii) in the DA offer, equal to or greater than the unit's ICAP obligation. A CLR unit may also be an Ambient Condition-dependent unit, in which case the UOL_E may also be derated, if appropriately justified to the NYISO, to account for its Ambient Condition-dependency. The UOL_N

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[2] Units capable of generating at a level equal to their ICAP obligation for more than he number of hours corresponding to its elected Energy Duration Limitation but fewer than 24 hours have a daily energy limit equal to: the product of their ICAP obligation and the number of hours they are capable of generating at that rate, plus the additional energy available at other hours during which they are capable of operating at less than their ICAP obligation.

[3] Temperature dependency alone is not an operational or plant configuration characteristic – see section below entitled "Ambient Condition-Dependent Units."

in the supplier's Day-Ahead offer should represent the supplier's actual capability under normal operating conditions, as reflected in the CLR description submitted to the NYISO.

CLR Scheduling and Settlements

Day-Ahead: As a general matter, the NYISO will establish DA schedules using bid-in UOL_N as the upper operating limit for all units and will not schedule any unit above that limit. However, if the NYISO determines that employing these limits in the DAM would lead to the violation of reliability based criteria, the NYISO will use the UOL_E of all units as the upper operating limit, for the DAM commitment process, and may schedule any unit up to its UOL_E[4].

If a CLR unit receives a DA schedule above its UOL_N which it cannot meet, it may request that the NYISO reduce its effective RT UOL to a level equal to or greater than its UOL_N ("capacity limited UOL"). If, pursuant to the CLR's request, the NYISO establishes a RT schedule based on the CLR's capacity limited UOL, ("capacity limited schedule"), that portion of its DAM schedule above its capacity limited schedule shall balance at the RT price for Energy, Operating Reserve Service and Regulation Service.

Real-Time: The NYISO will carry the upper operating limit used to establish the DA schedule into RTC and RTD to establish the RT schedule. Notwithstanding the use of the UOL_N as the upper operating limit in the DAM, the NYISO may, in accordance with its Emergency Operating Procedures ("EOP"), use the UOL_E of all units as the upper operating limit for establishing RT schedules. Therefore, a CLR with a DA schedule at or below its bid UOL_N will not be called on to operate above its UOL_N in Real-Time, except in accordance with the NYISO's Emergency Operating Procedures (EOP).

If a CLR unit receives a RT schedule above its UOL_N which it cannot meet, it may request that the NYISO reduce the CLR's UOL to a level equal to or greater than its UOL_N.

1.2. Energy-Limited Resource (ELR)

An Energy Limited Resource (ELR) is an energy supplier that is unable to operate at a level that represents its ICAP obligation for all hours of the day, but can operate at that level in accordance with its elected Energy Duration Limitation, pursuant to section 4.8.2 of this ICAP Manual. It is defined in the tariff as:

> *A resource that, due to environmental restrictions on operations, cyclical requirements, such as the need to recharge or refill, or other non-economic reasons, is unable to operate continuously on a daily basis, but is able to operate for at least four consecutive hours each day. Energy Limited Resources must register their energy limiting characteristics with, and justify them to, the ISO consistent with ISO procedures.*

To register as an ELR a unit operator must describe the unit's physical energy limiting characteristics, as well as its daily energy limit. Examples of an ELR include, but are not limited to (i) a hydro unit that is subject to recharge periods, or (ii) a generator with NOx and/or SOx restrictions.

UOL_N and UOL_E in the ELR Offer

The value of UOL_E submitted for an ELR resource must be: (i) greater than or equal to that of UOL_N in both the DA and RT offers; (ii) achievable for a minimum of the number of consecutive hours that correspond to its elected Energy Duration Limitation during the applicable ICAP Obligation

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[4] The applicable reliability criteria consider transmission constraints and reliability based locational reserve requirements - specifically all NYCA, Eastern NY 10-minute, and Long Island 30-minute reserve requirements.

Hours in any day; and (iii) in the DA offer, equal to or greater than the unit's ICAP obligation. An ELR unit may also be Ambient Condition-dependent in which case the UOL_E may be derated, if appropriately justified to the NYISO, to account for its Ambient Condition-dependency. The value of UOL_N in the supplier's Day-Ahead offer must:

- Fall within the supplier's actual capability under normal operating conditions, as reflected in the description submitted to the NYISO of the ELR situation,
- Reflect Ambient Condition-dependency if applicable; and
- Over the day, must make available to the NYISO at least its daily energy limit.

ELR Scheduling and Settlements

Day-Ahead: As a general matter, the NYISO will establish DA schedules using bid-in UOL_N as the upper operating limit for all units and will not schedule any unit above that limit. However, if the NYISO determines that employing these limits in the DAM would lead to the violation of reliability based criteria,[5] the NYISO will reference the UOL_E of all units as the upper operating limit, for the DAM commitment process, and any unit may be scheduled up to its UOL_E.

If an ELR unit receives a DA schedule above its UOL_N which it cannot meet, it may request that the NYISO reduce its effective UOL to a level equal to or greater than its UOL_N provided however that the NYISO may request that the effective UOL be established to ensure that the ELR unit is offering its daily energy limit over the hours requested by the NYISO (which may be no fewer than the number of consecutive hours that correspond to its elected Energy Duration Limitation for the day during the applicable ICAP Obligation Hours).[6] Each such ELR unit will settle deviations between its RT and DA schedules at the RT LBMPs but shall be eligible for a Day-Ahead Margin Assurance Payment, if necessary, to guarantee its Day-Ahead margin on an hourly basis.

Real-Time: The NYISO will carry the upper operating limit used to establish the DA schedule into RTC and RTD to establish the RT schedule. Notwithstanding the use of the UOL_N as the upper operating limit in the DAM, to prevent or address an emergency, the NYISO may notify the ELR generator operator that the NYISO requires operation above the UOL_N for a period of the NYISO's choice (which may be continuous), provided it does not cause the ELR resource to exceed its daily energy limit. This notification is made via e-mail and/or RTC_{15} schedule posting.

Whenever the NYISO requests that a registered ELR operate to a modified schedule the following will apply:

1. The ISO will determine the necessary schedule modifications, and notify the ELR operator via the Transmission Owner.
2. For hours in which the NYISO approves a modified schedule that is less than the original Day-Ahead schedule, the ELR will be flagged as derated for ELR purposes. In this case, the Real-Time UOL_N is set at the ELR derated UOL_N in these hours, and is also used for Real-Time operations.

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[5] The applicable reliability criteria consider transmission constraints and reliability based locational reserve requirements - specifically all NYCA, Eastern NY 10-minute, and Long Island 30-minute reserve requirements.

[6] Units capable of providing an ICAP equivalent of their UCAP sales for more than the number of consecutive hours that correspond to its elected Energy Duration Limitation may be requested to provide the energy equivalent of their ICAP obligation over the maximum number of hours that the unit can generate at a level equal to its ICAP obligation.

3. For hours in which the modified schedule is greater than the original Day-Ahead schedule, the unit will be set Out-of-Merit.

1.3. Ambient Condition-Dependent Units

Capacity Suppliers whose UOL_N or UOL_E varies as a function of an ambient condition such as air temperature must register those characteristics with the ISO. These suppliers must submit a UOL_N that is equal to or greater than their ICAP obligation reduced, if necessary, to account for the ambient condition such as ambient air temperature, pursuant to the registration information provided to the NYISO.

Suppliers wishing to take advantage of this option should submit operating data and an explanation of the manner in which their output varies as a function of an ambient condition to the NYISO.

Examples

The NYISO has developed several examples of the application of the rules and protocols described in this Attachment to the Installed Capacity Manual.

1.3.1. Output Factor Equation Requirement

The output factor equation is required for all the ambient condition dependent generators such as combined cycle plants and combustion turbine simple cycle plants, for their characteristics of generator output vs. ambient temperature. NYISO requires the output factor equation as a function of ambient temperature and not the combustion turbine compressor inlet temperature. Some of the OEM performance curves are based on combustion turbine compressor inlet temperature, and the expected generator output at a given ambient temperature cannot be directly obtained from an output factor equation as a function of the combustion turbine compressor inlet temperature, since there is a difference between the ambient temperature and combustion turbine compressor inlet temperature in the presence of combustion turbine inlet conditioning operation.

The output factor is the ratio of the generator output at an ambient temperature to the generator output at the reference ambient temperature. At the reference ambient temperature, the output factor is 1:

$$Output\ Factor_{Tamb} = \frac{Generator\ Output\ on\ the\ high\ side\ of\ GSU_{Tamb}}{Generator\ Output\ on\ the\ high\ side\ of\ GSU_{Tamb,ref}}$$

Where

Tamb = Ambient temperature, °F

Tamb, ref = Reference ambient temperature, °F

The output factor equation(s) requirements are as follows:

1.3.1.1 Type of equation:

NYISO requires that the output factor equations are expressed in polynomial equations. The highest degree of output factor equations that NYISO can accept is 3rd degree polynomial equations, i.e.

$$Output\ Factor\ (Tamb) = a1 \cdot Tamb^3 + a2 \cdot Tamb^2 + a3 \cdot Tamb + C$$

Where

Tamb = ambient temperature, °F

a1, a2, a3 and C are the coefficients.

The 3rd degree equation is the highest degree available but the submitted equations can be lower than the 3rd degree. i.e. in the case that a linear function adequately expresses the relationship between the output ratio and the ambient temperature, a1 and a2 are zero.

1.3.1.2 Performance/Output Data:

The generator output data used for the output factor equation must reflect DMNC operating conditions. There are a number of possible sources for the output factor equations:

a. OEM performance curves and heat balances: this is the preferred source of output factor equations.
b. Operating data: are acceptable if all the performance data are from DMNC operation.
c. Net Plant performance modeling from engineering consulting firms.

1.3.1.3 Number of equation:

The maximum number of equations allowed is three (3), the minimum number of equations is one (1).

1.3.1.4 Range of validity

The output factor equation(s) must be valid for the full ambient temperature range applicable at the site, a typical ambient temperature range for NYCA is from 0 °F to 100 °F.

1.3.1.5 Reference Point

The reference point of the output factor equation is at the ambient temperature where output factor is 1. The most common reference point is at 59 °F, but it is not the requirement and can be at a different ambient temperature. There should be only one reference point for the entire ambient temperature range, instead of the distinction of "summer curve" and "winter curve" that have separate reference points.

1.3.1.6 Break points

It is possible to have break points as a part of the characteristics of output factor vs. ambient temperature equations. These break points represent physical, and not mathematical/statistical changes in the characteristics such as:

a. Combustion turbine inlet conditioning (heating and/or cooling) turn on point.
b. Equipment operating limits, i.e. combustion turbine shaft limit.

Break points lead to multiple output factor equations in expressing the relationship between output ratio and the ambient temperature over the full ambient temperature range.
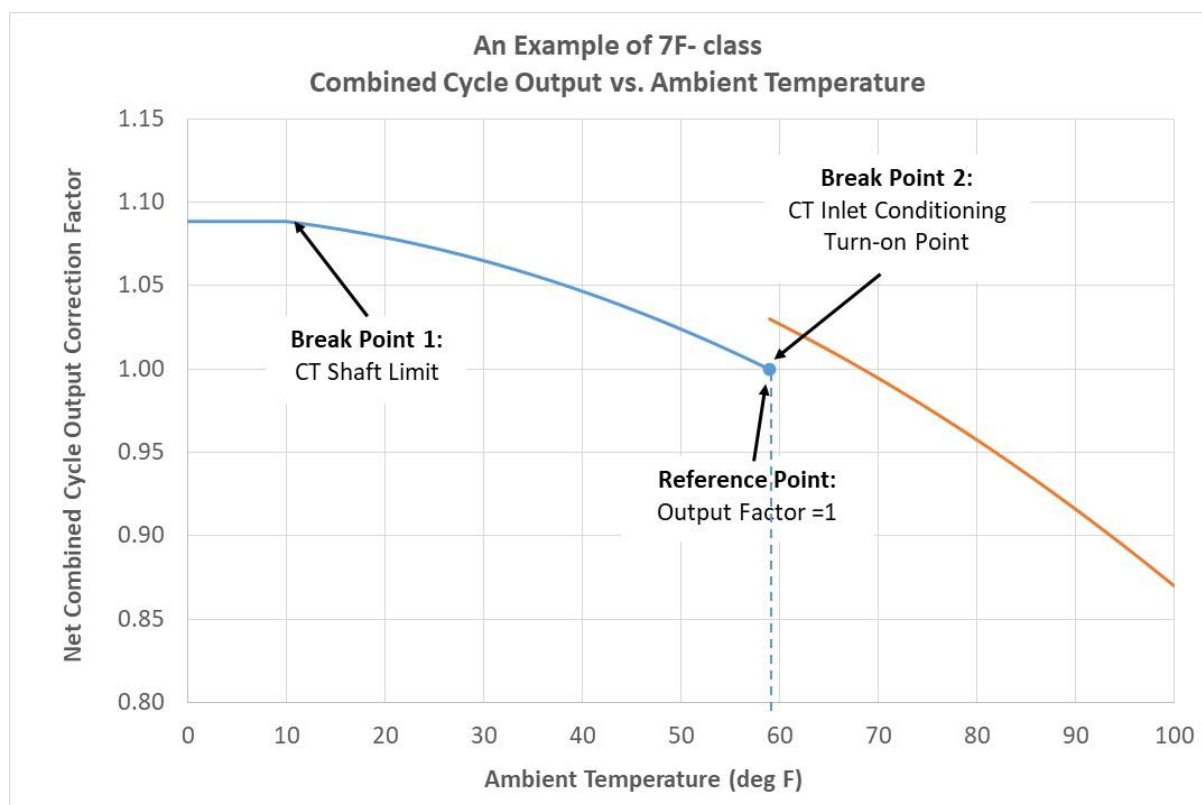
Figure 1. Output factor equation example with break points

1.4. Example 1 – CLR

The example illustrates variations in upper operating limits for three ambient condition-dependent units, one of which is a CLR. Day-Ahead schedule and settlement are also discussed. The three suppliers are described below and summarized in the table that follows.

1. A combustion-turbine generator (CT-A) with a nameplate rating of 100 MW:
   - The nameplate rating is established at 59° F.
   - The maximum capacity decreases as ambient temperature increases above 59° F. Rate of decrease is 1% of nameplate rating for every 3° F above 59° F. CT-A has registered this characteristic with the ISO.
   - The summer capability of the generator (89 MW) is established at an ambient temperature of 92° F.
   - The generator is unable to increase output above its normal output. That is, the generator is not a CLR.
   - The generator has no recharge requirement. That is, it is not an ELR.
   - The generator is an Ambient Condition-dependent (air temperature) unit once it registers its characteristics with the ISO.
   - CT-A has an ICAP obligation that requires a temperature-adjusted Day-Ahead offer of at least 89 MW, adjusted to an ambient temperature of 92° F
2. A run-of-the-river hydro generator (HYDRO-A) with a nameplate rating of 100 MW.
   - The nameplate rating is established with river flow near flood stage.

- The maximum capacity decreases linearly as river flow decreases. HYDRO-A has registered this characteristic with the ISO.
- The summer capability of the generator (50 MW) is established for an expected summer river flow that is only 50% of flood stage.
- The generator is unable to increase output above its normal output. That is, the generator is not a CLR.
- The generator has no recharge requirement. That is, it is not an ELR.
- HYDRO-A has an ICAP obligation that requires a Day-Ahead offer of at least 50 MW, adjusted to a river flow of 50% of flood stage.

	CT-A		HYDRO-A
Nameplate MW	100 MW @ 59° F		100 MW
Emergency MW	n/a		n/a
Summer MW (normal)	89 MW @ 92° F		50 MW
Summer MW (emergency)	n/a		n/a

It is summer and it has been hot. The next day is expected to be a scorcher. Ambient temperature between the hours of 10:00 to 20:00 is expected to be 104° F. Ambient temperature in all other hours is expected to be 92° F. It has also been a dry summer and the river is flowing at only 20% of flood stage. The UOL_N and UOL_E for the generators' Day-Ahead offers are tabulated below.

	CT-A				HYDRO-A	
	UOL_N	**UOL_E**			**UOL_N**	**UOL_E**
HB 0:00 – 9:00	89	89			20	20
HB 10:00 – 19:00	85	85			20	20
HB 20:00 – 23:00	89	89			20	20

Suppose all three generators were fully scheduled Day-Ahead and that no reliability-based security criteria were violated with schedules that respected each generator's UOL_N. Schedules for the next day are tabulated below. Deviations in Real-Time from the Day-Ahead schedule would be balanced at Real-Time prices. Barring derates in Real-Time, all generators will have fulfilled their ICAP obligations.

	CT-A		HYDRO-A
HB 0:00 – 9:00	89		20
HB 10:00 – 19:00	85		20
HB 20:00 – 23:00	89		20

Now suppose all three generators were fully scheduled Day-Ahead and that reliability-based security criteria were violated with schedules that respected each generator's UOL_N. Each energy resource would be evaluated up to its UOL_E. Schedules for the next day are tabulated below.

Deviations in Real-Time from the Day-Ahead schedule would be balanced at Real-Time prices. Barring derates in Real-Time, all generators will have fulfilled their ICAP obligations.

	CT-A		HYDRO-A
HB 0:00 – 9:00	89		20
HB 10:00 – 19:00	85		20
HB 20:00 – 23:00	89		20

1.5. Example 2 – ELR

Example 2 illustrates variations in upper operating limit for two energy suppliers, one of which is an ELR and the other of which is an ambient condition-dependent unit. Day-Ahead schedule and settlement are also discussed. The two suppliers are described below and summarized in the table that follows.

1. A run-of-the-river hydro generator (HYDRO-A) with a nameplate rating of 100 MW.
   - This generator is identical to the generator of the same name in the preceding example.
2. A hydro generator (HYDRO-B) with a pond. HYDRO-B can operate for four hours at maximum capacity if the pond is full. HYDRO-B has a nameplate rating of 100 MW.
   - The nameplate rating can be achieved with a full pond.
   - The maximum capacity is constant until the pond is empty.
   - The pond can be recharged over night at any time of the year.
   - The generator is unable to increase output above its normal output. That is, the generator is not a CLR. HYDRO-B has registered as an ELR with the ISO.
   - HYDRO-B has an ICAP obligation that requires a Day-Ahead offer of at least 100 MW for four hours of the day.
   - HYDRO-B wants to operate from 12:00 to 16:00 hours.

	HYDRO-A	HYDRO-B
Nameplate MW	100 MW	100 MW
Emergency MW	n/a	n/a
Summer MW (normal)	50 MW	100 MW
Summer MW (emergency)	n/a	n/a
Energy Limit	n/a	400 MWH

It is summer and it has been hot. Regardless of the expected temperature for the next day, and it is expected to be a scorcher, the river is flowing at only 20% of flood stage. The UOL_N and UOL_E for the generators' Day-Ahead offers are tabulated below.

	HYDRO-A		HYDRO-B	
	UOL_N	UOL_E	UOL_N	UOL_E

HB 0:00 – 11:00	20	20	0	100
HB 12:00 – 15:00	20	20	100	100
HB 16:00 – 23:00	20	20	0	100

Suppose both generators were fully scheduled Day-Ahead and that no reliability-based security criteria were violated with schedules that respected each generator's UOL$_N$. Schedules for the next day are tabulated below. Baring derates in Real-Time, all generators will have fulfilled their ICAP obligations.

	HYDRO-A	HYDRO-B
HB 0:00 – 11:00	20	0
HB 12:00 – 15:00	20	100
HB 16:00 – 23:00	20	0

If the ISO detects a security problem during Real-Time operation, the ISO may ask HYDRO-B to modify its schedule. In such a case the Day-Ahead Margin Assurance Payment ("DAMAP") provides certain guarantees that HYDRO-B will not be harmed by balancing charges.

Now suppose both generators were fully scheduled Day-Ahead and that reliability-based security criteria were violated with schedules that respected each generator's UOL$_N$. Each energy resource would be evaluated up to its UOL$_E$. Schedules for the next day are tabulated below. Barring derates in Real-Time, all generators will have fulfilled their ICAP obligations.

	HYDRO-A	HYDRO-B
HB 0:00 – 9:00	20	0
HB 10:00 – 11:00	20	100
HB 12:00 – 15:00	20	100
HB 16:00 – 17:00	20	100
HB 18:00 – 23:00	20	0

HYDRO-B clearly has been given an impossible schedule. It is scheduled to operate for eight hours, but is only able to operate for four hours. HYDRO-B may request an ELR derate for four hours. Its schedule would be modified so that it runs for only four of the hours. Normally the four hours would be chosen by HYDRO-B, but, for reliability considerations, the ISO reserves the right to choose the hours of operation. In the event of an ELR derate or a schedule modification directed by the ISO, the DAMAP provides certain guarantees that HYDRO-B will not be harmed by balancing charges.

Attachment N   Procedure to Calculate Translation Factors for an Intermittent Power Resource or Limited Control Run of River Hydro Resource

(Version 1.1)

This Attachment N describes the general procedure for calculating translation factors for Intermittent Power Resources, which include generators that depend on wind, solar, and landfill gas for their fuel, and Limited Control Run of River Hydro Resources. The translation factors are for use in the shifting methodologies utilized in the Installed Reserve Margin study, Locational Minimum Installed Capacity Requirement study, and for studying resources in deliverability studies.

1.1.   Definitions

Capability Year	per Tariff definition
Summer Capability Period	per Tariff definition

1.2.   Calculations

For purposes of this Section 1.2:

"Hourly Output" means the metered output of the Intermittent Power Resource or Limited Control Run of River Hydro Resource expressed to the nearest tenth of a MW and integrated over a one-hour period

"Hourly LOLE distribution percentage" means the hourly LOLE distribution percentage expressed as a full percentage point

The calculation of the translation factor for an Intermittent Power Resource or Limited Control Run of River Hydro Resource for a particular Capability Year is based on its operating data for the five previous Capability Years. This process captures any changes in the historical average performance of an Intermittent Power Resource or Limited Control Run of River Hydro Resource that may have occurred during the prior five years of operation.

The following definitions are applicable to Intermittent Power Resources and Limited Control Run of River Hydro Resources:

AF_{gy}: is the unit-specific availability factor used in the calculation of the unit-specific translation factor of supplier g in year y;

$$AF_{gy} = \frac{1}{H} \sum_{h \in CYH} \left[\left(\frac{E_{ghy}}{NC_{ghy}} \right) \times WF_h \right]$$

Where:

CYH is the set of all hours during the months of June, July and August of the previous five Summer Capability Periods during which Resource g was available for commercial operation;

H is the total number of hours in *CYH;*

E_{ghy} is the total amount of energy delivered to the NYCA transmission system by Resource *g* during hour *h*, and year *y*;

NC_{ghy} is the nameplate capacity of Resource *g* in hour *h* and year *y;* and

WF_h is the hourly weighting factor corresponding to the most recent hourly LOLE distribution percentage table, available on the NYISO Capacity Accreditation web page (https://www.nyiso.com/accreditation).

TF_{gy}: is the unit-specific translation factor for the ICAP-to-UCAP translation for use in the shifting methodologies utilized in the Installed Reserve Margin study, Locational Minimum Installed Capacity Requirement study, and for studying resources in deliverability studies (as defined in Attachment S of the *NYISO Open Access Transmission Tariff* (OATT))

$$TF_{gy} = 1 - AF_{gy}$$

Except that for new Intermittent Power Resources or Limited Control Run of River Hydro Resources for which less than sixty (60) days of production data are available to calculate AF_{gy} using the equation above, AF_{gy} instead will be calculated by the ISO based on NERC class averages for similar Resources of the same class as Resource *g*. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.