

# Attachment J:

## Unforced Capacity for Installed Capacity Suppliers

### 1.0 Fundamental Formulae

$$(1-1) \quad UCAP = (1 - EFOR_b) \times DMNC$$

$$(1-2) \quad EFOR_b = \frac{f_r \times FOH + f_p \times (EFOH - FOH)}{SH + f_r \times FOH}$$

$$(1-3) \quad f_r = \frac{\frac{1}{r} + \frac{1}{T}}{\frac{1}{r} + \frac{1}{T} + \frac{1}{D}}$$

$$(1-3a) \quad r = \text{average forced outage duration} = \frac{FOH}{\text{number of forced outages}}$$

$$(1-3b) \quad T = \text{average time between calls for a unit to run} = \frac{RSH}{\text{number of attempted starts}}$$

$$(1-3c) \quad D = \text{average run time} = \frac{SH}{\text{number of successful starts}}$$

$$(1-4) \quad f_p = \frac{SH}{AH}$$

**Note: UCAP values will be calculated monthly for each Resource based on a rolling 12-month calculation. The detailed formulae, including treatment where new units are being phased in, are shown in Section 3.**

## 2.0 Definitions

UCAP .....	Unforced Capacity
EFOR <sub>D</sub> .....	Equivalent Demand Forced Outage Rate
DMNC .....	per Tariff definition
ICE .....	Installed Capacity Equivalent as defined in the Services Tariff and in Section 3 of this Attachment J.
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 <sub>f</sub> .....	full f-factor (see formula in Section 1.0)
f <sub>p</sub> .....	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](http://www.nerc.com)

### 3.0 Calculations

In general, all generating Resources with nameplate capacities greater than 10 MWs or plants with aggregated capacities greater than 25 MW are expected to provide the full GADS Data set defined in [Attachment K](#). Units for which the full GADS Data set is provided will have their UCAP based on EFOR<sub>D</sub> according to Section 3.1 below. All other generating units will be rated based on equivalent GADS Data as described in Section 3.2. Energy Limited Resources that do not want to have their UCAP based on production levels using equivalent GADS Data will have to submit GADS Data to document their available capacity for the minimum 4-hour daily requirement period. Special Case Resources will have their UCAP based on Load reduction determined in Section 3.3.

#### 3.1 UCAP based on EFOR<sub>D</sub>

(a) **Determining the Amount of UCAP a Supplier Qualifies to Supply**

$$UCAP_{gm}^Q = (1 - EFOR_{Dgm}) DMNC_{gm};$$

where:

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

$UCAP_{gmp}$  is the Unforced Capacity that supplier  $g$  provides in month  $m$ ;

$EFOR_{Dgm}$  is the Equivalent Demand Forced Outage Rate calculated for supplier  $g$  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; and

$DMNC_{gm}$  is the DMNC rating for supplier  $g$  which is applicable for month  $m$ , which shall be the most recent Summer DMNC rating for that supplier 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 supplier calculated in accordance with ISO procedures if month  $m$  is part of a Winter Capability Period, as of the close of business on the last business day preceding the Monthly Installed Capacity Auction that is conducted during the month preceding month  $m$ .

A rolling, cumulative, 12-month EFOR<sub>D</sub> will be calculated for each Resource that submits GADS Data using the GADS reporting format in [Attachment K](#). The EFOR<sub>D</sub> for month (m) will be based on GADS Date for months, m-14, through and including month, m-3. (For example, EFOR<sub>D</sub> for August will be based on data submitted for June of the prior year through May of the current year).

$$EFOR_{Dgm} = \frac{IST_{ge}}{12} \times \frac{f_{igbe}FOH_{gbe} + f_{pgbe}(EFOH_{gbe} - FOH_{gbe})}{(SH_{gbe} + f_{igbe}FOH_{gbe})} + \left(1 - \frac{IST_{ge}}{12}\right) CEFOR_{Dg}$$

where  $f_{igbe}$  and  $f_{pgbe}$  are further defined below and:

$EFOR_{Dgm}$  as above, is the 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  $m$ ;

$IST_{ge}$  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  $e$ ; 12 if Resource  $g$  was in service from months  $m-14$  through month  $m-3$ );

$FOH_{gbe}$  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 40-43 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:

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

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 F](#), Performance Record 01, columns 35-38;

$NAC_{gi}$  is the Net Available Capacity for Resource  $g$ , applicable for outage  $i$ , submitted in accordance with [Attachment K](#), Event Record 01, columns 60-63;

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 16-19;

$e$  is the end of the month occurring three months before month  $m$ , (e.g., if month  $m$  is September 2001, then  $e$  is the end of June 2001);

$b$  is the beginning of the month occurring 14 months before month  $m$ , unless the supplier had not gone into service at that time, in which case  $b$  is the time at which that supplier went into service; and

$CEFOR_{Dg}$  is the class-equivalent  $EFOR_D$  calculated by the ISO for suppliers of the same class as supplier  $g$  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:

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

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 20-23; 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

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

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 32-35.

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

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

If  $SH = 0$ , set  $f_r=1$ ;

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

If AH = 0, set  $f_p = 1$ .

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

$$ICE_{gm} = \frac{UCAP_{gm}^p}{1 - EFOR_{Dgm}}$$

where:

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

$UCAP_{gm}^p$  is the amount of Unforced Capacity that supplier  $g$  supplies in month  $m$ ; and

$EFOR_{Dgm}$  as above, is the 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  $m$ .

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

**(a) Determining the Amount of UCAP a Supplier Qualifies to Supply**

$$UCAP_{gm}^Q = (1 - OF_{gm})DMNC_{gm}$$

where:

$UCAP_{gm}^Q$  is the Unforced Capacity that supplier  $g$  is qualified to provide in month  $m$ ;

$OF_{gm}$  is the Outage Factor calculated for supplier  $g$ , as further defined below, that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month  $m$ ; and

$DMNC_{gm}$  is the DMNC rating for supplier  $g$  which is applicable for month  $m$ , which shall be the most recent Summer DMNC rating for that supplier 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 supplier calculated in accordance with ISO procedures if month  $m$  is part of a Winter Capability Period, as of the close of business on the last business day preceding the Monthly Installed Capacity Auction that is conducted during the month preceding month  $m$ .

A rolling, cumulative 12-month, outage factor (OF) will be calculated for each Resource that submits the basic data (equivalent GADS Data) using the GADS Data form in [Attachment K](#). The OF for month ( $m$ ) will be based on GADS Data for months,  $m-14$  through month  $m-3$ . (For example,  $EFOR_D$  for August will be based on data submitted for June of the prior year through May of the current year).

$$OF_{gm} = \frac{IST_{ge}}{12} \times (1 - CF_{gbe}) + \left(1 - \frac{IST_{ge}}{12}\right) (1 - CCF_g)$$

where:

$OF_{gm}$  is the 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  $m$ ;

$IST_{ge}$  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  $e$ ; 12 if Resource  $g$  was in service from months  $m-14$  through month  $m-3$ ); and

$$CF_{gbe} = \frac{NAG_{gbe}}{\sum_{m=B}^E (NDC_{gm}(PH_{gm} - POH_{gm} - MOH_{gm}))};$$

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 39-45;

$NDC_{gm}$  is the Net Dependable Capacity for Resource  $g$  for month  $m$ . The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

$PH_{gm}$  is the Period Hours reported for Resource  $g$  for month  $m$ . The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 56-59;

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

$MOH_{gm}$  is the Maintenance Outage Hours reported for Resource  $g$  for month  $m$ . The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 44-47;

$CCF_g$  is the class-equivalent Capacity Factor for suppliers of the same class as supplier  $g$  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;

$b$  is the beginning of the month occurring 14 months before month  $m$ , unless the supplier had not gone into service at that time, in which case  $b$  is the time at which that supplier went into service;

$e$  is the end of the month occurring three months before month  $m$ , (e.g., if month  $m$  is September 2001, then  $e$  is the end of June 2001);

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$B$  is the month containing time  $b$ ; and

$E$  is the month containing time  $e$ .

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

$$ICE_{gm} = \frac{UCAP_{gm}^P}{1 - OF_{gm}}$$

where:

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

$UCAP_{gm}^P$  is the amount of Unforced Capacity that supplier  $g$  supplies in month  $m$ ; and

$OF_{gm}$ , as above, is the 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  $m$ .

**3.3 UCAP based on Load/Demand Reduction applicable to Special Case Resources**

The amount of UCAP that can be provided by a Special Case Resource that provides capacity wholly or partially by means of non-generator based load reduction shall be calculated using the equations specified in subsection (a). The amount of UCAP that can be provided by a Special Case Resource that provides capacity solely by means of load reductions achieved through operation of one or more generators may be calculated using the equations specified in either subsection (a) or subsection (b). The Installed Capacity Equivalent of Special Case Resources shall be as specified in subsection (c). The "SCR Workbook" refers to the Excel Workbook posted on the NYISO website at <http://www.nyiso.com/public/products/icap/auctions.jsp>.

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**(a) Determining the Amount of UCAP for a Non-Generator Based Special Case Resource**

$$UCAP_{gm}^Q = (APMD_{gm} - CMD_{gm}) \times \frac{\sum_{h \in LRH_{gbe}} \min\left(\frac{APMD_{gh} - AMD_{gh}}{APMD_{gh} - CMD_{gh}}, 1\right)}{NLRH_{gbe}} \times (1 + TLF_g)$$

where:

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

$APMD_{gm}$  is the Average of Peak Monthly Demands for Resource  $g$  applicable to month  $m$ , using data submitted in accordance with the SCR Workbook; if month  $m$  is in the Summer Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the months of June, July, August and September in the most recent Summer Capability Period preceding the Capability Period containing month  $m$  (e.g., if month  $m$  is August 2007, then the peak monthly demands to be counted would be for the months of June, July,

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August and September of 2006); and if month  $m$  is in the Winter Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the months of December, January, February and March in the most recent Winter Capability Period preceding the Capability Period containing month  $m$ ;

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$CMD_{gm}$  is the Contract Minimum Demand for Resource  $g$  applicable to month  $m$ , using data submitted in accordance with the SCR Workbook;

$LRH_{gbe}$  is the set of hours (each an hour  $h$ ) in the period beginning at time  $b$  and ending at time  $e$  in which Resource  $g$  was requested to reduce load;

$APMD_{gh}$  is the applicable Average of Peak Monthly Demands for Resource  $g$  applicable to hour  $h$ , using data submitted in accordance with the SCR Workbook; if hour  $h$  is in the Summer Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the months of June, July, August and September in the most recent Summer Capability Period preceding the Capability Period containing hour  $h$ ; and if hour  $h$  is in the Winter Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the months of December, January, February and March in the most recent Winter Capability Period preceding the Capability Period containing hour  $h$ ;

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$AMD_{gh}$  is the Average Minimum Demand for Resource  $g$  for hour  $h$ , using data submitted in accordance with SCR Workbook;

$CMD_{gh}$  is the Contract Minimum Demand for Resource  $g$  applicable to hour  $h$ , using data submitted in accordance with SCR Workbook;

$NLRH_{gbe}$  is the number of hours during the period beginning at time  $b$  and ending at time  $e$  in which Resource  $g$  was requested to reduce load (including any hour in which Resource  $g$  was requested to reduce load by the ISO as part of a test);

$b$  is the beginning of the most recent Summer Capability Period that precedes the Summer Capability Period containing month  $m$ , if month  $m$  occurs during a Summer Capability Period; otherwise the beginning of the most recent Winter Capability Period that precedes the Winter Capability period containing month  $m$ , if month  $m$  occurs during a Winter Capability Period;

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$e$  is the end of the most recent Summer Capability Period that precedes the Summer Capability Period containing month  $m$ , if month  $m$  occurs during a Summer Capability Period; otherwise the end of the most recent Winter Capability Period that precedes the Winter Capability period containing month  $m$ , if month  $m$  occurs during a Winter Capability Period; and

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$TLF_g$  is the applicable transmission loss factor for Resource  $g$ , expressed in decimal form (i.e. a loss factor of 8% is equal to .08). The applicable transmission loss factor shall be the loss factor for deliveries of Energy by the relevant TO to the retail customer where the Resource  $g$  is located as reflected in the TO's most recent rate case.

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If  $NLRH_{gbe} = 0$ , then the calculation of  $UCAP_{gm}^Q$  shall be performed as though the value of

$$\sum_{h \in LRH_{gbe}} \min \left( \frac{APMD_{gh} - AMD_{gh}}{APMD_{gh} - CMD_{gh}}, 1 \right)$$

in the equation above were 1; provided, however, that if

Resource  $g$  had not begun to serve as a Special Case Resource at time  $e$ , then the value of

$$\sum_{h \in LRH_{gbe}} \min \left( \frac{APMD_{gh} - AMD_{gh}}{APMD_{gh} - CMD_{gh}}, 1 \right)$$
 in the equation above shall be set equal to an average

historical performance factor calculated by the ISO for all Special Case Resources. Until such a calculation is performed and posted by the ISO, this factor shall equal 1.

**(b) Determining the Amount of UCAP for a Non-Generator Based Special Case Resource with a APMD provisionally based on monthly billing demands**

The calculation will be performed as in 3.3 (a) except that the applicable Average of Peak Monthly Demands for Resource  $g$  applicable to hour  $h$  is calculated using the actual peak monthly demands for that supplier as follows; if hour  $h$  is in the Summer Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the months of June, July, August and September in that same Capability Period; and if hour  $h$  is in the Winter Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the months of December, January, February and March in that same Capability Period.

This provision is only applicable for SCRs with newly installed interval billing meters and applicable for no longer than two successive Capability Periods.

**(c) Determining the Amount of UCAP for a Generator-Based Special Case Resource**

$$UCAP_{gm}^Q = DMNC_{gm} \times \frac{\sum_{h \in LRH_{gbe}} \min \left( \frac{AGO_{gh}}{CGO_{gh}}, 1 \right)}{NLRH_{gbe}} \times (1 + TLF_g)$$

where:

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

$DMNC_{gm}$  is the total of DMNC ratings for all generators used to reduce load at Resource  $g$  which are applicable for month  $m$ , which shall be the most recent Summer DMNC ratings for the generators calculated in accordance with ISO procedures if month  $m$  is part of a Summer Capability Period, or the most recent Winter DMNC ratings for the generators calculated in accordance with ISO procedures if month  $m$  is part of a Winter Capability Period, as of the close of business on the last business day preceding the Monthly Installed Capacity Auction that is conducted during the month preceding month  $m$ .

$LRH_{gbe}$  is the set of hours (each an hour  $h$ ) in the period beginning at time  $b$  and ending at time  $e$  in which Resource  $g$  was requested to reduce load;

$NLRH_{gbe}$  is the number of hours during the period beginning at time  $b$  and ending at time

$e$  in which Resource  $g$  was requested to operate in order to offset system load (including any hour in which Resource  $g$  was requested to operate by the ISO as part of a test);

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$AGO_{gh}$  is the average output of the generator(s) located at Resource  $g$  during an hour  $h$  using data submitted in accordance with SCR Workbook, Figure 2, Special Case Resource Generator Output Performance;

$CGO_{gh}$  is the Contracted Generator Output for the generator(s) located at Resource  $g$  applicable to an hour  $h$ , using data submitted in accordance with SCR Workbook, Special Case Resource Certification;

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$b$  is the beginning of the month occurring 14 months before month  $m$ , unless Resource  $g$  had not begun at that time to serve as a Special Case Resource available to reduce load, in which case  $b$  is the earlier of time  $e$  or the time at which Resource  $g$  began to serve as a Special Case Resource available to reduce load;

$e$  is the end of the month occurring three months before month  $m$  (e.g., if month  $m$  is September 2001, then  $e$  is the end of June 2001; and

$TLF_g$  is the applicable transmission loss factor for Resource  $g$ , expressed in decimal form (i.e. a loss factor of 8% is equal to .08). The applicable transmission loss factor shall be the loss factor for deliveries of Energy by the relevant TO to the retail customer where the Resource  $g$  is located as reflected in the TO's most recent rate case.

If  $NLRH_{gbe} = 0$ , then the calculation of  $UCAP_{gm}^Q$  shall be performed as though the value of

$\frac{\sum_{h \in LRH_{gbe}} \min\left(\frac{AGO_{gh}}{CGO_{gh}}, 1\right)}{NLRH_{gbe}}$  in the equation above were 1; provided, however, that if Resource  $g$  had

not begun to serve as a Special Case Resource at time  $e$ , then the value of

$\frac{\sum_{h \in LRH_{gbe}} \min\left(\frac{AGO_{gh}}{CGO_{gh}}, 1\right)}{NLRH_{gbe}}$  in the equation above shall be set equal to an average historical

performance factor calculated by the ISO for all Special Case Resources. Until such a calculation is performed and posted by the ISO, this factor shall equal 1.

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

##### (1) ICE for a Non-Generator Based Special Case Resource

The ICE of a Special Case Resource  $g$  that provides capacity wholly or partially by means of non-generator based load reduction shall be calculated as follows:

$$ICE_{gm} = APMD_{gm} - CMD_{gm}$$

where:

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

$APMD_{gm}$  is the Average of Peak Monthly Demands for Resource  $g$  applicable to month  $m$ , using data submitted in accordance with SCR Workbook, Special Case Resource Certification, as calculated in subsection (a) above; and

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$CMD_{gm}$  is the Contract Minimum Demand for Resource  $g$  applicable to month  $m$ , using data submitted in accordance with SCR Workbook, Special Case Resource Certification.

(2) ICE for a Generator Based Special Case Resource

The ICE of a Special Case Resource that provides capacity solely by means of load reductions achieved through operation of one or more generators shall be as follows:

$ICE_{gm} = CGO_{gm}$

where:

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

$CGO_{gm}$  is the Contracted Generator Output for the generator(s) located at Resource  $g$  applicable for month  $m$ , using data submitted in accordance with SCR Workbook, Special Case Resource Certification.

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(e) Measuring RIP Deficiencies for RIP Portfolios

A RIP will not be charged with a deficiency penalty if the total performance of its Special Case Resources meets or exceeds the total capacity it is committed to supply from all of its Special Case Resources. Just as a Special Case Resource is expected to meet its Installed Capacity commitment for a minimum 1 hour each Capability Period, a RIP portfolio must meet its certified Installed Capacity commitment (the Installed Capacity Equivalent of its certified Unforced Capacity). The calculation will be performed on an hour by hour basis for each hour of each Special Case Resource event and for any audit hours, if any.

The performance of each curtailable Load Special Case Resource will be the difference between its APMD and its AMD (terms as defined in Section 3.3 (a) above) for each hour in MW-hrs. The total performance of all curtailable Load Special Case Resources will be the sum of all such differences for the same hour in each event.

The performance of each generator based Special Case Resource will be its production in MW-hrs for each hour. The total performance of all generator based Special Case Resources will be the sum of all such SCR's for the same hour in each event.

The RIP performance will be the sum of all curtailable Load Special Case Resources and all generator based Special Case Resources in its portfolio, calculated as in the above two paragraphs for the same hour in each event. The best hour will be compared to the Installed Capacity equivalent of its certified Unforced Capacity for each applicable month. The RIP deficiency, if any, will be the difference between the Installed Capacity Equivalent of its certified Unforced Capacity and the portfolio performance. If this quantity is negative or zero there is no deficiency. The applicable deficiency penalty will apply for the entire Capability Period, ?

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(f) Determining RIP Performance and Performance factors applicable to new SCR's

Similar to the deficiency calculation above and to the individual Special Case Resource

performances as determined in Sections 3.3 (a), (b), and (c) above, RIP portfolio performance will combine all hours of all events and/or audits into an overall performance factor. The NYISO will use the methodology described above to determine the RIP portfolio performance for each hour of each event and/or audit. The ratio of the sum of actual performances for all hours compared to the sum of the expected performances for all hours (Installed Capacity equivalent s of its certified Unforced Capacity is expected for each hour) will be the RIP performance factor applicable to all new resources registered in that RIP's portfolio and in accordance with the procedures in Section 4.12 of the Installed Capacity Manual.

### 3.4 Calculation of UCAP for Control Area System Resources

#### (a) Determining the Amount of UCAP a Supplier Qualifies to Supply

$$UCAP_{cm}^Q = NPC_{cm} \times (1 - CAF_{cm})$$

where:

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

$NPC_{cm}$  is the Net Projected Capacity calculated pursuant to the formula set forth in Section 4.10.3 of this Manual, repeated below for clarity:

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

and

$CAF_{cm}$  is the derating factor applicable to the Control Area System Resource providing Installed Capacity from Control Area  $c$  for month  $m$ , representing the average proportion of its Installed Capacity Equivalent that that Control Area System Resource was able to provide during months  $m-14$  through and including  $m-3$ , calculated as follows:

$$CAF_{cm} = \frac{\sum_{i=b}^e \max(0, ICE_{ci} - (CAP_{ci} + EP_{ci} + LM_{ci} - L_{ci} - ES_{ci} - LS_{ci} - PM_{ci} - FO_{ci} - OR_{ci}))}{\sum_{m=B}^E ICE_{cm} TH_m}$$

where:

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

$b$  is the beginning of the month 14 months before month  $m$ , 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 month 3 months before month  $m$ ;

$ICE_{ci}$  is the Installed Capacity equivalent of the amount of Unforced Capacity supplied from a

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  $b$ ;

$ICE_{cm}$  is the Installed Capacity Equivalent of the amount of Unforced Capacity provided from a Control Area Resource associated with Control Area  $c$  during month  $m$ , and

$TH_m$  is the total number of hours in month  $m$  in which the Control Area System Resource provided Installed Capacity to the NYCA.

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

$$ICE_{cm} = UCAP_{cm}^P / (1 - CAF_{cm}),$$

where:

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

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

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$CAF_m$  is the Capacity Adjustment Factor for Control Area  $c$  for month  $m$ , as calculated above.

### 3.5 Calculation of UCAP for Intermittent Power Resources

#### Determining the Amount of UCAP a Supplier Qualifies to Supply

This section describes the general procedure for calculating Unforced Capacity values for all Intermittent Power Resources.

#### DEFINITIONS

1. The Unforced Capacity value for an Intermittent Power Resources is that amount of generating capacity, expressed to the nearest tenth of a MW, that it can reliably contribute during summer peak hours and which can be traded as UCAP in the NYISO Installed Capacity market.
2. "Production Factor" for an Intermittent Power Resource is a factor based on historic operating data and/or a class average Production Factor.
3. The Intermittent Power Resource's DMNC or Installed Capacity value is the resource manufacturer's nameplate output rating, less the Station Power. Station Power is defined in the NYISO Tariffs and, as a general matter, refers to the amount of energy that is consumed to operate all auxiliary equipment and control systems to deliver the Intermittent Power Resource's energy to the NYCA transmission system.
4. An untested Intermittent Power Resource is a resource with less than one year of operating history. [??]
5. Class average Production Factor is a factor that is only used to calculate the UCAP Value of an untested Intermittent Power Resource.
6. "Hourly Output" is the average of the metered outputs, in MW, integrated over a one-hour period.
7. "Summer Day" is defined as any day in June, July or August.
8. "Summer Period" is the 3-month period from June 1 through August 31, inclusive.
9. "Summer Peak Hours" are hours beginning 1400, 1500, 1600, and 1700.
10. "Winter Day" is defined as any day in December, January or February.
8. "Winter Period" is the period from 3-month period from December 1 the last day of February, inclusive.
9. "Winter Peak Hours" are hours beginning 1600, 1700, 1800 and 1900.

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#### CALCULATION PROCEDURE

1. General Approach - The calculation of the Production Factor for a particular Intermittent Power Resource for a particular year is based on its operating data for the prior like Summer Period or Winter Period, as applicable. In the case of an untested Intermittent Power Resource, the untested Resource is assigned the class average Production Factor for its first year of operation in accordance with Section 4.5 of this Installed Capacity Manual. The class average Production Factor, when multiplied by the current DMNC value yields the Unforced Capacity value for that Intermittent Power

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Resource. This two-step process accommodates any changes in the DMNC value that may have occurred during the prior year of operation.

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## **DETAILED PROCEDURE**

A detailed outline, addressing both Intermittent Power Resources with historic production data and untested Intermittent Power Resources, is as follows:

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### **Unforced Capacity values applicable to the Summer Capability Period for any single Intermittent Power Resource**

A. Sum the Hourly Outputs (from each turbine?) for each of the Summer Peak Hours in the prior Summer Capability Period.

B. For each Summer Peak Hour, sum the DMNC values from each turbine ? attributable to each hour.

C. The quotient of the summed Summer Peak Hour outputs divided by the summed Summer Peak Hour DMNC values will yield the Production Factor for the Summer Capability Period.

D. For untested Intermittent Power Resources, the class average Summer Capability Period Production Factor will apply, in accordance with Section 4.5 of this Installed Capacity Manual.

E. The Unforced Capacity value is calculated by multiplying the Production Factor from (C) or (D) above by the current DMNC value for the Intermittent Power Resource.

### **Unforced Capacity values applicable to the Winter Capability Period**

A. Sum the Hourly Outputs (from each turbine?) for each of the Winter Peak Hours in the prior Winter Capability Period.

B. For each Winter Peak Hour, sum the DMNC values (from each turbine?) attributable to each hour.

C. The quotient of the summed Winter Peak Hour outputs divided by the summed Winter Peak Hour DMNC values will yield the Production Factor for the Winter Capability Period.

D. For untested Intermittent Power Resources, the class average Summer Capability Period Production Factor in accordance with Section 4.5 of this Installed Capacity Manual will apply.

E. The Unforced Capacity value is calculated by multiplying the Production Factor from (C) or (D) above by the current DMNC value for the Intermittent Power Resource.

### 3.6 Calculation of UCAP for Installed Capacity Delivered over UDR Facilities

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

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✓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 to the Interconnection Point in MWs, throughout its project life.

✓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 value in MW of Capacity delivered to a Locality will be:

$$(\text{Resource}_{\text{ICAP}} - \text{loss}_{\text{FL}}) * P_{\text{resource}} * P_{\text{cable}}$$

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where

Resource<sub>ICAP</sub> = ICAP value of resources associated with specific UDRs

loss<sub>FL</sub> = cable and converter station losses at rated UDR level

P<sub>resource</sub> = 1 - Resource EFORd

P<sub>cable</sub> = 1 - cable outage rate, including cable and converter station unavailability