

# Attachment J:

## Unforced Capacity for Installed Capacity Suppliers

### 1.0 Fundamental Formulae

$$(1-1) \quad \text{UCAP} = (1 - \text{EFOR}_D) \times \text{DMNC}$$

$$(1-2) \quad \text{EFOR}_D = \frac{f_f \times \text{FOH} + f_p \times (\text{EFOH} - \text{FOH})}{\text{SH} + f_f \times \text{FOH}}$$

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

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

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

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

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

**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.
$f_f$ .....	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](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, the following Sections~~. 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 accordance to Section 3.3, Control Area System Resources according to Section 3.4, Intermittent Power Resources according to Section 3.5 and UCAP values associated with UDRs will be determined according to Section 3.6.~~

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

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

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

where:

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

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

$EFOR_{Dgm}$  is the Equivalent Demand Forced Outage Rate calculated for supplierResource  $g$  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 supplierResource  $g$  which is applicable for month  $m$ , which shall be the most recent Summer DMNC rating for that supplierResource 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 supplierResource 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  $EFOR_D$  will be calculated each month for each Resource that submits GADS Data using the GADS reporting format in Attachment K. The  $EFOR_D$  for month ( $m$ ) will be based on GADS Data the average of  $EFOR_D$  values calculated for months,  $m-14$ , through Resource  $g$  covering the 12-month periods ending in February, March, April, May, June and including July if month,  $m-3$ . (For example, is in the Winter Capability Period and the average of  $EFOR_D$  values for Resource  $g$  covering the 12-month periods ending in August will be based on data submitted for June of the prior year through May of the current year)., September, October, November, December and January if month  $m$  is in the Summer Capability Period. Each rolling, cumulative, 12-month  $EFOR_D$  will be calculated as follows:

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

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

$EFOR_{Dg}$  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:

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

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 FK, 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-Resource had not gone into service at that time, in which case  $b$  is the time at which that supplierResource went into service; and

$CEFOR_{Dg}$  is the class-equivalent  $EFOR_D$  calculated by the ISO for suppliersResources of the same class as supplierResource  $g$  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

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

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 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  $f_f = 1$ ;

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**

$$ICE_{gm} = \frac{UCAP^p_{gm}}{1 - EFOR_{Dgm}}$$

where:

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

$UCAP^p_{gm}$  is the amount of Unforced Capacity that supplierResource  $g$  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 SupplierResource Qualifies to Supply

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

where:

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

$OF_{gm}$  is the Outage Factor calculated for supplierResource  $g$ , 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 supplierResource  $g$  which is applicable for month  $m$ , which shall be the most recent Summer DMNC rating for that supplierResource 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 supplierResource 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 suppliersResources of the same class as supplierResource  $g$  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 supplierResource had not gone into service at that time, in which case  $b$  is the time at which that supplierResource 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);

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

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



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

$$ICE_{gm} = \frac{UCAP^P_{gm}}{1 - OF_{gm}}$$

where:

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

$UCAP^P_{gm}$  is the amount of Unforced Capacity that supplierResource 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 3.3(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 3.3(a) or subsection 3.3(b). The method for determining the amount of UCAP for a non-generator based Special Case Resource with its APMD provisionally based on monthly billing demands is specified in subsection 3.3(c). The Installed Capacity Equivalent of Special Case Resources shall be as specified in subsection ~~(e)~~3.3(d). The method for determining RIP deficiencies is specified in subsection 3.3(e) and RIP portfolio performance will be determined according to subsection 3.3(f). The “SCR Workbook” refers to the Excel Workbook currently posted on the NYISO website at <http://www.nyiso.com/public/products/icap/auctions.jsp>.

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

$$UCAP^Q_{gm} = (APMD_{gm} - CMD_{gm}) \times \frac{\sum_{LRgbe} (APMD_{gh} - AMD_{gh})}{\sum_{LRgbe} (APMD_{gh} - CMD_{gh})} \times (1 + TLF_g)$$

where:

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

$APMD_{gm}$  is the Average of Peak Monthly Demands between Noon and 8 PM for Resource  $g$  applicable to month  $m$ , using data submitted in accordance with Attachment K, Special Case Resource Certification 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 between 12:00 p.m. and 8:00 p.m. for that ~~supplier~~Special Case Resource for the ~~most recent consecutive~~ months of June, July, August and September ~~that had occurred as of in~~ the beginning of Summer Capability Period prior to the Capability Period containing month  $m$  (e.g., if month  $m$  is August ~~2004~~2007, then the peak monthly demands to be ~~counted~~used would be for the months of June, July, August and September of ~~2000~~2006); and if month  $m$  is in the Winter Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands between 12:00 p.m. and 8:00 p.m. for that ~~supplier~~Special Case Resource for the ~~most recent consecutive~~ months of December, January, February and March ~~that had occurred as of in~~ the beginning of Winter Capability Period prior to the Capability Period containing month  $m$  (e.g., if month  $m$  is January 2008, then the peak monthly demands to be counted would be for the months of December 2006, and January, February and March of 2007);

$CMD_{gm}$  is the ~~Contract~~Committed Minimum Demand for Resource  $g$  applicable to month  $m$ , using data submitted in accordance with Attachment K, Special Case Resource Certification 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; where

$b$  is the beginning of the Winter Capability immediately preceding the Summer Capability Period prior to the Summer Capability Period containing month  $m$ , if month  $m$  occurs during a Summer Capability Period; otherwise the beginning of the most recent Summer Capability Period immediately preceding the Winter Capability prior to the Winter Capability period containing month  $m$ , if month  $m$  occurs during a Winter Capability Period;

$e$  is the end of the Summer Capability Period immediately preceding 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 immediately preceding the Winter Capability period containing month  $m$ , if month  $m$  occurs during a Winter Capability Period;

$APMD_{gh}$  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 most recent consecutive months of June, July, August and September that had occurred as of time  $e$ ; 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 most recent consecutive months of December, January, February and March that had occurred as of time  $e$ ;

$AMD_{gh}$  is the Actual Metered Demand for Resource  $g$  for hour  $h$ , using data submitted in accordance with the SCR Workbook (e.g., if month  $m$  is August 2007, then the Actual Metered Demand for Resource  $g$  is that which was read for required hours in the 2006 Summer Capability Period and the 2005/2006 Winter Capability period; if month  $m$  is January 2008, then the Actual Metered Demand for Resource  $g$  is that which was read for required hours in the 2006/2007 Winter Capability Period and the 2006 Summer Capability Period;

$CMD_{gh}$  is the Committed Minimum Demand for Resource  $g$  applicable to hour  $h$ , using data submitted in accordance with the SCR Workbook (e.g., if month  $m$  is August 2007, then the Committed Minimum Demand for Resource  $g$  is that which was declared for hour  $h$  in the 2006 Summer Capability Period and the 2005/2006 Winter Capability period; if month  $m$  is January 2008, then the Committed Minimum Demand for Resource  $g$  is that which was declared for hour  $h$  in the 2006/2007 Winter Capability Period and the 2006 Summer Capability Period); 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.

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

$$UCAP_{gm}^Q = \frac{DMNC_{gm}}{\frac{\sum_{LRH_{gbe}} (AGO_{gh})}{\sum_{LRH_{gbe}} (CGO_{gh})}} \times (1 + TLF_g)$$

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 (net of auxiliary power, load bank Load and any base Load generation production that served to modify the Special Case Resource's metered Load during the prior NYCA system peak period) 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;

~~$APMD_{gh}$  is the applicable Average of Peak Monthly Demands for Resource  $g$  applicable to hour  $h$ , using data submitted in accordance with Attachment K, Special Case Resource Certification; 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 most recent consecutive months of June, July, August and September that had occurred as of time  $e$ ; 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 most recent consecutive months of December, January, February and March that had occurred as of time  $e$ ;~~

~~$AMD_{gh}$  is the Average Minimum Demand for Resource  $g$  for hour  $h$ , using data submitted in accordance with Attachment K, Figure 2, Special Case Resource Minimum Load Demonstration;~~

~~$CMD_{gh}$  is the Contract Minimum Demand for Resource  $g$  applicable to hour  $h$ , using data submitted in accordance with Attachment K, Special Case Resource Certification;~~

~~$NLRH_{gbe}$  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 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  $UCAP_{gm}^e$  shall be performed as though the value

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

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

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

where:

$UCAP_{gm}^e$  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);

~~$AGO_{gh}$  is the average output of the generator(s) located at Resource  $g$  during an hour  $h$  using data submitted in accordance with Attachment K, 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 Attachment K, Special Case Resource Certification;~~

~~$b$  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  $UCAP_{gm}^e$  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.~~

**(e) — Determining the**

$AGO_{gh}$  is the MW-hr output of the generator(s) located at Resource  $g$  during an hour  $h$  using data submitted in accordance with the SCR Workbook;

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

$b$  is the beginning of the Winter Capability immediately preceding the Summer Capability Period prior to the Summer Capability Period containing month  $m$ , if month  $m$  occurs during a Summer Capability Period; otherwise the beginning of



the most recent Summer Capability Period immediately preceding the Winter Capability prior to the Winter Capability period containing month  $m$ , if month  $m$  occurs during a Winter Capability Period;

$e$  is the end of the Summer Capability Period immediately preceding 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 immediately preceding the Winter Capability period containing month  $m$ , if month  $m$  occurs during a Winter Capability Period ; 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.

**(c) Determining the Amount of UCAP for a Non-Generator Based Special Case Resource with APMD Provisionally Based on Monthly Billing Demands**

This calculation applies only to non-generator based Special Case Resources with newly installed interval billing meters and will apply for no longer than two successive Capability Periods. UCAP for non-generator based Special Case Resources will be calculated as in Section 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 Special Case Resource as follows: if hour  $h$  is in the Summer Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands between 12:00 p.m. and 8:00 p.m. for that Resource for the months of June, July, August and September in that same Summer 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 between 12:00 p.m. and 8:00 p.m. for that Resource for the months of December, January, February and March in that same Winter Capability Period.

**(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 Attachment K, Special Case Resource Certification, the SCR Workbook and as calculated in subsection (a) above; and

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

## (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 Committed Generator Output for the generator(s) located at Resource  $g$  applicable for month  $m$ , using data submitted in accordance with Attachment K the SCR Workbook, Special Case Resource Certification.

### (e) Measuring RIP Deficiencies for RIP Portfolios

A RIP will not be charged with a deficiency penalty if the performance of its portfolio of Special Case Resources, within a Locality or the Rest-of-State region, as applicable, meets or exceeds the total capacity it is committed to supply from its aggregated Special Case Resources. Just as a Special Case Resource is expected to meet its Installed Capacity commitment for a minimum of one hour each Capability Period, a RIP portfolio must meet its certified Installed Capacity commitment (the Installed Capacity Equivalent of its certified Unforced Capacity) for a minimum of one hour. This 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) in MWh for each event hour. The total performance of all curtailable Load Special Case Resources in a single portfolio will be the sum of all such differences for the same hour of each event by Locality or the Rest-of-State region, as applicable.



The performance of each generator based Special Case Resource will be its production in MWh for each hour. The total performance of all generator based Special Case Resources in a portfolio will be the sum of all such Special Case Resources for the same hour of each event by Locality or the Rest-of-State region, as applicable.

The RIP performance will be the sum of all curtailable Load Special Case Resources within a Locality or the Rest-of-State region, as applicable, and all generator based Special Case Resources within a Locality or the Rest-of-State region, as applicable in its portfolio, calculated according to the above two paragraphs for the same hour of each event. To determine if the RIP is deficient, 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 minimum difference between the Installed Capacity Equivalent of its certified Unforced Capacity and the portfolio performance. If this quantity is negative or zero, then there is no deficiency. Any deficiency penalty will be determined according to the Market Administration and Services Tariff for each month in the Capability Period.

**(f) Determining RIP Performance and Performance Factors Applicable to New SCRs**

Resource performances for each RIP portfolio will combine all hours of all events and/or audits into an overall performance factor. The overall RIP portfolio performance factor will be the ratio of the sum of the performances of all curtailable Load Special Case Resources and all generator based Special Case Resources divided by the ICE of all certified curtailable Load Special Case Resources and all generator based Special Case Resources in the RIP portfolio for all requested event hours.

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

**(a) Determining the Amount of UCAP a ~~Supplier~~Control Area System Resource 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

$CAF_{cm}$  is the Capacity Adjustment Factor for Control Area  $c$  for month  $m$ , as calculated above.

### **3.5 Calculation of UCAP for Intermittent Power Resources**

This section describes the general procedure for calculating Unforced Capacity values for Intermittent Power Resources. Also see Section 4.5 of this Manual and 5.12.6(a) of the Market Administration and Services Tariff.

**(a) Definitions**

For purposes of this Section 3.5:

“Intermittent Unforced Capacity Value” for an Intermittent Power Resource means that amount of generating capacity, expressed to the nearest tenth of a MW, that it can reasonably be expected to contribute during summer or winter peak hours, as applicable, and for these calculations, an Intermittent Power Resource is considered to be a collection of wind turbines (a “Wind Farm”) with its electrical output totaled at some point between the Wind Farm and the NYCA transmission system and that determines the Wind Farm’s delivery to the NYCA.

“Production Factor” for an Intermittent Power Resource means a factor based on historic operating data, and for facilities without historic operating data, initial Intermittent Unforced Capacity Values will be determined using the factors defined in Section 4.5 of this Manual and in this Section 3.5.

“Intermittent Installed Capacity Value” for an Intermittent Power Resource means the resource’s nameplate output rating, less the Station Power, which is defined in the Market Administration and Services Tariff 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.

“Hourly Output” means the average of the metered outputs, expressed to the nearest tenth of a MW, integrated over a one-hour period.

“Summer Day” means any day in June, July or August.

“Summer Period” means the 3-month period from June 1 through August 31, inclusive.

“Summer Peak Hours” means the hours beginning 14, 15, 16, and 17.

“Winter Day” means any day in December, January or February.

“Winter Period” means the 3-month period from December 1 through the last day of the immediately succeeding February.

“Winter Peak Hours” means the hours beginning 16, 17, 18 and 19.

### **(b) Calculation Procedure**

Generally, the calculation of the Production Factor for a particular Intermittent Power Resource (Wind Farm) for a particular Capability Period is based on its operating data for the immediately preceding Summer Period or immediately preceding Winter Period, as applicable. For facilities with less than sixty (60) days of historic operating data in the previous Summer Period or the previous Winter Period, as applicable, initial Intermittent Unforced Capacity Values will use the factors in Section 4.5 of the Installed Capacity Manual for the applicable Capability Period. The Production Factor, when multiplied by the current Intermittent Installed Capacity Value yields the Intermittent Unforced Capacity Value for that Intermittent Power Resource. This two-step process

accommodates any changes in the Intermittent Installed Capacity Value that may have occurred during the prior or current year of operation.

Intermittent Unforced Capacity Values for Intermittent Power Resources applicable to the Summer Capability Period will be calculated as follows:

- A. Sum the Hourly Outputs from the Wind Farm for each of the Summer Peak Hours in the immediately preceding Summer Period.
- B. For each Summer Peak Hour, sum the Intermittent Installed Capacity Values for the Wind Farm attributable to each Summer Peak Hour.
- C. The quotient of the summed Summer Peak Hour outputs divided by the summed Summer Peak Hour Intermittent Installed Capacity Values will yield the Production Factor for the Summer Capability Period.
- D. For new Wind Farms that do not have at least two months of production data, the Summer Capability Period Production Factor in accordance with Section 4.5 of the Installed Capacity Manual will apply.
- E. The Intermittent Unforced Capacity Value is calculated by multiplying the Production Factor from (C) or (D) above by the current Intermittent Installed Capacity Value for the Intermittent Power Resource.

Intermittent Unforced Capacity Values for Intermittent Power Resources applicable to the Winter Capability Period will be calculated as follows:

- A. Sum the Hourly Outputs from the Wind Farm for each of the Winter Peak Hours in the immediately preceding Winter Period.
- B. For each Winter Peak Hour, sum the Intermittent Installed Capacity Value for the Wind Farm attributable to each Winter Peak Hour.
- C. The quotient of the summed Winter Peak Hour outputs divided by the summed Winter Peak Hour Intermittent Installed Capacity Values will yield the Production Factor for the Winter Capability Period.
- D. For new Wind Farms that do not have at least sixty (60) days of production data, the Winter Capability Period Production Factor in accordance with Section 4.5 of the Installed Capacity Manual will apply.
- E. The Intermittent Unforced Capacity Value is calculated by multiplying the Production Factor from (C) or (D) above by the current Intermittent Installed Capacity Value for the Intermittent Power Resource.

### **3.6 Calculating 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 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 Intermittent Unforced Capacity Value to be delivered to the Interconnection Point in MW, 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:

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

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 (or weighted-average EFORD for all contributing Resources

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