## Attachment J: Unforced Capacity for Installed Capacity Suppliers

#### 1.0 Fundamental Formulas

(1-1) UCAP =  $(1 - EFOR_D) \times DMNC$ 

(1-2) 
$$EFOR_D = \frac{f_f \times FOH + f_p \times (EFOH - FOH)}{SH + f_f \times FOH}$$



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

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

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

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

Note: UCAP values will be calculated monthly for each Resource based on a rolling twelvemonth calculation. The detailed formulas, 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
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. THE FOLLOWING IS SUBJECT TO ICAPWG AGREEMENT: 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.
РН	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.

#### 3.0 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>

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

where:

 $UCAP_{gm}$  is the Unforced Capacity that supplier g is permitted to provide 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 ICAP Auction that is conducted during the month preceding month *m*.

A rolling, cumulative, twelve-month  $EFOR_D$  will be calculated 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 Date for months, m-14, through and including 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).

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

where  $f_{fgbe}$  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, Performance Record 02, columns 40-43 and Event Record 01, NERC Event Types U1, U2, U3, D1, D2, D3 and SF;

 $SH_{gbe}$  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;

 $CEFOR_{Dg}$  is the class-equivalent EFOR<sub>D</sub> 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 judgement, if a mutually acceptable value cannot be agreed on; and

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

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;

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

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

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;

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

b is the beginning of the month occurring fourteen 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.

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

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

where:

 $UCAP_{gm}$  is the Unforced Capacity that supplier g is permitted 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 ICAP Auction that is conducted during the month preceding month *m*.

A rolling, cumulative twelve-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).

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

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<sub>ge</sub> 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);

$$CF_{gbe} = 1 - \frac{(NAG_{gbe})}{\sum_{m=b}^{e} (NDC_{gm}(PH_{gm} - POH_{gm} - MOH_{gm}))}$$

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* beginning with month *b* and ending with month *e*. 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* beginning with month *b* and ending with month *e*. 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 the month *m* beginning with month *b* and ending with month e. 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 the month m beginning with month b and ending with month e. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 44-47; and

 $CF_g$  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 judgement if a mutually acceptable value cannot be agreed on.

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

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

#### SUBJECT TO FURTHER DISCUSSION BY THE ICAPWG

Where:

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

 $APMD_{gm}$  is the Average of Peak Monthly Demands for Resource *g* for the Capability Period containing month *m*, applicable to month *m*, using data submitted in accordance with Attachment K, Special Case Resource Certification; 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 most recent months of June, July, August and September that had occurred as of the end of month *m*; 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 most recent months of June, July, August and September that had occurred as of the end of month *m*; 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 most recent months of November, December, January and February that had occurred as of the end of month *m*; submitted in accordance with Attachment K, Special Case Resources Certification;

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

 $LRH_{gbe}$  is the set of hours 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* for the applicable Capability Period containing 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 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 for that supplier for the most recent 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 for that supplier for the most recent months of the peak monthly demands for that supplier for the most recent months of the peak monthly demands for that supplier for the most recent months of the peak monthly demands for that supplier for the most recent months of the peak monthly demands for that supplier for the most recent months of November, December, January and February 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 applicable Contract Minimum Demand for Resource g applicable to month m, 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;

b is the beginning of the month occurring fourteen months before month m, unless the supplier had not begun at that time to serve as a Special Case Resource available to reduce load, in which case b is the time at which that supplier began to serve as a Special Case Resource available to reduce load; and

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).