4.4.12 Retired, Mothballed, and Inactive Generating Units

The NERC Data Reporting Instructions define three (3) Inactive states; Inactive Reserve (IR), Mothballed (MB) or Retired (RU). A Resource that is a Generator that is Inactive with an indeterminate return to service, and excepting NYISO acknowledged forced outages or approved scheduled (Planned or Maintenance) outages with permissible extensions, is not qualified to participate in the NYISO Installed Capacity Market. Any exceptions to this rule must be requested of, and granted by, the NYISO, in writing.

4.5 Calculation of the Amount of Unforced Capacity each Resource may Supply to the NYCA (Section 5.12.6.1 *NYISO Services Tariff*)

(a) Definitions

For purposes of Sections 4.5 and 4.5.1:

"Solar Farm" means a collection of solar installations with its electrical output metered at the interconnection with the NYCA Transmission System and which metering determines the Solar Farm's delivery to the NYCA.

(b) Calculation Procedure

The NYISO will calculate the amount of Unforced Capacity that Resources are qualified to supply to the NYCA for each Capability Period. The Unforced Capacity methodology estimates the probability that a Resource will be available to serve Load, taking into account forced outages and forced deratings. To evaluate this probability, the NYISO will use the Operating Data submitted by each Resource in accordance with Section 4.4~~4.4~~.4~~.4~~ of this *ICAP Manual*, and the mathematical formulae included in Attachment J of this *ICAP Manual*. The value (termed "CRIS-adjusted DMNC") used in determining the ICAP equivalent of the Unforced Capacity will be the smaller of the then currently-effective DMNC rating or the CRIS value, as applicable. Unforced Capacity values will remain in effect for the entire Capability Period, except in cases where corrections to historical data are necessary.

For each Capability Period, the NYISO will base the amount of Unforced Capacity a generating Resource is qualified to supply on the average of EFORd values calculated for that Resource covering the 12-month periods ending in January, February, March, April, May and June for the subsequent Winter Capability Period and the average of EFORd calculations for that Resource covering the 12-month periods ending in July, August, September, October, November and December for the subsequent Summer Capability Period. Detailed procedures for calculating the 12-month EFORd values are described in Attachment J of this *ICAP Manual*. Such EFORd values shall be for the same interval used to determine the Minimum Installed Capacity Requirement to Minimum Unforced Capacity Requirement translation for a given Capability Period, as noted in Sections 2.5~~2.5~~2.5~~.5~~ and 2.6~~2.6~~2.6~~.6~~ of this *ICAP Manual*.

For Special Case Resources, Unforced Capacity values will be based on two successive seasonal performance factors of each individual Special Case Resource as described in Section 4.12 of this *ICAP Manual*.

The NYISO shall compute the amount of Unforced Capacity that each Limited Control Run-of-River Hydro Resource is authorized to provide in the NYCA separately for Summer and Winter Capability Periods. The amount for each Capability Period shall be equal to the rolling average of the hourly net Energy provided by each Limited Control Run-of River Hydro Resource during the twenty (20) highest NYCA-integrated real-time load hours in each of the five (5) previous Summer or Winter Capability Periods, as appropriate, stated in megawatts.

Intermittent Power Resource Unforced Capacity values will have Unforced Capacity values based on seasonal performance factors calculated in accordance with section 4.5.1 of this *ICAP Manual*. Unforced Capacity from an Intermittent Power Resource for the summer capability period shall be based on the average production during the 14:00 to 18:00 hours for the months of June, July and August during the Prior Equivalent Capability Period. Unforced Capacity from an Intermittent Power Resource for the winter Capability Period shall be based on the average production during the 16:00 to 20:00 hours for the months of December, January, and February during the Prior Equivalent Capability Period.

Initial Unforced Capacity values for new generating Resources will be based on NERC class average EFORd values for Resources of the same type. If no NERC class average exists, the NYISO will estimate a class average using capacity values for Resources of the same type currently providing capacity in the NYISO market; provided however, that for a new Intermittent Power Resource that depends upon wind as fuel, the initial Unforced Capacity value (which is to be measured as the amount of capacity it can reliably provide during system peak Load hours) will be the product of the applicable Unforced Capacity percentage in the Table shown below and that resource's DMNC value (nameplate rating net of station power). The Unforced Capacity percentages set forth below are taken from the Report on Phase II System Performance Evaluation "The Effects of Integrating Wind Power on Transmission System Planning, Reliability, and Operations" prepared by GE Energy, March 4, 2005.

Unforced Capacity Percentage – Wind			
	Zones A through J	**Zone K (land-based)**	**Zone K (off-shore)**
Summer	10%	10%	38%
Winter	30%	30%	38%

For a new Intermittent Power Resource that is a Solar Farm, the Unforced Capacity value shall be equal to the product of (a) the Summer or Winter Unforced Capacity percentage for the Solar Farm based on the characteristics at the time the Unforced Capacity value is determined using the Tables in this Section, (i) if a fixed array, the Unforced Capacity Percentage for Fixed Tilt Arrays determined using the Azimuth Angle and the Tilt angle for the Solar Farm, (ii) if a tracking installation, the Unforced Capacity Percentage for

Tracking Arrays, (b) the Solar Inverter and Transformer Efficiency Multiplier determined based on the Inverter Efficiency supplied by the Installed Capacity Supplier on behalf of the Intermittent Power Resource, and (c) the sum of the nameplate DC power rating for all installations within the Solar Farm.

Summer Unforced Capacity Percentage – Solar (Fixed Tilt Arrays)							
Azimuth Angle (Degrees)	Tilt Angle (Degrees)						
	18 - 22	23 - 27	28 - 32	33 - 37	38 - 42	43 - 47	48 - 52
155 - 164	35%	34%	33%	31%	30%	28%	26%
165 - 174	36%	36%	35%	34%	33%	31%	30%
175 - 184	37%	37%	37%	36%	35%	34%	33%
185 - 194	39%	39%	39%	38%	38%	37%	36%
195 - 204	40%	40%	40%	40%	40%	39%	38%
205 - 214	41%	41%	42%	42%	42%	41%	41%
215 - 224	42%	42%	43%	43%	43%	43%	42%

Winter Unforced Capacity Percentage – Solar (Fixed Tilt Arrays)							
Azimuth Angle (Degrees)	Tilt Angle (Degrees)						
	18 - 22	23 - 27	28 - 32	33 - 37	38 - 42	43 - 47	48 - 52
155 - 164	0%	0%	0%	0%	0%	0%	0%
165 - 174	0%	1%	1%	1%	1%	1%	1%
175 - 184	1%	1%	1%	1%	1%	1%	1%
185 - 194	1%	1%	1%	1%	1%	1%	1%
195 - 204	1%	1%	1%	1%	1%	1%	2%
205 - 214	1%	1%	1%	1%	2%	2%	2%
215 - 224	1%	1%	1%	2%	2%	2%	2%

Unforced Capacity Percentage – Solar (Tracking Arrays, 1 or 2 Axis)

Summer	46%
Winter	2%

Solar Inverter and Transformer Efficiency Multiplier											
Inverter Efficiency	**0.88**	**0.89**	**0.90**	**0.91**	**0.92**	**0.93**	**0.94**	**0.95**	**0.96**	**0.97**	**0.98**
Applicable Multiplier	0.96	0.97	0.98	0.99	1	1.01	1.02	1.03	1.04	1.05	1.07

4.5.1 Calculation of UCAP for Wind and Solar Energy Generators

This section describes the general procedure for calculating Unforced Capacity values for wind and solar generators.

(a) Definitions

For purposes of this Section 4.5.1:

"Wind Farm" means a collection of wind turbines with its electrical output metered at the interconnection with the NYCA transmission system and that determines the Wind Farm's delivery to the NYCA.

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

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

"Production Factor" for a Wind Farm or Solar Farm means a factor based on historic operating data, and for facilities without historic operating data, initial Wind Farm or Solar Farm Unforced Capacity will be determined using the factors defined in Section 4.5 above and in this Section 4.5.1.

"Wind Farm Installed Capacity" means the sum of the nameplate ratings of the wind turbines in the Wind Farm.

"Solar Farm Installed Capacity" means the sum of the nameplate ratings of the solar installations in the Solar Farm.

"Hourly Output" means the metered output of the Wind Farm or Solar Farm expressed to the nearest tenth of a MW and integrated over a one-hour period.

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

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

(b) Calculation Procedure

Generally, the calculation of the Production Factor for a particular Wind Farm or Solar Farm for a particular Capability Period is based on its operating data for the Prior Equivalent Capability Period. For facilities with less than sixty (60) days of historic operating data in the Prior Equivalent Capability Period, the initial Wind Farm or Solar Farm Unforced Capacity will use the factors in Section 4.5. The Production Factor, when multiplied by the current Wind Farm or Solar Farm Installed Capacity yields the Wind Farm or Solar Farm Unforced Capacity for that Wind Farm or Solar Farm. This two-step process accommodates any changes in the Wind Farm or Solar Farm Installed Capacity that may have occurred during the prior or current year of operation.

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

$UCAP^{Q}_{gm} = ProdF_{gm} \times NC_{gm}$,

where:

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

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

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

$$ProdF_{gm} = \frac{\sum_{h \in CPPH_{gm}} E_{gh}}{\sum_{h \in CPPH_{gm}} NC_{gh}},$$

Where:

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

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

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

except that for new Wind Farms or Solar Farms for which less than sixty (60) days of production data are available to calculate $ProdF_{gm}$ using the equation above, $ProdF_{gm}$ instead will be calculated in accordance with Section 4.5.