

MPID 139 – Removal of Maximum Continuous Rating

Grid Code clause number: Various- see Appendix B below.

Proposed by: EirGrid

Date Proposed: November 2007

Modification Proposal:

Background: The previous Grid Code definition in Version 2.0 for Registered Capacity was misleading and incorrect.

Registered Capacity:

*The maximum **Active Power**, expressed in whole MW, modified for ambient limitations, that a **Generation Unit** can sustain less the **Auxiliary Load**, as declared by the **Generator** in accordance with the **Operating Characteristics**.*

This was modified during the SEM modifications to the following in Version 3.0:

Redline version:

Registered Capacity:

*The maximum ~~Active Power~~ **Capacity**, expressed in whole MW, ~~modified for ambient limitations~~, that a **Generation Unit** can deliver on a sustained basis, without accelerated loss of equipment life, at the **Connection Point**. This shall be the value at 10°C, 70 % humidity and 1013 hPa and shall be in accordance with the **User's Connection Agreement**. ~~less the **Auxiliary Load**, as declared by the **Generator** in accordance with the **Operating Characteristics**.~~*

Clean version:

Registered Capacity:

The maximum **Capacity**, expressed in whole MW, that a **Generation Unit** can deliver on a sustained basis, without accelerated loss of equipment life, at the **Connection Point**. This shall be the value at 10°C, 70 % humidity and 1013 hPa and shall be in accordance with the **User's Connection Agreement**.

“hPa – hectopascal” was also listed in the Acronyms section.

Rather than being measured or stated at ambient limitations the new definition defines the Registered Capacity at the following ambient conditions, 10°C, 70 % humidity and 1013 hPa (hectopascals) (1.01 bar). This is to ensure that all units submit their Registered Capacity at the same standing condition. The Registered Capacity is therefore always a fixed value for each generating unit and is also to be reflected in the User's Connection Agreement.

This further modification now proposes to remove the definition of **Maximum Continuous Rating** and replace the 10 instances of **Maximum Continuous Rating** with **Registered Capacity** as this is now no longer required as the definition of **Registered Capacity** has been modified.

The current definition of **Maximum Continuous Rating** is as follows

*The maximum capacity (MW) (or effective rating), modified for ambient limitations, that a **Generation Unit** can sustain indefinitely without loss of equipment life, less the capacity used to supply the **Auxiliary Load**.*

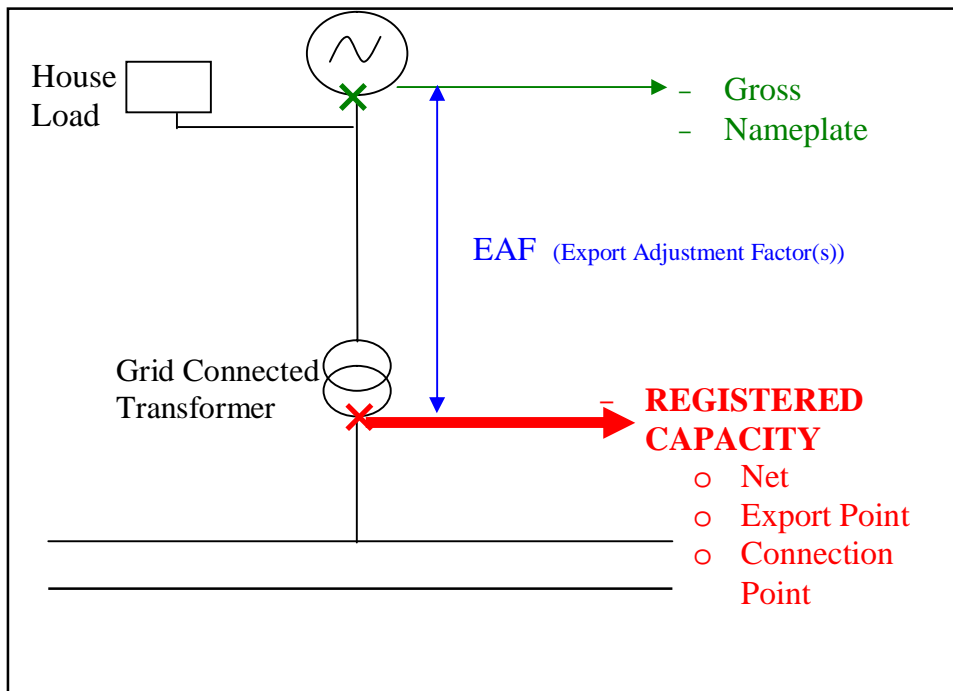
For further clarity please refer to Appendix A which shows a diagram indicating the location of relevant terminology.

Each instance of **Maximum Continuous Rating** in the Grid Code has been extracted and appears in Appendix B.

For completeness each instance of **Registered Capacity** in the Grid Code has been extracted and appears in Appendix C.

Appendix A

Diagram of relevant terminology



Appendix B

Use of Maximum Continuous Rating in the Grid Code, Version 3.0 November 2007

The modification proposal to change Maximum Continuous Rating to Registered Capacity is shown in redline below.

Clause	Requirement														
PC.A4.12.2	<p>Forecast Availability of Maximum Continuous Rating Registered Capacity</p> <p>Apart from the expected scheduled maintenance requirements,</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 30%;">Availability</th> <th style="width: 20%;">of Reason</th> <th style="width: 30%;">Available</th> <th style="width: 20%;">Time %</th> </tr> </thead> <tbody> <tr> <td>Maximum Continuous Rating</td> <td></td> <td>Exported MW</td> <td></td> </tr> <tr> <td>Registered Capacity</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Maximum Continuous Rating Registered Capacity</p> <p>Restricted Rating</p> <p>Forced outage probability</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="text-align: right;">Total</td> <td style="text-align: left;">100%</td> </tr> </table> <p>Reasons for restricted rating might include poor fuel, loss of mill, loss of burners, hydro flow restrictions, etc.</p>	Availability	of Reason	Available	Time %	Maximum Continuous Rating		Exported MW		Registered Capacity				Total	100%
Availability	of Reason	Available	Time %												
Maximum Continuous Rating		Exported MW													
Registered Capacity															
Total	100%														
CC.7.3.6.1	<p>Each Generation Unit shall have the following Reactive Power capability as measured at their alternator terminals:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 20%;">Voltage Range</th> <th style="width: 15%;">Connected at:</th> <th style="width: 25%;">At a MW Output of Maximum Continuous Rating Registered Capacity, between:</th> <th style="width: 40%;">At a MW Output of 35% of Maximum Continuous Rating Registered Capacity, between:</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Voltage Range	Connected at:	At a MW Output of Maximum Continuous Rating Registered Capacity, between:	At a MW Output of 35% of Maximum Continuous Rating Registered Capacity, between:										
Voltage Range	Connected at:	At a MW Output of Maximum Continuous Rating Registered Capacity, between:	At a MW Output of 35% of Maximum Continuous Rating Registered Capacity, between:												

		85kV ≤ V < 99kV		Unity power factor to 0.85 power factor lagging	0.7 power factor leading to 0.4 power factor lagging
		200kV ≤ V ≤ 245kV	220kV	0.93 power factor leading to 0.85 power factor lagging	0.7 power factor leading to 0.4 power factor lagging
		190kV ≤ V < 200kV		Unity power factor to 0.85 power factor lagging	0.7 power factor leading to 0.4 power factor lagging
		360kV ≤ V ≤ 420kV	400kV	0.93 power factor leading to 0.85 power factor lagging	0.7 power factor leading to 0.4 power factor lagging
		350kV ≤ V < 360kV		Unity power factor to 0.85 power factor lagging	0.7 power factor leading to 0.4 power factor lagging
CC.7.3.6.2	At between Maximum Continuous Rating Registered Capacity and 35% Maximum Continuous Rating Registered Capacity, Mvar capability to be not less than indicated by a straight line drawn between the two points derived from the above, on a plot of Mvar capability against MW output.				
CC.7.3.6.3	At below 35% Maximum Continuous Rating Registered Capacity, Mvar capability to be not less than that at 35% Maximum Continuous Rating Registered Capacity.				
Availability Factor	The ratio of the Energy that could have been produced during a specified period of time by a Generation Unit operating in accordance with its Availability, and the Energy that could have been produced during the same period by that Generation Unit operating at its Maximum Continuous Rating Registered Capacity. Availability Factor can alternatively be reported in gross terms.				

Appendix C

Existing Use of Registered Capacity in the Grid Code

Clause	Requirement
PC.3 (a)	<p>SCOPE</p> <p>The Planning Code applies to the TSO and to the following Users:</p> <p>(a) Generators with Registered Capacity greater than 10MW;</p>
PC.4.5	<p>Notice Required</p> <p>Any User proposing to de-rate, close, retire, withdraw from service or otherwise cease to maintain and keep available for Dispatch in accordance with Good Industry Practice any Generation Unit or Generation Units with Registered Capacity greater than 10 MW in aggregate shall give the TSO at least 24 calendar months notice of such action.</p>
PC.A43	<p>Generator Operating Characteristics And Registered Data</p> <p>Minimum requirements for generator operating conditions are specified in the Connection Conditions.</p> <p>* For thermal plant, provide a functional block diagram of the main plant components, showing boilers, alternators, any heat or steam supplies to other processes etc. indicate whether single shaft or separate shaft.</p> <p>For each individual unit fill in the following: Unit Number _____ Registered Capacity (MW) _____</p>
CC.3 (a)	<p>SCOPE</p> <p>The Connection Conditions apply to the TSO and to the following Users:</p> <p>(a) Generators with Registered Capacity greater than 2MW</p>
CC.7.3.1.1 (k)	<p>Minimum Load: not greater than 50% of Registered Capacity for CCGTs and not greater than 35% of Registered Capacity for all other Generation Units</p>
CC.7.3.1.1 (l)	<p>Ramp up Capability: not less than 1.5% of Registered Capacity per minute when the Unit is in the Normal Dispatch Condition.</p>
CC.7.3.1.1 (m)	<p>Ramp down Capability: not less than 1.5% of Registered Capacity per minute when the Unit is in the Normal Dispatch</p>

	Condition.
CC.7.3.1.1 (p)	Forbidden Zones: within the range between normal Minimum Load plus 5% and Registered Capacity less 10%, not more than 2 specified zones each not greater than 10% of Registered Capacity
CC.7.3.1.1 (q)	Block Loading: not greater than 10% of Registered Capacity
CC.7.3.1.1 (u) (i)	POR not less than 5% Registered Capacity To be provided, at a minimum, at MW Outputs in the range from 50% to 95% Registered Capacity , with provision in the range of 95% to 100% Registered Capacity to be not less than that indicated by a straight line with unity decay from 5% of Registered Capacity at 95% output to 0 at 100% output.
CC.7.3.1.1 (u) (ii)	SOR not less than 5% Registered Capacity To be provided, at a minimum, at MW Outputs in the range from 50% to 95% Registered Capacity , with provision in the range of 95% to 100% Registered Capacity to be not less than that indicated by a straight line with unity decay from 5% of Registered Capacity at 95% output to 0 at 100% output.
CC.7.3.1.1 (u) (iii)	TOR1 not less than 8% Registered Capacity To be provided, at a minimum, at MW Outputs in the range from 50% to 92% Registered Capacity , with provision in the range of 92% to 100% Registered Capacity to be not less than that indicated by a straight line with unity decay from 8% of Registered Capacity at 92% output to 0 at 100% output.
CC.7.3.1.1 (u) (iv)	TOR2 not less than 10% Registered Capacity To be provided, at a minimum, at MW Outputs in the range from 50% to 90% Registered Capacity , with provision in the range of 90% to 100% Registered Capacity to be not less than that indicated by a straight line with unity decay from 10% of Registered Capacity at 90% output to 0 at 100% output.
CC.7.3.1.1 (v)	The TSO may request Generation Units of Registered Capacity greater than or equal to 60MW to have the capacity to operate under SFRS at all loads between SFRS Minimum Load and SFRS Maximum Load
OC1.4.2 (c)	The DSO shall supply typical MW profiles for the operation, or Availability as appropriate, of Embedded Generation where the total Registered Capacity of Generation Units on a single Site exceeds 5MW for defined categories of day type as determined by the TSO . The method for submitting MW schedules and/or Availability shall be agreed between the TSO and the DSO , such agreement not to be unreasonably withheld;
OC1.4.2 (d)	Notwithstanding OC1.4.2 (c), the DSO shall supply typical MW profiles for the operation, or Availability as appropriate, of Embedded Generation where the total Registered Capacity of Generation Units on a single Site exceeds 2MW, for defined categories of day type as determined by the TSO , if the TSO

	considers the Site to be critical for Transmission System operation. The method for submitting MW schedules and/or Availability shall be agreed between the TSO and the DSO , such agreement not to be unreasonably withheld.
OC1.5 (c)	Details of half hour Active Power output and Reactive Power produced or absorbed by Embedded Generation , with a single Site with Registered Capacity in excess of 2MW, during the previous Schedule Day , from the DSO ;
OC2.2	OC2 shall apply to all proposed Outages that may affect the ability of a Generation Unit to achieve its full Registered Capacity appropriate to each Registered Fuel in accordance with its Registered Operating Characteristics .
OC2.3 (a)	Generators which for the purposes of OC2 includes all Generators with Registered Capacity greater than 5 MW or which are subject to Central Dispatch ; and
OC4.2.1 (a)	OC4 applies to the TSO and to the following, each of which is a User under this OC4: (a) Grid Connected Generators with Registered Capacity greater than 2MW;
OC4.3.5.2	Generation Units with a Registered Capacity of 60MW or greater are, under Connection Conditions , required to be connected to SFRS , the SFRS control range being a Registered Operating Characteristic .
OC6.3	OC6 applies to the TSO , and to the following Users : (a) Generators with Registered Capacity of 2MW or less (on a single Site) (b) Generators with Registered Capacity less than 5MW (on a single Site) and greater than 2MW (on a single Site) where the TSO consider that the Generator is in a location that does not make its operation particularly critical to the operation of the transmission system
OC8.3 (a)	OC8 applies to the TSO and to all Users , which term in this OC8 means: (a) Generators which includes all Generators with units with Registered Capacity greater than 5 MW;
OC9.3 (a)	OC9 applies to the TSO and to all Users , which term in this OC9 means: (a) Generators which for the purposes of OC9 includes all Generators with Registered Capacity greater than 5 MW;
OC10.3 (a)	OC10 applies to the TSO and to the following Users (a) Generators which, for the purposes of OC10, include all Generators with Generation Unit(s) subject to Central Dispatch or with Generation Unit(s) that have a total Registered Capacity greater than 5 MW on a single Site ;
SDC.2.6.8	Where a Generator has two or more identical (identical for this purpose meaning Registered Capacity , Ancillary Services capability and Declared Operating Characteristics , and other relevant electrical parameters) Centrally Dispatched

	Generation Units at the same site, the Generator may notify the TSO as to the preferred Centrally Dispatched Generation Unit to be Dispatched . The TSO shall however, retain the right to select the Centrally Dispatched Generation Unit to be Dispatched , taking into account its obligations in operating the Transmission System .
Outage	In relation to a Generation Unit , a total or partial reduction in Availability such that the Generation Unit is unavailable to achieve its full Registered Capacity in accordance with its Registered Operating Characteristics .
Ramp-down Capability	The rate of decrease in a Generation Unit' Output after the End Of Start-up Period . Ramp-down Capabilities apply over the output range from its Registered Capacity to Minimum generation . The rate of change is not dependent upon the initial warmth of the plant but may depend on the MW Output .
Ramp-up Capability	The rate of increase in a Generation Unit' Output after the End Of Start-up Period . This rate of increase continues until the Generation Unit reaches the level of output instructed by the control room operator or its Registered Capacity . Following the End Of Start-up Period , the rate of increase is not dependent upon the initial warmth of the plant but may depend on the MW Output .
Short-Term Maximisation Capability	The capability of a Generation Unit to deliver, for a limited duration of time, MW Output greater than its Registered Capacity .
Small Scale Generators	(i) Generators with Registered Capacity of 2MW or less (on a single Site); and Generators with Registered Capacity less than 5MW (on a single Site) and greater than 2MW (on a site basis) where the TSO consider that the Generator is in a location that does not make its operation particularly critical to the operation of the Transmission System .
