

Grid Code Harmonisation for SEM

Addition of CCGT Installation Matrix to the Planning Code Appendix.

Version 3

Introduction:

It is proposed to add the text below in red. SONI currently requires CCGTs to provide a CCGT installation matrix in order for the TSO to know what configuration the CCGT will operate given a particular Dispatch Instruction. EirGrid is now adding this requirement to the Planning Code Appendix.

The only change from the previous version is the inclusion of the requirement that the CCGT Installation Matrix be submitted at defined atmospheric conditions.

Proposed Text Modifications:

PC.A4: Generator Data Requirements

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PC.A4.3 Generator Operating Characteristics And Registered Data

Minimum requirements for generator operating conditions are specified in the **Connection Conditions**.

- * 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.

For each individual unit fill in the following:

Unit Number _____

Registered Capacity (MW) _____

	Symbol	Units
* Normal Maximum Continuous Generation Capacity:		MW
* Normal Maximum Continuous Export Capacity		MW
* Power Station auxiliary load		MW
§ Power Station auxiliary load		Mvar
* Maximum (Peaking) Generating Capacity		MW
* Maximum (Peaking) Export Capacity		MW

* Normal Minimum Continuous Generating Capacity		MW
* Normal Minimum Continuous Export Capacity		MW
* Generator Rating:	Mbase	MVA
* Normal Maximum Lagging Power Factor		Mvar
* Normal Maximum Leading Power Factor		Mvar
§ Governor Droop	R	
§ Forbidden zones		MW
§ Terminal Voltage adjustment range		kV
§ Short Circuit Ratio		
§ Rated Stator Current		Amps

Description		
§ Capability Chart showing full range of operating capability of the generator including thermal and excitation limits.		Diagram
§ Open Circuit Magnetisation Curves		Graph
§ Short Circuit characteristic		Graph
§ Zero power factor curve		Graph
§ V curves		Diagram

	Symbol	Units
§ Time to synchronise from warm		Hour
§ Time to synchronise from cold		Hour
§ Minimum up-time		Hour
§ Minimum down-time		Hour
§ Normal loading rate		MW / min
§ Normal deloading rate		MW / min
§ Can the generator start on each fuel		
§ Ability to change fuels on-load		
§ Available modes (lean burn, etc.)		
§ Time to change modes on-load		
§ Control range for SFRS operation		MW
Other relevant operating characteristics not otherwise provided....		

§ Reserve Capability

Primary Spinning Reserve

Secondary Spinning Reserve

Tertiary Reserve

Give details of reserve capability of the generator in different operating modes:

Unit co-ordinating, turbine follow, recirculation, base load, etc.

What reserve, if any, is available when the unit is off load?

CCGT Installation Matrix

This matrix is a look up table determining which **CCGT Modules** will be operating at any given MW **Dispatch** level. This information will be applied for planning purposes and for scheduling, **Dispatch** and control purposes as covered in the **SDCs** unless by prior agreement with the **TSO**.

As an example of how the matrix might be filled out, consider a sample unit with a total capacity of 400 MW made up of two 150 MW combustion turbines and one 100 MW steam turbine. In this case, the following ranges might be specified

0 MW to 50 MW	GT1
50 MW to 170 MW	GT1 and ST
170 MW to 400 MW	GT1 and GT2 and ST

Please insert MW ranges and tick the boxes to indicate which units are synchronised to deliver each MW range at the following atmospheric conditions: Temperature 10°C, Pressure 1.01 bar and 70% Humidity.

<u>CCGT INSTALLATION</u>	<u>CCGT MODULES AVAILABLE</u>					
	<u>1st</u> <u>GT</u>	<u>2nd</u> <u>GT</u>	<u>3rd</u> <u>GT</u>	<u>1st</u> <u>ST</u>	<u>2nd</u> <u>ST</u>	<u>3rd</u> <u>ST</u>
	<u>OUTPUT USABLE</u>					
<u>Unit MW Capacity →</u>	<i>e.g. 150</i>	<i>150</i>	<i>-</i>	<i>100</i>	<i>-</i>	<i>-</i>
<u>Total MW Output Range ↓</u>						
<u>[] MW to [] MW</u>						
<u>[] MW to [] MW</u>						
<u>[] MW to [] MW</u>						
<u>[] MW to [] MW</u>						
<u>[] MW to [] MW</u>						
<u>[] MW to [] MW</u>						