

MODIFICATION PROPOSAL FORM



RATE OF CHANGE OF FREQUENCY

FORM GC1, PROPOSAL OF MODIFICATION TO GRID CODE.

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MODIFICATION PROPOSAL ORIGINATOR TELEPHONE NUMBER:	01-2370113	DATE:	04/09/2012
MODIFICATION PROPOSAL ORIGINATOR E-MAIL ADDRESS:	alan.rogers at eirgrid.com	MODIFICATION PROPOSAL NUMBER (EIRGRID USE ONLY)	MPID 229
GRID CODE SECTION(S) AFFECTED BY PROPOSAL:	Glossary, CC7.3.1.1(d), CC7.4(i), WFPS1.5.1(d), WFPS1.3.2		
GRID CODE VERSION :	4.0		
MODIFICATION PROPOSAL DESCRIPTION (MUST CLEARLY STATE THE DESIRED AMENDMENT, ALL TEXT/FORMULA CHANGES TO THE GRID CODE. THE REQUIRED REASON FOR THE MODIFICATION MUST STATED. ATTACH ANY FURTHER INFORMATION IF NECESSARY.)	To introduce a definition of Rate of Change of Frequency (RoCoF) and amend clause CC7.3.1.1(d) and similar clauses for DSUs and WFPS, to give direction on when this clause does and does not apply. [Amended Text Below]		
IMPLICATION OF NOT IMPLEMENTING THE MODIFICATION	The continuing absence of a concise definition of RoCoF is hampering efforts to understand the capabilities of generators and windfarms when frequency varies rapidly. This in turn is having a knock-on effect on the level of non-synchronous generation that can be allowed on the power system, while continuing to operate the system in a safe and prudent manner.		
<i>Please submit the Modification Proposal by fax, post or electronically, using the information supplied above</i>			
EIRGRID REVIEWER			

EIRGRID ASSESSMENT	
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PROPOSAL 1

PROPOSED GLOSSARY DEFINITION (NEW):

Rate of Change of Frequency :

The rate of increase or decrease of **Frequency** as measured at the **User's Connection Point** over the time period as set out in CC.7.3.1.1(d).

PROPOSED CHANGE TO CC7.3.1.1(d)

- CC.7.3.1.1 Each **Generation Unit**, shall, as a minimum, have the following capabilities:
- (a) operate continuously at normal rated output at **Transmission System Frequencies** in the range 49.5Hz to 50.5Hz;
 - (b) remain synchronised to the **Transmission System** at **Transmission System Frequencies** within the range 47.5Hz to 52.0Hz for a duration of 60 minutes;
 - (c) remain synchronised to the **Transmission System** at **Transmission System Frequencies** within the range 47.0Hz to 47.5Hz for a duration of 20 seconds required each time the **Frequency** is below 47.5Hz;
 - (d) remain synchronised to the **Transmission System** ~~during rate of change of Transmission System Frequency of values up to and including 0.5 Hz per second~~ for a **Rate of Change of Frequency** up to and including 1 Hz per second as measured over a rolling 500 milliseconds period. **Voltage** dips may cause localised **Rate of Change of Frequency** values in excess of 1 Hz per second for short periods, and in these cases, the **Fault-Ride Through** clause CC.7.3.1.1(h) supercedes this clause (CC.7.3.1.1(d)); For the avoidance of doubt, this requirement relates to the capabilities of **Generating Units** only and does not impose the need for **Rate of Change of Frequency** protection nor does it impose a specific setting for anti-islanding or loss-of-mains protection relays.
- CC.7.4 Each **Demand Side Unit** shall, as a minimum, have the following capabilities:
- (a) Able to provide **Demand Reduction** between 0 MW and the **Demand Reduction Capability**;
 - (b) **Max Ramp Up Rate** not less than 1.5% of **Demand Reduction Capability** per minute when the **Demand Side Unit** is in **Normal Dispatch Condition**;

- (c) **Max Ramp Down Rate** not less than 1.5% of **Demand Reduction Capability** per minute when the **Demand Side Unit** is in **Normal Dispatch Condition**;
- (d) **Minimum Down-Time** not greater than 30 minutes for **Demand Side Units**; and
- (e) **Maximum Down- Time** not less than 2 hours for **Demand Side Units**.

Each **Demand Side Unit** with on-site **Generation**, shall, as a minimum, have the following capabilities:

- (f) operate continuously at normal rated output at **Transmission System Frequencies** in the range 49.5Hz to 50.5Hz;
- (g) remain synchronised to the **Transmission System** at **Transmission System Frequencies** within the range 47.5Hz to 52.0Hz for a duration of 60 minutes;
- (h) remain synchronised to the **Transmission System** at **Transmission System Frequencies** within the range 47.0Hz to 47.5Hz for a duration of 20 seconds required each time the **Frequency** is below 47.5Hz; and
- (i) remain synchronised to the **Transmission System** ~~during a rate of change of **Transmission System Frequency** of values up to and including 0.5 Hz per second.~~ for a **Rate of Change of Frequency** up to and including 1 Hz per second as measured over a rolling 500 milliseconds period. For the avoidance of doubt, this requirement relates to the capabilities of **Demand Side Units** only and does not impose the need for **Rate of Change of Frequency** protection nor does it impose a specific setting for anti-islanding or loss-of-mains protection relays.

WFPS1.5.1 TRANSMISSION SYSTEM FREQUENCY RANGES

Controllable WFPSs shall have the capability to:

- a) operate continuously at normal rated output at **Transmission System Frequencies** in the range 49.5 Hz to 50.5 Hz;
- b) remain connected to the **Transmission System** at **Transmission System Frequencies** within the range 47.5 Hz to 52.0 Hz for a duration of 60 minutes;
- c) remain connected to the **Transmission System** at **Transmission System Frequencies** within the range 47.0 Hz to 47.5 Hz for a duration of 20 seconds required each time the **Transmission System Frequency** is below 47.5 Hz;
- d) remain connected to the **Transmission System** ~~during rate of change of Transmission System Frequency of values up to and including 0.5 Hz per second.~~ ~~second~~ for a **Rate of Change of Frequency** up to and including 1 Hz per second as measured over a rolling 500 milliseconds period. **Voltage** dips may cause localised **ROCOF** values in excess of 1 Hz per second for short periods, and in these cases, the **Fault-Ride Through** clause WFPS1.4.1 supercedes this clause; For the avoidance of doubt, this requirement relates to the capabilities of **Controllable WFPS** only, and does not impose the need for **Rate of Change of Frequency** protection nor does it impose a specific setting for anti-islanding or loss-of-mains protection relays

~~e) —~~

WFPS1.3 SCOPE

WFPS1.3.1 WFPS1 applies to the following **Users**:

- (a) The **TSO**; and
- (b) **Grid Connected Controllable WFPSs**.

WFPS1.3.2 In addition to WFPS1, **Controllable WFPSs** are required to comply with the following sections of the **Grid Code**:

- GC - General Conditions
- PC - Planning Code
- PCA – Planning Code Appendix
- CC- Connection Conditions excluding:
 - CC 7.2.5.1
 - CC 7.2.5.2
 - CC7.3.1.1 ~~(a) to (h)~~ (a) to (c), (e) to (h), and (j) to (u)