

MODIFICATION PROPOSAL FORM

Clarification Mod - WFPS Voltage Regulation (MPID 248)

FORM GC1, PROPOSAL OF MODIFICATION TO GRID CODE.



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MODIFICATION PROPOSAL ORIGINATOR E-MAIL ADDRESS:	david.cashman@eirgrid.com	MODIFICATION PROPOSAL NUMBER (EIRGRID USE ONLY)	MPID 248
GRID CODE SECTION(S) AFFECTED BY PROPOSAL:	WFPS1.6.2		
GRID CODE VERSION :	5.0		
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.)	<p>This modification aims to clarify the Voltage Regulation requirements for WFPS outlined in WFPS1.6.2. The modification introduces a requirement for the reactive power response to be zero at nominal voltage. This ensures that the voltage regulation slope passes through zero. This is the intent of this clause but at present it is not explicitly stated.</p> <p>In addition to this, the definition for voltage regulation slope setting is changed such that it is the slope of the line required to move from maximum reactive power absorption to maximum production as defined by the capability diagram in WFPS 1.4. This aims to clarify that the slope is fixed and does not vary with wind conditions. It should be noted that a WFPS should continue on this slope if it has a reactive power capability in excess of the Grid Code requirements.</p>		

<p>IMPLICATION OF NOT IMPLEMENTING THE MODIFICATION</p>	<p>The intent of the clause is for the voltage regulation slope to pass through zero ensuring that the reactive response to be zero at reference voltage. For this reason the modification will provide clarity to Users on this requirement. Omitting this line may cause ambiguity.</p> <p>Similarly, the revised definition of voltage regulation slope setting is to ensure that a fixed slope is defined between maximum and minimum reactive power capability as defined in the Grid Code.</p>
<p><i>Please submit the Modification Proposal by fax, post or electronically, using the information supplied above</i></p>	
<p>EIRGRID REVIEWER</p>	
<p>EIRGRID ASSESSMENT</p>	

WFPS1.6.2 AUTOMATIC VOLTAGE REGULATION

WFPS1.6.2.1 **Controllable WFPSs** shall have a continuously-variable and continuously-acting **Voltage Regulation System** with similar response characteristics to a conventional **Automatic Voltage Regulator** and shall perform generally as described in BS4999 part 140, or equivalent European Standards.

WFPS1.6.2.2 Under steady state conditions, the **Voltage Regulation System** shall be capable of implementing the following **Reactive Power** control modes which shall be available to the **TSO**:

- a) The **Controllable WFPS** shall be capable of receiving a **Power Factor** control (PF) set-point to maintain the **Power Factor** set-point at the **Connection Point**;
- b) The **Controllable WFPS** shall be capable of receiving a **Reactive Power** control (Q) set-point to maintain the **Reactive Power** set-point at the **Connection Point**;

- c) The **Controllable WFPS** shall be capable of receiving a **Voltage Regulation (kV) Set-point** for the **Voltage** at the **Connection Point**. The **Voltage Regulation System** shall act to regulate the **Voltage** at this point by continuous modulation of the **Controllable WFPS's Reactive Power** output, without violating the **Voltage Step Emissions** limits as set out in the IEC standard 61000-3-7:1996 *Assessment of Emission limits for fluctuating loads in MV and HV power systems*. **The Controllable WFPS's Reactive Power output shall be zero when the Voltage at the Connection Point is equal to the Voltage Regulation Set-point.**

A change to the **Power Factor** control (PF) set-point, **Reactive Power** control (Q) set-point or **Voltage Regulation (kV) Set-Point** shall be implemented by the **Controllable WFPS** within 20 seconds of receipt of the appropriate signal from the **TSO**, within its reactive power capability range as specified in WFPS1.6.3.

WFPS1.6.2.3 The **Voltage Regulation System Slope Setting** shall be capable of being set to any value between 1 % and 10 %. The setting shall be specified by the **TSO** at least 120 **Business Days** prior to the **Controllable WFPS's** scheduled **Operational Date**. The **Controllable WFPS** shall be responsible for implementing the appropriate settings during **Commissioning**. The slope setting may be varied from time to time depending on **Transmission System** needs. The **TSO** shall give the **Controllable WFPS** a minimum of two weeks notice if a change is required. The **Controllable WFPS** shall formally confirm that any requested changes have been implemented within two weeks of receiving the **TSO's** formal request.

WFPS1.6.2.4 The speed of response of the **Voltage Regulation System** shall be such that, following a step change in **Voltage** at the **Connection Point** the **Controllable WFPS** shall achieve 90 % of its steady-state **Reactive Power** response within 1 second. The response may require a transition from maximum **Mvar** production to maximum **Mvar** absorption or vice-versa.

GLOSSARY:

Voltage Regulation System Slope Setting

The percentage change in **Transmission System Voltage** that would cause the **Reactive Power** output of the **Interconnector** to vary from maximum **Mvar** production to maximum **Mvar** absorption or vice-versa or **Controllable WFPS** to vary from maximum **Mvar** production capability of Q/Pmax of 0.33 to maximum **Mvar** absorption capability of Q/Pmax of -0.33 or vice-versa, as per Figure WFPS1.4.