

Further Items on HVDC Interconnectors Discussion Paper

CC.7.5.5 Each **HVDC Interconnector** must be fitted with a fast acting proportional governor and unit load controller or equivalent control device to provide **Frequency** response under normal operating conditions in accordance with OC4.

CC.10.13 HVDC Interconnector

CC.10.13.1 **HVDC Interconnector** shall provide:

(a) differential protection on the **HVDC Interconnector Transformer**. The connections between the **Grid Connection Point** circuit breaker and the **HV** terminals of the **HVDC Interconnector Transformer** shall be included in the protected zone of this differential protection;

(b) backup protection (to the **Transmission System**) on **HVDC Interconnectors**. The **TSO** acting reasonably shall require one or more of the following to be installed: **HVDC Interconnector** overcurrent protection, voltage controlled **HVDC Interconnector** overcurrent protection or **HVDC Interconnector** distance protection;

(c) under frequency protection;

CC.10.13.2

The **TSO** may require an individual **HVDC Interconnector**, to install additional protection and/or control schemes, where the **TSO** can reasonably show that it is prudent or necessary to do so. These schemes may include but are not limited to the following:

(a) **HVDC Interconnector** over/under-voltage protection;

(b) **HVDC Interconnector** over-frequency protection;

(c) **Power System** stabiliser.

CC.10.13.3 Distance protection shall be provided by the **TSO** on the **Grid Connection Point** circuit breaker of **HVDC Interconnector Transformers**.

CC.10.12 Power Quality

Users shall ensure that their connection to the **Transmission System** does not result in the level of distortion or fluctuation of the supply **Voltage** on the **Transmission System**, at the **Connection Point**, exceeding that allocated to them following consultation with the **TSO**. Distortion and fluctuation limits are outlined in IEC/TR3 61000-3-6 (Harmonics) and IEC/TR3 61000-3-7 (Voltage fluctuation). **Users** shall also operate their **Plant** in a manner which will not cause the requirements contained in CENELEC Standard EN 50160 to be breached.

The HVDC Interconnector and the TSO shall engage in discussions to determine allowable harmonic distortion limits, and to identify what data needs to be exchanged between both parties. For the avoidance of doubt, the Facility cannot be connected to the Transmission System until:

1. the required harmonic studies have been completed by the HVDC Interconnector to show compliance with the standards outlined above and reviewed by the TSO;
2. any appropriate remedies required to enable the HVDC Interconnector to operate with harmonic distortion levels within agreed limits have been identified and implemented or as agreed with the TSO