



Draft Network Code on HVDC

7 November 2013

Was this document ready for Public consultation?



When reading the draft NC HVDC, dated 7 November 2013 and published for Public Consultation by ENTSO-E, we observed:

- ▶ Several faults, where it seems to be clear what the intention was
- ▶ Several faults, where we think we understand what the intention might have been
- ▶ Faults, where it is not clear at all what the intention was
- ▶ On the next slides we show ***some*** examples:

Article 37 Isolated network operation

1. **The capability** to take part in Isolated Network Operation, if required by the Relevant TSO while respecting the provisions of Article 4(3), **shall remain within the Frequency limits** defined in Article 7, Voltage Limits according to Article 16 and the Network Characteristics according to Article 30.

Is the capability itself really required to remain within the limits? If yes, a wider (better) capability is not allowed.

Article 40 Reactive Power and Voltage requirements

i. With regard to Reactive Power Capability, for Power Park Modules **where:**

- **the Connection Point is not** at the location of the high-voltage terminals of its step-up transformer, or
- where no step up transformer exists at the terminals of the high-voltage line or cable to the Connection Point at the Power Park Module,

supplementary Reactive Power may be required by the Relevant TSO while respecting the provisions of Article 4(3) to compensate for the Reactive Power demand of the high-voltage line or cable between these two points from the responsible owner of this line or cable.

ii. With regard to Reactive Power capability at Maximum Capacity:

- The Relevant TSO shall define while respecting the provisions of Article 4(3) the Reactive Power provision capability requirements in the context of varying Voltage. For doing so, it shall define **a U-Q/Pmax-profile that shall take any shape** within the boundaries of which the Power Park Module shall be capable of providing Reactive Power at its Maximum Capacity.

- i) Where the connection point is at the HV Terminals, it seems to make sense. Should we delete “not” or what is the intention?
- ii) A profile, that shall take any shape, is continuously changing!

SECTION 2 OPERATIONAL NOTIFICATION PROCEDURE FOR CONNECTION OF NEW DC-CONNECTED POWER PARK MODULES

Article 55 General provisions

1. The provisions of CHAPTER 5 shall apply to New DC-connected Power Park Modules only.
2. The DC-Connected Power Park Module Owner shall demonstrate to the Relevant TSO its compliance with the requirements referred to in CHAPTER 3 and CHAPTER 4 of this Network Code at the respective Connection Point by completing successfully the operational notification procedure for connection of the HVDC System as defined in Article 56 through Article 59.

1: The whole chapter 5 or only Section 2 of chapter 5 (as only section 2 applies to New DC-connected PPM's)?

2: The title applies for New HVDC connected PPM's.
Connection of the HVDC System should be described in another section.... or is it a copy & paste fault and is the PPM meant?

Article 58

Final Operational Notification (FON) for DC-connected Power Park Modules

3. For the purpose of the completion of data and study review, the Relevant TSO shall have the right to request the following from the DC-connected Power Park Module:
- **Statement** of Compliance; and
 - **Update** of applicable technical data, simulation models and studies as referred to in Article 57(3), including use of actual measured values during testing.

Requesting a statement and an update from the PPM equipment will not work. Ask the PPM Owner.

SECTION 4 OPERATIONAL NOTIFICATION PROCEDURE FOR EXISTING DC-CONNECTED POWER PARK MODULES

Article 61 **General provisions**

3. Existing DC-connected Power Park Module Owners shall assist and contribute to this Cost-Benefit Analysis and provide the relevant data as requested by the Relevant TSO within three months after reception of the request, unless agreed otherwise.

What is existing and DC connected, the Power Park Module or the owner? Is the article valid also for new PPM's owned by existing PPM owners?

SECTION 4 OPERATIONAL NOTIFICATION **PROCEDURE FOR EXISTING DC-CONNECTED POWER PARK MODULES**

Article 62 **Modernization, development and replacement**

1. **All Existing HVDC Systems, HVDC Converter Stations and DC-Connected Power Park Modules** shall fulfil the following requirements related to equipment development, modernisation and replacement:

As Article 62 is part of section 4, it is only valid for EXISTING DC CONNECTED PPM's.

- If Article 62 should also be valid for Existing HVDC systems and HVDC Converter Stations, make clear why “existing” only in case of HVDC systems and place the article in the correct section.
- If it is a copy & paste fault, replace the wrong words and limit it to the intended PPM's.

CHAPTER 6 COMPLIANCE

SECTION 5 COMPLIANCE MONITORING

Article 63 Responsibility of the HVDC System Owner

1. The HVDC System Owner or DC-connected Power Park Module Owner shall ensure that the HVDC System, HVDC Converter Station or DC-connected Power Park Module is compliant with the requirements under this Network Code. This compliance shall be maintained throughout the lifetime of the facility.

As chapter 6 is a new chapter, start with section 1 in stead of 5.

Is it the responsibility of the HVDC System Owner or of the DC-connected PPM to ensure it?

As it is written, if only one of them (HVDC System, HVDC Converter Station or PPM) remains compliant it is ok. Is that the intention?

SECTION 6 COMPLIANCE TESTING

Article 65 Compliance testing for HVDC Systems

8. With regard to the LFSM-U response test:
- a) The HVDC System shall demonstrate its technical capability to continuously modulate Active Power at operating points below Maximum Capacity to contribute to Frequency Control in case of large drop of Frequency in the system.
 - b) The test shall be carried out by simulating at appropriate Active Power load points (e.g. 80 %) with low Frequency steps and ramps big enough to activate at least 10 % of Maximum Capacity Active Power change, taking into account the Droop settings and the deadband. Simulated Frequency deviation signals shall be injected simultaneously into both the speed governor and the load controller references if required, taking into account the speed governor and the load controller scheme.

Is this the speed governor of a PPM as a part of the compliance of a HVDC System?

Article 67 Compliance simulations for HVDC Systems

1. The Equipment Certificate may be used instead of part of the simulations below, provided that they are provided to the Relevant TSO.
2. With regard to the fast acting additional reactive Current injection simulation:
 - a) The HVDC Converter Unit or the HVDC Converter Station shall demonstrate its **capability to simulate** fast acting additional reactive Current injection in the conditions set forth in Article 17.
 - b) The simulation is deemed passed, provided that compliance with the requirement according to Article 17(2) is demonstrated.

Should the mentioned systems really have capabilities to simulate or was the intention that simulations demonstrate that the systems fulfil the requirements?

Article 68 **Compliance simulations for DC-connected Power Park Modules**

7. The model of the DC-Connected Power Park Module shall demonstrate its capability to simulate fault-ride-through capability in the conditions as referred to in Article 11(3) (a) of the [NC RfG].

The model shall demonstrate its capability to simulate.... What is the intention and how can it ever demonstrate this?

Having seen that:

- ▶ The faults presented in this presentation are only a limited amount of examples.
- ▶ Several faults in the Code make unclear what the intention is. Therefore concrete comments cannot be given, nor can it be accepted as it is.

And realizing that:

- ▶ This NC HVDC should grow into a European Regulation.

The answer to the question on sheet 1 can only be:

No, although a lot of good work has been done, the actual draft is not ready for Public Consultation

Realising that:

- ▶ As demonstrated, the draft as it is, is not ready for Public Consultation. Comments can only be based on interpretation/missinterpretation.
- ▶ A serious amount of fundamental changes are necessary.
- ▶ This NC HVDC should grow into a European Regulation.
- ▶ The NC HVDC was written by a stakeholder (ENTSO-E), involved in the energy system and market.
- ▶ The Public Consultation is the only possibility for Stakeholders to bring in their comments.

Conclusions can only be:

- ▶ A SERIOUS AMOUNT OF CORRECTIONS WILL BE NECESSARY
- ▶ A SECOND PUBLIC CONSULTATION OF A TECHNICAL AS WELL AS LEGAL CLEAR NC HVDC MUST BE ORGANIZED TO ENSURE OBJECTIVITY OF THE CODE

**THANK YOU VERY MUCH FOR
YOUR ATTENTION.**