# FNN Comments on NC HVDC

Forum Network Technology / Network Operation in the VDE (FNN)

VDE

# Agenda

1.FNN in brief

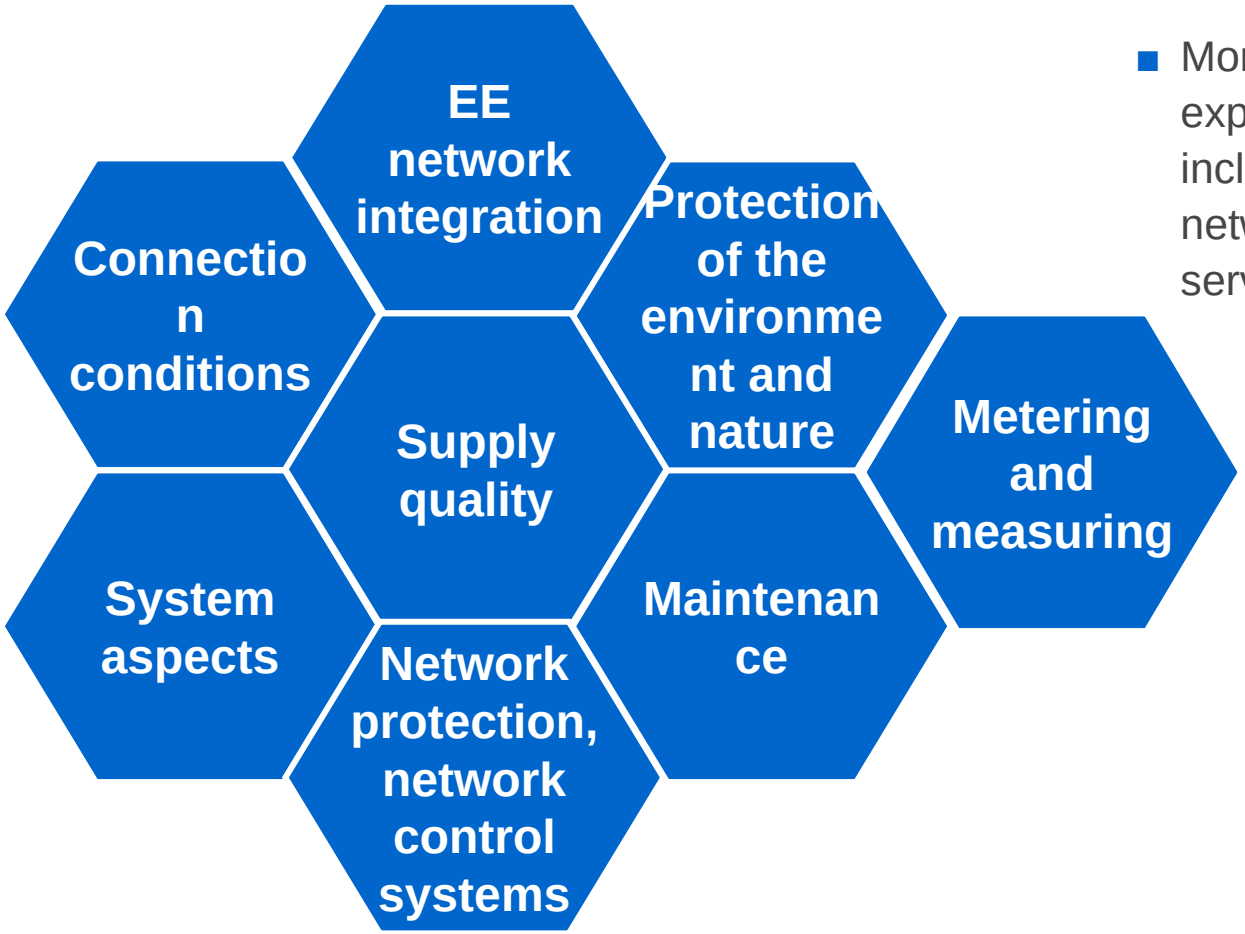
2.Comments on NC HVDC Draft

# Forum Network Technology / Network Operation in the VDE (FNN)

- Rule-setting for technical requirements and operational aspects of electricity networks from 230 V to 380 kV (Germany)
- Focus: safe and reliable operation
- All stakeholder groups concerned
  included
- Over 340 members financing and supporting the activities

✓ **The objective is reliable system operation at all times with, at the same time, as high a receptiveness as possible of electricity generated from renewable energy sources.**

# FNN competence fields

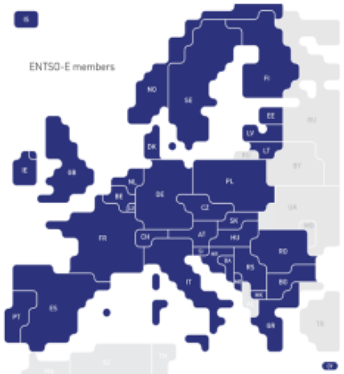



- Over 330 members (companies, industry, associations)
- More than 400 voluntary experts in over 40 committees: including manufacturers, network operators, scientists, service providers

VDE

# Interaction between network codes – VDE-AR – Customer connection

Customer




Grid connection agreement

DSO requirements

VDE-AR (FNN)

TSO requirements

VDE-AR (FNN) for transmission grid

European gridcodes

Contract

Ministries, Regulator,

Regional authorities

EU Commission

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# General Comments

- VDE|FNN appreciates the well structured Draft NC in an early stage of development
- VDE|FNN supports the application of § 3(3) in further topics. Due to the specific national challenges and the importance of system stability, it is necessary to leave flexibility to the technical regulation on a national level
- No technology should be eliminated compared to others by any defined requirements
  - One might have the impression that the VSC technology in comparison with the LCC technology can fulfil the requirements better with regards to an economic and technical reasonable solution
- The existing draft needs to be checked regarding consistency with other Network Codes.

# Art. 16 Reactive Power Capability

- It is necessary that the reactive power requirements can be defined within the national implementation process- therefor the application of § 3(3) is important
  - Definition of concrete values should be done by national committees
- Are the chosen values and the procedure to be understood as it is described in the NC RfG?
- The defined values for Maximum Range of Q/Pmax and Steady-State Voltage Level seem to be unnecessarily high
- ENTSO-E shall justify the mentioned ranges considering evenly possible system stability requirements and possible costs for implementation

# Art. 38 Reactive Power and Voltage requirements

- Similar to comments on §16
- There is a reference made in Art. 38 3(b) to NC RfG which seems to be oversized
  - Why there are different Reactive Power Ranges in Europe for DC-connected PPMs connected to an AC island? Harmonization?
  - Why there are different Voltage Ranges in Europe for DC-connected PPMs connected to an AC island? Harmonization?
  - For which purpose the enormous amount of Reactive Power Capability (HVDC and PPM) in the AC island is needed?

# Art. 37 Frequency stability requirements

- Capabilities for
  - Limited Frequency Sensitive Mode - Over Frequency
  - Limited Frequency Sensitive Mode - Under Frequency
  - Frequency Sensitive Mode

  shall be determined in accordance with (various) articles of the NC RfG, subject to a fast signal response as specified in Article 37 (1) of this Network Code.

- How does ENTSO-E determine a "fast signal response"?

- Is it necessary that all requirements listed in Articles 6 to 36 are applicable for HVDC substations which are AC connected to DC connected PPM?

# Art. 39 Control Requirements

- An output signal shall be required from the PPM and control coordination with the HVDC system and DC-connected Power Park Module[s] is required to deliver an optimum response.
  - Remark: What is optimum response? - and how fast?
- Power oscillation damping capability of Power Park Modules shall be determined in accordance with Article 16.3.(f) of the NC RfG.
  - Remark: How to do it if there are connections to "two different TSO areas"?

# Art. 48 Simulation Models

- The requirements in Art. 48 for the mentioned models are to general
  - further definitions need to be made - especially regarding the protection of intelligent equipment
  - it is not really obvious who has to provide what kind of information and data to whom
    - e.g. what does the HVDC manufacturer needs for information from the TSO in order to perform the compliance monitoring

# Comments

## Further Points

- Who judges on the requirement/feasibility in Art. 6 1(b) and Art. 14 1(b) regarding wider frequency ranges and wider voltage ranges?
- Art. 28 1 (c) : The requirements regarding harmonic network conditions requires clarification.
  - TSO should define the necessary harmonics? On what basis?
- Interoperability of parallel HVDC connections
  - Remark: the requirement is missing – but it is very important that two different HVDC suppliers can run in parallel