

PROPOSAL FOR THE CREATION OF A NEW JOINT WORKING GROUP

JWG* N° C2/B4.38	Name of Convenor : Jan van Putten (Netherlands) E-mail address: Jan.van.Putten@tennet.eu
Technical Issues # : 3, 5	Strategic Directions # : 1
The WG applies to distribution networks: No	
Title of the Group: Capabilities and requirements definition for Power Electronics based technology for secure and efficient system operation and control	
Scope, deliverables and proposed time schedule of the Group : Background : <p>The dynamic developments in the electrical power system are creating continuous challenges for the sector, including system operators. Due to the integration of renewable energy sources, more and more technology based on Power Electronics is being installed into the power system. New HVDC transmission and different FACTS devices are added to the system.</p> <p>System operators need to be prepared to cope with a low-carbon system where investments for additional transmission capacity are hard to resolve. Due to this there is the need to increase system flexibility and control capabilities in the operational context and to integrally and efficiently use the technology that is available now and in the future in the power system.</p> <p>Power systems are facing a transition from a system where synchronous generators were providing the necessary services to maintain stability, such as inertia, frequency and voltage control, system restoration support, power oscillation damping, short-circuit power, etc. into a future where more and more conventional synchronous generators are decommissioned or mothballed. This turns the power system into a Power Electronics dominated system with a different dynamic behaviour.</p> <p>In order to prepare for the near future, this Joint Working Group aims to bridge the gap between technology experts and system operation experts, providing the adequate platform to create insight on the technological capabilities and operational and control practices, and to open the door for new concepts and more efficient system operations.</p> <p>This Joint Working Group is expected to help both power electronics and system operation experts to better understand each other's reality, thus facilitating the implementation of power electronics in the system operations and control.</p> Scope: <p>The main scope of this Joint Working Group will be assessing best practices, technology capabilities and requirements for the integration of power electronics based technologies in the electrical power system, with the focus on its usage for system operations and control, taking advantage of the technical strengths, and mitigate the weaknesses.</p> <p>To successfully perform the described activities, knowledge sharing and integration between system operators and power electronics technology experts is required.</p>	

The main activities will focus on:

1. Reviewing previous CIGRE (e.g. SC B4, SC C6) and other work in this domain.
2. Researching and describing world-wide implemented solutions and best operational and control practices with Power Electronics based equipment, building an overview on installed systems and developed solutions.
3. Identifying Power Electronics technology integration capabilities and control issues relevant for system operations, including further steps to better define the requirements and adequately utilise the various Power Electronics based network components.
4. Defining best practices for Power Electronics based technology used in system operation and control, including implementation in connection requirements and possible description of necessary analysis.
5. Recommending areas for further research and development, in order to gain new insights.

Deliverables: Technical brochure with a summary to be published in Electra

Time Schedule: start: April 2017

Final report : April 2020

Comments from Chairmen of SCs concerned:

Approval by Technical Committee Chairman:

Date: 09/02/2017

A handwritten signature in black ink, appearing to read "M. Wald", is written over a light grey dotted grid background.

Table 1: Technical Issues of the TC project "Network of the Future" (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non-technical audience