

**PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP**

<p><b>JWG* N° A3/B4.34</b></p>	<p><b>Name of Convenor : Christian Franck (Switzerland)</b>  <b>E-mail address: franck@eeh.ee.ethz.ch</b></p>
<p><b>Technical Issues # : 3</b></p>	<p><b>Strategic Directions # : 1</b></p>
<p><b>The WG applies to distribution networks : Yes</b></p>	
<p><b>Title of the Group: Technical requirements and specifications of state-of-the-art DC switching equipment</b></p>	
<p><b>Scope, deliverables and proposed time schedule of the Group :</b></p> <p><b>Background :</b></p> <p>The new applications projected for future DC grids and multi-terminal DC systems at different voltages suggest that various DC equipment besides power electronic devices may be required; in particular all sorts of switching devices.</p> <p>The requirements for DC high speed making and breaking capabilities are different from those for AC equipment. Moreover, standards for DC system and equipment performance testing are lacking.</p> <p>SC A3 in cooperation with other SCs, especially B4, propose to create a new JWG to investigate technical requirements and the state-of-the-art specifications for “mechanical” based DC switching equipment in order to identify a guideline that may facilitate the development of efficient, reliable and cost beneficial DC switching equipment applied to the future DC grid and systems.</p> <p><b>Objectives:</b></p> <p>This JWG will review the technical requirements of DC switching equipment for different applications such as multi-terminal DC systems and off-shore wind farm connections. It will collect all available specifications of the state-of-the-art DC switching equipment used at transmission and distribution voltages. It will also investigate the technical capabilities and limitations of existing and projected switching equipment mainly with mechanical operating drives and then foresee the future capability of these DC switching equipment.</p> <p>The investigations will expect to facilitate the new development of DC switching equipment. The JWG will closely cooperate with SC A3 and B4 in addition to other related SCs.</p> <p><b>Scope :</b></p> <p>Technical requirements and specifications of the state-of-the-art DC switching equipment (based on investigations performed by JWG B5/B4.59 as well as WG B4.52 and B4.57)</p> <ul style="list-style-type: none"> <li>- HVDC and MVDC circuit breakers with mechanical operating drives and auxiliary switching components such as high speed making switches, fault current limiting devices, current commutation devices.</li> <li>- Disconnecting, earthing, bypass, and transfer switches</li> </ul> <p>The survey will cover the current technical capabilities and limitations of existing and projected equipment and provide:</p> <ul style="list-style-type: none"> <li>- An overview of techniques to create current zero or to commutate the fault current</li> </ul>	

- An overview of techniques to dissipate the fault current energy efficiently
- Understanding of the DC switching phenomena and relevant technical limitations such as DC current interruption capability and fault clearing times.
- A preview of the switching performance for these devices in future DC applications.
- A preview of testing requirements and testing methods

**Deliverables :**

Technical brochure + ELECTRA summary report

**Time Schedule :** start : 2013    **Final report :** 2015

**Comments from Chairmen of SCs concerned :** B4, B5, C4

**Approval by Technical Committee Chairman :**

**Date :** 20/08/2013

A handwritten signature in black ink, appearing to read "M. Wald", is written over the approval line.

- (1) Joint Working Group (JWG) - (2) See attached table 1 – (3) See attached table 2  
(4) Delete as appropriate

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

<b>1</b>	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
<b>2</b>	The application of advanced metering and resulting massive need for exchange of information.
<b>3</b>	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.
<b>4</b>	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.
<b>5</b>	New concepts for system operation and control to take account of active customer interactions and different generation types.
<b>6</b>	New concepts for protection to respond to the developing grid and different characteristics of generation.
<b>7</b>	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
<b>8</b>	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
<b>9</b>	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.
<b>10</b>	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)**

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