

## CIGRE Study Committee B5 «Protection and Automation»

### PROPOSAL FOR CREATION OF A NEW WORKING GROUP

<b>WG B5.43</b>	<b>Name of Convenor:</b> Mark Adamiak (US)
<b>Title of the Group: Coordination of Protection and Automation for Future Networks</b>	
<b>Scope, deliverables and proposed time schedule of the Group</b>	
<b>Background:</b> <p>In the context of the discussions about Smart Grids within the industry and the launch of research projects by several entities, CIGRE Technical Committee has drafted a report on Future Networks. The aim of this document is to describe the driving factors and the predictable evolutions of the Energy Supply Systems of the Future.</p> <p>Future networks will contain new types of equipments such as Distributed Generation, Renewable Energy Sources (RES), FACTS, SVC, Power Storage – typically all inverter based - and Dispatchable Loads. These equipments and the types of generation, which are likely to be massively implemented, will have an impact on the protection and automation systems of the electric power grid. This concerns, in particular, the distribution networks because many of the generation resources will be connected on medium voltage or low voltage level. There are also consequences for the subtransmission and transmission network, specifically, issues with stability, reversal of the power flow, contribution to short-circuit currents, etc. The protection systems at all levels have to be adapted and co-ordinated. Regional or zone control algorithms have to be designed and implemented. System Integrity Protection Schemes (SIPS), which are becoming of increasing importance, and the standard local protection system also have to be co-ordinated.</p>	
<b>Exclusions:</b> <ul style="list-style-type: none"><li>• Power Quality</li><li>• Dispatching of generation resources (communication requirements to be addressed)</li><li>• Algorithms implemented or executed on dispatching level</li><li>• Metering</li></ul>	
<b>Scope:</b> <p>The scope of the working group shall be as follows :</p> <p>The WG shall first identify a model of the future grid and then identify protection and automation issues. From these issues, potential solutions as well as follow-up investigations will be proposed. From the issues, requirements related to protection and automation of Future Networks will be identified.. This is a first, early deliverable used also as a base for discussion within SC B5 in 2011 to construct a SC B5 "vision" of the related protection and automation issues. Close cooperation is intended with SC C6 and C1 for the identification of a realistic model of the future grid. Both SC are invited to send experts to the WG</p> <p>For each of the items of the scope, a comprehensive description should be established. If the Working Group estimates that more detailed work is required for a given subject, this item should be identified as a possible future subject of another WG. Given the broad general subject and the time schedule, a detailed research on any of the items is explicitly excluded from the scope of the WG. Some specific items are or have been covered by other Working Groups (eg B5.14 "Wide Area Protection &amp; Control Technologies", IntelliGrid.info, and NIST) and the new WG should use the available documents and conclusions from these groups.</p> <p>Specific items that are to be addressed in the report include:</p> <ul style="list-style-type: none"><li>• Description of the characteristics and models of the Networks of the Future (e.g. city, suburb, rural, sub-transmission, and transmission) applicable to the scope</li></ul>	

- Identify the potential Protection, Automation, and performance issues and needs
- Address specific known items such as listed below
- Coordination and interaction of protection associated with Future Networks
  - Equipment Protection of generating resources (DG, RES) and support equipment (FACTS / SVC / Power Storage)
  - Local, sub-regional, regional and wide area protection
  - Dynamic protection setting coordination and verification
  - Use of adaptive protections
  - Protection of the islanded grid
- Coordination and interaction of automation functions associated to Future Networks
  - Functions for islanding detection
  - Identification and description of automation functions
  - Sharing and allocation of automation functions
  - Local, regional and wide area automation for generating sources (DG / RES) (supervision, adaptation to network topology and constraints)
  - Local, inter-substation and regional automation for loads and energy storage (supervision, adaptation to network topology and constraints)
  - Distribution automation functions
  - Automation functions to monitor and adjust transfer capacity on different network levels
  - Local or regional automation functions related to the stability of the generating resources
  - Local or regional automation functions related to the stability of the higher-voltage network
- Coordination and interaction of automation and protection functions
  - Impedance/load flow control by FACTS and line protection
  - Load shedding and protection
  - Adaptive protection responding to network changes resulting from automation
- Communication requirements for coordinated protection and automation functions (supports, acceptable delays)
- Use of IEC 61850 and future extensions

**Deliverables:**

- Characteristics and definition of Network of the Future (first point of scope): for discussion within SC B5 in 2011 to construct SC B5 "vision"
  - Technical Report (Brochure)
  - ELECTRA Executive Summary
  - Power Point Presentation for Tutorials

**Time Schedule:** start: 2011; Final report: 2014.

**Comments from Chairmen of SCs concerned:**

**Approval by Technical Committee Chairman:** Klaus Fröhlich      **Date:** 18/01/2011