CIGRE Study Committee A1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

WG* N° A1.37	**Name of Convenor : Alberto Villarrubia (Spain)** **E-mail address**: **avillarrubia@iberdrola.es**
Technical Issues # (2): XXXXXX	**Strategic Directions # (3): 2**
The WG applies to distribution networks (4): No	
Title of the Group: Turbogenerator Stator Winding Support System Experience	

Scope, deliverables and proposed time schedule of the Group :

Background :

Generator expected reliability and integrity in service is jointed to design and performance of support systems to assure mechanical integrity of the stator winding, both in the end-winding and slot area. These systems are one of the most critical component for generator unavailability and forced outage rates as the mechanical insulation wear and the “time to fault” of this degradation mechanism of the winding insulation are quicker than electric ones.

Normal winding vibration due to electromagnetic forces could cause severe damages for insulation wear if support systems have been improperly designed, installed or maintained, even more if natural winding vibration frequencies are in the vicinity of multiples of the grid frequency.

In addition, to ensure the mechanical integrity of the winding, these support systems should be designed with a commitment to allow normal expansion and compression of the winding due to temperature change during the operation and star/stop periods, as well as mitigate the overstress like to short circuit currents.

These two conditions lead to different technical solutions for implementing these systems and together with quality manufacturing, lead to different problems after time in operation, which require to carry out repairs and implementation of technical improvements or modifications of the original design.

Scope :

1. Working group will focus on air, hydrogen and water cooled turbo-generators.

2. The goal of the working group is to investigate the state of the art and experiences of turbogenerator stator windings support systems both in end-winding and slot area, with focus on:
   - Design.
   - Winding support integrity evaluation techniques during commissioning, operation and maintenance:
   - On-line Monitoring.
   - Detected problems during normal operation or during abnormal conditions.
   - Root Cause Analysis.
   - Repairs.
   - Upgrades or Design modifications.

Deliverables : Report to be published in Electra or Technical Brochure with summary in Electra

Time Schedule : start: September 2012 **Final report:** September 2014

• TOR submitted for approval on June, 2012 • Draft questionnaire by November , 2012 • Comments by members and experts – February 2013 • Final questionnaire – April 2013. • Survey – answers – July 2013 • Draft report – August 2013 • Comments by members and experts - SC-A1 Colloquium Romania 2013 • Final document (Report or Technical Brochure) – March 2014 • Approval of final document – Paris 2014.
Comments from Chairmen of SCs concerned : None
Approval by Technical Committee Chairman : Klaus Fröhlich **Date** :12/08/2012

(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)

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