CIGRE Study Committee B1

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

WG B1.39	**Name of Convenor :** Olivier MOREAU (France) **E-mail address**: olivier-armand.moreau@edf.fr
TECHNICAL ISSUES: 1, 9, 10	**Strategic Directions: 1**
THE WG APPLIES TO DISTRIBUTION NETWORKS (4): YES	

On shore generation cable connections

Background : Today a lot of onshore generation plants have been built or are under construction being connected through underground cables and even more are already planned. The power ranges is from tens of MW for small solar or wind farms up to two thousands of MVA for huge nuclear power plants.

There is already a lot of experience about cables installed on the transmission network, but there far less when considering generation connections.

As the way to operate cable systems in case of on shore generation connections is different from the links on the grid, a full WG is needed to address the potential gaps in standards.

Terms of Reference:

All topics shall be addressed in a comprehensive guide dedicated to onshore generation and inter-array cables. A lot of topics can be covered by reference to other works, and shall be mentioned, given the very different nature of the readers.

The WG should address :

- Export cables, inter array cables and interconnections
- HV but also MV and even LV AC cables should be addressed as long as they are part of the connection scheme,
- HVDC export cables.
- The cable thermo-mechanical behaviour under normal operation taking into account specific load conditions associated with the different types of generation that can be connected., overload such as during cooling fault, and short circuit,
- The thermo-mechanical behaviour at the interface between cable and accessories in the different configurations, GIS, transformer terminations under vibration, in flexible and rigid installation
- The possible need to qualify the cable system under reactive power
- The cable system stresses under grid fault
- The need to change voltage test values to reach the expected availability by generation companies
- The typical load conditions associated with the different types of generation to be conencted ;
    - need to use specific load cycles for qualification and/or testing process(es),
    - need to determine typical load factors F to optimise cable ratings
- The preferred installation methods taking into account power ratings, availability and all kind of maintenance

And other criteria that are different from the transmission world to meet generation requirements

Deliverables : Technical Brochure with summary in Electra and a tutorial. The report will be sent to IEC TC 20 for further consideration.

Time Schedule : start : September 2011 **Final report** : 2014

Comments from Chairmen of SCs concerned : **B3, B4**

Approval by Technical Committee Chairman : Klaus Fröhlich **Date** : 23/05/2012

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	Interactive communication with the public and with political decision maker