CIGRE Study Committee B4

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG B4.66	**Name of Convenor :** Fernando CATTAN Jusan (Brazil) **E-mail address**: cattan@furnas.com.br
Technical Issues # : 3	**Strategic Directions # : 1**
The WG applies to distribution networks : No	
Title of the Group: Implications for harmonics and filtering of the staggered installation of HVDC converter stations in proximate locations	

Background :

Several ongoing and proposed HVDC projects consist of two near-identical transmission connections, between identical or proximate AC connection points, but staggered in installation date, perhaps by several years. This delayed installation of the second transmission is typically done in order to match transmission capacity to the build-up of generation capability or load growth.

Many technical aspects of the close location of converter stations have already been covered in the work of WG B4.41 and the resulting Technical Brochure 364 on "Systems with Multiple DC Infeed". However, intentional and planned staggered installation of stations with identical or near identical HVDC schemes being connected in close proximity to each other poses some different issues, particularly in the area of harmonics and filtering.

Such issues include:

- Specification of harmonic limits at the time of the first installation which will also permit the connection of the anticipated second station without breaching regulatory limits.
- The validity of the recommendations in IEC 61000-3-6, Chapter 9 need to be examined.
- The transfer of harmonics between LV-MV-HV and EHV may need to be considered.
- Consideration of harmonic limits for joint operation, which may be different from the limits applicable to each station individually.
- Compatibility of filter designs to achieve fair sharing of harmonic load between stations
- Prevention of overloading of one station's filters by the other
- Possible inter-changeability of filters from either station to enhance operational flexibility and increase redundancy.

Scope :

1. Assess the issues which have arisen in the specification (and where relevant the project execution) of recent HVDC projects which fall into this category.
2. Consider the full extent of possible technical concerns – including all those listed in "Background" above.
3. Take into account the economic implications and the regulatory aspects – for example concerning transfer of proprietary information and of providing an equal basis for tendering for the later transmission.
4. Prepare a Technical Brochure summarising the above investigations and making suitable recommendations.

Deliverables :
Technical Brochure with summary in Electra

Time Schedule : start October 2014 **Final report** : 2016

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman :

Date : 21/07/2014

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