



WORKING GROUP FORM

Study Committee: B4

Group No : B4 - 55

Name of Convener : Kent Sørbrink (Denmark)

TITLE of the Group: HVDC connection of offshore wind power plants.

Background

The first HVDC connection of an offshore wind power plant (WPP) has been commissioned and many more are planned in the North Sea and in other sites around the world. VSC-based HVDC has become the preferred solution for many large offshore WPP, with a long cable distance to the ac grid connection point. This is largely because it is more compact than LCC HVDC as well as being capable of independent control of active and reactive powers.

In addition many HVDC submarine cable connections for power exchange between countries are being planned and the possibility of connecting WPPs to these interconnections and to future HVDC is being seriously discussed and considered. The issues associated with expanding a WPP or a HVDC connection with equipment from another manufacturer also needs to be addressed.

A typical on-shore WPP has to be designed to comply with a relevant Grid Code (GC) which defines the performance during normal operation, faults, and disturbances. Existing GCs are however written for ac connected WPPs, and for an offshore wind farm these conditions typically apply only at the grid connection point. This raises the possibility of optimizing the overall WPP and the HVDC converter, with potential economic and maintenance benefits. However, if the HVDC connection and the WPP are provided by different parties, such optimisation cannot be done unless both parties understand the benefits that they can obtain from the optimisation.

Guidelines and recommendation for point to point and multi terminal HVDC connection of wind power plants are therefore highly needed and of mutual interest for the HVDC and Wind industries in order to be able to provide the best possible solutions for the stakeholders.

Scope

This WG will use generally available and generic models of WPPs and HVDC schemes. It will concentrate on the interactions between the close connected offshore WPP and the offshore HVDC converter.

The optimisation will look at how the steady state and dynamic offshore ac voltage can be efficiently managed with minimum overall rating in the HVDC converter and the WPP converters.

The use of dc choppers within the HVDC converter station and control methodologies to cope with the excess energy being generated during faults in the on-shore ac network will be studied. The impact on the rating of the HVDC

converter and the WPP resulting from the different strategies will be discussed. Recommendations will be made.

The WG will focus mainly on point to point HVDC connections. However, the WG will also discuss the consequences of the offshore HVDC terminal being part of an HVDC Grid.

Other SC's are invited to nominate experts with knowledge in this area to contribute to this WG, and their contribution will be acknowledged in the TB in the usual way, with the mention of their name and the SC to which they belong.

Deliverables and time schedule:

Technical Brochure, Tutorial, Electra Paper
WG start end 2010. Completion end 2013,

Other SCs/ Target Groups concerned by the work:

Manufacturers, Transmission companies, Issuing Bodies of Grid Codes, Transmission System Owners and Authorities.

Approval by TC Chairman : Klaus Fröhlich

Date : 02/12/2010