

**LES RESEAUX HVDC MULTI-TERMINAUX: DES DEFIS
MULTIPLES EN GENIE ELECTRIQUE
HIGH VOLTAGE DIRECT CURRENT GRID MULTI-
TERMINALS: MANY CHALLENGES IN ELECTRICAL
ENGINEERING**

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Introduction: Electrical installation using high voltage need to be improve to make the exchanges of power under the sea with security and to connect the offshore sources. Alternative grid show limits in those applications. High voltage direct current (HVDC) installation can be a solution to those cases, if some technological and scientist problem are solved. Challenge are in every level of the electrical engineering work, in the whole system, with the material used, and the way their used. This article introduce the main challenges in the domain of electrical engineering to solve in case of the exploitation of a HVDC grid.

Keys words: Electrical system, HVDC grid multi-terminals, HVDC converter and high voltage semiconductor.

1. Construction of an electrical grid

First electrical grid in the XIXth century was both made with alternative and direct current, finally the alternative technology be the mainly use thanks to the invention of the transformers. The both technology together allow to make a more power travel though the cables.

In the second part of the XXth century and the improvement of the semiconductor for high power system some project to connect country over the seas emerged. Like the connection the Italia-Corsica-Sardinia, France-England or in the Baltic Sea or other very long distance connection earthly.

Add to this the actual environmental goal in terms of renewable energy which encourage the use of hydraulic and solar energy which big installation can be very far of the consumer create a need for transport infrastructure with a good efficiency on very longue distance.

To satisfy of this evolutions the construction of electrical transport facility HVDC can have some advantage technically and financially [part 1]. In this article we will remind the limits of the HVDC [part 2] then introduce different situation where HVDC are needed [part 3]. Anyway, all this create some challenge to run this new network [part 4] which make some technological lock to break in the domain of the semiconductor and all component generally [part 5 & 6].