## Abstract

**Status of conventional HVDC electricity transport at the GW level**
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Already in the very early days of electricity supply there has been a fundamental discussion, whether this new system should be built using direct or better alternating current. The decision was made for alternating current, mainly because it was easier to break and voltage transformation as a pre-requisite for efficient transmission was not possible with direct current. However, the advantages of direct current transmission, in particular its higher efficiency at long distance transmission, was not forgotten, and since the 30ies of the 20th century the idea of high-voltage direct current (HVDC) transmission was investigated. In the 50ies the first systems were delivered. HVDC systems were deployed mainly for connecting remotely located hydro power plants to the grids or to interconnect asynchronous systems. Development of HVDC technology showed good progress until the mid of the 80ies, driven e. g. by the Itaipu hydro power plant in Latin America.
New dynamics came up in the late 90ies, when on side China requested more and more powerful long-distance links to supply its metropolitan regions and on the other side Europe started to transform its power generation sector rapidly towards renewable energy. By this Europe for the first time in its history built remotely located, bulk generation capacity – in particular wind farms in the North of the continent and offshore. Since about 2005 it became more and more obvious, that the existing 400 kV AC transmission grid is not the appropriate solution for future challenges and will have to be complemented by an overlay structure, which will most likely be realized with HVDC. But that means that for the first time we are talking about a DC grid instead of point-to-point connections. Classic DC technology is not well suited for this task. But since the mid of the 90ies a new technology generation, the so called voltage source converters, was introduced and has reached the GW range meanwhile. It fulfils all requirements for DC grids and thus will be the technology of choice for Europe's power systems of the future.