

Tests on possible transmission systems (AC / DC) with regard to power grid connection of xxxxx (xxx MW) and xxxx (xxx MW) offshore wind parks.

The objective was to determine the most suitable power transmission system for the network of the power transmission system operator with regard to the connection combination of one and / or two common wind farms. The tests were focused on observing the operator's power grid connection regulations.

To examine the reactive power flow of the connection the conditions to observe the xxx-network connection regulations on the 380 kV power grid connection point as well as the voltage stabilization in the 150 kV grid have been controlled and the resulting necessary adjusting ranges of the transformers and 150 kV shunt reactors have been determined through power flow studies and by considering the characteristic performance chart of the offshore wind farms (WEA).

The analysis on the resonance patterns includes tests on the vibration behavior of the 150 kV grid and on the influence of the subordinate medium and low voltage levels including recommendations on measures to eliminate critical vibration and harmonic conditions.

Furthermore, tests have been carried out regarding the influence of the regenerative characteristic of the wind farms on the short circuit variables in the 380 and 150 kV grids and for dimensioning the neutral earthing of the 150 kV grid against the maximum permissible single pole short circuit currents.

Within the framework of an insulation coordination the following actions were carried out: evaluation of the maximum transient and stationary conductor-earth and shield-earth voltage loads and the circuit breaker load, determination of the optimum switch angles for controlled switching, selection of over-voltage conductors by taking into consideration the thermal loading for switch processes in normal operation and in case of network faults. Furthermore, a recommendation on the switching sequence for commissioning and decommissioning of the 150 kV grid connection has been developed.

The analysis of a separate xxxxx connection for OWP xxxx additionally contains an economic comparison of the two connection models.

The result of the analyses proves the AC/DC hybrid solution to be the optimum power grid connection solution for the two OWPs.