Paper 03: Design of a reactive power compensation scheme for AC offshore wind power system

Author: Egil Viken (ABB)

Abstract:

To maintain a stable power system, even with the growing integration of inverter-based renewable sources, grid codes require that all plants possess sufficient dynamic reactive capability to support the grid voltage. For offshore wind farms, which are situated far from shore, the reactive support cannot be based on the wind converters, and the capability requirement must be fulfilled from equipment installed onshore. The plant must also manage its own reactive power production, which can be significant because of the long transmission distances and large wind farm sizes.

This paper presents an approach for designing an optimized plant power system for compensating the AC transmission system in offshore windfarms and complying with the reactive capability of the grid codes. This approach makes use of different power system components such as shunt reactors and STATCOMs for a cost-effective design. The approach shows how to determine the relative size of the compensation equipment and methods to verify the requirements as given in the grid codes involving PQ and UQ plots.