Abstract

In recent years, wind energy has become one of the most important and promising sources of renewable energy, which demands additional transmission capacity and better means of maintaining system reliability. The evolution of technology related to wind systems industry leaded to the development of a generation of variable speed wind turbines that present many
advantages compared to the fixed speed wind turbines. These wind energy conversion systems are connected to the grid through Voltage Source Converters (VSC) to make variable speed operation possible. The stator of the generator is directly connected to the grid while the rotor is connected through a back-to-back converter which is dimensioned to stand only a fraction of the generator rated power.

To harness the wind power efficiently the most reliable system in the present era is grid connected doubly fed induction generator. The rotor side converter (RSC) of DFIG usually provides active and reactive power control of the machine while the grid-side converter (GSC) keeps the voltage of the DC-link constant. The additional freedom of reactive power generation by the GSC is usually not used due to the fact that it is more preferable to do so using the RSC. However, within the available current capacity the GSC can be controlled to participate in reactive power generation in steady state as well as during low voltage periods. The GSC can supply the required reactive current very quickly while the RSC passes the current through the machine resulting in a delay. Both converters can be temporarily overloaded, so the DFIG is able to provide a considerable contribution to grid voltage support during short circuit periods.

In this paper we focus on analysing a wind turbine system using MATLAB SimPower Systems. The machine used was a doubly fed induction generator (DFIG). As protection against short circuit transients, the crowbar protection was modelled.

Reference

Analysis on Dg’s Connection in a Developed Model of Doubly-Fed Wind Energy System


Index Terms

Computer Science
Power Systems

Key words
dg’s Connection
DFIG
Fault Ride Through

Grid.