Application of static synchronous series compensator and series braking resistor for Enhanced Fault Ridethrough Performance of FixedSpeed Wind Turbines

Ali Derikvand [1], Mahmood Jorabiyan [2]

1- Master Degree Student,Department of Electric,Dezful Branch,Islamic Azad University ,Dezful, Iran, Ali_barghk@yahoo.com
2- Department of Electric,Dezful Branch,Islamic Azad University ,Dezful, Iran, Iran.mjoorabian@scu.ac.ir, PhD.

Abstract:

This paper presents new series grid interface topologies for enhancing the low voltage ridethrough capability of self-excited induction generator-based wind turbines. Two proposed schemes: static synchronous series compensator (SSSC) and controllable series braking resistor (CSBR) have been designed and simulated. The test system simulated represents a wind turbine connected to an electric grid with alternatively employing SSSC and CSBR. The potential of the two schemes is evaluated and analyzed using positive and negative-sequence reference frames in response to balanced and unbalanced fault scenarios. The simulation results using MATLAB demonstrate the performance of the proposed schemes for improving the fault ridethrough capability and transient stability margin in response to severe symmetrical and asymmetrical grid faults. The schemes have shown successful and fast mitigation of voltage disturbance consequences on the mechanical system. The schemes helped the wind turbine to remain connected with considerable isolation from grid faults.

Keywords: Fixed Speed Wind Turbines,self-excited induction generator,static synchronous series compensator , Brakingresistor.