

# **Fault Ride through of Fully Rated Converter Wind Turbines with AC and DC transmission systems**

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## **Abstract**

Fault ride through of fully rated converter wind turbines in an offshore wind farm connected to onshore network via either high voltage AC (HVAC) or high voltage DC (HVDC) transmission is described. Control of the generators and the grid side converters is shown using vector control techniques. A de-loading scheme was used to protect the wind turbine DC link capacitors from over voltage. How de-loading of each generator aids the fault ride through of the wind farm connected through HVAC transmission is demonstrated. The voltage recovery of the AC network during the fault was enhanced by increasing the reactive power current of the wind turbine grid side converter. A practical fault ride through protection scheme for a wind farm connected through an HVDC link is to employ a chopper circuit on the HVDC link. Two alternatives to this approach are also discussed. The first involves de-loading the wind farm on detection of the fault, which requires communication of the fault condition to each wind turbine of the wind farm. The second scheme avoids this complex communication requirement by transferring the fault condition via control of the HVDC link to the offshore converter. The fault performances of the three schemes are simulated and the results were used to assess their respective capabilities.