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IMPROVING VOLTAGE SAG RIDE-THROUGH IN HYBRID FUEL CELL / BATTERY DISTRIBUTED GENERATION SYSTEMS

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ABSTRACT

In this paper controller design for voltage sag ride-through in hybrid fuel cell/energy storage distributed power generation system has been presented. As the amount of fuel cell power generation and other Distributed Generation (DG) with power electronic in the grid grows, it becomes unacceptable to disconnect generating units every time a disturbance occurs, as was common practice in he past. Keeping the VSC on line during unbalanced voltage sags becomes thus a very critical issue. Hence, modeling, controller design, and simulation study of a hybrid distributed generation system are investigated. The physical model of the fuel cell stack, battery energy storage and the dynamic models of power conditioning units are described. Based on the classification of unbalanced faults that can occur in the grid, resulting in voltage sags at the bus where the hybrid power system is connected, the maximum current that the converter valves must be bale to withstand is calculated. Simulation results are given to show the overall system performance including active power control and voltage sag ride-through capability of the hybrid distributed generation system.