The Impact of Inverter Overloading Capability on the FRT Performance of Inverter-Based DG Units

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Abstract

Microgrid (MG) is experiencing a rapid growth and better integration of renewable distributed generation (DG) units with utility grid and plays a key role in grid infrastructure upgrade. It is required from these DG units to stay connected during and after any voltage disturbance to support the voltage, further ensuring the power system stability. In this context, an adapted inverter control scheme for fault ride through (FRT) is proposed to enhance the MG stability after fault provoked islanding. Hence, a maximum available support of inverter DG unit regarding the reactive power enhancement is achieved. In addition, the influence of using the droop control strategy on the MG stability is analyzed with and without the proposed FRT scheme. Superior feature for the FRT based on the overloading capability of the inverter DG unit is proposed to enhance MG performance. The MG under study includes a synchronous diesel DG unit, an inverter DG unite, and a combined load (static, and dynamic induction motor (IM) load). The structure of MG and the proposed inverter control strategy and scheme are employing using Matlab/Simulink package. A wide perspective on the simulation results verify the feasibility of the proposed FRT to enhance MG stability at the fault incidents.

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