Fault Ride-Through of Inverter Based-Microgrids

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Abstract

An increasing percentage of the total power generated is no longer derived from the traditional synchronous generators but from the inverter-based renewable energy system. Inverter based systems are often decentralized with a paradigm shift in the dynamic and operating features of the grid. Microgrids provide a veritable platform to aggregate multiple Distributed Energy Resource with local loads and can operate as an island or in synchronism with the grid. Microgrids and DERs are often decentralized and integrated into the medium-voltage network and, in certain instances, low-voltage networks. The integration of small scale DERs as microgrids to the grid is not really a big concern to the grid operator as large scale integration. The grid identifies small scale integrated microgrids as negative loads. However, installed large scale facilities have a significant influence on the overall grid frequency and voltage regulations through their generation. Consequently, conventional microgrids and DER systems typically do not render ancillary grid services or ensure fault-ride-through. The traditional control system of grid-connected units provides the power injection at the unity power factor with a strict requirement to disconnect promptly in the event fault or disturbances in the grid. However, with inverter-based microgrids (DERs) poised to play an influential role in the emerging power generation, there is a need to revamp their control scheme to provide fault ride-through capability and other ancillary services. This will ultimatly ensure grid stability and reliability.

Outline

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