

Dynamic Performance of Microgrid after Fault Provoked-Islanding Considering Induction Motor Loads

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Abstract

Microgrids (MGs) are one of the most feasible structures that accommodate the increased penetration of the intermittent renewable distributed energy sources. Enabling MGs with renewable energy sources is crucial to meet the environmental concerns, and get economic benefits and reliability requirements. This paper details the effect of control strategies of an inverter-based distributed generation (DG) on the dynamic performance of MG after fault-caused islanding conditions with the presence of Induction Motor (IM) loads. The dynamic performance of MG is analyzed with different IM load conditions. Further, the effect of DGs penetration levels on the performance of MG is investigated. Voltage and frequency deviations are taken as a key indicator for MG stability. A MG model along with the control strategies is simulated on Matlab/Simulink environment. The model includes a composite generation consists of inverter-based DG and synchronous generator coupled with a critical load which contains static RLC load and IM loads. The simulation results declared that the control techniques of the inverter-based DG are highly affecting the MG stability. Moreover, the MG may lose its stable operation owing to IM loads and DGs penetration levels.

International Middle-East Power Systems Conference, (MEPCON 2016). 2016, December