

Performance Investigation of Microgrid Stability Subsequent to Fault Provoked-Islanding with Different Loads and DG Conditions

Hossam Eldin Abdallah Talaat ,Ahmed A. Salem, Ali H. Kasem Alaboudy, Abdelazeem A. Abdelsalam

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 impact of control strategies of an inverter-based DG on the MG stability during intentional and fault-provoked islanding conditions. The MG stability performance is analyzed with different load conditions. In addition, the effect of the DG penetration level is highlighted. 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 mix of synchronous and inverter-based DG units coupled with a combined load. The Simulation results show that the MG may lose its stable operation owing to the impact of DGs penetration level. MG control strategy has significant effect on the critical clearing time of a MG.

International Conference on New Energy & Environmental Engineering (ICNEEE), Cairo, Egypt, 2016. 2016, April