Technical, Economical, and Environmental Evaluation for Sizing and Siting of Distributed Generation in Electric Power Networks

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Abstract

Distributed Generations (DGs) have spread widely in electric distribution systems due to their positive impacts on the system. One of the main benefits is using DGs as an alternative element in electric distribution expansion planning. Thus, this paper investigates the optimal solution of sizing and siting of DG units in electric distribution system using the Particle Swarm Optimization (PSO) technique. It takes into consideration minimizing the distribution network losses, improving the voltage profile, and improving economic and environmental aspects. Two electric distribution systems are used to evaluate the proposed PSO technique. The first system is used to verify the proposed PSO technique by comparing the obtained results with a previously studied Numerical technique. The second system is a practical distribution system (Borg El-Arab substation; a part of the Egyptian National Electricity network) where the proposed PSO technique is implemented. The obtained results are evaluated and discussed. Finally, conclusions are reported.

MEPCON 2014 Conference 2014, January