

Strategic maintenance scheduling in an islanded microgrid with Distributed Energy Resources

P. Mazidi; M.A. Sanz Bobi

Abstract-

This paper addresses passive and active preventive maintenance scheduling in an islanded microgrid with storage and renewable energy sources. At first, under a centralized framework, a single-level cost-minimization formulation for passive maintenance scheduling is developed and used as a benchmark in the operation. An independent microgrid operator is responsible for the operation in this framework. Then, through a bi-level formulation, the active maintenance scheduling and operation is carried out with profit-maximization objective. These two developed frameworks provide the houses with opportunity to earn profit and the regulator and the operator to analyze the performance of the system. The bi-level formulation is transformed into a single-level problem through Karush-Kuhn-Tucker conditions. Furthermore, the proposed model provides the capability of incorporating condition monitoring data into the operation. The model is validated through a test system and the outcomes demonstrate the advantages, applicability and challenges of utilizing the proposed model.

Index Terms- Maintenance Scheduling, Microgrid, Energy Storage, Solar Power Generation, Wind Power Generation

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