

Energy Management Strategy in Dynamic Distribution Network Reconfiguration considering Renewable Energy Resources and Storage

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Penetration of renewable energy sources (RESs) and electrical energy storage (EES) systems in distribution systems is increasing, and it is crucial to investigate their impact on systems' operation scheme, reliability and security. In this paper, expected energy not supplied (EENS) and voltage stability index (VSI) of distribution networks are investigated in dynamic balanced and unbalanced distribution network reconfiguration, including RESs and EES systems. Furthermore, due to the high investment cost of the EES systems, the number of charge and discharge is limited, and the state-of-health constraint is included in the underlying problem to prolong the lifetime of these facilities. The optimal charging/discharging scheme for EES systems and optimal distribution network topology are presented in order to optimize the operational costs, and reliability and security indices simultaneously. The proposed strategy is applied to a large-scale 119-bus distribution test network in order to show the economic justification of the proposed approach.