World Academy of Science, Engineering and Technology
International Journal of Energy and Power Engineering
Vol:17, No:08, 2023

Energy Management System Based on Voltage Fluctuations Minimization for Droop-Controlled Islanded Microgrid

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Abstract : Power management and voltage regulation is one of the most important issues in microgrid (MG) control and scheduling. This paper proposes a multiobjective scheduling formulation that consists of active power costs, voltage fluctuations summation, and technical constraints of MG. Furthermore, load flow and reserve constraints are considered to achieve proper voltage regulation. A modified Jacobian matrix is presented for calculating voltage variations and Mont Carlo simulation is used for generating and reducing scenarios. To convert the problem to a mixed integer linear program, a linearization procedure for nonlinear equations is presented. The proposed model is applied to a typical low-voltage MG and two different cases are investigated. The results show the effectiveness of the proposed model.

Keywords : microgrid, energy management system, voltage fluctuations, modified Jacobian matrix
Conference Title : ICEPES 2023 : International Conference on Electrical Power and Energy Systems
Conference Location : Istanbul, Türkiye
Conference Dates : August 17-18, 2023