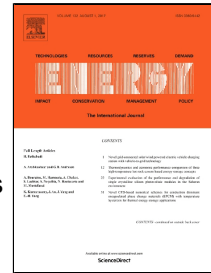


Accepted Manuscript

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PII: S0360-5442(17)31075-7
DOI: 10.1016/j.energy.2017.06.081
Reference: EGY 11089
To appear in: *Energy*
Received Date: 23 October 2016
Revised Date: 26 May 2017
Accepted Date: 13 June 2017

Please cite this article as: Reza Hemmati, Hedayat Saboori, Pierluigi Siano, Coordinated short-term scheduling and long-term expansion planning in microgrids incorporating renewable energy resources and energy storage systems, *Energy* (2017), doi: 10.1016/j.energy.2017.06.081

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Coordinated short-term scheduling and long-term expansion planning in microgrids incorporating renewable energy resources and energy storage systems

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Abstract: this paper presents a two-level stochastic microgrid planning tool. The proposed tool determines the optimal location and size of different technologies through a long-term plan as well as the optimal operation strategy for technologies through a short-term plan. The proposed planning tool considers distributed generation resources, energy storage systems, and lines as candidates for the expansion. One of the key characteristics of the introduced planning is its ability to tackle load and renewable energies uncertainties through stochastic planning. Both the long-term and short-term plans are mathematically expressed as mixed integer nonlinear programming problems and solved by using a strong Meta-heuristic optimization algorithm. Simulation results demonstrate that the proposed two-level planning method reduces the planning cost compared to the conventional method (i.e., only long-term planning). As well, it is indicated that considering line as an option for the expansion reduces the planning cost and increases the flexibility of the planning.

Keywords: Energy Storage System; Line Reinforcement; Microgrid; Resource Expansion Planning; Stochastic Programming.

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