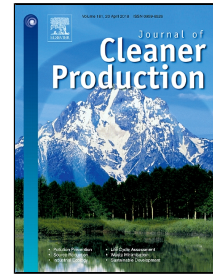


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Optimal Scheduling of Plug-in Electric Vehicles and Renewable Micro-grid in Energy and Reserve Markets Considering Demand Response Program

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Abstract

Plug-in electrical vehicles (PEVs) are introduced as a compatible transportation system for the environment. Manufacturing technology of electric vehicles (EVs) could bring an opportunity to implement them as energy storages. By expanding the use of renewable energy sources (RESs), the role of energy storage system is highlighted to overcome power generation fluctuations. Integrating PEVs and RESs could be profitable for both PEV and RESs owners. In this paper, a structure of renewable energy sources based micro grid (RMG) is considered. The proposed RMG has been equipped with a parking lot in order to control and aggregate PEVs. This paper investigates the optimal energy management problem of the RMG with the presence of PEVs. The objective of the RMG owner is to minimize the cost through generating power with its local generators and trading energy with the power market considering the market price. Also, the RMG could incentive PEV owners to take part in the demand response (DR) programs as a flexible load. It could bring profit for both PEVs and RMG owners. The existence uncertainties are modeled in the scenario-based framework. Three case studies are analyzed to display the effectiveness of the proposed model. As a result, utilization of the parking lot has decreased the

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