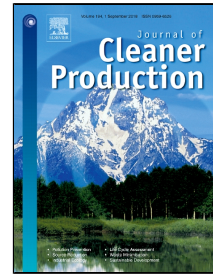


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Energy management of Smart Micro-grid with Response loads and Distributed Generation Considering Demand response

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ABSTRACT:

Governmental incentives to develop clean and renewable energy sources, and concerns about the increasingly serious environmental pollution problem, and the development of smart grid technology are the most important motivations for adding distributed generations to conventional power systems and carrying out the Demand Response program (DR). In these circumstances, it has become a key factor for the development of micro-grid to realize efficient and economical operation of smart micro-grid considering Demand Response strategy. In this paper, an intelligent park micro-grid consisting of photovoltaic power generation, combined cooling heating and power system, energy storage system and response load is modeled to study the optimal scheduling strategy of these units by taking into account the price-based demand response. To achieve this goal, an optimization model for the economic operation of micro-grid is established, and the model presented mainly aims to minimize the operating cost of micro-grid system and make full use of clean energy under the premise of considering distributed power generation and demand response. This operation optimization problem is solved by the Genetic Algorithm (GA) and the best solution on the best operating strategy is determined by the clean energy resources and demand response program. Finally, a micro-grid project in China was used to carry out optimization simulation in order to verify the accuracy and reliability of the established model. It is found that the operation optimization model of micro-grid with demand response can effectively reduce the operation cost of and improve the utilization rate of renewable energy sources.

KEY WORDS: Renewable energy; demand response (DR); micro-grid; distributed generation (DG); operation optimization; operation cost; utilization rate

1 Introduction

Following environmental pollution concerns, increasing clean energy demand, and rush in energy cost, special attention has been recently focused on micro-grid with response loads and distributed generation (Zao et al., 2018). As the energy crisis and environmental crisis become more and more serious, renewable energy has been widely concerned and applied to the field of power

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