电网技术 2009, 33(17) 146-151 DOI: ISSN: 1000-3673 CN: 11-2410/TM

新能源与分布式发电

组合蓄能离网型自治光伏发电系统优化运行与配置设计

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摘要：

提出了采用电解水制氢与蓄电池相结合的组合蓄能离网型自治光伏发电系统及其优化运行与配置设计方法。该系统不仅能消除太阳能与用户负荷间供需失配的影响，且能实现运行和成本的优化。以不同纬度地区的2个用户为例，对组合蓄能光伏发电系统和常规蓄电池蓄能光伏发电系统进行了对比计算与仿真。仿真结果表明，与常规系统相比，组合蓄能系统不仅能够绿色自治运行，提供不间断的电力供应，且成本较低、体积较小、重量较轻等。

关键词： 组合蓄能 光伏发电 优化设计 离网型 自治运行

Optimal Operation and Configuration Design of Off-Grid Autonomous Photovoltaic Generation System With Hybrid Energy Storage

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Abstract:

An off-grid autonomous photovoltaic generation system with hybrid energy storage, in which the water-electrolytic hydrogen making equipment and battery are integrated to store the energy, is proposed and the approaches for optimal operation and configuration for the proposed autonomous photovoltaic generation system are given. The proposed photovoltaic generation system can eliminate the mismatching between intermittent solar irradiation and the time-varying load demand, and the given optimal operation and configuration design approaches can be employed to optimize its operation and investment cost. Taking two consumers located in different latitudes for example, the comparative calculation and simulation of the proposed autonomous photovoltaic generation system with hybrid energy storage and conventional photovoltaic generation system with battery are performed. Simulation results show that the proposed photovoltaic generation system with hybrid energy storage not only can operate in green autonomous mode and provide uninterrupted power supply, but also possesses such advantages as lower investment cost, smaller volume, light weight and so on.

Keywords: hybrid energy storage photovoltaic generation optimal system design off-grid autonomous operation

收稿日期 2008-11-04 **修回日期** 2009-05-31 **网络版发布日期** 2009-09-17

DOI:

基金项目:

江苏省“六大人才高峰”资助项目(2008116);教育部留学回国人员启动资金资助项目

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